

# **LONGHORN ARMY AMMUNITION PLANT KARNACK, TEXAS**

## **ADMINISTRATIVE RECORD**

**Volume 27**

**2022**

**Bate Stamp Numbers**

**01121648 – 01123607**

**Prepared for**

**Department of the Army  
Longhorn Army Ammunition Plant**

**1976–2022**

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

VOLUME 27

2022

- A. Title: (Cont'd) Report – Appendix D Level IV DOD to Draft Final Second Annual Remedial Action Operation Report, Former Pilot Wastewater Treatment Plant, LHAAP-04, Longhorn Army Ammunition Plant, Karnack, Texas, August 2022  
Author(s): Department of the Army  
Recipient: U.S. Environmental Protection Agency and Texas Commission on Environmental Quality  
Date: August 17, 2022  
Bate Stamp: 01121648 – 01122240
- B. Title: Report – Revised Final Record of Decision for LHAAP-47, Plant 3 Area, Solid Rocket Motor Fuel Production, Longhorn Army Ammunition Plant Federal Superfund Site TX6213820529, Karnack, Harrison County, Texas  
Author(s): Department of the Army  
Recipient: U.S. Environmental Protection Agency and Texas Commission on Environmental Quality  
Date: August 17, 2022  
Bate Stamp: 01122241 – 01122357
- C. Title: Notice – Initial Notice of Land Use Controls, LHAAP-47, Plant 3 Area – Solid Rocket Motor Fuel Production, Longhorn Army Ammunition Plant, Karnack, Texas  
Author(s): Department of the Army  
Recipient: Public Officials et. al  
Date: August 17, 2022  
Bate Stamp: 01122358 – 01122360
- D. Title: Transmittal Letters – Initial Notice of Land Use Controls, LHAAP-47, Plant 3 Area – Solid Rocket Motor Fuel Production, Longhorn Army Ammunition Plant, Karnack, Texas  
Author(s): Department of the Army  
Recipient: Public Officials et. al  
Date: August 17, 2022  
Bate Stamp: 01122361 – 01122382
- E. Title: Minutes – Final Monthly Managers' Meeting, Longhorn Army Ammunition Plant, August 18, 2022  
Author(s): Department of the Army  
Recipient: All Parties  
Date: September 7, 2022  
Bate Stamp: 01122383 – 01122400



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

VOLUME 27 (Cont'd)

2022

F.      Title:            Report – Quarterly Evaluation Report, 2nd Quarter (April - June) 2022,  
                                 Groundwater Treatment Plant, Longhorn Army Ammunition Plant, Karnack,  
                                 Texas, September 2022  
            Author(s):    Department of the Army  
            Recipient:    U.S. Environmental Protection Agency and Texas Commission on  
                                 Environmental Quality  
            Date:            September 15, 2022  
            Bate Stamp:    01122401 – 01123607

## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080296

**Service Request:** E2100885  
**Date Analyzed:** 8/20/21

**Continuing Calibration Verification Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**Analytical Method:** 6850  
**File ID:** I:\LCMS01\DATA\20210820\20210820\_007

**Calibration Date:** 8/4/21  
**Calibration ID:** EC2100057  
**Analysis Lot:** 735740  
**Units:** ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	8.54	0.1426	0.1217	-14.6	NA	± 15 %	Average RF

## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080296

**Service Request:** E2100885  
**Date Analyzed:** 8/20/21

**Continuing Calibration Verification Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**Analytical Method:** 6850  
**File ID:** I:\LCMS01\DATA\20210820\20210820\_012

**Calibration Date:** 8/4/21  
**Calibration ID:** EC2100057  
**Analysis Lot:** 735740  
**Units:** ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	8.52	0.1426	0.1214	-14.8	NA	± 15 %	Average RF

## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080296

**Service Request:** E2100885  
**Date Analyzed:** 8/20/21

**Continuing Calibration Verification Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**Analytical Method:** 6850  
**File ID:** I:\LCMS01\DATA\20210820\20210820\_018

**Calibration Date:** 8/4/21  
**Calibration ID:** EC2100057  
**Analysis Lot:** 735740  
**Units:** ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	8.53	0.1426	0.1216	-14.7	NA	± 15 %	Average RF



## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080296

**Service Request:** E2100885  
**Date Analyzed:** 8/10/21 15:16

**Internal Standard Area and RT Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**File ID:** I:\LCMS01\DATA\20210810\20210810\_006  
**Instrument ID:** E-LCMS-01  
**Analytical Method:** 6850

**Lab Code:** EQ2100502-01  
**Analysis Lot:** 734453  
**Signal ID:** 1

---

Sodium Perchlorate-18O4

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	<u>Area</u>	<u>RT</u>
<b>ICAL Average ==&gt;</b>	69,829	2.77
<b>Upper Limit ==&gt;</b>	104,744	4.77
<b>Lower Limit ==&gt;</b>	34,915	0.77

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*Associated Analyses*

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Continuing Calibration Verification	EQ2100502-01	100,079	2.76
Method Blank	EQ2100494-01	103,917	2.76
Lab Control Sample	EQ2100494-02	66,543	2.67
Duplicate Lab Control Sample	EQ2100494-03	99,645	2.76

Results flagged with an asterisk (\*) indicate values outside control criteria.



## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080296

**Service Request:** E2100885  
**Date Analyzed:** 8/10/21 17:17

**Internal Standard Area and RT Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**File ID:** I:\LCMS01\DATA\20210810\20210810\_020  
**Instrument ID:** E-LCMS-01  
**Analytical Method:** 6850

**Lab Code:** EQ2100502-02  
**Analysis Lot:** 734453  
**Signal ID:** 1

Sodium Perchlorate-18O4			
		<u>Area</u>	<u>RT</u>
ICAL Average ==>		69,829	2.77
Upper Limit ==>		104,744	4.77
Lower Limit ==>		34,915	0.77
<i>Associated Analyses</i>			
Continuing Calibration Verification	EQ2100502-02	79,376	2.76

Results flagged with an asterisk (\*) indicate values outside control criteria.



## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080296

**Service Request:** E2100885  
**Date Analyzed:** 8/11/21 13:42

**Internal Standard Area and RT Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**File ID:** I:\LCMS01\DATA\20210811\20210811\_006  
**Instrument ID:** E-LCMS-01  
**Analytical Method:** 6850

**Lab Code:** EQ2100507-01  
**Analysis Lot:** 734614  
**Signal ID:** 1

Sodium Perchlorate-18O4			
		<u>Area</u>	<u>RT</u>
<b>ICAL Average ==&gt;</b>		69,829	2.77
<b>Upper Limit ==&gt;</b>		104,744	4.77
<b>Lower Limit ==&gt;</b>		34,915	0.77
<b>Associated Analyses</b>			
Continuing Calibration Verification	EQ2100507-01	81,326	2.79
04WW10_210805-FD	E2100885-006	35,066	2.77

Results flagged with an asterisk (\*) indicate values outside control criteria.



## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080296

**Service Request:** E2100885  
**Date Analyzed:** 8/11/21 15:39

**Internal Standard Area and RT Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**File ID:** I:\LCMS01\DATA\20210811\20210811\_017  
**Instrument ID:** E-LCMS-01  
**Analytical Method:** 6850

**Lab Code:** EQ2100507-02  
**Analysis Lot:** 734614  
**Signal ID:** 1

Sodium Perchlorate-18O4			
		<u>Area</u>	<u>RT</u>
<b>ICAL Average ==&gt;</b>		69,829	2.77
<b>Upper Limit ==&gt;</b>		104,744	4.77
<b>Lower Limit ==&gt;</b>		34,915	0.77
<b>Associated Analyses</b>			
Continuing Calibration Verification	EQ2100507-02	75,506	2.79
04WW10_210805	E2100885-005	35,493	2.78

Results flagged with an asterisk (\*) indicate values outside control criteria.





## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080296

**Service Request:** E2100885  
**Date Analyzed:** 8/11/21 17:13

**Internal Standard Area and RT Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**File ID:** I:\LCMS01\DATA\20210811\20210811\_028  
**Instrument ID:** E-LCMS-01  
**Analytical Method:** 6850

**Lab Code:** EQ2100507-03  
**Analysis Lot:** 734614  
**Signal ID:** 1

Sodium Perchlorate-18O4			
		<u>Area</u>	<u>RT</u>
ICAL Average ==>		69,829	2.77
Upper Limit ==>		104,744	4.77
Lower Limit ==>		34,915	0.77
<i>Associated Analyses</i>			
Continuing Calibration Verification	EQ2100507-03	76,604	2.74

Results flagged with an asterisk (\*) indicate values outside control criteria.



## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080296

**Service Request:** E2100885  
**Date Analyzed:** 8/11/21 18:47

**Internal Standard Area and RT Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**File ID:** I:\LCMS01\DATA\20210811\20210811\_039  
**Instrument ID:** E-LCMS-01  
**Analytical Method:** 6850

**Lab Code:** EQ2100507-04  
**Analysis Lot:** 734614  
**Signal ID:** 1

Sodium Perchlorate-18O4			
		<u>Area</u>	<u>RT</u>
ICAL Average ==>		69,829	2.77
Upper Limit ==>		104,744	4.77
Lower Limit ==>		34,915	0.77
<i>Associated Analyses</i>			
Continuing Calibration Verification	EQ2100507-04	73,313	2.74

Results flagged with an asterisk (\*) indicate values outside control criteria.



## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080296

**Service Request:** E2100885  
**Date Analyzed:** 8/20/21 10:13

**Internal Standard Area and RT Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**File ID:** I:\LCMS01\DATA\20210820\20210820\_007  
**Instrument ID:** E-LCMS-01  
**Analytical Method:** 6850

**Lab Code:** EQ2100526-01  
**Analysis Lot:** 735740  
**Signal ID:** 1

## Sodium Perchlorate-18O4

	<u>Area</u>	<u>RT</u>
<b>ICAL Average ==&gt;</b>	69,829	2.77
<b>Upper Limit ==&gt;</b>	104,744	4.77
<b>Lower Limit ==&gt;</b>	34,915	0.77

Associated Analyses

Continuing Calibration Verification	EQ2100526-01	75,271	2.76
04WW01_210804	E2100885-001	75,199	2.74
04WW05_210805	E2100885-003	44,020	2.75
04WW09_210805	E2100885-004	56,221	2.67

Results flagged with an asterisk (\*) indicate values outside control criteria.



## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080296

**Service Request:** E2100885  
**Date Analyzed:** 8/20/21 11:19

**Internal Standard Area and RT Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**File ID:** I:\LCMS01\DATA\20210820\20210820\_012  
**Instrument ID:** E-LCMS-01  
**Analytical Method:** 6850

**Lab Code:** EQ2100526-02  
**Analysis Lot:** 735740  
**Signal ID:** 1

Sodium Perchlorate-18O4			
		<u>Area</u>	<u>RT</u>
<b>ICAL Average ==&gt;</b>		69,829	2.77
<b>Upper Limit ==&gt;</b>		104,744	4.77
<b>Lower Limit ==&gt;</b>		34,915	0.77
<b>Associated Analyses</b>			
Continuing Calibration Verification	EQ2100526-02	75,457	2.76
04WW07_210805	E2100885-002	53,976	2.68
04WW07_210805MS	EQ2100494-04	53,886	2.66
04WW07_210805DMS	EQ2100494-05	54,630	2.68

Results flagged with an asterisk (\*) indicate values outside control criteria.



## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080296

**Service Request:** E2100885  
**Date Analyzed:** 8/20/21 12:51

**Internal Standard Area and RT Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**File ID:** I:\LCMS01\DATA\20210820\20210820\_016  
**Instrument ID:** E-LCMS-01  
**Analytical Method:** 6850

**Lab Code:** EQ2100526-03  
**Analysis Lot:** 735740  
**Signal ID:** 1

Sodium Perchlorate-18O4			
		<u>Area</u>	<u>RT</u>
ICAL Average ==>		69,829	2.77
Upper Limit ==>		104,744	4.77
Lower Limit ==>		34,915	0.77
<i>Associated Analyses</i>			
Continuing Calibration Verification	EQ2100526-03	47,460	2.66

Results flagged with an asterisk (\*) indicate values outside control criteria.



## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080296

**Service Request:** E2100885  
**Date Analyzed:** 8/20/21 13:10

**Internal Standard Area and RT Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**File ID:** I:\LCMS01\DATA\20210820\20210820\_018  
**Instrument ID:** E-LCMS-01  
**Analytical Method:** 6850

**Lab Code:** EQ2100526-04  
**Analysis Lot:** 735740  
**Signal ID:** 1

Sodium Perchlorate-18O4			
		<u>Area</u>	<u>RT</u>
ICAL Average ==>		69,829	2.77
Upper Limit ==>		104,744	4.77
Lower Limit ==>		34,915	0.77
<i>Associated Analyses</i>			
Continuing Calibration Verification	EQ2100526-04	65,310	2.76

Results flagged with an asterisk (\*) indicate values outside control criteria.



## Insight Report

Printed at 8/24/2021 4:27:35 PM

Method File: I:\LCMS01\DATA\20210810\20210804.lcm

Project File: I:\LCMS01\DATA\20210810\20210810.damp

## 20210810\_005

Sample ID: LODV

Date Acquired: 8/10/2021 3:07:35 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210810\20210810\_005.lcd

Vial: 31 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	Auto	2.775	977	118800	1	0.0577	ng/mL	----	27.33
Sodium Perchlorate-18O4_IS	Auto	2.779	118800	118800	1	1.0000	ng/mL	----	----

## Perchlorate

Conc 0.0577

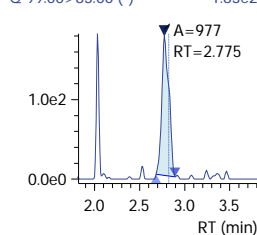
R#1 27.33 (0.00)

Q 99.00&gt;83.00 (-)

1.83e2

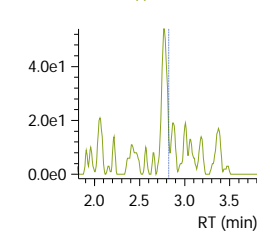
ISTD 107.00&gt;89.00 (-)

2.14e4

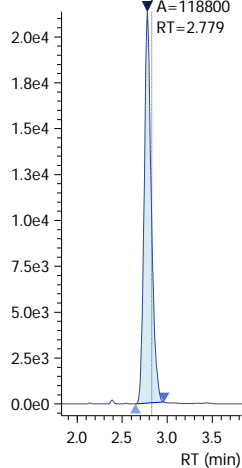


R1 101.00&gt;85.00 (-)

5.40e1

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

A=118800  
RT=2.779

## Insight Report

Printed at 8/24/2021 4:30:30 PM

Method File: I:\LCMS01\DATA\20210810\20210804.lcm

## 20210810\_005

Sample ID: LODV

Date Acquired: 8/10/2021 3:07:35 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210810\Before\20210810\_005.lcd

Vial: 31 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

Sodium Perchlorate  
-18O4\_IS

Conc 0.0596

Conc 1.0000

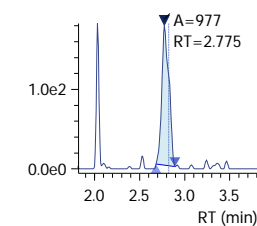
R#1 27.33 (0.00)

Q 99.00&gt;83.00 (-)

1.83e2

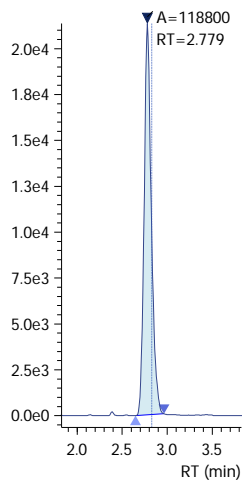
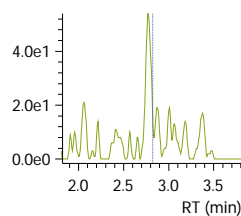
ISTD 107.00&gt;89.00 (-)

2.14e4



R1 101.00&gt;85.00 (-)

5.40e1





## Insight Report

Printed at 8/24/2021 4:27:35 PM

20210810\_006

Sample ID: PERCHLORATE7

Date Acquired: 8/10/2021 3:16:10 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210810\20210810\_006.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	Auto	2.765	142238	100079	1	9.9683	ng/mL	10.0000	21.74
Sodium Perchlorate-18O4_IS	Auto	2.763	100079	100079	1	1.0000	ng/mL	1.0000	----

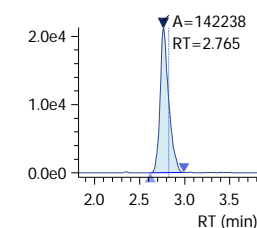
Perchlorate

Conc 9.9683

R#1 21.74 (0.00)

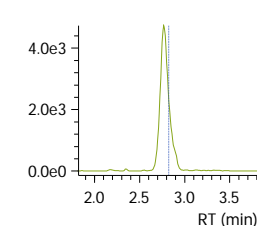
Q 99.00&gt;83.00 (-)

2.13e4



R1 101.00&gt;85.00 (-)

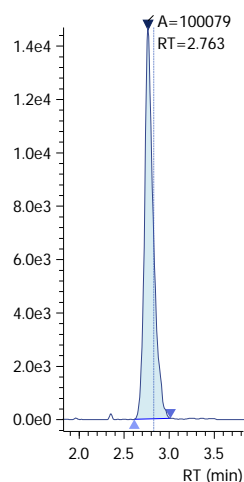
4.73e3

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

ISTD 107.00&gt;89.00 (-)

1.47e4



## Insight Report

Printed at 8/24/2021 4:30:30 PM

20210810\_006

Sample ID: PERCHLORATE7

Date Acquired: 8/10/2021 3:16:10 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210810\Before\20210810\_006.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

## Perchlorate

## Sodium Perchlorate

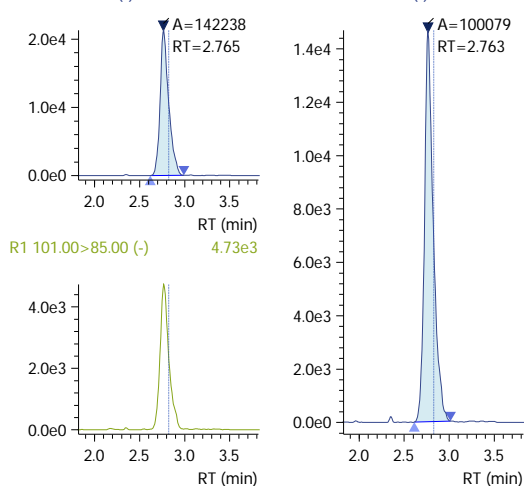
-18O4\_IS

Conc 10.3062

Conc 1.0000

R#1 21.74 (0.00)

Q 99.00&gt;83.00 (-) 2.13e4 ISTD 107.00&gt;89.00 (-) 1.47e4



## Insight Report

Printed at 8/24/2021 4:27:35 PM

20210810\_014

Sample ID: EQ2100494-01

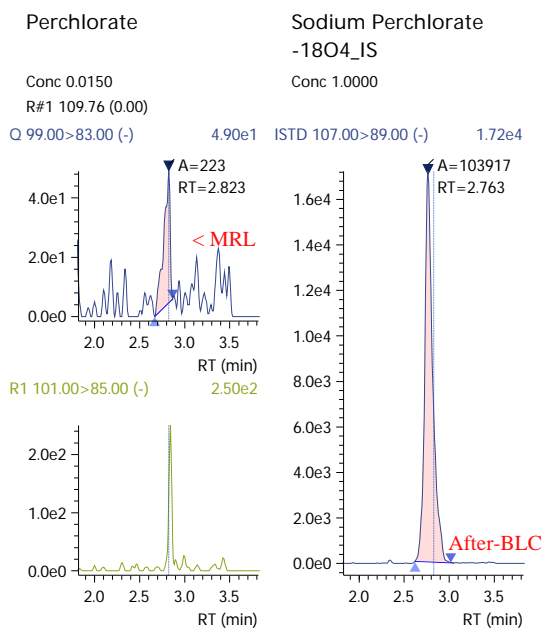
Date Acquired: 8/10/2021 4:24:27 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210810\20210810\_014.lcd

Vial: 28 | Inj. Volume: 25.0000uL | Tray: 3

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	M	2.823	223	103917	1	0.0150	ng/mL	----	109.76
Sodium Perchlorate-18O4_IS	M	2.763	1039	103917	1	1.0000	ng/mL	----	----



## Insight Report

Printed at 8/24/2021 4:30:30 PM

20210810\_014

Sample ID: EQ2100494-01

Date Acquired: 8/10/2021 4:24:27 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210810\Before\20210810\_014.lcd

Vial: 28 | Inj. Volume: 25.0000uL | Tray: 3

Perchlorate

Sodium Perchlorate

-18O4-IS

Conc ----

Conc 1.0000

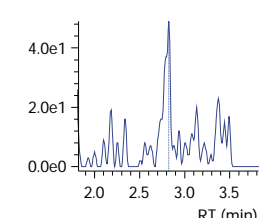
R#1 ---- (0.00)

Q 99.00&gt;83.00 (-)

4.90e1

ISTD 107.00&gt;89.00 (-)

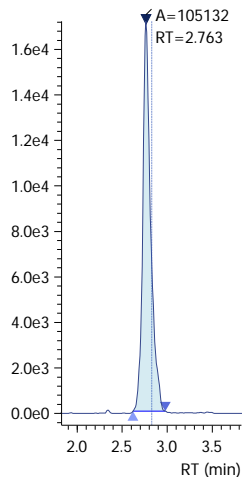
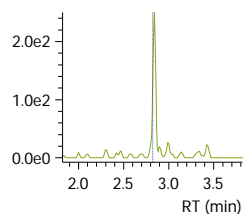
1.72e4



R1 101.00&gt;85.00 (-)

RT (min)

2.50e2



## Insight Report

Printed at 8/24/2021 4:27:35 PM

20210810\_015

Sample ID: EQ2100494-02

Date Acquired: 8/10/2021 4:34:50 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210810\20210810\_015.lcd

Vial: 29 | Inj. Volume: 25.0000uL | Tray: 3

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	M	2.684	946	66543	1	0.0997	ng/mL	----	13.87
Sodium Perchlorate-18O4_IS	Auto	2.666	66543	66543	1	1.0000	ng/mL	----	----

## Perchlorate

Conc 0.0997

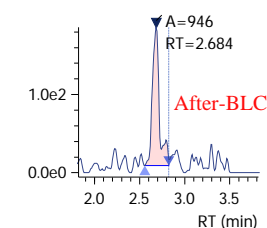
R#1 13.87 (0.00)

Q 99.00&gt;83.00 (-)

1.86e2

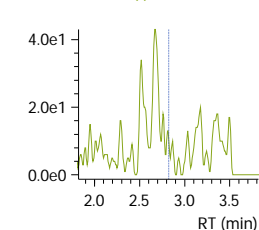
ISTD 107.00&gt;89.00 (-)

1.49e4

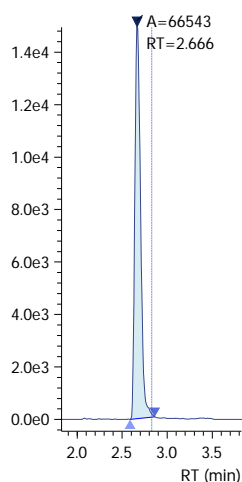


R1 101.00&gt;85.00 (-)

4.30e1

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000



## Insight Report

Printed at 8/24/2021 4:30:30 PM

20210810\_015

Sample ID: EQ2100494-02

Date Acquired: 8/10/2021 4:34:50 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210810\Before\20210810\_015.lcd

Vial: 29 | Inj. Volume: 25.0000uL | Tray: 3

Perchlorate

Sodium Perchlorate

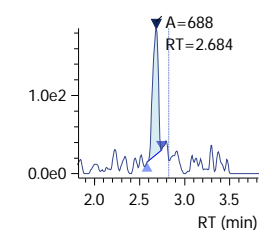
-18O4\_IS

Conc 0.0749

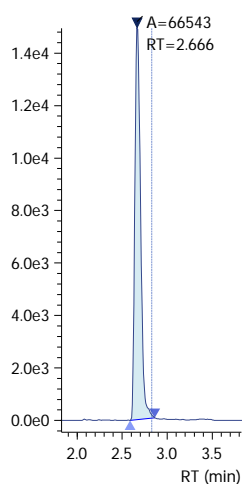
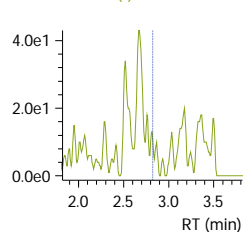
Conc 1.0000

R#1 18.75 (0.00)

Q 99.00&gt;83.00 (-) 1.86e2 ISTD 107.00&gt;89.00 (-) 1.49e4



R1 101.00&gt;85.00 (-) 4.30e1



## Insight Report

Printed at 8/24/2021 4:27:35 PM

20210810\_016

Sample ID: EQ2100494-03

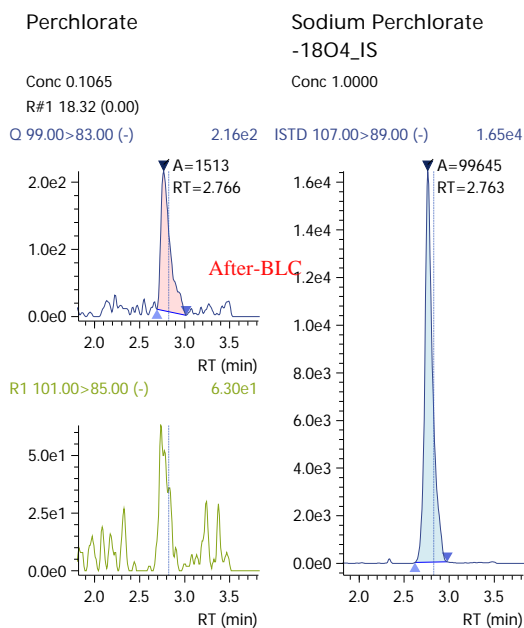
Date Acquired: 8/10/2021 4:43:25 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210810\20210810\_016.lcd

Vial: 30 | Inj. Volume: 25.0000uL | Tray: 3

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	M	2.766	1513	99645	1	0.1065	ng/mL	----	18.32
Sodium Perchlorate-18O4_IS	Auto	2.763	99645	99645	1	1.0000	ng/mL	----	----



## Insight Report

Printed at 8/24/2021 4:30:30 PM

20210810\_016

Sample ID: EQ2100494-03

Date Acquired: 8/10/2021 4:43:25 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210810\Before\20210810\_016.lcd

Vial: 30 | Inj. Volume: 25.0000uL | Tray: 3

Perchlorate

Sodium Perchlorate

-18O4\_IS

Conc 0.0864

Conc 1.0000

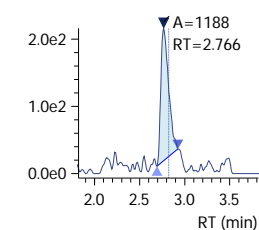
R#1 19.69 (0.00)

Q 99.00&gt;83.00 (-)

2.16e2

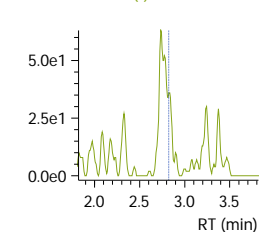
ISTD 107.00&gt;89.00 (-)

1.65e4



R1 101.00&gt;85.00 (-)

6.30e1



RT (min)





## Insight Report

Printed at 8/24/2021 4:27:35 PM

20210810\_020

Sample ID: PERCHLORATE7

Date Acquired: 8/10/2021 5:17:38 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210810\20210810\_020.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	Auto	2.763	109416	79376	1	9.6681	ng/mL	10.0000	22.38
Sodium Perchlorate-18O4_IS	Auto	2.761	79376	79376	1	1.0000	ng/mL	1.0000	----

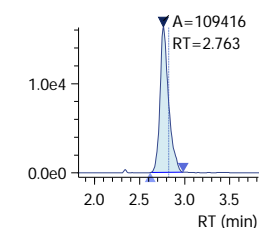
Perchlorate

Conc 9.6681

R#1 22.38 (0.00)

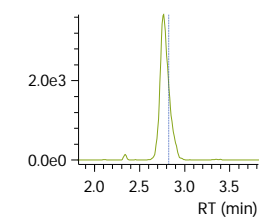
Q 99.00&gt;83.00 (-)

1.63e4



R1 101.00&gt;85.00 (-)

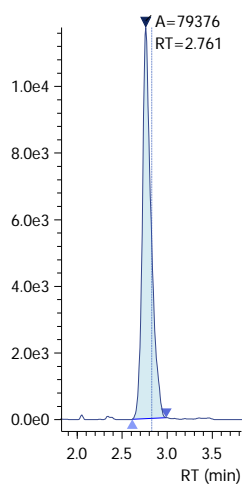
3.66e3

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

ISTD 107.00&gt;89.00 (-)

1.18e4



## Insight Report

Printed at 8/24/2021 4:30:30 PM

20210810\_020

Sample ID: PERCHLORATE7

Date Acquired: 8/10/2021 5:17:38 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210810\Before\20210810\_020.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

Sodium Perchlorate

-18O4\_IS

Conc 9.9958

Conc 1.0000

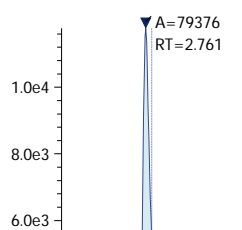
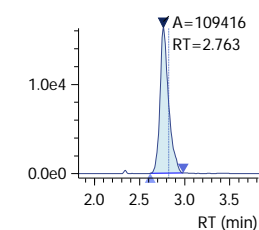
R#1 22.38 (0.00)

Q 99.00&gt;83.00 (-)

1.63e4

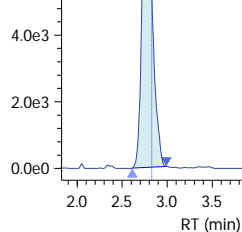
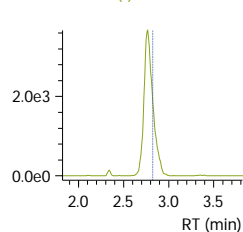
ISTD 107.00&gt;89.00 (-)

1.18e4



R1 101.00&gt;85.00 (-)

3.66e3



## Insight Report

Printed at 8/25/2021 9:03:29 AM

Method File: I:\LCMS01\DATA\20210811\20210804.lcm

Project File: I:\LCMS01\DATA\20210811\20210811.damp

## 20210811\_005

Sample ID: LODV

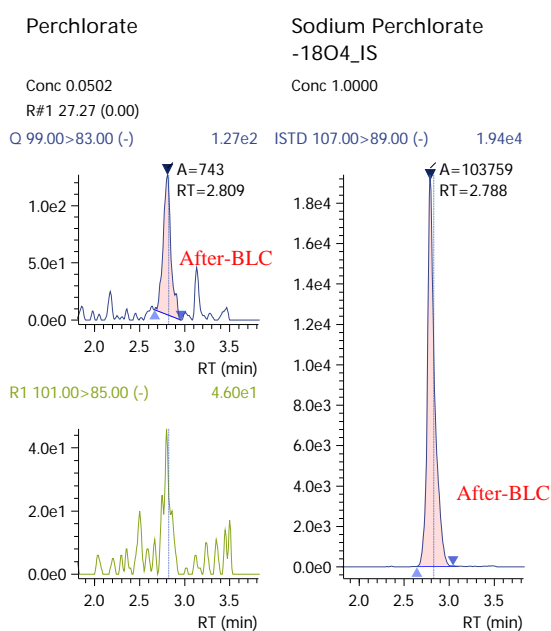
Date Acquired: 8/11/2021 1:34:08 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210811\20210811\_005.lcd

Vial: 31 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	M	2.809	743	103759	1	0.0502	ng/mL	----	27.27
Sodium Perchlorate-18O4-IS	M	2.788	103759	103759	1	1.0000	ng/mL	----	----



## Insight Report

Printed at 8/25/2021 9:18:43 AM

Method File: I:\LCMS01\DATA\20210811\20210804.lcm

## 20210811\_005

Sample ID: LODV

Date Acquired: 8/11/2021 1:34:08 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210811\Before\20210811\_005.lcd

Vial: 31 | Inj. Volume: 25.0000uL | Tray: 1

## Perchlorate

Conc 0.0329

R#1 33.01 (0.00)

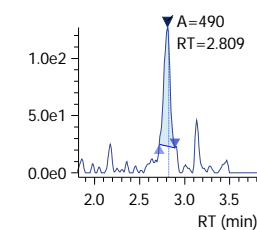
Q 99.00&gt;83.00 (-)

## Sodium Perchlorate

-18O4\_IS

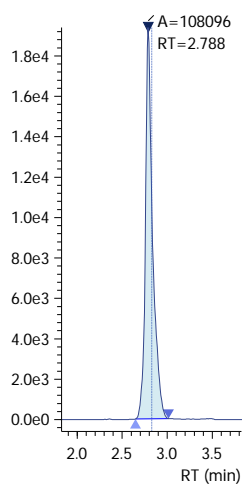
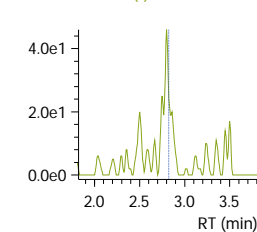
Conc 1.0000

ISTD 107.00&gt;89.00 (-)



R1 101.00&gt;85.00 (-)

4.60e1



## Insight Report

Printed at 8/25/2021 9:03:29 AM

20210811\_006

Sample ID: PERCHLORATE7

Date Acquired: 8/11/2021 1:42:41 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210811\20210811\_006.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

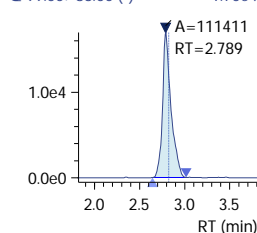
Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	Auto	2.789	111411	81326	1	9.6082	ng/mL	10.0000	22.83
Sodium Perchlorate-18O4_IS	Auto	2.788	81326	81326	1	1.0000	ng/mL	1.0000	----

Perchlorate

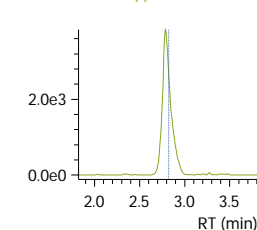
Conc 9.6082

R#1 22.83 (0.00)

Q 99.00&gt;83.00 (-)

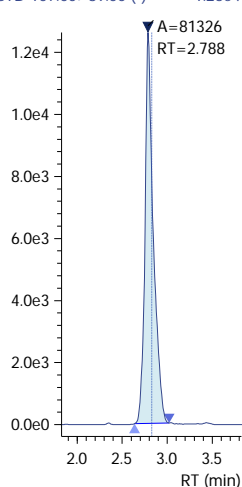


R1 101.00&gt;85.00 (-)

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

ISTD 107.00&gt;89.00 (-)



## Insight Report

Printed at 8/25/2021 9:18:43 AM

20210811\_006

Sample ID: PERCHLORATE7

Date Acquired: 8/11/2021 1:42:41 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210811\Before\20210811\_006.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

## Perchlorate

## Sodium Perchlorate

-18O4\_IS

Conc 9.9339

Conc 1.0000

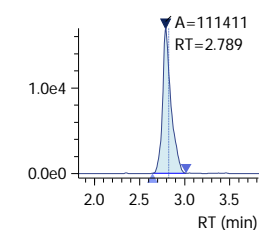
R#1 22.83 (0.00)

Q 99.00&gt;83.00 (-)

1.70e4

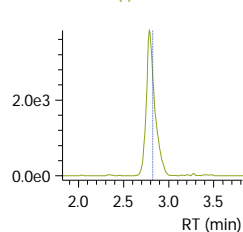
ISTD 107.00&gt;89.00 (-)

1.26e4



R1 101.00&gt;85.00 (-)

3.84e3



RT (min)

## Insight Report

Printed at 8/25/2021 9:03:29 AM

20210811\_008

Sample ID: E2100885-006

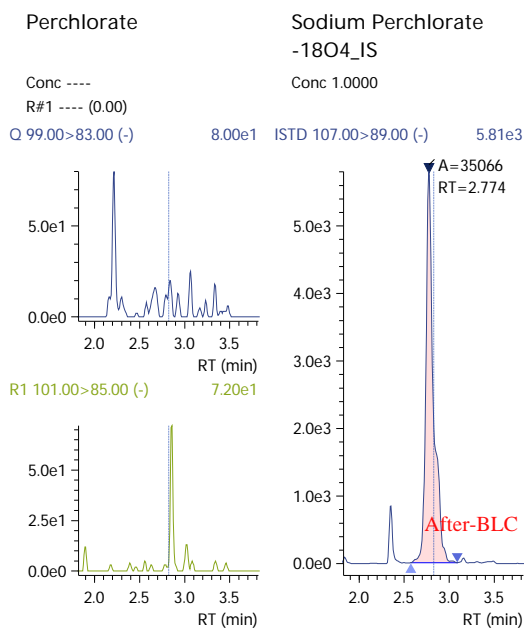
Date Acquired: 8/11/2021 1:59:45 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210811\20210811\_008.lcd

Vial: 41 | Inj. Volume: 25.0000uL | Tray: 3

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	ND(W/B)	----	----	35066	1	----	ng/mL	----	----
Sodium Perchlorate-18O4_IS	M	2.774	35066	35066	1	1.0000	ng/mL	----	----



## Insight Report

Printed at 8/25/2021 9:18:43 AM

20210811\_008

Sample ID: E2100885-006

Date Acquired: 8/11/2021 1:59:45 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210811\Before\20210811\_008.lcd

Vial: 41 | Inj. Volume: 25.0000uL | Tray: 3

Perchlorate

Sodium Perchlorate

-18O4\_IS

Conc ----

Conc 1.0000

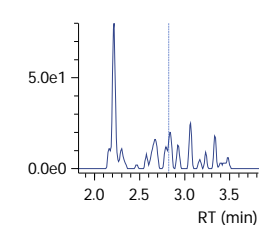
R#1 ---- (0.00)

Q 99.00&gt;83.00 (-)

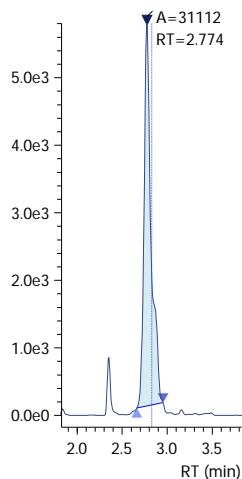
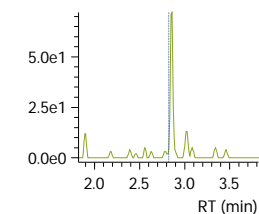
8.00e1

ISTD 107.00&gt;89.00 (-)

5.81e3



R1 101.00&gt;85.00 (-)





## Insight Report

Printed at 8/25/2021 9:03:29 AM

20210811\_016

Sample ID: ICS

Date Acquired: 8/11/2021 3:31:20 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210811\20210811\_016.lcd

Vial: 32 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	M	2.786	11336	83780	1	0.9490	ng/mL	----	22.49
Sodium Perchlorate-18O4-IS	M	2.787	83780	83780	1	1.0000	ng/mL	----	----

Perchlorate

Sodium Perchlorate  
-18O4-IS

Conc 0.9490

Conc 1.0000

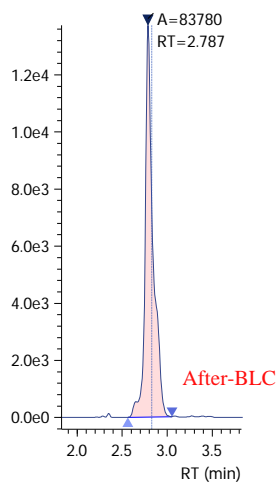
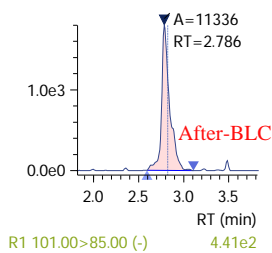
R#1 22.49 (0.00)

Q 99.00&gt;83.00 (-)

1.80e3

ISTD 107.00&gt;89.00 (-)

1.37e4



## Insight Report

Printed at 8/25/2021 9:18:43 AM

20210811\_016

Sample ID: ICS

Date Acquired: 8/11/2021 3:31:20 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210811\Before\20210811\_016.lcd

Vial: 32 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

Sodium Perchlorate

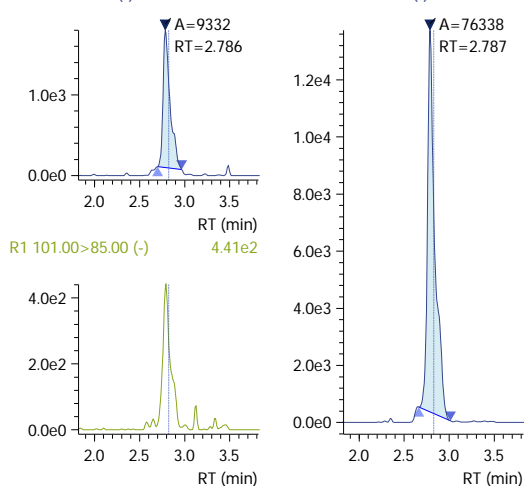
-18O4-IS

Conc 0.8864

Conc 1.0000

R#1 24.30 (0.00)

Q 99.00&gt;83.00 (-) 1.80e3 ISTD 107.00&gt;89.00 (-) 1.37e4



## Insight Report

Printed at 8/25/2021 9:03:29 AM

20210811\_017

Sample ID: PERCHLORATE7

Date Acquired: 8/11/2021 3:39:53 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210811\20210811\_017.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	M	2.786	101264	75506	1	9.4064	ng/mL	10.0000	22.14
Sodium Perchlorate-18O4_IS	M	2.785	75506	75506	1	1.0000	ng/mL	1.0000	----

Perchlorate

Conc 9.4064

R#1 22.14 (0.00)

Q 99.00&gt;83.00 (-)

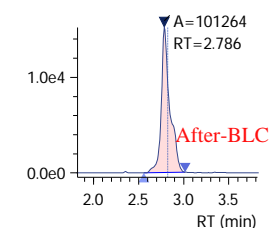
1.52e4

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

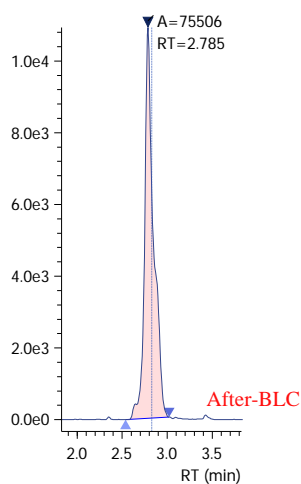
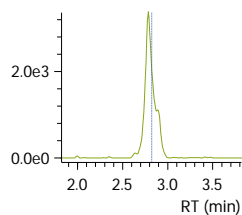
ISTD 107.00&gt;89.00 (-)

1.09e4



R1 101.00&gt;85.00 (-)

3.36e3



## Insight Report

Printed at 8/25/2021 9:18:43 AM

20210811\_017

Sample ID: PERCHLORATE7

Date Acquired: 8/11/2021 3:39:53 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210811\Before\20210811\_017.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

Sodium Perchlorate

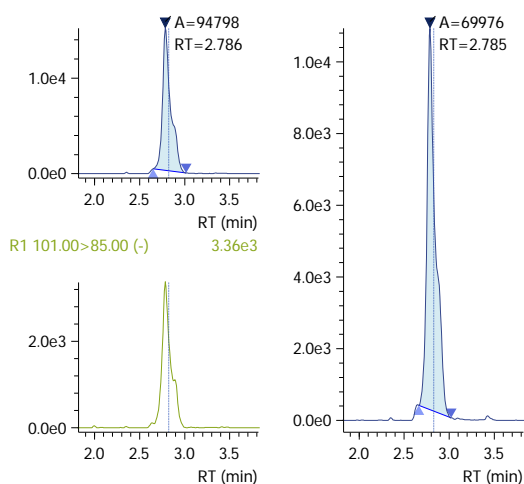
-18O4\_IS

Conc 9.8236

Conc 1.0000

R#1 22.18 (0.00)

Q 99.00&gt;83.00 (-) 1.52e4 ISTD 107.00&gt;89.00 (-) 1.09e4



## Insight Report

Printed at 8/25/2021 9:03:29 AM

20210811\_018

Sample ID: E2100885-005

Date Acquired: 8/11/2021 3:48:28 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210811\20210811\_018.lcd

Vial: 40 | Inj. Volume: 25.0000uL | Tray: 3

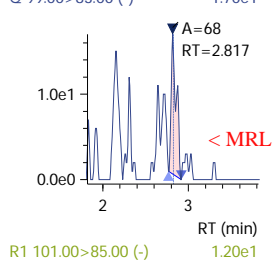
Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	M	2.817	68	35493	1	0.0134	ng/mL	----	0.00
Sodium Perchlorate-18O4-IS	M	2.778	35493	35493	1	1.0000	ng/mL	----	----

## Perchlorate

Conc 0.0134

R#1 0.00 (0.00)

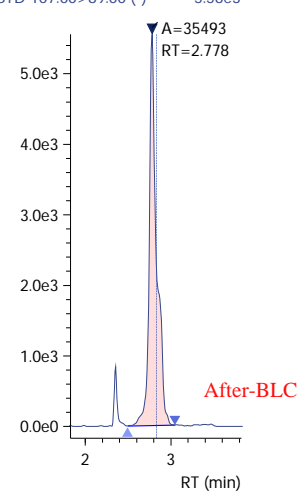
Q 99.00&gt;83.00 (-)



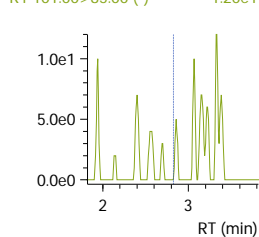
## Sodium Perchlorate-18O4-IS

Conc 1.0000

ISTD 107.00&gt;89.00 (-)



R1 101.00&gt;85.00 (-)



## Insight Report

Printed at 8/25/2021 9:18:43 AM

20210811\_018

Sample ID: E2100885-005

Date Acquired: 8/11/2021 3:48:28 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210811\Before\20210811\_018.lcd

Vial: 40 | Inj. Volume: 25.0000uL | Tray: 3

Perchlorate

Sodium Perchlorate

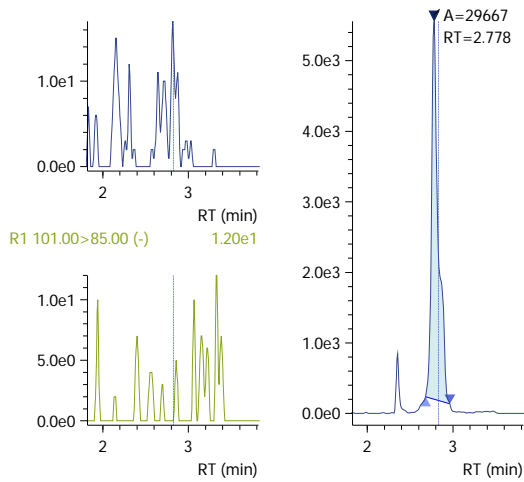
-18O4\_IS

Conc ----

Conc 1.0000

R#1 ---- (0.00)

Q 99.00&gt;83.00 (-) 1.70e1 ISTD 107.00&gt;89.00 (-) 5.56e3



## Insight Report

Printed at 8/25/2021 9:03:29 AM

20210811\_028

Sample ID: PERCHLORATE7

Date Acquired: 8/11/2021 5:13:59 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210811\20210811\_028.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	Auto	2.742	101180	76604	1	9.2638	ng/mL	10.0000	22.93
Sodium Perchlorate-18O4_IS	Auto	2.742	76604	76604	1	1.0000	ng/mL	1.0000	----

## Perchlorate

Conc 9.2638

R#1 22.93 (0.00)

Q 99.00&gt;83.00 (-)

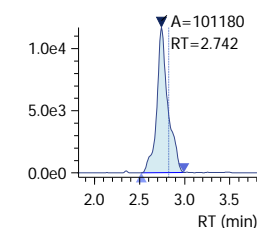
1.17e4

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

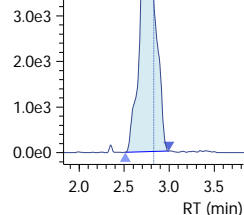
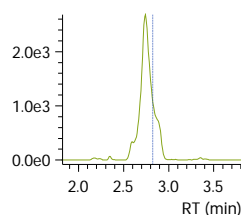
ISTD 107.00&gt;89.00 (-)

8.59e3



R1 101.00&gt;85.00 (-)

2.68e3



## Insight Report

Printed at 8/25/2021 9:18:43 AM

20210811\_028

Sample ID: PERCHLORATE7

Date Acquired: 8/11/2021 5:13:59 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210811\Before\20210811\_028.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

Sodium Perchlorate

-18O4\_IS

Conc 9.5778

Conc 1.0000

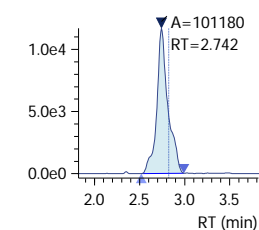
R#1 22.93 (0.00)

Q 99.00&gt;83.00 (-)

1.17e4

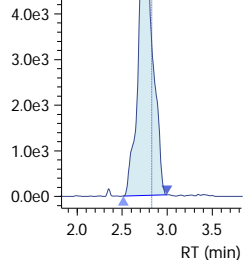
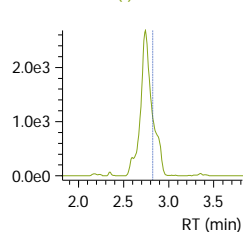
ISTD 107.00&gt;89.00 (-)

8.59e3



R1 101.00&gt;85.00 (-)

2.68e3





## Insight Report

Printed at 8/20/2021 3:58:03 PM

Method File: I:\LCMS01\DATA\20210820\20210804.lcm

Project File: I:\LCMS01\DATA\20210820\20210820.damp

## 20210820\_005

Sample ID: ICS

Date Acquired: 8/20/2021 9:56:07 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210820\20210820\_005.lcd

Vial: 32 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	M	2.760	10699	84197	1	0.8912	ng/mL	----	24.71
Sodium Perchlorate-18O4_IS	Auto	2.760	84197	84197	1	1.0000	ng/mL	----	----

## Perchlorate

Conc 0.8912

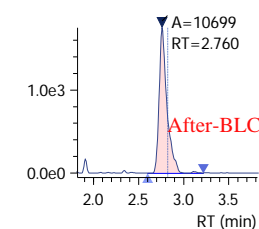
R#1 24.71 (0.00)

Q 99.00&gt;83.00 (-)

1.75e3

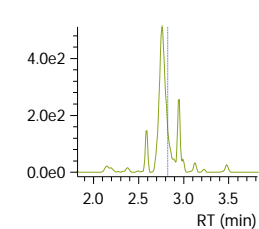
ISTD 107.00&gt;89.00 (-)

1.44e4

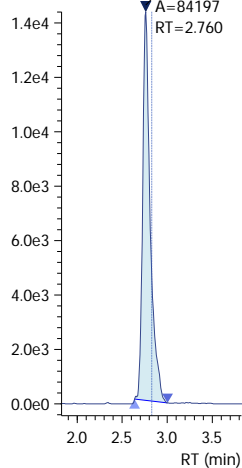


R1 101.00&gt;85.00 (-)

5.11e2

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

A=84197  
RT=2.760

## Insight Report

Printed at 8/20/2021 3:59:59 PM

Method File: I:\LCMS01\DATA\20210820\20210804.lcm

## 20210820\_005

Sample ID: ICS

Date Acquired: 8/20/2021 9:56:07 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210820\Before\20210820\_005.lcd

Vial: 32 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

Sodium Perchlorate  
-18O4\_IS

Conc 0.8979

Conc 1.0000

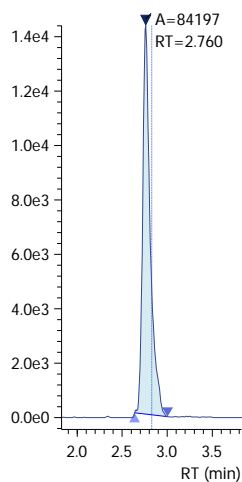
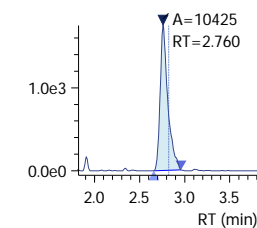
R#1 25.69 (0.00)

Q 99.00&gt;83.00 (-)

1.75e3

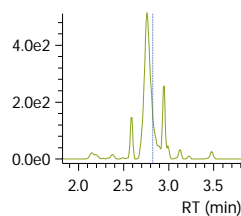
ISTD 107.00&gt;89.00 (-)

1.44e4



R1 101.00&gt;85.00 (-)

5.11e2



## Insight Report

Printed at 8/20/2021 3:58:03 PM

20210820\_006

Sample ID: LODV

Date Acquired: 8/20/2021 10:04:39 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210820\20210820\_006.lcd

Vial: 31 | Inj. Volume: 25.0000uL | Tray: 1

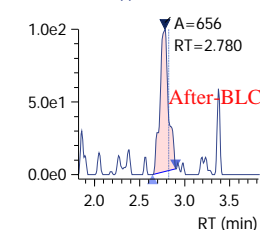
Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	M	2.780	656	92489	1	0.0497	ng/mL	----	154.08
Sodium Perchlorate-18O4_IS	Auto	2.757	92489	92489	1	1.0000	ng/mL	----	----

## Perchlorate

Conc 0.0497

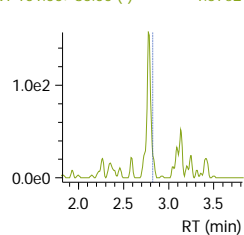
R#1 154.08 (0.00)

Q 99.00&gt;83.00 (-)



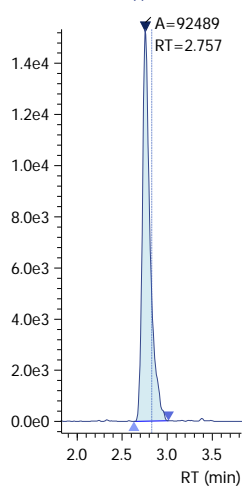
R1 101.00&gt;85.00 (-)

1.57e2

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

ISTD 107.00&gt;89.00 (-)



## Insight Report

Printed at 8/20/2021 3:59:59 PM

20210820\_006

Sample ID: LODV

Date Acquired: 8/20/2021 10:04:39 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210820\Before\20210820\_006.lcd

Vial: 31 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

Sodium Perchlorate

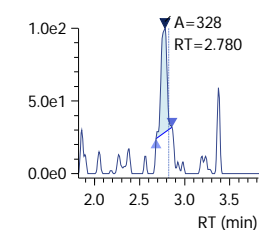
-18O4\_IS

Conc 0.0257

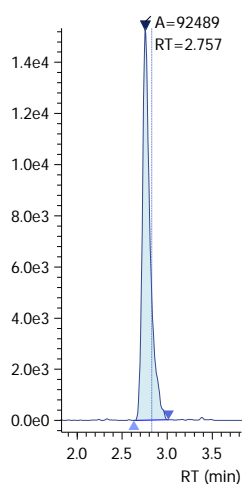
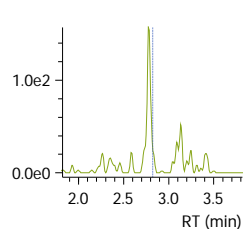
Conc 1.0000

R#1 212.86 (0.00)

Q 99.00&gt;83.00 (-) 1.00e2 ISTD 107.00&gt;89.00 (-) 1.53e4



R1 101.00&gt;85.00 (-) 1.57e2



## Insight Report

Printed at 8/20/2021 3:58:03 PM

20210820\_007

Sample ID: PERCHLORATE7

Date Acquired: 8/20/2021 10:13:13 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210820\20210820\_007.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	M	2.760	91627	75271	1	8.5376	ng/mL	10.0000	22.95
Sodium Perchlorate-18O4_IS	Auto	2.757	75271	75271	1	1.0000	ng/mL	1.0000	----

## Perchlorate

Conc 8.5376

R#1 22.95 (0.00)

Q 99.00&gt;83.00 (-)

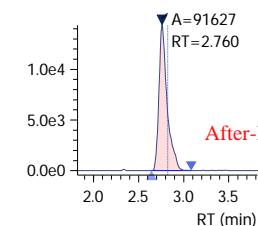
1.43e4

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

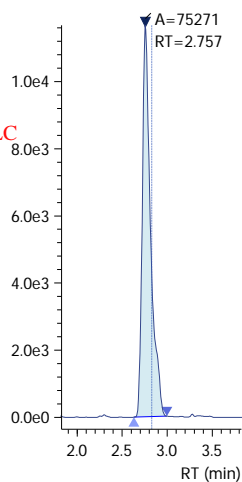
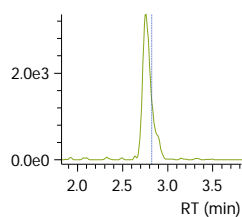
ISTD 107.00&gt;89.00 (-)

1.17e4



R1 101.00&gt;85.00 (-)

3.36e3



## Insight Report

Printed at 8/20/2021 3:59:59 PM

20210820\_007

Sample ID: PERCHLORATE7

Date Acquired: 8/20/2021 10:13:13 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210820\Before\20210820\_007.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

Sodium Perchlorate

-18O4\_IS

Conc 8.7708

Conc 1.0000

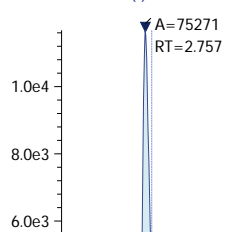
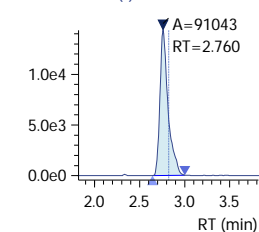
R#1 22.98 (0.00)

Q 99.00&gt;83.00 (-)

1.43e4

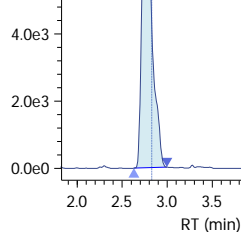
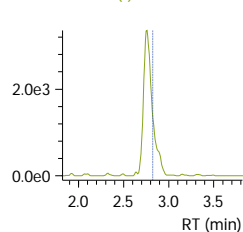
ISTD 107.00&gt;89.00 (-)

1.17e4



R1 101.00&gt;85.00 (-)

3.36e3



## Insight Report

Printed at 8/20/2021 3:58:03 PM

20210820\_008

Sample ID: E2100885-001X10

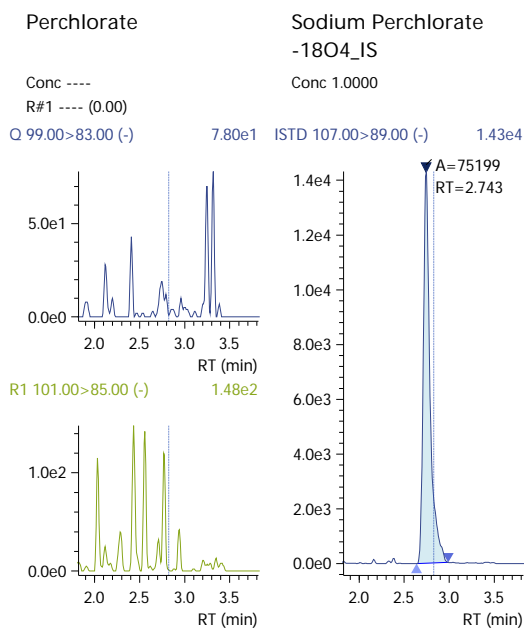
Date Acquired: 8/20/2021 10:21:46 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210820\20210820\_008.lcd

Vial: 36 | Inj. Volume: 25.0000uL | Tray: 3

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	ND(W/B)	----	----	75199	1	----	ng/mL	----	----
Sodium Perchlorate-18O4_IS	Auto	2.743	75199	75199	1	1.0000	ng/mL	----	----



## Insight Report

Printed at 8/20/2021 3:59:59 PM

20210820\_008

Sample ID: E2100885-001X10

Date Acquired: 8/20/2021 10:21:46 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210820\Before\20210820\_008.lcd

Vial: 36 | Inj. Volume: 25.0000uL | Tray: 3

Perchlorate

Sodium Perchlorate

-18O4\_IS

Conc ----

Conc 1.0000

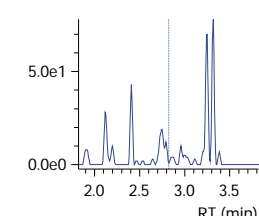
R#1 ---- (0.00)

Q 99.00&gt;83.00 (-)

7.80e1

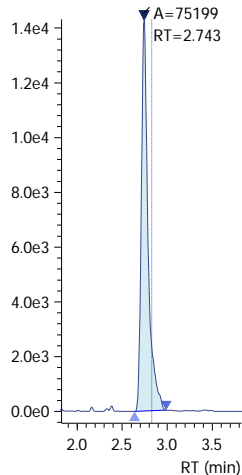
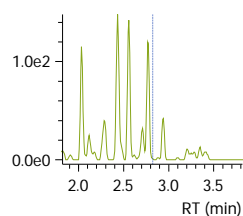
ISTD 107.00&gt;89.00 (-)

1.43e4



R1 101.00&gt;85.00 (-)

1.48e2





## Insight Report

Printed at 8/20/2021 3:58:03 PM

20210820\_010

Sample ID: E2100885-003X10

Date Acquired: 8/20/2021 10:38:48 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210820\20210820\_010.lcd

Vial: 38 | Inj. Volume: 25.0000uL | Tray: 3

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	ND(W/B)	----	----	44020	1	----	ng/mL	----	----
Sodium Perchlorate-18O4_IS	M	2.750	44020	44020	1	1.0000	ng/mL	----	----

## Perchlorate

Conc ----

R#1 ---- (0.00)

Q 99.00&gt;83.00 (-)

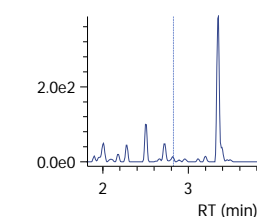
3.87e2

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

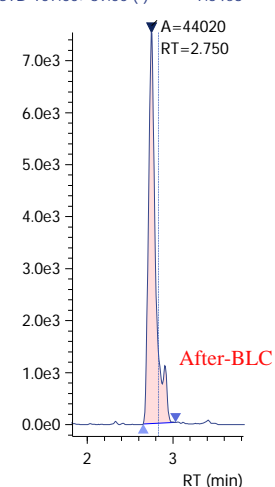
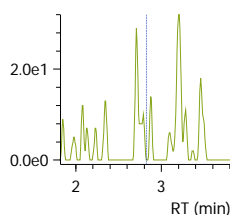
ISTD 107.00&gt;89.00 (-)

7.54e3



R1 101.00&gt;85.00 (-)

3.20e1



## Insight Report

Printed at 8/20/2021 3:59:59 PM

20210820\_010

Sample ID: E2100885-003X10

Date Acquired: 8/20/2021 10:38:48 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210820\Before\20210820\_010.lcd

Vial: 38 | Inj. Volume: 25.0000uL | Tray: 3

Perchlorate

Sodium Perchlorate

-18O4\_IS

Conc ----

Conc 1.0000

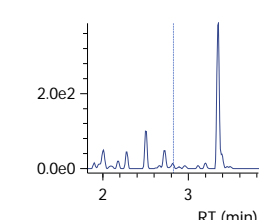
R#1 ---- (0.00)

Q 99.00&gt;83.00 (-)

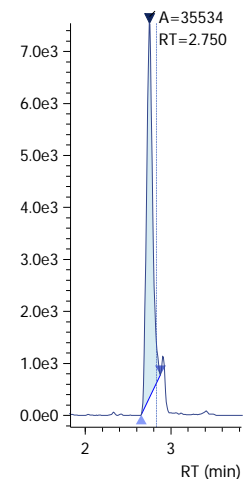
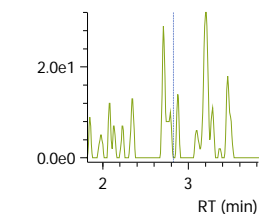
3.87e2

ISTD 107.00&gt;89.00 (-)

7.54e3



R1 101.00&gt;85.00 (-)



## Insight Report

Printed at 8/20/2021 3:58:03 PM

20210820\_011

Sample ID: E2100885-004X10

Date Acquired: 8/20/2021 11:10:44 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210820\20210820\_011.lcd

Vial: 39 | Inj. Volume: 25.0000uL | Tray: 3

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	M	2.707	71	56221	1	0.0089	ng/mL	----	0.00
Sodium Perchlorate-18O4_IS	Auto	2.666	56221	56221	1	1.0000	ng/mL	----	----

## Perchlorate

Conc 0.0089

R#1 0.00 (0.00)

Q 99.00&gt;83.00 (-)

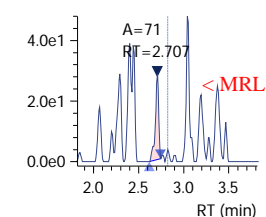
4.80e1

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

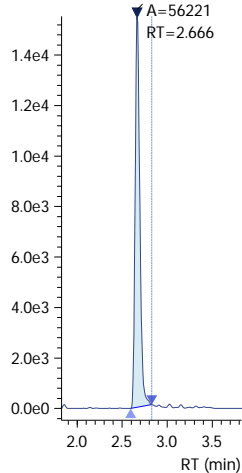
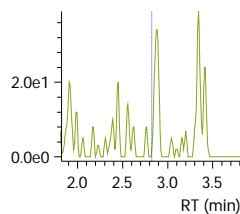
ISTD 107.00&gt;89.00 (-)

1.55e4



R1 101.00&gt;85.00 (-)

3.90e1



## Insight Report

Printed at 8/20/2021 3:59:59 PM

20210820\_011

Sample ID: E2100885-004X10

Date Acquired: 8/20/2021 11:10:44 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210820\Before\20210820\_011.lcd

Vial: 39 | Inj. Volume: 25.0000uL | Tray: 3

Perchlorate

Sodium Perchlorate

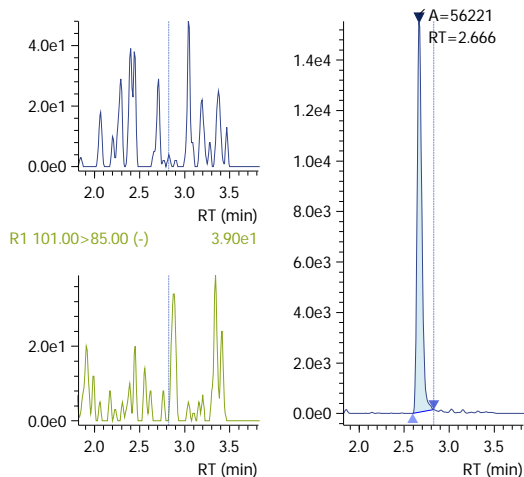
-18O4\_IS

Conc ----

Conc 1.0000

R#1 ---- (0.00)

Q 99.00&gt;83.00 (-) 4.80e1 ISTD 107.00&gt;89.00 (-) 1.55e4



## Insight Report

Printed at 8/20/2021 3:58:03 PM

20210820\_012

Sample ID: PERCHLORATE7

Date Acquired: 8/20/2021 11:19:16 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210820\20210820\_012.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	M	2.760	91621	75457	1	8.5161	ng/mL	10.0000	26.80
Sodium Perchlorate-18O4_IS	M	2.759	75457	75457	1	1.0000	ng/mL	1.0000	----

## Perchlorate

Conc 8.5161

R#1 26.80 (0.00)

Q 99.00&gt;83.00 (-)

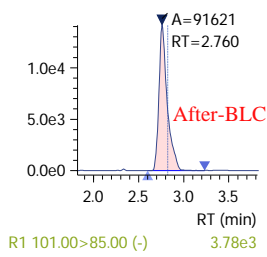
1.41e4

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

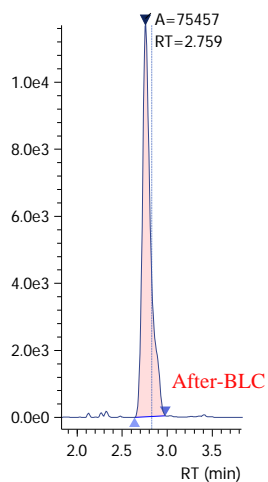
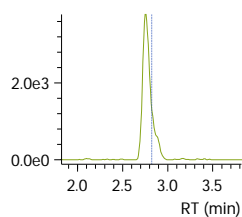
ISTD 107.00&gt;89.00 (-)

1.17e4



R1 101.00&gt;85.00 (-)

3.78e3



## Insight Report

Printed at 8/20/2021 3:59:59 PM

20210820\_012

Sample ID: PERCHLORATE7

Date Acquired: 8/20/2021 11:19:16 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210820\Before\20210820\_012.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

Sodium Perchlorate

-18O4\_IS

Conc 8.6716

Conc 1.0000

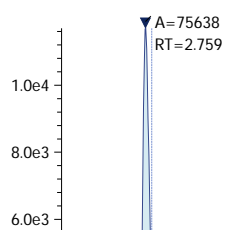
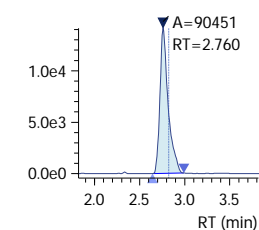
R#1 26.84 (0.00)

Q 99.00&gt;83.00 (-)

1.41e4

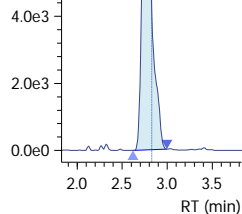
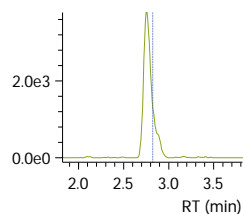
ISTD 107.00&gt;89.00 (-)

1.17e4



R1 101.00&gt;85.00 (-)

3.78e3



## Insight Report

Printed at 8/20/2021 3:58:03 PM

20210820\_013

Sample ID: E2100885-002X10

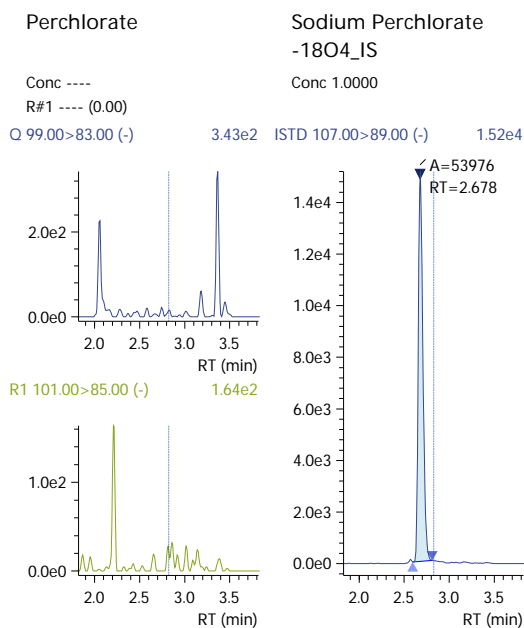
Date Acquired: 8/20/2021 11:27:55 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210820\20210820\_013.lcd

Vial: 37 | Inj. Volume: 25.0000uL | Tray: 3

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	ND(W/B)	----	----	53976	1	----	ng/mL	----	----
Sodium Perchlorate-18O4_IS	Auto	2.678	53976	53976	1	1.0000	ng/mL	----	----



## Insight Report

Printed at 8/20/2021 3:59:59 PM

20210820\_013

Sample ID: E2100885-002X10

Date Acquired: 8/20/2021 11:27:55 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210820\Before\20210820\_013.lcd

Vial: 37 | Inj. Volume: 25.0000uL | Tray: 3

Perchlorate

Sodium Perchlorate

-18O4\_IS

Conc ----

Conc 1.0000

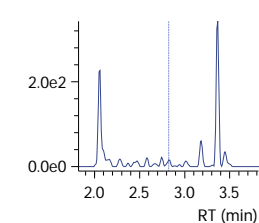
R#1 ---- (0.00)

Q 99.00&gt;83.00 (-)

3.43e2

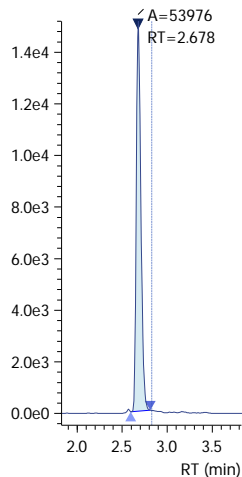
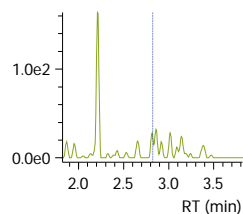
ISTD 107.00&gt;89.00 (-)

1.52e4



R1 101.00&gt;85.00 (-)

1.64e2





## Insight Report

Printed at 8/20/2021 3:58:03 PM

20210820\_014

Sample ID: EQ2100494-04X10

Date Acquired: 8/20/2021 11:38:37 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210820\20210820\_014.lcd

Vial: 42 | Inj. Volume: 25.0000uL | Tray: 3

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	M	2.659	89	53886	1	0.0116	ng/mL	----	69.57
Sodium Perchlorate-18O4_IS	M	2.659	53886	53886	1	1.0000	ng/mL	----	----

## Perchlorate

Conc 0.0116

R#1 69.57 (0.00)

Q 99.00&gt;83.00 (-)

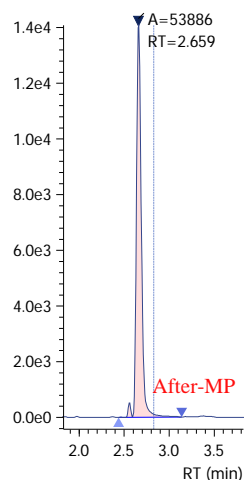
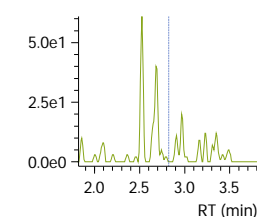
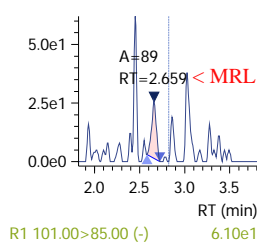
6.20e1

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

ISTD 107.00&gt;89.00 (-)

1.41e4



## Insight Report

Printed at 8/20/2021 3:59:59 PM

20210820\_014

Sample ID: EQ2100494-04X10

Date Acquired: 8/20/2021 11:38:37 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210820\Before\20210820\_014.lcd

Vial: 42 | Inj. Volume: 25.0000uL | Tray: 3

Perchlorate

Sodium Perchlorate

-18O4\_IS

Conc ----

Conc ----

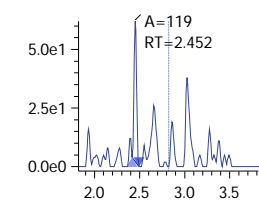
R#1 ---- (0.00)

Q 99.00&gt;83.00 (-)

6.20e1

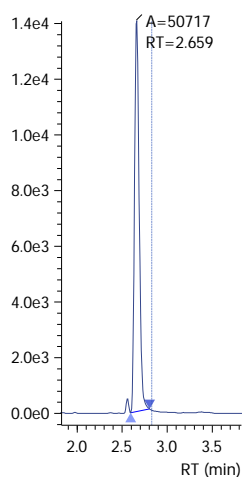
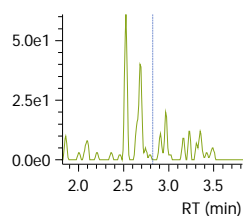
ISTD 107.00&gt;89.00 (-)

1.41e4



R1 101.00&gt;85.00 (-)

6.10e1



## Insight Report

Printed at 8/20/2021 3:58:03 PM

20210820\_015

Sample ID: EQ2100494-05X10

Date Acquired: 8/20/2021 12:30:43 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210820\20210820\_015.lcd

Vial: 43 | Inj. Volume: 25.0000uL | Tray: 3

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	M	2.679	92	54630	1	0.0118	ng/mL	----	0.00
Sodium Perchlorate-18O4_IS	M	2.680	54630	54630	1	1.0000	ng/mL	----	----

## Perchlorate

Conc 0.0118

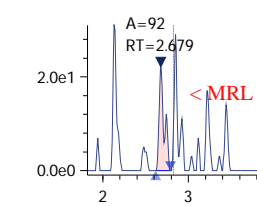
R#1 0.00 (0.00)

Q 99.00&gt;83.00 (-)

3.10e1

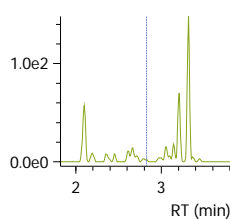
ISTD 107.00&gt;89.00 (-)

1.45e4



R1 101.00&gt;85.00 (-)

1.48e2

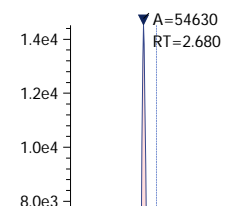


## Sodium Perchlorate-18O4\_IS

Conc 1.0000

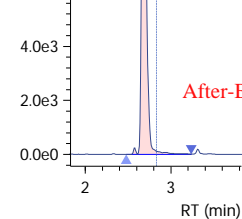
ISTD 107.00&gt;89.00 (-)

1.45e4



ISTD 107.00&gt;89.00 (-)

1.48e2



## Insight Report

Printed at 8/20/2021 3:59:59 PM

20210820\_015

Sample ID: EQ2100494-05X10

Date Acquired: 8/20/2021 12:30:43 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210820\Before\20210820\_015.lcd

Vial: 43 | Inj. Volume: 25.0000uL | Tray: 3

Perchlorate

Sodium Perchlorate

-18O4\_IS

Conc ----

Conc 1.0000

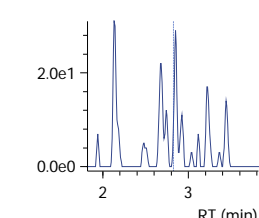
R#1 ---- (0.00)

Q 99.00&gt;83.00 (-)

3.10e1

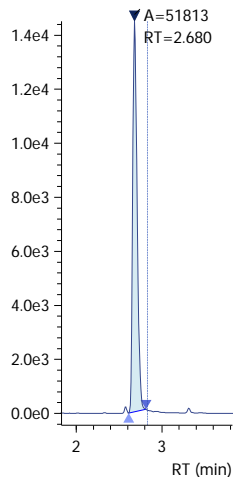
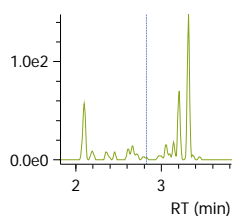
ISTD 107.00&gt;89.00 (-)

1.45e4



R1 101.00&gt;85.00 (-)

1.48e2



## Insight Report

Printed at 8/20/2021 3:58:03 PM

20210820\_016

Sample ID: PERCHLORATE7

Date Acquired: 8/20/2021 12:51:00 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210820\20210820\_016.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	M	2.659	57585	47460	1	8.5100	ng/mL	10.0000	26.29
Sodium Perchlorate-18O4_IS	M	2.658	47460	47460	1	1.0000	ng/mL	1.0000	----

## Perchlorate

Conc 8.5100

R#1 26.29 (0.00)

Q 99.00&gt;83.00 (-)

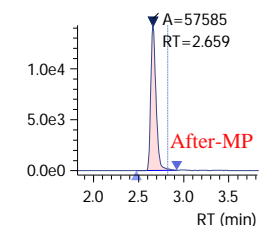
1.43e4

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

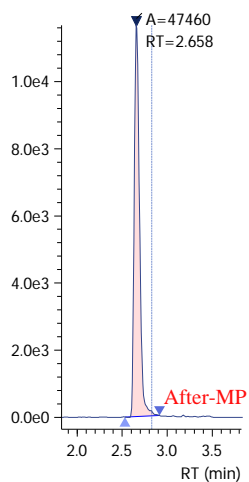
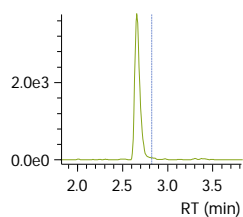
ISTD 107.00&gt;89.00 (-)

1.17e4



R1 101.00&gt;85.00 (-)

3.76e3



## Insight Report

Printed at 8/20/2021 3:59:59 PM

20210820\_016

Sample ID: PERCHLORATE7

Date Acquired: 8/20/2021 12:51:00 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210820\Before\20210820\_016.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

Sodium Perchlorate

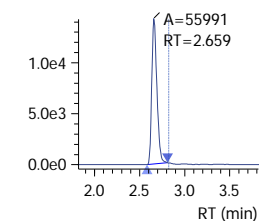
-18O4-IS

Conc ----

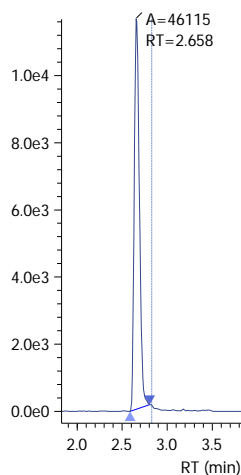
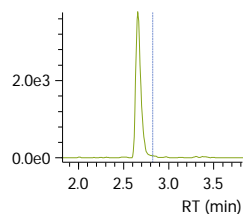
Conc ----

R#1 ---- (0.00)

Q 99.00&gt;83.00 (-) 1.43e4 ISTD 107.00&gt;89.00 (-) 1.17e4



R1 101.00&gt;85.00 (-) 3.76e3



## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS21080296  
**Sample Matrix:** Ground Water  
**Sample Name:** 04WW07\_210805  
**Lab Code:** EQ2100494-05  
**Run Type:** Duplicate Matrix Spike

**Service Request:** E2100885  
**Date Collected:** 8/ 5/21 0700  
**Date Received:** 8/ 6/21  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	1.00	0.500	0.250	10	8/ 9/21	8/20/21 12:30	384806	735740	

**ALS Environmental**

**Client:** ALS Houston  
**Project:** HS21080296  
**Sample Matrix:** W

**Service Request No.:** E2100885  
**Date Received:** 08/06/21

**CASE NARRATIVE**

All analyses were performed in adherence to the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II. When appropriate to the method, method blank results have been reported with each analytical test.

**Sample Receipt**

One samples were received for analysis at ALS Environmental in Houston on 08/06/21.

The samples were received in good condition and are consistent with the accompanying chain of custody form. The sample were stored in a refrigerator at 4°C upon receipt at the laboratory.

**Data Validation Notes and Discussion****Precision and Accuracy:**

EQ2100494: Laboratory Control Spike/Duplicate Laboratory Control Spike (LCS/DLCS) samples were analyzed and reported in addition to a MS/MSD for these extraction batches. The LCS and DLCS recoveries are within QC limits. MS/MSD recoveries were not calculated due to 10X dilution factor.

Samples were analyzed at a dilution due to sample matrix interference with the Internal Standard. Lowest possible dilution reported.

DoD certification is held for the method/matrix/analytes provided in this report.

*The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.*

*Use of ALS group USA Corp dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.*





# HS21080336 Longhorn Army Ammunition Plant Cover Page

ALS WO# HS21080336



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[www.alsglobal.com](http://www.alsglobal.com)

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**WorkOrder: HS21080336**

**Longhorn Army Ammunition Plant**

**Aptim Environmental & Infrastructure, Inc.**

Vicki Graves  
10333 Richmond Ave Ste 1030  
Houston TX 77042

**07-Oct-2021**



# HS21080336 Longhorn Army Ammunition Plant Final

ALS WO# HS21080336



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10450 Stancliff Rd. Suite 210  
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August 19, 2021

Vicki Graves  
Aptim Environmental & Infrastructure, Inc.  
10333 Richmond Ave  
Ste 1030  
Houston, TX 77042

Work Order: **HS21080336**

Laboratory Results for: **Longhorn Army Ammunition Plant**

Dear Vicki Graves ,

ALS Environmental received 8 sample(s) on Aug 06, 2021 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

A handwritten signature in black ink, appearing to read 'Dayna Fisher'.

Generated By: DAYNA.FISHER

Ragen Giga  
Project Manager



## ALS Houston, US

Date: 19-Aug-21

**Client:** Aptim Environmental & Infrastructure, Inc.  
**Project:** Longhorn Army Ammunition Plant  
**Work Order:** HS21080336

**SAMPLE SUMMARY**

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS21080336-01	LHSMW01-210804	Groundwater		04-Aug-2021 07:20	06-Aug-2021 08:45	<input type="checkbox"/>
HS21080336-02	04WW04-210804	Groundwater		04-Aug-2021 08:05	06-Aug-2021 08:45	<input type="checkbox"/>
HS21080336-03	04WW08-210804	Groundwater		04-Aug-2021 08:50	06-Aug-2021 08:45	<input type="checkbox"/>
HS21080336-04	04WW02-210804	Groundwater		04-Aug-2021 09:30	06-Aug-2021 08:45	<input type="checkbox"/>
HS21080336-05	04WW06-210804	Groundwater		04-Aug-2021 10:10	06-Aug-2021 08:45	<input type="checkbox"/>
HS21080336-06	LHSMW02-210804	Groundwater		04-Aug-2021 10:55	06-Aug-2021 08:45	<input type="checkbox"/>
HS21080336-07	04WW11-210804	Groundwater		04-Aug-2021 11:40	06-Aug-2021 08:45	<input type="checkbox"/>
HS21080336-08	04WW11-210804-FD	Groundwater		04-Aug-2021 11:40	06-Aug-2021 08:45	<input type="checkbox"/>

**ALS Houston, US**

Date: 19-Aug-21

**Client:** Aptim Environmental & Infrastructure, Inc.**CASE NARRATIVE****Project:** Longhorn Army Ammunition Plant**Work Order:** HS21080336**Work Order Comments**

- The analysis for Perchlorate was subcontracted to ALS Houston Specialty Lab. Final report attached.



## ALS Houston, US

Date: 19-Aug-21

Client: Aptim Environmental & Infrastructure, Inc.  
Project: Longhorn Army Ammunition Plant  
Sample ID: LHSMW01-210804  
Collection Date: 04-Aug-2021 07:20

**ANALYTICAL REPORT**

WorkOrder:HS21080336  
Lab ID:HS21080336-01  
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>						Analyst: GR
Subcontract Analysis	See Attached		0	0		NA	1	19-Aug-2021 11:47

Note: See Qualifiers Page for a list of qualifiers and their explanation.



## ALS Houston, US

Date: 19-Aug-21

Client: Aptim Environmental & Infrastructure, Inc.  
Project: Longhorn Army Ammunition Plant  
Sample ID: 04WW04-210804  
Collection Date: 04-Aug-2021 08:05

**ANALYTICAL REPORT**

WorkOrder:HS21080336  
Lab ID:HS21080336-02  
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>						Analyst: GR
Subcontract Analysis	See Attached		0	0		NA	1	19-Aug-2021 11:47

Note: See Qualifiers Page for a list of qualifiers and their explanation.



**ALS Houston, US**

Date: 19-Aug-21

Client: Aptim Environmental & Infrastructure, Inc.  
 Project: Longhorn Army Ammunition Plant  
 Sample ID: 04WW08-210804  
 Collection Date: 04-Aug-2021 08:50

**ANALYTICAL REPORT**

WorkOrder:HS21080336  
 Lab ID:HS21080336-03  
 Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>						Analyst: GR
Subcontract Analysis	See Attached		0	0		NA	1	19-Aug-2021 11:47

Note: See Qualifiers Page for a list of qualifiers and their explanation.



**ALS Houston, US**

Date: 19-Aug-21

Client: Aptim Environmental & Infrastructure, Inc.  
 Project: Longhorn Army Ammunition Plant  
 Sample ID: 04WW02-210804  
 Collection Date: 04-Aug-2021 09:30

**ANALYTICAL REPORT**

WorkOrder:HS21080336  
 Lab ID:HS21080336-04  
 Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>						Analyst: GR
Subcontract Analysis	See Attached		0	0		NA	1	19-Aug-2021 11:47

Note: See Qualifiers Page for a list of qualifiers and their explanation.



## ALS Houston, US

Date: 19-Aug-21

Client: Aptim Environmental & Infrastructure, Inc.  
Project: Longhorn Army Ammunition Plant  
Sample ID: 04WW06-210804  
Collection Date: 04-Aug-2021 10:10

**ANALYTICAL REPORT**

WorkOrder:HS21080336  
Lab ID:HS21080336-05  
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>						Analyst: GR
Subcontract Analysis	See Attached		0	0		NA	1	19-Aug-2021 11:47

Note: See Qualifiers Page for a list of qualifiers and their explanation.



## ALS Houston, US

Date: 19-Aug-21

Client: Aptim Environmental & Infrastructure, Inc.  
Project: Longhorn Army Ammunition Plant  
Sample ID: LHSMW02-210804  
Collection Date: 04-Aug-2021 10:55

**ANALYTICAL REPORT**

WorkOrder: HS21080336  
Lab ID: HS21080336-06  
Matrix: Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method: NA</b>						Analyst: GR
Subcontract Analysis	See Attached		0	0		NA	1	19-Aug-2021 11:47

Note: See Qualifiers Page for a list of qualifiers and their explanation.



**ALS Houston, US**

Date: 19-Aug-21

Client: Aptim Environmental & Infrastructure, Inc.  
 Project: Longhorn Army Ammunition Plant  
 Sample ID: 04WW11-210804  
 Collection Date: 04-Aug-2021 11:40

**ANALYTICAL REPORT**

WorkOrder:HS21080336  
 Lab ID:HS21080336-07  
 Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>						Analyst: GR
Subcontract Analysis	See Attached		0	0		NA	1	19-Aug-2021 11:47

Note: See Qualifiers Page for a list of qualifiers and their explanation.



## ALS Houston, US

Date: 19-Aug-21

Client: Aptim Environmental & Infrastructure, Inc.  
Project: Longhorn Army Ammunition Plant  
Sample ID: 04WW11-210804-FD  
Collection Date: 04-Aug-2021 11:40

**ANALYTICAL REPORT**

WorkOrder:HS21080336  
Lab ID:HS21080336-08  
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>						Analyst: GR
Subcontract Analysis	See Attached		0	0		NA	1	19-Aug-2021 11:47

Note: See Qualifiers Page for a list of qualifiers and their explanation.





ALS Houston, US

Date: 19-Aug-21

**Client:** Aptim Environmental & Infrastructure, Inc.  
**Project:** Longhorn Army Ammunition Plant  
**WorkOrder:** HS21080336

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> R389814 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			<b>Matrix:</b> Groundwater	
HS21080336-01	LHSMW01-210804	04 Aug 2021 07:20			19 Aug 2021 11:47	1
HS21080336-02	04WW04-210804	04 Aug 2021 08:05			19 Aug 2021 11:47	1
HS21080336-03	04WW08-210804	04 Aug 2021 08:50			19 Aug 2021 11:47	1
HS21080336-04	04WW02-210804	04 Aug 2021 09:30			19 Aug 2021 11:47	1
HS21080336-05	04WW06-210804	04 Aug 2021 10:10			19 Aug 2021 11:47	1
HS21080336-06	LHSMW02-210804	04 Aug 2021 10:55			19 Aug 2021 11:47	1
HS21080336-07	04WW11-210804	04 Aug 2021 11:40			19 Aug 2021 11:47	1
HS21080336-08	04WW11-210804-FD	04 Aug 2021 11:40			19 Aug 2021 11:47	1



**ALS Houston, US**

Date: 19-Aug-21

**Client:** Aptim Environmental & Infrastructure, Inc.  
**Project:** Longhorn Army Ammunition Plant  
**WorkOrder:** HS21080336

**QUALIFIERS,  
ACRONYMS, UNITS**

<b>Qualifier</b>	<b>Description</b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

<b>Acronym</b>	<b>Description</b>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program



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**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

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Agency	Number	Expire Date
Arkansas	21-022-0	26-Mar-2022
Dept of Defense	PJLA L20-507-R2	22-Dec-2021
Florida	E87611-33	30-Jun-2022
Illinois	2000322021-7	09-May-2022
Kansas	E-10352 2021-2022	31-Jul-2022
Kentucky	123043, 2021-2022	30-Apr-2022
Louisiana	03087, 2021-2022	30-Jun-2022
North Carolina	624-2021	31-Dec-2021
Oklahoma	2020-165	31-Aug-2021
Texas	T104704231-21-27	30-Apr-2022

ALS Houston, US

Date: 19-Aug-21

## Sample Receipt Checklist

Work Order ID: HS21080336

Date/Time Received: 06-Aug-2021 08:45

Client Name: CBI-Houston

Received by: Jared R. Makan

Completed By: <u>/S/ Paresh M. Giga</u>	06-Aug-2021 20:36	Reviewed by: <u>/S/ Ragen Giga</u>	09-Aug-2021 15:09
eSignature	Date/Time	eSignature	Date/Time

Matrices: WaterCarrier name: FedEx Priority Overnight

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	1 Page(s)
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	COC IDs:none
Samplers name present on COC?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Temperature(s)/Thermometer(s):	4.2C U/C IR31		
Cooler(s)/Kit(s):	24862		
Date/Time sample(s) sent to storage:	8/6/2021 20:45		
Water - VOA vials have zero headspace?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input checked="" type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>
pH adjusted?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>
pH adjusted by:			

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:


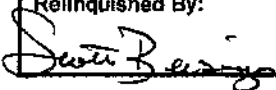
Comments:

Corrective Action:




## CHAIN OF CUSTODY

Name Of Lab Shipping To: ALS 10450 Stancliff Rd. Suite 210 Houston, TX. 77092 (281) 530-5656 ATTN: Ragen GigaPage 1 of 1

<b>Project:</b> APTIM LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS			<b>Project No.</b> 501032		<b>Analyses</b>										<b>HS21080336</b> Aptim Environmental & Infrastructure, Inc. Longhorn Army Ammunition Plant				
<b>Job:</b> <b>LHAAP 04 August 2021</b>					MS / MSD No. OF CONTAINERS Perchlorate by SW6850 TOC by SM5310 Anions (nitrate, nitrite and sulfate) by SW9056 and Alkalinity by SM2320B											<b>Remarks</b> (Preservatives, etc.)		<b>Lab I.D.#</b>	
<b>Prepared By:</b> Scott Beesinger			<b>P.O. Number</b>																
<b>Field Sample I.D.</b>			<b>Sample Matrix</b>		<b>Date / Time</b>														
LH5mw01-210804			wg		8/4/21/0720														
04ww04-210804			wg		8/4/21/0805														
04ww08-210804			wg		8/4/21/0850														
04ww02-210804			wg		8/4/21/0930														
04ww06-210804			wg		8/4/21/1010														
LH5mw02-210804			wg		8/4/21/1055														
04ww11-210804			wg		8/4/21/1140														
04ww11-210804-FD			wg		8/4/21/1140														
<b>Additional Remarks:</b> Standard TAT on all parameters. Please email results to <a href="mailto:Vicki.Graves@aptim.com">Vicki.Graves@aptim.com</a> and invoices to <a href="mailto:fedinvoices@aptim.com">fedinvoices@aptim.com</a>																			
<b>Relinquished By:</b> 		<b>Date</b> 8/5/21	<b>Time</b> 1200	<b>Received By:</b>		<b>Date</b>	<b>Time</b>	<b>Relinquished By:</b>		<b>Date</b>	<b>Time</b>	<b>Received By:</b>		<b>Date</b>	<b>Time</b>				
<b>Received At Lab By:</b> J. MALAN		<b>Date</b> 8/6/21	<b>Time</b> 0845	<b>Airbill No.</b>		<b>For Lab Use Only</b> <b>Opened By:</b>		<b>Date</b>	<b>Time</b>	<b>Temp of Container</b>	<b>Seal No.</b>	<b>Condition</b>							
<b>Remarks:</b> Cooler 24862 11231 Temp 4.2°C CEO																			



 <b>ALS</b> 10450 Stancliff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5656 Fax. +1 281 530 5887	<b>CUSTODY SEAL</b>		Seal Broken By:
	Date: 8/5/21 Time: 1200 Name: Scott Beesinger Company: DHA	Date: 08/06/21	

21862



21862

ORIGIN ID: SGRA (903) 930-B193  
 ATT: SCOTT BEESINGER  
 APTIN  
 1203-B EAST GRAND AVE PHB202  
 MARSHALL, TX 75670  
 UNITED STATES US

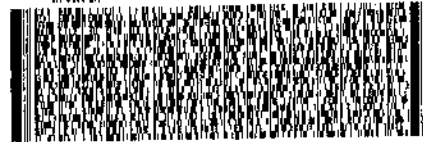
SHIP DATE: 27JUL21  
 ACTWGT: 7.40 LB  
 CAD: 0221247/CAFE3504  
 DIMS: 19x18x13 IN

TO SHIPPING DEPT  
 ALS LABORATORY GROUP  
 10450 STANCLIFF RD  
 SUITE 210  
 HOUSTON TX 77099

(281) 530-5858

REF: LHAAP 04 - 80 79874 - RG

FIMA: 01111111

FedEx  
Express

FedEx

9473 0846 2870

FRI - 06 AUG AA  
PRIORITY OVERNIGHT

AB SGRA

77099  
TX-US  
IAH

5090257 05Aug2021 GIGA-SERIAL/TIME/11003





August 19, 2021

Service Request No:E2100887

Ragen Giga  
ALS Environmental - US  
10450 Stancliff Rd Suite 210  
Houston, TX 77099

**Laboratory Results for: HS21080336**

Dear Ragen,

Enclosed are the results of the sample(s) submitted to our laboratory August 09, 2021  
For your reference, these analyses have been assigned our service request number **E2100887**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current TNI standards, where applicable, and except as noted in the laboratory case narrative provided. All results are intended to be considered in their entirety and ALS Environmental is not responsible for use of less than the complete final report. Results apply only to the items submitted to the laboratory, as received for analysis. In accordance with the current TNI Standard, a statement on the estimated uncertainty of measurement of any quantitative analysis will be supplied upon request.

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Corey Grandits  
Project Manager

ADDRESS 10450 Stancliff Rd., Suite 210, Houston, TX 77099  
PHONE +1 281 530 5656 | FAX +1 281 530 5887  
ALS Group USA, Corp.  
dba ALS Environmental





# Certificate of Analysis

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)





**ALS Environmental**

**Client:** ALS Houston  
**Project:** HS21080336  
**Sample Matrix:** W

**Service Request No.:** E2100887  
**Date Received:** 08/09/21

**CASE NARRATIVE**

All analyses were performed in adherence to the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II. When appropriate to the method, method blank results have been reported with each analytical test.

**Sample Receipt**

Eight samples were received for analysis at ALS Environmental in Houston on 8/09/21.

The samples were received in good condition and are consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

**Data Validation Notes and Discussion****Precision and Accuracy:**

EQ2100498: Laboratory Control Spike/Duplicate Laboratory Control Spike (LCS/DLCS) samples were analyzed and reported in lieu of a MS/MSD for these extraction batches. The LCS and DLCS recoveries are within QC limits.

Lowest practical dilution performed (matrix interference) for all samples in SR E2100877.

DoD certification is held for the method/matrix/analytes provided in this report.

*The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.*

*Use of ALS group USA Corp dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.*



**Client:** ALS Environmental - US  
**Project:** HS21080336

**Service Request:** E2100887

### SAMPLE CROSS-REFERENCE

<u>SAMPLE #</u>	<u>CLIENT SAMPLE ID</u>	<u>DATE</u>	<u>TIME</u>
E2100887-001	LHSMW01-210804	8/4/2021	0720
E2100887-002	04WW04-210804	8/4/2021	0805
E2100887-003	04WW08-210804	8/4/2021	0850
E2100887-004	04WW02-210804	8/4/2021	0930
E2100887-005	04WW06-210804	8/4/2021	1010
E2100887-006	LHSMW02-210804	8/4/2021	1055
E2100887-007	04WW11-210804	8/4/2021	1140
E2100887-008	04WW11-210804-FD	8/4/2021	1140

**Service Request Summary**

**Folder #:** E2100887  
**Client Name:** ALS Environmental - US  
**Project Name:** HS21080336  
**Project Number:**  
**Report To:** Ragen Giga  
 ALS Environmental - US  
 10450 Standliff Rd Suite 210  
 Houston, TX 77099  
 USA  
**Phone Number:**  
**Cell Number:**  
**Fax Number:**  
**E-mail:** ragenp.giga@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 08/09/21  
**Internal Due Date:** 8/20/2021  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS21080336  
**EDD:** No EDD Specified

8 120 mL-Plastic Bottle Natural WM Unpreserved

**Location:** EHRMS-AirArch 1

**Pressure Gas:**

				HOUSTON
				CIO4 DOD/6850
Lab Samp No.	Client Samp No	Matrix	Collected	
E2100887-001	LHSMW01-210804	Ground Water	08/04/21 0720	IV
E2100887-002	04WW04-210804	Ground Water	08/04/21 0805	IV
E2100887-003	04WW08-210804	Ground Water	08/04/21 0850	IV
E2100887-004	04WW02-210804	Ground Water	08/04/21 0930	IV
E2100887-005	04WW06-210804	Ground Water	08/04/21 1010	IV
E2100887-006	LHSMW02-210804	Ground Water	08/04/21 1055	IV
E2100887-007	04WW11-210804	Ground Water	08/04/21 1140	IV
E2100887-008	04WW11-210804-FD	Ground Water	08/04/21 1140	IV

**Service Request Summary**

**Folder #:** E2100887  
**Client Name:** ALS Environmental - US  
**Project Name:** HS21080336  
**Project Number:**  
  
**Report To:** Ragen Giga  
 ALS Environmental - US  
 10450 Standliff Rd Suite 210  
 Houston, TX 77099  
 USA  
  
**Phone Number:**  
**Cell Number:**  
**Fax Number:**  
**E-mail:** ragenp.giga@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 08/09/21  
**Internal Due Date:** 8/20/2021  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS21080336  
**EDD:** No EDD Specified

8 120 mL-Plastic Bottle Natural WM Unpreserved  
**Location:** EHRMS-AirArch 1  
**Pressure Gas:**

**Test Comments:**

Group	Test/Method	Samples	Comments
Semivola GCMS	CIO4 DOD/6850	8	IV due 8/27

## Data Qualifiers

### Lab Standard

- + Possible Tedlar bag artifact.
- A TIC is a suspected aldol-condensation product
- B Analyte found in the associated method blank as well as in the sample.
- BC Reported results are not blank corrected.
- BH The back section of the tube yielded higher results than the front.
- BT Results indicated possible breakthrough; back section  $\geq 10\%$  front section.
- C Result identification confirmed.
- D Compound identified in an analysis at a secondary dilution factor
- D Spike was diluted out
- DE Reported results are corrected for desorption efficiency.
- E Estimated value. Concentration above calibration range
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- H1 Sample analysis performed past holding time. See case narrative.
- H2 Initial analysis within holding time. Reanalysis for the required dilution was past holding time.
- H3 Sample was received and analyzed past holding time.
- H4 Sample was extracted past required extraction holding time, but analyzed within analysis holding time. See case narrative.
- I Internal standard not within the specified limits. See case narrative.
- J Estimated Value. Concentration found below MRL.
- K A deflection in the QC ion may indicate interference with the quantitation of this ion. The concentration of this analyte should be considered as an estimate.
- K Analyte was detected above the method reporting limit prior to normalization.
- K The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- L1 Laboratory control sample recovery outside the specified limits; results may be biased high.
- L2 Laboratory control sample recovery outside the specified limits; results may be biased low.
- L3 Laboratory control sample recovery outside the specified limits.
- M Matrix interference; results may be biased high.
- M The duplicate injection precision not met.
- M1 Matrix interference due to coelution with a non-target compound; results may be biased high.
- N Presumptive evidence of a compound for TICs that have been identified based on a mass spectral library search.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.



## Data Qualifiers

### Lab Standard

- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- P Indicates chlorodiphenyl ether interference present at the retention time of the target compound.
- P Pesticide/Aroclor target analyte > 40% difference for detected concentrations between GC columns
- Q Indicates as estimated value because the P and P + 2 theoretical abundance ratio does not meet method criteria.
- R Duplicate Precision not met.
- R1 Duplicate precision not within the specified limits; however, the results are below the MRL and considered estimated.
- S Surrogate recovery not within specified limits.
- S The reported value was determined by the Method of Standard Additions (MSA).
- T Analyte is a tentatively identified compound, result is estimated.
- U Compound was analyzed for, but was not detected (ND).
- V1 The continuing calibration verification standard was outside (biased high) the specified limits for this compound.
- V2 The continuing calibration verification standard was outside (biased low) the specified limits for this compound.
- W Result quantified, but the corresponding peak was detected outside the generated retention time window.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- X See case narrative.
- Y Recovery outside limits
- Y The chromatogram resembles a petroleum product but does not match the calibration standard.
- Z The chromatogram does not resemble a petroleum product.
- i The MRL/MDL has been elevated due to a matrix interference.

## ALS Laboratory Group

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### Acronyms

Cal	Calibration
Conc	CONCetration
Dioxin(s)	Polychlorinated dibenzo-p-dioxin(s)
EDL	Estimated Detection Limit
EMPC	Estimated Maximum Possible Concentration
Flags	Data qualifiers
Furan(s)	Polychlorinated dibenzofuran(s)
g	Grams
ICAL	Initial CALibration
ID	IDentifier
Ions	Masses monitored for the analyte during data acquisition
L	Liter (s)
LCS	Laboratory Control Sample
DLCS	Duplicate Laboratory Control Sample
MB	Method Blank
MCL	Method Calibration Limit
MDL	Method Detection Limit
mL	Milliliters
MS	Matrix Spiked sample
DMS	Duplicate Matrix Spiked sample
NO	Number of peaks meeting all identification criteria
PCDD(s)	Polychlorinated dibenzo-p-dioxin(s)
PCDF(s)	Polychlorinated dibenzofuran(s)
ppb	Parts per billion
ppm	Parts per million
ppq	Parts per quadrillion
ppt	Parts per trillion
QA	Quality Assurance
QC	Quality Control
Ratio	Ratio of areas from monitored ions for an analyte
% Rec.	Percent recovery
RPD	Relative Percent Difference
RRF	Relative Response Factor
RT	Retention Time
SDG	Sample Delivery Group
S/N	Signal-to-noise ratio
TEF	Toxicity Equivalence Factor
TEQ	Toxicity Equivalence Quotient



### State Certifications, Accreditations, and Licenses

Agency	Number	Expire Date
American Association for Laboratory Accreditation	2897.01 2020	11/30/2021
Arkansas Department of Environmental Quality	19-028-0	6/30/2022
Arkansas Department of Environmental Quality	21-022-0	3/26/2022
Department of Defense	A2LA 2897.01	11/30/2021
Florida Department of Health	E87611-33	6/30/2022
Hawaii Department of Health	2021-2022	4/30/2022
Kansas Department of Health and Environment	E-10352 2022	7/31/2022
Louisiana Department of Environmental Quality	03087-2021	6/30/2022
Louisiana Department of Health and Hospitals	LA028-2021	12/31/2021
Maine Department of Health and Human Services	2020016	6/5/2022
Minnesota Department of Health	2021671	12/31/2021
Nevada Department of Conservation and Natural Resources	TX026932022-1	7/31/2022
New Hampshire Environmental Laboratory Accreditation Program	209421	4/24/2022
Oklahoma Department of Environmental Quality	2020-123	8/31/2021
Pennsylvania Department of Environmental Protection	68-03441-015	6/30/2022
Tennessee Department of Environment and Conservation	04016-2021	4/30/2022
Texas Commission on Environmental Quality	T104704231-21-27	4/30/2022
United States Department of Agriculture	P330-19-00299	10/10/2022





## Chain of Custody

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)





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Houston, TX 77099  
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F: +1 281 530 5887  
[www.alsglobal.com](http://www.alsglobal.com)

## Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 16642

**SUBCONTRACT TO:**

ALS Environmental  
10450 Stancliff Road Suite 210  
Houston, TX 77084

**Phone:** +1 281 530 5656

**CUSTOMER  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Ragen Giga  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Email:** RagenP.Giga@ALSGlobal.com  
**Alternate  
Contact:** Jumoke M. Lawal  
**Email:** jumoke.lawal@alsglobal.com

**INVOICE  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Accounts Payable  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Reference:** HS21080336  
**TSR:** Sonia West

	LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
	ANALYSIS REQUESTED			DUE DATE
1.	HS21080336-01	LHSMW01-210804	Groundwater	04 Aug 2021 07:20
	Level II and Level IV reports on a separate pdf. Send WOA to Vicki Graves.			20 Aug 2021
2.	HS21080336-02	04WW04-210804	Groundwater	04 Aug 2021 08:05
	Level II and Level IV reports on a separate pdf. Send WOA to Vicki Graves.			20 Aug 2021
3.	HS21080336-03	04WW08-210804	Groundwater	04 Aug 2021 08:50
	Level II and Level IV reports on a separate pdf. Send WOA to Vicki Graves.			20 Aug 2021
4.	HS21080336-04	04WW02-210804	Groundwater	04 Aug 2021 09:30
	Level II and Level IV reports on a separate pdf. Send WOA to Vicki Graves.			20 Aug 2021
5.	HS21080336-05	04WW06-210804	Groundwater	04 Aug 2021 10:10
	Level II and Level IV reports on a separate pdf. Send WOA to Vicki Graves.			20 Aug 2021
6.	HS21080336-06	LHSMW02-210804	Groundwater	04 Aug 2021 10:55
	Level II and Level IV reports on a separate pdf. Send WOA to Vicki Graves.			20 Aug 2021
7.	HS21080336-07	04WW11-210804	Groundwater	04 Aug 2021 11:40
	Level II and Level IV reports on a separate pdf. Send WOA to Vicki Graves.			20 Aug 2021
8.	HS21080336-08	04WW11-210804-FD	Groundwater	04 Aug 2021 11:40





## Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 16642

LAB SAMPLE ID CLIENT SAMPLE ID

MATRIX

COLLECT DATE

ANALYSIS REQUESTED

DUE DATE

Level II and Level IV reports on a separate pdf. Send WOA to Vicki Graves.

20 Aug 2021

**Comments:** Please analyze for the analysis listed above.  
Send report to the emails shown above.

**QC Level:** DOD IV (DoD Data Package)

Relinquished By:

Date/Time:

Received By:

Date/Time:

Cooler ID(s):

Temperature(s):

*[Handwritten signature]*  
*[Handwritten signature]*  
*[Handwritten signature]*

*[Handwritten signature]*  
*[Handwritten signature]*  
*[Handwritten signature]*





10450 Stancliff Rd, Ste 210  
Houston, TX 77099  
**T:** +1 281 530 5656  
**F:** +1 281 530 5887  
**www.alsglobal.com**

## Sample Receipt Checklist

<b>Work Order ID:</b> HS21080336		<b>Date/Time received:</b> 06 Aug 2021 08:45	
<b>Client name:</b> Aptim Environmental & Infrastructure, Inc.		<b>Received by:</b> Jared R. Makan	

---

<b>Completed/By:</b> 06 Aug 2021 20:36	Paresh M. Giga	<b>Reviewed/By:</b> 09 Aug 2021 15:09	Ragen Giga
Date/Time	eSignature	Date/Time	eSignature

---

**Matrices:** Water

**Carrier name:** FedEx Priority Overnight

<b>Shipping container/cooler in good condition?</b>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Not Present
<b>Custody seals intact on shipping container/cooler?</b>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Not Present
<b>Custody seals intact on Sample bottles?</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Not Present
<b>VOA/TX1005/TX1006 Solids in hermetically sealed vials?</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Not Present
<b>Chain of custody present?</b>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	1 Page(s)
<b>Chain of custody signed when relinquished and received?</b>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	COC ID(s): none
<b>Samplers name present on COC?</b>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
<b>Chain of custody agrees with sample labels?</b>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
<b>Samples in proper container/bottle?</b>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
<b>Sample containers intact?</b>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
<b>Sufficient sample volume for indicated test?</b>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
<b>All samples received within holding time?</b>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
<b>Container/Temp Blank temperature in compliance?</b>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	

---

**Temperature(s)/Thermometer(s):** 4.2C U/C IR31

---

**Cooler Information:** 1 Cooler(s), 24862

---

**Date/Time sample(s) sent to storage:** 8/6/2021 20:45

---

<b>Water - VOA vials have zero headspace?</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> No VOA vials submitted
<b>Water - pH acceptable upon receipt?</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Not Applicable
<b>pH adjusted?</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Not Applicable

**pH adjusted by:** \_\_\_\_\_

**Login notes:** \_\_\_\_\_

---

**Client contacted:** \_\_\_\_\_ **Date contacted:** \_\_\_\_\_ **Person contacted:** \_\_\_\_\_

**Contacted by:** \_\_\_\_\_ **Regarding:** \_\_\_\_\_

**Comments:** \_\_\_\_\_

**Corrective action:** \_\_\_\_\_

---





10450 Stancliff Rd., Suite 210  
Houston, TX 77099  
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[www.alsglobal.com](http://www.alsglobal.com)

## SAMPLE ACCEPTANCE POLICY

This policy outlines the criteria samples must meet to be accepted by ALS Environmental – Houston HRMS.

### **Cooler Custody Seals (desirable, mandatory if specified in SAP):**

- ✓ Intact on outside of cooler, signed and dated

### **Chain-of-Custody (COC) documentation (mandatory):**

The following is required on each COC:

- ✓ Sample ID, the location, date and time of collection, collector's name, preservation type, sample type, and any other special remarks concerning the sample. The COC must be completed in ink.
- ✓ Signature and date of relinquishing party.

In the absence of a COC at sample receipt, the COC will be requested from the client.

### **Sample Integrity (mandatory):**

Samples are inspected upon arrival to ensure that sample integrity was not compromised during transfer to the laboratory.

- ✓ Sample containers must arrive in good condition (not broken or leaking).
- ✓ Samples must be labeled appropriately, including Sample IDs, and requested test using durable labels and indelible ink.
- ✓ The correct type of sample bottle must be used for the method requested.
- ✓ An appropriate sample volume, or weight, must be received.
- ✓ Sample IDs and number of containers must reconcile with the COC.
- ✓ Samples must be received within the method defined holding time.

### **Temperature Requirement (varies by sample matrix):**

- ✓ Aqueous and Non-aqueous samples must be shipped and stored cold, at 0 to 6°C.
- ✓ Tissue samples must be shipped and stored frozen, at -20 to -10°C.
- ✓ Air samples are shipped and stored cold, at 0 to 6°C
- ✓ The sample temperature must be recorded on the COC

All cooler inspections are documented on the Cooler Receipt Form (CRF). A separate CRF is completed for each service request. Any samples not meeting the above criteria are noted on the CRF and the Project Manager notified. The Project Manager must resolve any sample integrity issues with the client prior to proceeding with the analysis. Such resolutions are documented in writing and filed with the project folder. Data associated with samples received outside of this acceptance policy will be qualified on the case narrative of the final report





# Preparation Information Benchsheets

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)



**Preparation Information Benchsheet**

**Prep Run#:** 384851  
**Team:** Semivoa GCMS/GRIVERA

**Prep WorkFlow:** GenExt28Day  
**Prep Method:** Method

**Status:** Prepped  
**Prep Date/Time:** 8/13/21 14:25

#	Lab Code	Client ID	B#	Method /Test	pH	Cl	Matrix	Amt. Ext.	Sample Description
1	E2100887-001	LHSMW01-210804	.01	6850/CIO4 DOD			Ground Water	10mL	
2	E2100887-002	04WW04-210804	.01	6850/CIO4 DOD			Ground Water	10mL	
3	E2100887-003	04WW08-210804	.01	6850/CIO4 DOD			Ground Water	10mL	
4	E2100887-004	04WW02-210804	.01	6850/CIO4 DOD			Ground Water	10mL	
5	E2100887-005	04WW06-210804	.01	6850/CIO4 DOD			Ground Water	10mL	
6	E2100887-006	LHSMW02-210804	.01	6850/CIO4 DOD			Ground Water	10mL	
7	E2100887-007	04WW11-210804	.01	6850/CIO4 DOD			Ground Water	10mL	
8	E2100887-008	04WW11-210804-FD	.01	6850/CIO4 DOD			Ground Water	10mL	
9	E2100895-001	LH18/24-SP650_081121_BIX	.01	6850/CIO4 DOD			Water	10mL	
10	EQ2100498-01	MB		6850/CIO4 DOD			Liquid	10mL	
11	EQ2100498-02	LCS		6850/CIO4 DOD			Liquid	10mL	
12	EQ2100498-03	DLCS		6850/CIO4 DOD			Liquid	10mL	

**Spiking Solutions**

Name:	Sodium Perchlorate 1 ug/mL (IS) (18-O) as CLO4	Inventory ID	214765	Logbook Ref:	Sodium Perchlorate	Expires On:	12/11/2022
-------	--	--------------	--------	--------------	--------------------	-------------	------------

E2100887-001	100.00µL	E2100887-002	100.00µL	E2100887-003	100.00µL	E2100887-004	100.00µL	E2100887-005	100.00µL	E2100887-006	100.00µL
E2100887-007	100.00µL	E2100887-008	100.00µL	E2100895-001	100.00µL	EQ2100498-01	100.00µL	EQ2100498-02	100.00µL	EQ2100498-03	100.00µL

Name:	Perchlorate Intermediate Stock1	Inventory ID	217422	Logbook Ref:	Perchlorate	Expires On:	11/26/2021
-------	---------------------------------	--------------	--------	--------------	-------------	-------------	------------

E2100887-001	1.00µL	EQ2100498-02	1.00µL	EQ2100498-03	1.00µL
--------------	--------	--------------	--------	--------------	--------

**Preparation Materials**

Water HPLC Grade	08/03/2021 Water (218530)	537M Glass Culture Tubes	537M Glass Tubes (218064)
------------------	---------------------------	--------------------------	---------------------------

**Preparation Steps**

Step: Preparation  
 Started: 8/13/21 14:25  
 Finished: 8/13/21 15:30  
 By: GRIVERA  
 Comments

Comments: \_\_\_\_\_

Reviewed By: GR Date: 8/13/21



# Analytical Results

**ALS Environmental - Houston HRMS**  
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Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)





## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS21080336  
**Sample Matrix:** Ground Water  
**Sample Name:** LHSMW01-210804  
**Lab Code:** E2100887-001

**Service Request:** E2100887  
**Date Collected:** 8/ 4/21 0720  
**Date Received:** 8/ 9/21  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	0.200	0.100	0.0500	2	8/13/21	8/16/21 14:47	384851	735251	



## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS21080336  
**Sample Matrix:** Ground Water  
**Sample Name:** 04WW04-210804  
**Lab Code:** E2100887-002

**Service Request:** E2100887  
**Date Collected:** 8/ 4/21 0805  
**Date Received:** 8/ 9/21  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	0.500	0.250	0.125	5	8/13/21	8/16/21 16:14	384851	735251	



## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS21080336  
**Sample Matrix:** Ground Water  
**Sample Name:** 04WW08-210804  
**Lab Code:** E2100887-003

**Service Request:** E2100887  
**Date Collected:** 8/ 4/21 0850  
**Date Received:** 8/ 9/21  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	1.00	0.500	0.250	10	8/13/21	8/18/21 11:21	384851	735470	



## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS21080336  
**Sample Matrix:** Ground Water  
**Sample Name:** 04WW02-210804  
**Lab Code:** E2100887-004

**Service Request:** E2100887  
**Date Collected:** 8/ 4/21 0930  
**Date Received:** 8/ 9/21  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	0.500	0.250	0.125	5	8/13/21	8/16/21 16:32	384851	735251	



## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS21080336  
**Sample Matrix:** Ground Water  
**Sample Name:** 04WW06-210804  
**Lab Code:** E2100887-005

**Service Request:** E2100887  
**Date Collected:** 8/ 4/21 1010  
**Date Received:** 8/ 9/21  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	2.00	1.00	0.500	20	8/13/21	8/18/21 17:00	384851	735470	



## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS21080336  
**Sample Matrix:** Ground Water  
**Sample Name:** LHSMW02-210804  
**Lab Code:** E2100887-006

**Service Request:** E2100887  
**Date Collected:** 8/ 4/21 1055  
**Date Received:** 8/ 9/21  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	0.500	0.250	0.125	5	8/13/21	8/16/21 16:49	384851	735251	



## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS21080336  
**Sample Matrix:** Ground Water  
**Sample Name:** 04WW11-210804  
**Lab Code:** E2100887-007

**Service Request:** E2100887  
**Date Collected:** 8/ 4/21 1140  
**Date Received:** 8/ 9/21  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	0.500	0.250	0.125	5	8/13/21	8/16/21 16:57	384851	735251	



## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS21080336  
**Sample Matrix:** Ground Water  
**Sample Name:** 04WW11-210804-FD  
**Lab Code:** E2100887-008

**Service Request:** E2100887  
**Date Collected:** 8/ 4/21 1140  
**Date Received:** 8/ 9/21  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	0.500	0.250	0.125	5	8/13/21	8/16/21 17:15	384851	735251	





## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS21080336  
**Sample Matrix:** Ground Water  
**Sample Name:** Method Blank  
**Lab Code:** EQ2100498-01

**Service Request:** E2100887  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	0.100	0.0500	0.0250	1	8/13/21	8/13/21 12:47	384851	734969	





## Accuracy & Precision

**ALS Environmental - Houston HRMS**  
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## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080336  
**Sample Matrix:** Ground Water

**Service Request:** E2100887  
**Date Analyzed:** 8/13/21

**Lab Control Sample Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**Analytical Method:** 6850  
**Prep Method:** Method

**Units:** µg/L  
**Basis:** NA

**Extraction Lot:** 384851

Analyte Name	Lab Control Sample EQ2100498-02			Duplicate Lab Control Sample EQ2100498-03			% Rec Limits	RPD	RPD Limit
	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Perchlorate	0.115	0.100	115	0.112	0.100	112	84 - 119	3	15

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.



## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS21080336  
**Sample Matrix:** Ground Water  
**Sample Name:** Lab Control Sample  
**Lab Code:** EQ2100498-02

**Service Request:** E2100887  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.115		0.100	0.0500	0.0250	1	8/13/21	8/13/21 13:00	384851	734969	



## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS21080336  
**Sample Matrix:** Ground Water  
**Sample Name:** Duplicate Lab Control Sample  
**Lab Code:** EQ2100498-03

**Service Request:** E2100887  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.112		0.100	0.0500	0.0250	1	8/13/21	8/13/21 13:08	384851	734969	



# HS21080336 - Sub Perch IV (E2100887)

ALS WO# HS21080336



September 29, 2021

Service Request No:E2100887

Ragen Giga  
ALS Environmental - US  
10450 Stancliff Rd Suite 210  
Houston, TX 77099

**Laboratory Results for: HS21080336**

Dear Ragen,

Enclosed are the results of the sample(s) submitted to our laboratory August 09, 2021  
For your reference, these analyses have been assigned our service request number **E2100887**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current TNI standards, where applicable, and except as noted in the laboratory case narrative provided. All results are intended to be considered in their entirety and ALS Environmental is not responsible for use of less than the complete final report. Results apply only to the items submitted to the laboratory, as received for analysis. In accordance with the current TNI Standard, a statement on the estimated uncertainty of measurement of any quantitative analysis will be supplied upon request.

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Corey Grandits  
Project Manager

ADDRESS 10450 Stancliff Rd., Suite 210, Houston, TX 77099  
PHONE +1 281 530 5656 | FAX +1 281 530 5887  
ALS Group USA, Corp.  
dba ALS Environmental





# Certificate of Analysis

**ALS Environmental - Houston HRMS**  
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[www.alsglobal.com](http://www.alsglobal.com)





## ALS Environmental

**Client:** ALS Houston  
**Project:** HS21080336  
**Sample Matrix:** W

**Service Request No.:** E2100887  
**Date Received:** 08/09/21

## CASE NARRATIVE

All analyses were performed in adherence to the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II. When appropriate to the method, method blank results have been reported with each analytical test.

### Sample Receipt

Eight samples were received for analysis at ALS Environmental in Houston on 8/09/21.

The samples were received in good condition and are consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

### Data Validation Notes and Discussion

#### Precision and Accuracy:

EQ2100498: Laboratory Control Spike/Duplicate Laboratory Control Spike (LCS/DLCS) samples were analyzed and reported in lieu of a MS/MSD for these extraction batches. The LCS and DLCS recoveries are within QC limits.

Lowest practical dilution performed (matrix interference) for all samples in SR E2100877.

DoD certification is held for the method/matrix/analytes provided in this report.

*The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.*

*Use of ALS group USA Corp dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.*



**Client:** ALS Environmental - US  
**Project:** HS21080336

**Service Request:** E2100887

### SAMPLE CROSS-REFERENCE

<u>SAMPLE #</u>	<u>CLIENT SAMPLE ID</u>	<u>DATE</u>	<u>TIME</u>
E2100887-001	LHSMW01-210804	8/4/2021	0720
E2100887-002	04WW04-210804	8/4/2021	0805
E2100887-003	04WW08-210804	8/4/2021	0850
E2100887-004	04WW02-210804	8/4/2021	0930
E2100887-005	04WW06-210804	8/4/2021	1010
E2100887-006	LHSMW02-210804	8/4/2021	1055
E2100887-007	04WW11-210804	8/4/2021	1140
E2100887-008	04WW11-210804-FD	8/4/2021	1140

**Service Request Summary**

**Folder #:** E2100887  
**Client Name:** ALS Environmental - US  
**Project Name:** HS21080336  
**Project Number:**  
**Report To:** Ragen Giga  
 ALS Environmental - US  
 10450 Standliff Rd Suite 210  
 Houston, TX 77099  
 USA  
**Phone Number:**  
**Cell Number:**  
**Fax Number:**  
**E-mail:** ragenp.giga@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 08/09/21  
**Internal Due Date:** 8/20/2021  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS21080336  
**EDD:** No EDD Specified

8 120 mL-Plastic Bottle Natural WM Unpreserved

**Location:** EHRMS-AirArch 1

**Pressure Gas:**

				HOUSTON
				CIO4 DOD/6850
Lab Samp No.	Client Samp No	Matrix	Collected	
E2100887-001	LHSMW01-210804	Ground Water	08/04/21 0720	IV
E2100887-002	04WW04-210804	Ground Water	08/04/21 0805	IV
E2100887-003	04WW08-210804	Ground Water	08/04/21 0850	IV
E2100887-004	04WW02-210804	Ground Water	08/04/21 0930	IV
E2100887-005	04WW06-210804	Ground Water	08/04/21 1010	IV
E2100887-006	LHSMW02-210804	Ground Water	08/04/21 1055	IV
E2100887-007	04WW11-210804	Ground Water	08/04/21 1140	IV
E2100887-008	04WW11-210804-FD	Ground Water	08/04/21 1140	IV

**Service Request Summary**

**Folder #:** E2100887  
**Client Name:** ALS Environmental - US  
**Project Name:** HS21080336  
**Project Number:**  
  
**Report To:** Ragen Giga  
 ALS Environmental - US  
 10450 Standliff Rd Suite 210  
 Houston, TX 77099  
 USA  
  
**Phone Number:**  
**Cell Number:**  
**Fax Number:**  
**E-mail:** ragenp.giga@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 08/09/21  
**Internal Due Date:** 8/20/2021  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS21080336  
**EDD:** No EDD Specified

8 120 mL-Plastic Bottle Natural WM Unpreserved  
**Location:** EHRMS-AirArch 1  
**Pressure Gas:**

**Test Comments:**

Group	Test/Method	Samples	Comments
Semivola GCMS	CIO4 DOD/6850	8	IV due 8/27

## Data Qualifiers

### Lab Standard

- + Possible Tedlar bag artifact.
- A TIC is a suspected aldol-condensation product
- B Analyte found in the associated method blank as well as in the sample.
- BC Reported results are not blank corrected.
- BH The back section of the tube yielded higher results than the front.
- BT Results indicated possible breakthrough; back section  $\geq 10\%$  front section.
- C Result identification confirmed.
- D Compound identified in an analysis at a secondary dilution factor
- D Spike was diluted out
- DE Reported results are corrected for desorption efficiency.
- E Estimated value. Concentration above calibration range
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- H1 Sample analysis performed past holding time. See case narrative.
- H2 Initial analysis within holding time. Reanalysis for the required dilution was past holding time.
- H3 Sample was received and analyzed past holding time.
- H4 Sample was extracted past required extraction holding time, but analyzed within analysis holding time. See case narrative.
- I Internal standard not within the specified limits. See case narrative.
- J Estimated Value. Concentration found below MRL.
- K A deflection in the QC ion may indicate interference with the quantitation of this ion. The concentration of this analyte should be considered as an estimate.
- K Analyte was detected above the method reporting limit prior to normalization.
- K The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- L1 Laboratory control sample recovery outside the specified limits; results may be biased high.
- L2 Laboratory control sample recovery outside the specified limits; results may be biased low.
- L3 Laboratory control sample recovery outside the specified limits.
- M Matrix interference; results may be biased high.
- M The duplicate injection precision not met.
- M1 Matrix interference due to coelution with a non-target compound; results may be biased high.
- N Presumptive evidence of a compound for TICs that have been identified based on a mass spectral library search.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.



## Data Qualifiers

### Lab Standard

- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- P Indicates chlorodiphenyl ether interference present at the retention time of the target compound.
- P Pesticide/Aroclor target analyte > 40% difference for detected concentrations between GC columns
- Q Indicates as estimated value because the P and P + 2 theoretical abundance ratio does not meet method criteria.
- R Duplicate Precision not met.
- R1 Duplicate precision not within the specified limits; however, the results are below the MRL and considered estimated.
- S Surrogate recovery not within specified limits.
- S The reported value was determined by the Method of Standard Additions (MSA).
- T Analyte is a tentatively identified compound, result is estimated.
- U Compound was analyzed for, but was not detected (ND).
- V1 The continuing calibration verification standard was outside (biased high) the specified limits for this compound.
- V2 The continuing calibration verification standard was outside (biased low) the specified limits for this compound.
- W Result quantified, but the corresponding peak was detected outside the generated retention time window.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- X See case narrative.
- Y Recovery outside limits
- Y The chromatogram resembles a petroleum product but does not match the calibration standard.
- Z The chromatogram does not resemble a petroleum product.
- i The MRL/MDL has been elevated due to a matrix interference.

## ALS Laboratory Group

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### Acronyms

Cal	Calibration
Conc	CONCetration
Dioxin(s)	Polychlorinated dibenzo-p-dioxin(s)
EDL	Estimated Detection Limit
EMPC	Estimated Maximum Possible Concentration
Flags	Data qualifiers
Furan(s)	Polychlorinated dibenzofuran(s)
g	Grams
ICAL	Initial CALibration
ID	IDentifier
Ions	Masses monitored for the analyte during data acquisition
L	Liter (s)
LCS	Laboratory Control Sample
DLCS	Duplicate Laboratory Control Sample
MB	Method Blank
MCL	Method Calibration Limit
MDL	Method Detection Limit
mL	Milliliters
MS	Matrix Spiked sample
DMS	Duplicate Matrix Spiked sample
NO	Number of peaks meeting all identification criteria
PCDD(s)	Polychlorinated dibenzo-p-dioxin(s)
PCDF(s)	Polychlorinated dibenzofuran(s)
ppb	Parts per billion
ppm	Parts per million
ppq	Parts per quadrillion
ppt	Parts per trillion
QA	Quality Assurance
QC	Quality Control
Ratio	Ratio of areas from monitored ions for an analyte
% Rec.	Percent recovery
RPD	Relative Percent Difference
RRF	Relative Response Factor
RT	Retention Time
SDG	Sample Delivery Group
S/N	Signal-to-noise ratio
TEF	Toxicity Equivalence Factor
TEQ	Toxicity Equivalence Quotient



### State Certifications, Accreditations, and Licenses

Agency	Number	Expire Date
American Association for Laboratory Accreditation	2897.01 2020	11/30/2021
Arkansas Department of Environmental Quality	19-028-0	6/30/2022
Arkansas Department of Environmental Quality	21-022-0	3/26/2022
Department of Defense	A2LA 2897.01	11/30/2021
Florida Department of Health	E87611-33	6/30/2022
Hawaii Department of Health	2021-2022	4/30/2022
Kansas Department of Health and Environment	E-10352 2022	7/31/2022
Louisiana Department of Environmental Quality	03087-2021	6/30/2022
Louisiana Department of Health and Hospitals	LA028-2021	12/31/2021
Maine Department of Health and Human Services	2020016	6/5/2022
Minnesota Department of Health	2021671	12/31/2021
Nevada Department of Conservation and Natural Resources	TX026932022-1	7/31/2022
New Hampshire Environmental Laboratory Accreditation Program	209421	4/24/2022
Oklahoma Department of Environmental Quality	2020-123	8/31/2021
Pennsylvania Department of Environmental Protection	68-03441-015	6/30/2022
Tennessee Department of Environment and Conservation	04016-2021	4/30/2022
Texas Commission on Environmental Quality	T104704231-21-27	4/30/2022
United States Department of Agriculture	P330-19-00299	10/10/2022





## Chain of Custody

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
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## Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 16642

**SUBCONTRACT TO:**

ALS Environmental  
10450 Stancliff Road Suite 210  
Houston, TX 77084

**Phone:** +1 281 530 5656

**CUSTOMER  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Ragen Giga  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Email:** RagenP.Giga@ALSGlobal.com  
**Alternate  
Contact:** Jumoke M. Lawal  
**Email:** jumoke.lawal@alsglobal.com

**INVOICE  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Accounts Payable  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Reference:** HS21080336  
**TSR:** Sonia West

	LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
	ANALYSIS REQUESTED			DUE DATE
1.	HS21080336-01	LHSMW01-210804	Groundwater	04 Aug 2021 07:20
	Level II and Level IV reports on a separate pdf. Send WOA to Vicki Graves.			20 Aug 2021
2.	HS21080336-02	04WW04-210804	Groundwater	04 Aug 2021 08:05
	Level II and Level IV reports on a separate pdf. Send WOA to Vicki Graves.			20 Aug 2021
3.	HS21080336-03	04WW08-210804	Groundwater	04 Aug 2021 08:50
	Level II and Level IV reports on a separate pdf. Send WOA to Vicki Graves.			20 Aug 2021
4.	HS21080336-04	04WW02-210804	Groundwater	04 Aug 2021 09:30
	Level II and Level IV reports on a separate pdf. Send WOA to Vicki Graves.			20 Aug 2021
5.	HS21080336-05	04WW06-210804	Groundwater	04 Aug 2021 10:10
	Level II and Level IV reports on a separate pdf. Send WOA to Vicki Graves.			20 Aug 2021
6.	HS21080336-06	LHSMW02-210804	Groundwater	04 Aug 2021 10:55
	Level II and Level IV reports on a separate pdf. Send WOA to Vicki Graves.			20 Aug 2021
7.	HS21080336-07	04WW11-210804	Groundwater	04 Aug 2021 11:40
	Level II and Level IV reports on a separate pdf. Send WOA to Vicki Graves.			20 Aug 2021
8.	HS21080336-08	04WW11-210804-FD	Groundwater	04 Aug 2021 11:40





## Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 16642

LAB SAMPLE ID CLIENT SAMPLE ID

MATRIX

COLLECT DATE

ANALYSIS REQUESTED

DUE DATE

Level II and Level IV reports on a seperate pdf. Send WOA to Vicki Graves.

20 Aug 2021

**Comments:** Please analyze for the analysis listed above.  
Send report to the emails shown above.

**QC Level:** DOD IV (DoD Data Package)

Relinquished By:

Date/Time:

Received By:

Date/Time:

Cooler ID(s):

Temperature(s):

*[Handwritten signature]*  
*[Handwritten signature]*  
*[Handwritten signature]*

*[Handwritten signature]*  
*[Handwritten signature]*  
*[Handwritten signature]*





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Houston, TX 77099  
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**www.alsglobal.com**

## Sample Receipt Checklist

<b>Work Order ID:</b> HS21080336	<b>Date/Time received:</b> 06 Aug 2021 08:45
<b>Client name:</b> Aptim Environmental & Infrastructure, Inc.	<b>Received by:</b> Jared R. Makan

---

<b>Completed/By:</b> 06 Aug 2021 20:36	Paresh M. Giga	<b>Reviewed/By:</b> 09 Aug 2021 15:09	Ragen Giga
Date/Time	eSignature	Date/Time	eSignature

---

**Matrices:** Water

**Carrier name:** FedEx Priority Overnight

<b>Shipping container/cooler in good condition?</b>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Not Present
<b>Custody seals intact on shipping container/cooler?</b>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Not Present
<b>Custody seals intact on Sample bottles?</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Not Present
<b>VOA/TX1005/TX1006 Solids in hermetically sealed vials?</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Not Present
<b>Chain of custody present?</b>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	1 Page(s)
<b>Chain of custody signed when relinquished and received?</b>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	COC ID(s): none
<b>Samplers name present on COC?</b>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
<b>Chain of custody agrees with sample labels?</b>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
<b>Samples in proper container/bottle?</b>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
<b>Sample containers intact?</b>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
<b>Sufficient sample volume for indicated test?</b>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
<b>All samples received within holding time?</b>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
<b>Container/Temp Blank temperature in compliance?</b>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	

---

**Temperature(s)/Thermometer(s):** 4.2C U/C IR31

---

**Cooler Information:** 1 Cooler(s), 24862

---

**Date/Time sample(s) sent to storage:** 8/6/2021 20:45

---

<b>Water - VOA vials have zero headspace?</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> No VOA vials submitted
<b>Water - pH acceptable upon receipt?</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Not Applicable
<b>pH adjusted?</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Not Applicable

**pH adjusted by:** \_\_\_\_\_

**Login notes:** \_\_\_\_\_

---

**Client contacted:** \_\_\_\_\_ **Date contacted:** \_\_\_\_\_ **Person contacted:** \_\_\_\_\_

**Contacted by:** \_\_\_\_\_ **Regarding:** \_\_\_\_\_

**Comments:** \_\_\_\_\_

**Corrective action:** \_\_\_\_\_





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## SAMPLE ACCEPTANCE POLICY

This policy outlines the criteria samples must meet to be accepted by ALS Environmental – Houston HRMS.

### **Cooler Custody Seals (desirable, mandatory if specified in SAP):**

- ✓ Intact on outside of cooler, signed and dated

### **Chain-of-Custody (COC) documentation (mandatory):**

The following is required on each COC:

- ✓ Sample ID, the location, date and time of collection, collector's name, preservation type, sample type, and any other special remarks concerning the sample. The COC must be completed in ink.
- ✓ Signature and date of relinquishing party.

In the absence of a COC at sample receipt, the COC will be requested from the client.

### **Sample Integrity (mandatory):**

Samples are inspected upon arrival to ensure that sample integrity was not compromised during transfer to the laboratory.

- ✓ Sample containers must arrive in good condition (not broken or leaking).
- ✓ Samples must be labeled appropriately, including Sample IDs, and requested test using durable labels and indelible ink.
- ✓ The correct type of sample bottle must be used for the method requested.
- ✓ An appropriate sample volume, or weight, must be received.
- ✓ Sample IDs and number of containers must reconcile with the COC.
- ✓ Samples must be received within the method defined holding time.

### **Temperature Requirement (varies by sample matrix):**

- ✓ Aqueous and Non-aqueous samples must be shipped and stored cold, at 0 to 6°C.
- ✓ Tissue samples must be shipped and stored frozen, at -20 to -10°C.
- ✓ Air samples are shipped and stored cold, at 0 to 6°C
- ✓ The sample temperature must be recorded on the COC

All cooler inspections are documented on the Cooler Receipt Form (CRF). A separate CRF is completed for each service request. Any samples not meeting the above criteria are noted on the CRF and the Project Manager notified. The Project Manager must resolve any sample integrity issues with the client prior to proceeding with the analysis. Such resolutions are documented in writing and filed with the project folder. Data associated with samples received outside of this acceptance policy will be qualified on the case narrative of the final report.





# Preparation Information Benchsheets

**ALS Environmental - Houston HRMS**  
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**Preparation Information Benchsheet**

**Prep Run#:** 384851  
**Team:** Semivoa GCMS/GRIVERA

**Prep WorkFlow:** GenExt28Day  
**Prep Method:** Method

**Status:** Prepped  
**Prep Date/Time:** 8/13/21 14:25

#	Lab Code	Client ID	B#	Method /Test	pH	Cl	Matrix	Amt. Ext.	Sample Description
1	E2100887-001	LHSMW01-210804	.01	6850/CIO4 DOD			Ground Water	10mL	
2	E2100887-002	04WW04-210804	.01	6850/CIO4 DOD			Ground Water	10mL	
3	E2100887-003	04WW08-210804	.01	6850/CIO4 DOD			Ground Water	10mL	
4	E2100887-004	04WW02-210804	.01	6850/CIO4 DOD			Ground Water	10mL	
5	E2100887-005	04WW06-210804	.01	6850/CIO4 DOD			Ground Water	10mL	
6	E2100887-006	LHSMW02-210804	.01	6850/CIO4 DOD			Ground Water	10mL	
7	E2100887-007	04WW11-210804	.01	6850/CIO4 DOD			Ground Water	10mL	
8	E2100887-008	04WW11-210804-FD	.01	6850/CIO4 DOD			Ground Water	10mL	
9	E2100895-001	LH18/24-SP650_081121_BIX	.01	6850/CIO4 DOD			Water	10mL	
10	EQ2100498-01	MB		6850/CIO4 DOD			Liquid	10mL	
11	EQ2100498-02	LCS		6850/CIO4 DOD			Liquid	10mL	
12	EQ2100498-03	DLCS		6850/CIO4 DOD			Liquid	10mL	

**Spiking Solutions**

Name:	Sodium Perchlorate 1 ug/mL (IS) (18-O) as CLO4	Inventory ID	214765	Logbook Ref:	Sodium Perchlorate	Expires On:	12/11/2022
-------	--	--------------	--------	--------------	--------------------	-------------	------------

E2100887-001	100.00µL	E2100887-002	100.00µL	E2100887-003	100.00µL	E2100887-004	100.00µL	E2100887-005	100.00µL	E2100887-006	100.00µL
E2100887-007	100.00µL	E2100887-008	100.00µL	E2100895-001	100.00µL	EQ2100498-01	100.00µL	EQ2100498-02	100.00µL	EQ2100498-03	100.00µL

Name:	Perchlorate Intermediate Stock1	Inventory ID	217422	Logbook Ref:	Perchlorate	Expires On:	11/26/2021
-------	---------------------------------	--------------	--------	--------------	-------------	-------------	------------

E2100887-001	1.00µL	EQ2100498-02	1.00µL	EQ2100498-03	1.00µL
--------------	--------	--------------	--------	--------------	--------

**Preparation Materials**

Water HPLC Grade	08/03/2021 Water (218530)	537M Glass Culture Tubes	537M Glass Tubes (218064)
------------------	---------------------------	--------------------------	---------------------------

**Preparation Steps**

Step: Preparation  
 Started: 8/13/21 14:25  
 Finished: 8/13/21 15:30  
 By: GRIVERA  
 Comments

Comments: \_\_\_\_\_

Reviewed By: GR Date: 8/13/21



# Analytical Results

**ALS Environmental - Houston HRMS**  
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## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS21080336  
**Sample Matrix:** Ground Water  
**Sample Name:** LHSMW01-210804  
**Lab Code:** E2100887-001

**Service Request:** E2100887  
**Date Collected:** 8/ 4/21 0720  
**Date Received:** 8/ 9/21  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	0.200	0.100	0.0500	2	8/13/21	8/16/21 14:47	384851	735251	



## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS21080336  
**Sample Matrix:** Ground Water  
**Sample Name:** 04WW04-210804  
**Lab Code:** E2100887-002

**Service Request:** E2100887  
**Date Collected:** 8/ 4/21 0805  
**Date Received:** 8/ 9/21  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	0.500	0.250	0.125	5	8/13/21	8/16/21 16:14	384851	735251	



## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS21080336  
**Sample Matrix:** Ground Water  
**Sample Name:** 04WW08-210804  
**Lab Code:** E2100887-003

**Service Request:** E2100887  
**Date Collected:** 8/ 4/21 0850  
**Date Received:** 8/ 9/21  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	1.00	0.500	0.250	10	8/13/21	8/18/21 11:21	384851	735470	



## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS21080336  
**Sample Matrix:** Ground Water  
**Sample Name:** 04WW02-210804  
**Lab Code:** E2100887-004

**Service Request:** E2100887  
**Date Collected:** 8/ 4/21 0930  
**Date Received:** 8/ 9/21  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	0.500	0.250	0.125	5	8/13/21	8/16/21 16:32	384851	735251	



## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS21080336  
**Sample Matrix:** Ground Water  
**Sample Name:** 04WW06-210804  
**Lab Code:** E2100887-005

**Service Request:** E2100887  
**Date Collected:** 8/ 4/21 1010  
**Date Received:** 8/ 9/21  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	2.00	1.00	0.500	20	8/13/21	8/18/21 17:00	384851	735470	



## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS21080336  
**Sample Matrix:** Ground Water  
**Sample Name:** LHSMW02-210804  
**Lab Code:** E2100887-006

**Service Request:** E2100887  
**Date Collected:** 8/ 4/21 1055  
**Date Received:** 8/ 9/21  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	0.500	0.250	0.125	5	8/13/21	8/16/21 16:49	384851	735251	



## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS21080336  
**Sample Matrix:** Ground Water  
**Sample Name:** 04WW11-210804  
**Lab Code:** E2100887-007

**Service Request:** E2100887  
**Date Collected:** 8/ 4/21 1140  
**Date Received:** 8/ 9/21  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	0.500	0.250	0.125	5	8/13/21	8/16/21 16:57	384851	735251	



## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS21080336  
**Sample Matrix:** Ground Water  
**Sample Name:** 04WW11-210804-FD  
**Lab Code:** E2100887-008

**Service Request:** E2100887  
**Date Collected:** 8/ 4/21 1140  
**Date Received:** 8/ 9/21  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	0.500	0.250	0.125	5	8/13/21	8/16/21 17:15	384851	735251	





## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS21080336  
**Sample Matrix:** Ground Water  
**Sample Name:** Method Blank  
**Lab Code:** EQ2100498-01

**Service Request:** E2100887  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	0.100	0.0500	0.0250	1	8/13/21	8/13/21 12:47	384851	734969	





## Accuracy & Precision

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## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080336  
**Sample Matrix:** Ground Water

**Service Request:** E2100887  
**Date Analyzed:** 8/13/21

**Lab Control Sample Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**Analytical Method:** 6850  
**Prep Method:** Method

**Units:** µg/L  
**Basis:** NA

**Extraction Lot:** 384851

Analyte Name	Lab Control Sample EQ2100498-02			Duplicate Lab Control Sample EQ2100498-03			% Rec Limits	RPD	RPD Limit
	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Perchlorate	0.115	0.100	115	0.112	0.100	112	84 - 119	3	15

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.



## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS21080336  
**Sample Matrix:** Ground Water  
**Sample Name:** Lab Control Sample  
**Lab Code:** EQ2100498-02

**Service Request:** E2100887  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.115		0.100	0.0500	0.0250	1	8/13/21	8/13/21 13:00	384851	734969	



## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS21080336  
**Sample Matrix:** Ground Water  
**Sample Name:** Duplicate Lab Control Sample  
**Lab Code:** EQ2100498-03

**Service Request:** E2100887  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.112		0.100	0.0500	0.0250	1	8/13/21	8/13/21 13:08	384851	734969	





# Initial Calibration

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)



20210804

1st Review:

2nd Review:

Grivena

Kneir



ICAL Date: 8/4/2021

Cat. Std. xp: 11/26/2021

ICAL ID: EC2100057

Mobile Phases

A: 0.75% Formic Acid/Water 3100813-08

B: MeOH 216350

		File Name	Acquisition Method	Dilution	R	Comments	Date/Time
1	PERCHLORATE1	20210804_014	Perchlorate6850c.lcm	1x	☑	3100812-01	8/4/2021 13:15
2	PERCHLORATE2	20210804_015	Perchlorate6850c.lcm	1x	☑	3100812-02	8/4/2021 13:24
3	PERCHLORATE3	20210804_016	Perchlorate6850c.lcm	1x	☑	3100812-03	8/4/2021 13:32
4	PERCHLORATE4	20210804_017	Perchlorate6850c.lcm	1x	☑	3100812-04	8/4/2021 13:41
5	PERCHLORATE5	20210804_018	Perchlorate6850c.lcm	1x	☑	3100812-05	8/4/2021 13:50
6	PERCHLORATE6	20210804_019	Perchlorate6850c.lcm	1x	☑	3100812-06	8/4/2021 13:58
7	PERCHLORATE7	20210804_020	Perchlorate6850c.lcm	1x	☑	3100812-07	8/4/2021 14:07
8	PERCHLORATE8	20210804_021	Perchlorate6850c.lcm	1x	☑	3100812-08	8/4/2021 14:15
9	PERCHLORATE9	20210804_022	Perchlorate6850c.lcm	1x	☑	3100812-09	8/4/2021 14:24
10	PERCHLORATE10	20210804_023	Perchlorate6850c.lcm	1x	☑	3100813-01	8/4/2021 14:32
11	PERCHLORATEICV	20210804_024	Perchlorate6850c.lcm	1x	☑	3100811-06	8/4/2021 14:41
12	LODV	20210804_025	Perchlorate6850c.lcm	1x	☑		8/4/2021 15:06
13	PERCHLORATE7	20210804_026	Perchlorate6850c.lcm	1x	☑	3100812-07	8/4/2021 15:15
14	E2100824-001X5	20210804_028	Perchlorate6850c.lcm	5x	☑		8/4/2021 15:33
15	E2100825-001X10	20210804_029	Perchlorate6850c.lcm	10x	☑	INST out of range	8/4/2021 15:42
16	E2100825-002X10	20210804_030	Perchlorate6850c.lcm	10x	☑	INST out of range	8/4/2021 15:51
17	E2100825-003X10	20210804_031	Perchlorate6850c.lcm	10x	☑	INST out of range	8/4/2021 15:59
18	E2100825-005X10	20210804_032	Perchlorate6850c.lcm	10x	☑	INST out of range	8/4/2021 16:08
19	E2100825-006X10	20210804_033	Perchlorate6850c.lcm	10x	☑	INST out of range	8/4/2021 16:16
20	E2100825-007X10	20210804_034	Perchlorate6850c.lcm	10x	☑	INST out of range	8/4/2021 16:25
21	E2100825-008X10	20210804_035	Perchlorate6850c.lcm	10x	☑	INST out of range	8/4/2021 16:33
22	E2100831-002X5	20210804_036	Perchlorate6850c.lcm	5x	☑		8/4/2021 16:42
23	PERCHLORATE7	20210804_037	Perchlorate6850c.lcm	1x	☑	3100812-07	8/4/2021 16:50
24	E2100856-001X10	20210804_039	Perchlorate6850c.lcm	10x	☑		8/4/2021 18:18
25	E2100856-002X5	20210804_040	Perchlorate6850c.lcm	5x	☑	INST out of range	8/4/2021 18:27
26	E2100856-004X5	20210804_041	Perchlorate6850c.lcm	5x	☑	INST out of range	8/4/2021 18:35
27	E2100825-001X20	20210804_042	Perchlorate6850c.lcm	20x	☑	INST out of range	8/4/2021 18:44
28	E2100825-002X20	20210804_043	Perchlorate6850c.lcm	20x	☑	INST out of range	8/4/2021 18:52
29	E2100825-003X20	20210804_044	Perchlorate6850c.lcm	20x	☑	INST out of range	8/4/2021 19:01
30	E2100825-006X20	20210804_045	Perchlorate6850c.lcm	20x	☑	No injection	8/4/2021 18:05
31	E2100825-005X20	20210804_045-1	Perchlorate6850c.lcm	20x	☑		8/4/2021 19:09
32	E2100825-006X20	20210804_046	Perchlorate6850c.lcm	20x	☑	INST out of range	8/4/2021 19:18
33	E2100825-007X20	20210804_047	Perchlorate6850c.lcm	20x	☑	INST out of range	8/4/2021 19:26
34	PERCHLORATE7	20210804_048	Perchlorate6850c.lcm	1x	☑	3100812-07	8/4/2021 19:35
35	E2100825-008X20	20210804_049	Perchlorate6850c.lcm	20x	☑	INST out of range	8/4/2021 19:43
37	E2100856-002X20	20210804_051	Perchlorate6850c.lcm	20x	☑	INST out of range	8/4/2021 20:00
38	E2100856-004X20	20210804_052	Perchlorate6850c.lcm	20x	☑	INST out of range	8/4/2021 20:09
39	E2100837-001X10	20210804_053	Perchlorate6850c.lcm	10x	☑		8/4/2021 20:18
40	E2100837-002X10	20210804_054	Perchlorate6850c.lcm	10x	☑		8/4/2021 20:26
41	E2100837-004X10	20210804_055	Perchlorate6850c.lcm	10x	☑		8/4/2021 20:35
42	E2100837-005X10	20210804_056	Perchlorate6850c.lcm	10x	☑		8/4/2021 20:43
43	E2100837-007X10	20210804_057	Perchlorate6850c.lcm	10x	☑		8/4/2021 20:52
44	PERCHLORATE7	20210804_058	Perchlorate6850c.lcm	1x	☑	3100812-07	8/4/2021 21:00
45	E2100841-008	20210804_059	Perchlorate6850c.lcm	1x	☑		8/4/2021 21:09
46	E2100841-009	20210804_060	Perchlorate6850c.lcm	1x	☑		8/4/2021 21:17
47	E2100842-001X2	20210804_061	Perchlorate6850c.lcm	2x	☑	3100812-07	8/4/2021 21:26
48	E2100842-002X10	20210804_062	Perchlorate6850c.lcm	10x	☑		8/4/2021 21:34
49	E2100842-003X10	20210804_063	Perchlorate6850c.lcm	10x	☑		8/4/2021 21:43
50	E2100842-004X10	20210804_064	Perchlorate6850c.lcm	10x	☑		8/4/2021 21:52
51	E2100842-005	20210804_065	Perchlorate6850c.lcm	1x	☑	INST out of range	8/4/2021 22:00
52	E2100842-006X10	20210804_066	Perchlorate6850c.lcm	10x	☑		8/4/2021 22:09
53	PERCHLORATE7	20210804_067	Perchlorate6850c.lcm	1x	☑	3100812-07	8/4/2021 22:17
54	E2100843-001	20210804_068	Perchlorate6850c.lcm	1x	☑	INST out of range	8/4/2021 22:26
55	E2100843-002	20210804_069	Perchlorate6850c.lcm	1x	☑	INST out of range	8/4/2021 22:34
56	E2100843-003	20210804_070	Perchlorate6850c.lcm	1x	☑	INST out of range	8/4/2021 22:43
57	PERCHLORATE7	20210804_071	Perchlorate6850c.lcm	1x	☑	3100812-07	8/4/2021 22:51
58	E2100843-004	20210804_072	Perchlorate6850c.lcm	1x	☑	INST out of range	8/4/2021 23:00
59	E2100843-005	20210804_073	Perchlorate6850c.lcm	1x	☑	INST out of range	8/4/2021 23:08
60	E2100843-006	20210804_074	Perchlorate6850c.lcm	1x	☑	INST out of range	8/4/2021 23:17
61	E2100843-007	20210804_075	Perchlorate6850c.lcm	1x	☑		8/4/2021 23:26
62	E2100843-008	20210804_076	Perchlorate6850c.lcm	1x	☑		8/4/2021 23:34
63	E2100843-009	20210804_077	Perchlorate6850c.lcm	1x	☑	INST out of range	8/4/2021 23:43
64	E2100844-001	20210804_078	Perchlorate6850c.lcm	1x	☑	INST out of range	8/4/2021 23:51
65	E2100844-002	20210804_079	Perchlorate6850c.lcm	1x	☑	INST out of range	8/5/2021 0:00
66	E2100844-003	20210804_080	Perchlorate6850c.lcm	1x	☑	INST out of range	8/5/2021 0:08
67	E2100844-004	20210804_081	Perchlorate6850c.lcm	1x	☑		8/5/2021 0:17



20210804



ICAL Date: 8/4/2021

Cat. Std. xp: 11/26/2021

ICAL ID: EC2100057

1st Review:

Grivena

2nd Review:

Kneir

LCMS01 -Shimadzu 8050

Mobile Phases

A: 0.75% Formic Acid/Water 3100813-08

B: MeOH 216350

		File Name	Acquisition Method	Dilution	R	Comments	Date/Time
68	PERCHLORATE7	20210804_082	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	3100812-07	8/5/2021 0:25
69	E2100844-005	20210804_083	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	INST out of range	8/5/2021 0:34
70	E2100844-006	20210804_084	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	INST out of range	8/5/2021 0:42
71	E2100844-007	20210804_085	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	INST out of range	8/5/2021 0:51
72	E2100844-008	20210804_086	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	INST out of range	8/5/2021 1:00
73	E2100844-009	20210804_087	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	INST out of range	8/5/2021 1:08
74	PERCHLORATE7	20210804_088	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	3100812-07	8/5/2021 1:17



*Initial Calibration - Detailed Report***Calibration ID:** EC2100057**Instrument ID:** E-LCMS-01**Column Name:** 1

#	Lab Code	Sample Name	File Location	Aquisition Date
01	EC2100057-01	PERCHLORATE1	20210804_014	08/04/2021 13:15
02	EC2100057-02	PERCHLORATE2	20210804_015	08/04/2021 13:24
03	EC2100057-03	PERCHLORATE3	20210804_016	08/04/2021 13:32
04	EC2100057-04	PERCHLORATE4	20210804_017	08/04/2021 13:41
05	EC2100057-05	PERCHLORATE5	20210804_018	08/04/2021 13:50
06	EC2100057-06	PERCHLORATE6	20210804_019	08/04/2021 13:58
07	EC2100057-07	PERCHLORATE7	20210804_020	08/04/2021 14:07
08	EC2100057-08	PERCHLORATE8	20210804_021	08/04/2021 14:15
09	EC2100057-09	PERCHLORATE9	20210804_022	08/04/2021 14:24
10	EC2100057-10	PERCHLORATE10	20210804_023	08/04/2021 14:32

**Analyte****Curve Fit****Weighting****Perchlorate****Average RF****RSD = 6.011****Average RF = 0.1426**

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.1000	0.1626	02	0.5000	0.1438	03	0.7000	0.1497	04	1.0000	0.1384
05	2.0000	0.1454	06	5.0000	0.1412	07	10.0000	0.1378	08	20.0000	0.138
09	30.0000	0.1329	10	50.0000	0.136						

**Analyte****Perchlorate**

#	Amount	Calculated Conc	%D	#	Amount	Calculated Conc	%D	#	Amount	Calculated Conc	%D
01	0.1000	0.114	14.0	02	0.5000	0.504	0.9	03	0.7000	0.735	5.0
04	1.0000	0.971	-2.9	05	2.0000	2.04	2.0	06	5.0000	4.95	-1.0
07	10.0000	9.66	-3.4	08	20.0000	19.4	-3.2	09	30.0000	28.0	-6.8
10	50.0000	47.7	-4.6								



*Initial Calibration Verification Summary Report*

<b>Calibration ID:</b>	EC2100057	<b>Instrument ID:</b>	E-LCMS-01
<b>Datafile ID:</b>	20210804_024	<b>Column Name:</b>	1

Analyte	Lab Code	Type	Curve Fit	True Value	Calc Conc	Units	Result	Criteria
Perchlorate	EC2100057-11	T	Average RF	10	9.593	ng/mL	-4.1	<= 15



## Insight Report

Printed at 8/19/2021 11:52:26 AM

Method File: I:\LCMS01\DATA\20210804\20210804.lcm

Project File: I:\LCMS01\DATA\20210804\20210804.damp

## 20210804\_014

Sample ID: PERCHLORATE1

Date Acquired: 8/4/2021 1:15:49 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210804\20210804\_014.lcd

Vial: 20 | Inj. Volume: 25.0000uL | Tray: 1

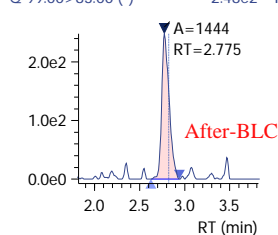
Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	M	2.775	1444	88815	1	0.1140	ng/mL	0.1000	26.05
Sodium Perchlorate-18O4_IS	Auto	2.772	88815	88815	1	1.0000	ng/mL	1.0000	----

## Perchlorate

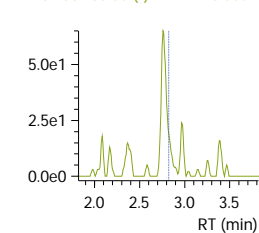
Conc 0.1140

R#1 26.05 (0.00)

Q 99.00&gt;83.00 (-)

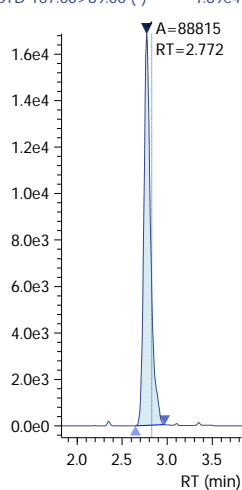


R1 101.00&gt;85.00 (-)

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

ISTD 107.00&gt;89.00 (-)



## Insight Report

Printed at 8/19/2021 11:57:47 AM

Method File: I:\LCMS01\DATA\20210804\20210802.lcm

## 20210804\_014

Sample ID: PERCHLORATE1

Date Acquired: 8/4/2021 1:15:49 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210804\Before\20210804\_014.lcd

Vial: 20 | Inj. Volume: 25.0000uL | Tray: 1

## Perchlorate

Conc 0.1060

R#1 27.47 (0.00)

Q 99.00&gt;83.00 (-)

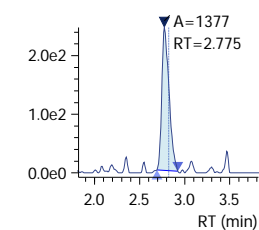
2.48e2

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

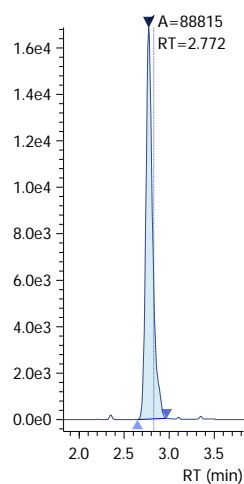
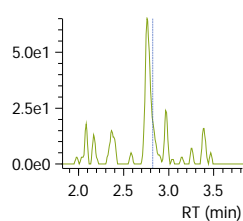
ISTD 107.00&gt;89.00 (-)

1.69e4



R1 101.00&gt;85.00 (-)

6.50e1



## Insight Report

Printed at 8/19/2021 11:52:26 AM

20210804\_015

Sample ID: PERCHLORATE2

Date Acquired: 8/4/2021 1:24:24 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210804\20210804\_015.lcd

Vial: 21 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	M	2.774	6054	84174	1	0.5044	ng/mL	0.5000	23.28
Sodium Perchlorate-18O4_IS	Auto	2.772	84174	84174	1	1.0000	ng/mL	1.0000	----

## Perchlorate

Conc 0.5044

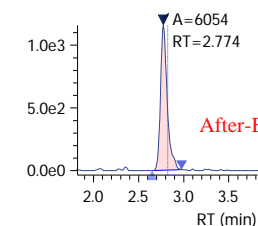
R#1 23.28 (0.00)

Q 99.00&gt;83.00 (-)

1.16e3

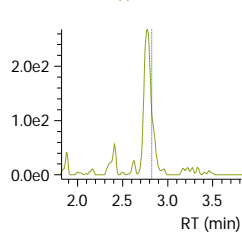
ISTD 107.00&gt;89.00 (-)

1.63e4

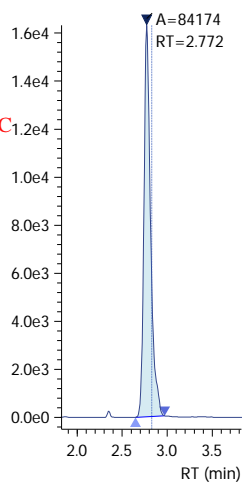


R1 101.00&gt;85.00 (-)

2.68e2

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000



## Insight Report

Printed at 8/19/2021 11:57:47 AM

20210804\_015

Sample ID: PERCHLORATE2

Date Acquired: 8/4/2021 1:24:24 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210804\Before\20210804\_015.lcd

Vial: 21 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

Sodium Perchlorate

-18O4\_IS

Conc 0.4232

Conc 1.0000

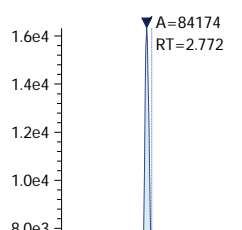
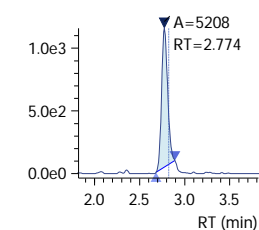
R#1 23.81 (0.00)

Q 99.00&gt;83.00 (-)

1.16e3

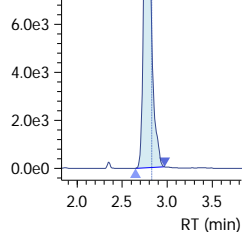
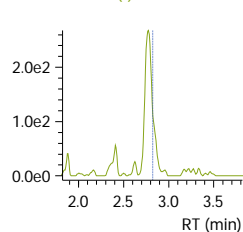
ISTD 107.00&gt;89.00 (-)

1.63e4



R1 101.00&gt;85.00 (-)

2.68e2



## Insight Report

Printed at 8/19/2021 11:52:26 AM

20210804\_016

Sample ID: PERCHLORATE3

Date Acquired: 8/4/2021 1:32:57 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210804\20210804\_016.lcd

Vial: 22 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	Auto	2.772	8848	84429	1	0.7350	ng/mL	0.7000	21.75
Sodium Perchlorate-18O4_IS	Auto	2.772	84429	84429	1	1.0000	ng/mL	1.0000	----

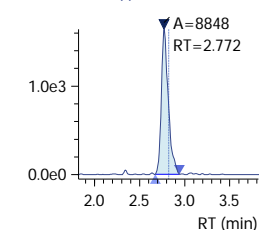
## Perchlorate

Conc 0.7350

R#1 21.75 (0.00)

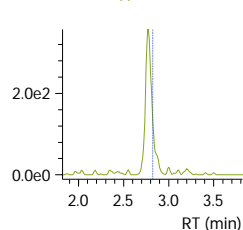
Q 99.00&gt;83.00 (-)

1.64e3



R1 101.00&gt;85.00 (-)

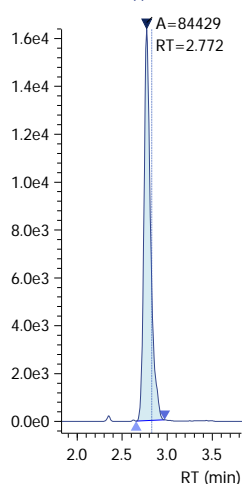
3.57e2

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

ISTD 107.00&gt;89.00 (-)

1.64e4



## Insight Report

Printed at 8/19/2021 11:57:47 AM

20210804\_016

Sample ID: PERCHLORATE3

Date Acquired: 8/4/2021 1:32:57 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210804\Before\20210804\_016.lcd

Vial: 22 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

Sodium Perchlorate

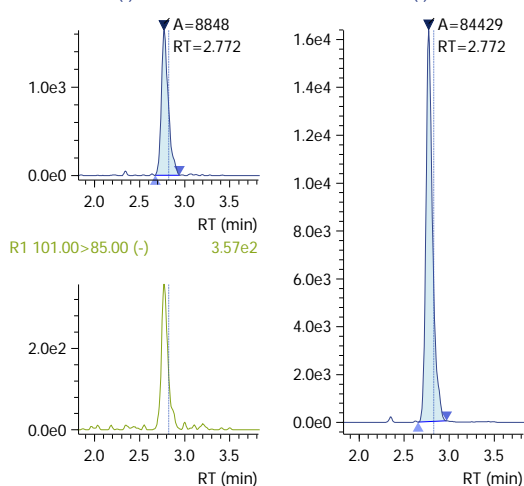
-18O4\_IS

Conc 0.7169

Conc 1.0000

R#1 21.75 (0.00)

Q 99.00&gt;83.00 (-) 1.64e3 ISTD 107.00&gt;89.00 (-) 1.64e4





## Insight Report

Printed at 8/19/2021 11:52:26 AM

20210804\_017

Sample ID: PERCHLORATE4

Date Acquired: 8/4/2021 1:41:28 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210804\20210804\_017.lcd

Vial: 23 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	M	2.777	11505	83135	1	0.9706	ng/mL	1.0000	22.57
Sodium Perchlorate-18O4_IS	Auto	2.772	83135	83135	1	1.0000	ng/mL	1.0000	----

## Perchlorate

Conc 0.9706

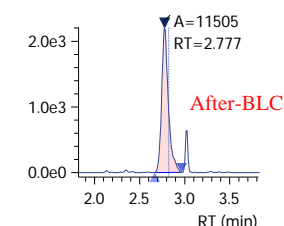
R#1 22.57 (0.00)

Q 99.00&gt;83.00 (-)

2.21e3

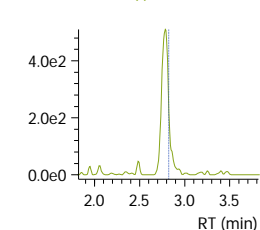
ISTD 107.00&gt;89.00 (-)

1.58e4



R1 101.00&gt;85.00 (-)

5.10e2

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

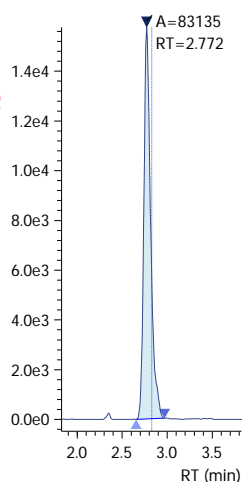
R#1 22.57 (0.00)

Q 99.00&gt;83.00 (-)

2.21e3

ISTD 107.00&gt;89.00 (-)

1.58e4



## Insight Report

Printed at 8/19/2021 11:57:47 AM

20210804\_017

Sample ID: PERCHLORATE4

Date Acquired: 8/4/2021 1:41:28 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210804\Before\20210804\_017.lcd

Vial: 23 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

Sodium Perchlorate

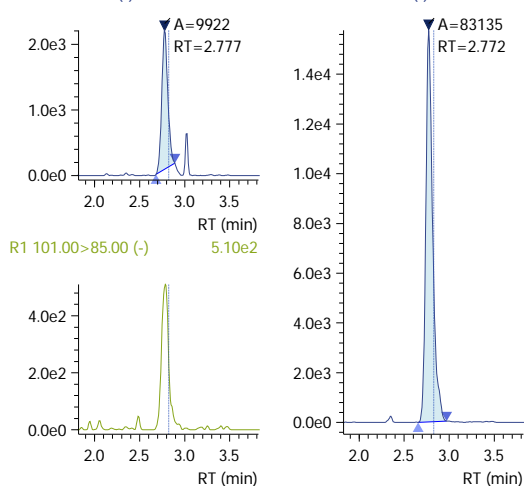
-18O4-IS

Conc 0.8164

Conc 1.0000

R#1 22.85 (0.00)

Q 99.00&gt;83.00 (-) 2.21e3 ISTD 107.00&gt;89.00 (-) 1.58e4



## Insight Report

Printed at 8/19/2021 11:52:26 AM

20210804\_018

Sample ID: PERCHLORATE5

Date Acquired: 8/4/2021 1:50:00 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210804\20210804\_018.lcd

Vial: 24 | Inj. Volume: 25.0000uL | Tray: 1

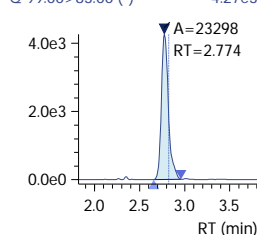
Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	Auto	2.774	23298	80133	1	2.0391	ng/mL	2.0000	23.83
Sodium Perchlorate-18O4_IS	Auto	2.773	80133	80133	1	1.0000	ng/mL	1.0000	----

## Perchlorate

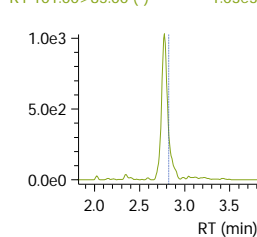
Conc 2.0391

R#1 23.83 (0.00)

Q 99.00&gt;83.00 (-)

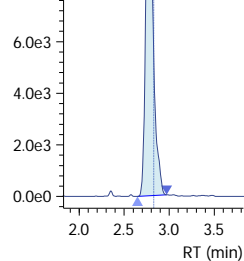
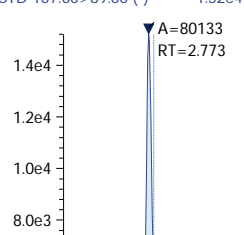


R1 101.00&gt;85.00 (-)

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

ISTD 107.00&gt;89.00 (-)



## Insight Report

Printed at 8/19/2021 11:57:47 AM

20210804\_018

Sample ID: PERCHLORATE5

Date Acquired: 8/4/2021 1:50:00 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210804\Before\20210804\_018.lcd

Vial: 24 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

Sodium Perchlorate

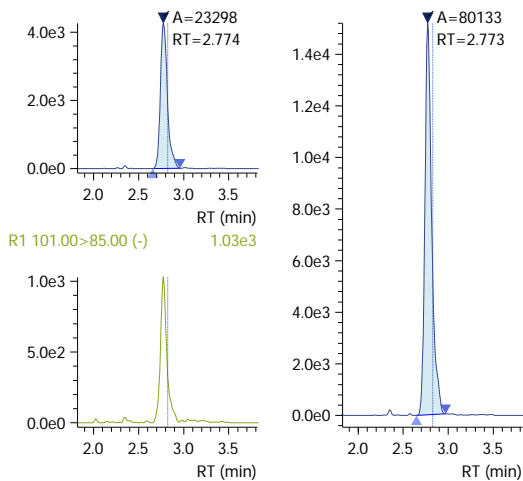
-18O4-IS

Conc 1.9889

Conc 1.0000

R#1 23.83 (0.00)

Q 99.00&gt;83.00 (-) 4.27e3 ISTD 107.00&gt;89.00 (-) 1.52e4



## Insight Report

Printed at 8/19/2021 11:52:26 AM

20210804\_019

Sample ID: PERCHLORATE6

Date Acquired: 8/4/2021 1:58:34 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210804\20210804\_019.lcd

Vial: 25 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	Auto	2.775	51305	72676	1	4.9512	ng/mL	5.0000	24.60
Sodium Perchlorate-18O4_IS	Auto	2.773	72676	72676	1	1.0000	ng/mL	1.0000	----

## Perchlorate

Conc 4.9512

R#1 24.60 (0.00)

Q 99.00&gt;83.00 (-)

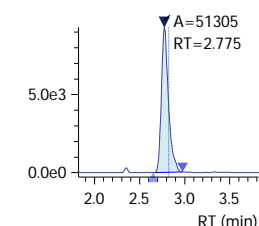
9.31e3

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

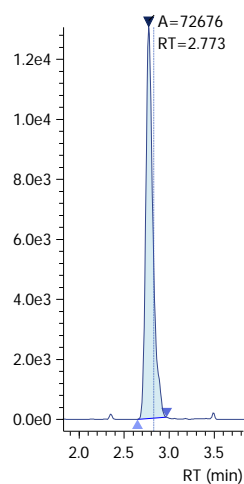
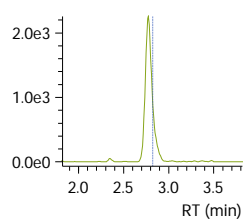
ISTD 107.00&gt;89.00 (-)

1.31e4



R1 101.00&gt;85.00 (-)

2.26e3



## Insight Report

Printed at 8/19/2021 11:57:47 AM

20210804\_019

Sample ID: PERCHLORATE6

Date Acquired: 8/4/2021 1:58:34 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210804\Before\20210804\_019.lcd

Vial: 25 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

Sodium Perchlorate

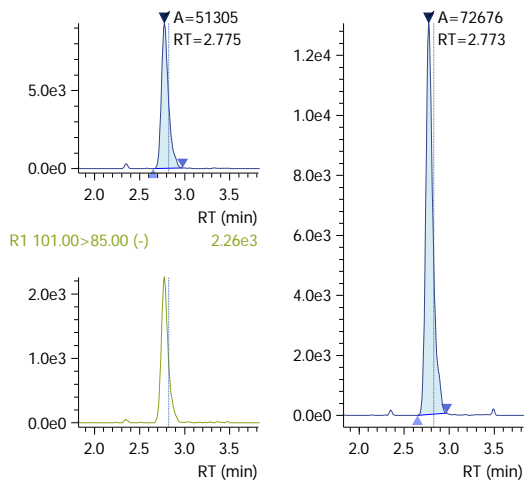
-18O4-IS

Conc 4.8291

Conc 1.0000

R#1 24.60 (0.00)

Q 99.00&gt;83.00 (-) 9.31e3 ISTD 107.00&gt;89.00 (-) 1.31e4



## Insight Report

Printed at 8/19/2021 11:52:26 AM

20210804\_020

Sample ID: PERCHLORATE7

Date Acquired: 8/4/2021 2:07:05 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210804\20210804\_020.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	Auto	2.775	90179	65443	1	9.6646	ng/mL	10.0000	22.44
Sodium Perchlorate-18O4_IS	Auto	2.772	65443	65443	1	1.0000	ng/mL	1.0000	----

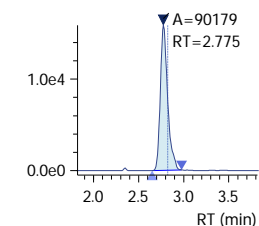
## Perchlorate

Conc 9.6646

R#1 22.44 (0.00)

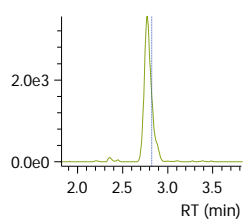
Q 99.00&gt;83.00 (-)

1.59e4



R1 101.00&gt;85.00 (-)

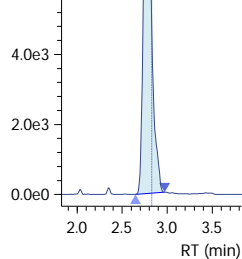
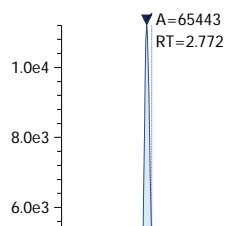
3.56e3

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

ISTD 107.00&gt;89.00 (-)

1.12e4



## Insight Report

Printed at 8/19/2021 11:57:47 AM

20210804\_020

Sample ID: PERCHLORATE7

Date Acquired: 8/4/2021 2:07:05 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210804\Before\20210804\_020.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

Sodium Perchlorate

-18O4\_IS

Conc 9.4264

Conc 1.0000

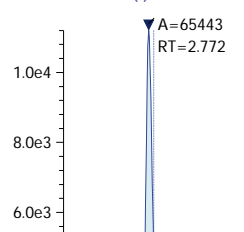
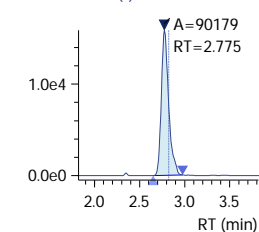
R#1 22.44 (0.00)

Q 99.00&gt;83.00 (-)

1.59e4

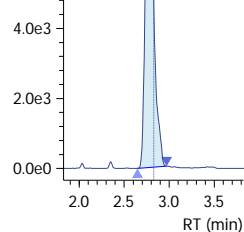
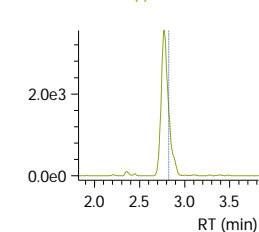
ISTD 107.00&gt;89.00 (-)

1.12e4



R1 101.00&gt;85.00 (-)

3.56e3





## Insight Report

Printed at 8/19/2021 11:52:26 AM

20210804\_021

Sample ID: PERCHLORATE8

Date Acquired: 8/4/2021 2:15:40 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210804\20210804\_021.lcd

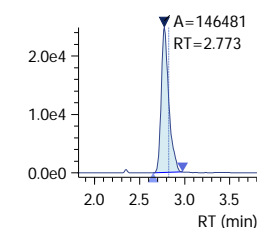
Vial: 27 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	Auto	2.773	146481	53059	1	19.3627	ng/mL	20.0000	20.71
Sodium Perchlorate-18O4_IS	Auto	2.770	53059	53059	1	1.0000	ng/mL	1.0000	----

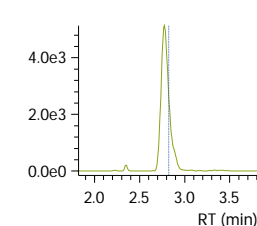
Perchlorate

Conc 19.3627  
R#1 20.71 (0.00)

Q 99.00&gt;83.00 (-) 2.49e4

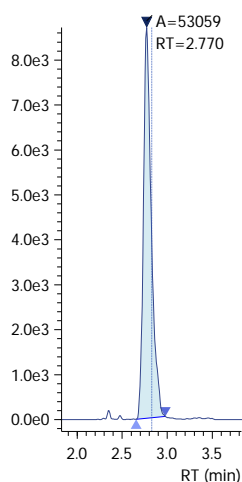


R1 101.00&gt;85.00 (-) 5.14e3

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

ISTD 107.00&gt;89.00 (-) 8.72e3



## Insight Report

Printed at 8/19/2021 11:57:47 AM

20210804\_021

Sample ID: PERCHLORATE8

Date Acquired: 8/4/2021 2:15:40 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210804\Before\20210804\_021.lcd

Vial: 27 | Inj. Volume: 25.0000uL | Tray: 1

## Perchlorate

## Sodium Perchlorate

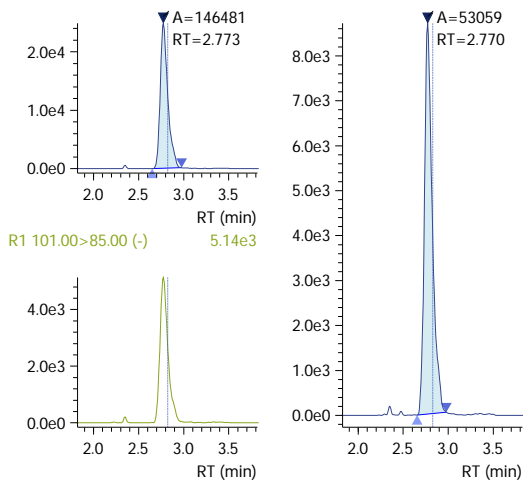
-18O4\_IS

Conc 18.8854

Conc 1.0000

R#1 20.71 (0.00)

Q 99.00&gt;83.00 (-) 2.49e4 ISTD 107.00&gt;89.00 (-) 8.72e3



## Insight Report

Printed at 8/19/2021 11:52:26 AM

20210804\_022

Sample ID: PERCHLORATE9

Date Acquired: 8/4/2021 2:24:11 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210804\20210804\_022.lcd

Vial: 28 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	Auto	2.774	191371	48015	1	27.9541	ng/mL	30.0000	21.22
Sodium Perchlorate-18O4_IS	Auto	2.774	48015	48015	1	1.0000	ng/mL	1.0000	----

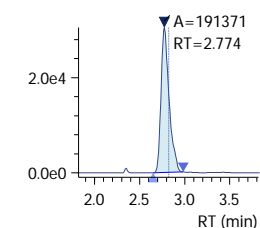
## Perchlorate

Conc 27.9541

R#1 21.22 (0.00)

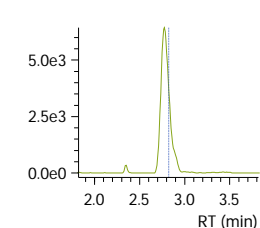
Q 99.00&gt;83.00 (-)

3.05e4



R1 101.00&gt;85.00 (-)

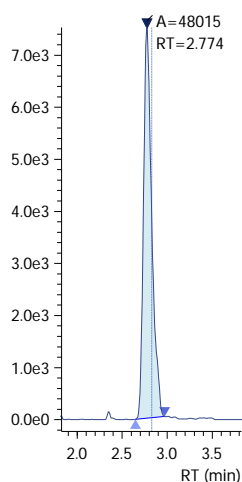
6.44e3

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

ISTD 107.00&gt;89.00 (-)

7.53e3



## Insight Report

Printed at 8/19/2021 11:57:47 AM

20210804\_022

Sample ID: PERCHLORATE9

Date Acquired: 8/4/2021 2:24:11 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210804\Before\20210804\_022.lcd

Vial: 28 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

Sodium Perchlorate

-18O4\_IS

Conc 27.2649

Conc 1.0000

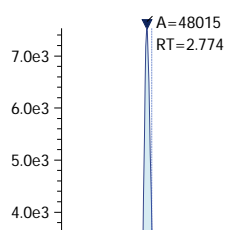
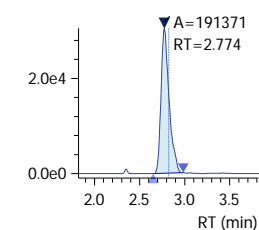
R#1 21.22 (0.00)

Q 99.00&gt;83.00 (-)

3.05e4

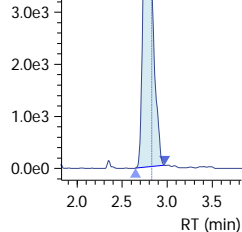
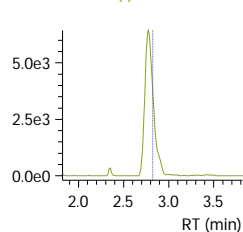
ISTD 107.00&gt;89.00 (-)

7.53e3



R1 101.00&gt;85.00 (-)

6.44e3



## Insight Report

Printed at 8/19/2021 11:52:26 AM

20210804\_023

Sample ID: PERCHLORATE10

Date Acquired: 8/4/2021 2:32:42 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210804\20210804\_023.lcd

Vial: 29 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	Auto	2.772	261232	38409	1	47.7026	ng/mL	50.0000	21.73
Sodium Perchlorate-18O4_IS	Auto	2.768	38409	38409	1	1.0000	ng/mL	1.0000	----

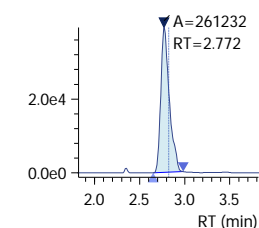
## Perchlorate

Conc 47.7026

R#1 21.73 (0.00)

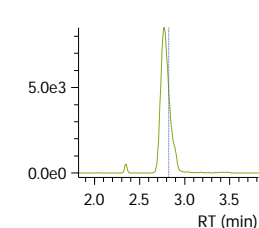
Q 99.00&gt;83.00 (-)

3.94e4



R1 101.00&gt;85.00 (-)

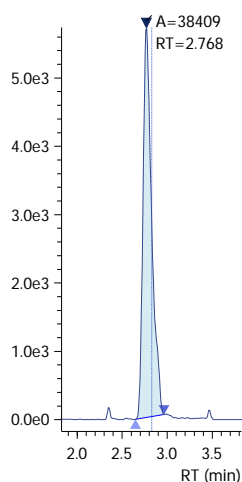
8.50e3

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

ISTD 107.00&gt;89.00 (-)

5.74e3



## Insight Report

Printed at 8/19/2021 11:57:47 AM

20210804\_023

Sample ID: PERCHLORATE10

Date Acquired: 8/4/2021 2:32:42 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210804\Before\20210804\_023.lcd

Vial: 29 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

Sodium Perchlorate

-18O4\_IS

Conc 46.5266

Conc 1.0000

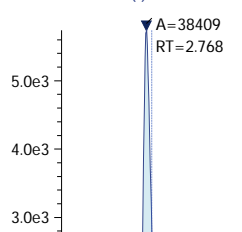
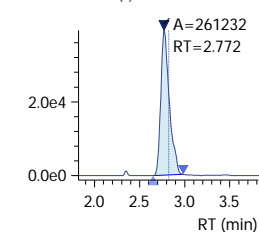
R#1 21.73 (0.00)

Q 99.00&gt;83.00 (-)

3.94e4

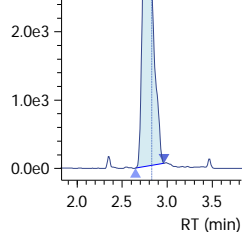
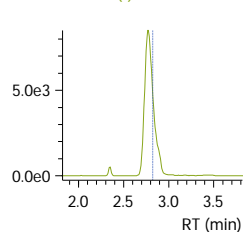
ISTD 107.00&gt;89.00 (-)

5.74e3



R1 101.00&gt;85.00 (-)

8.50e3



## Insight Report

Printed at 8/19/2021 11:52:26 AM

20210804\_024

Sample ID: PERCHLORATEICV

Date Acquired: 8/4/2021 2:41:14 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210804\20210804\_024.lcd

Vial: 30 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	Auto	2.772	87984	64329	1	9.5927	ng/mL	10.0000	21.51
Sodium Perchlorate-18O4_IS	Auto	2.771	64329	64329	1	1.0000	ng/mL	1.0000	----

## Perchlorate

Conc 9.5927

R#1 21.51 (0.00)

Q 99.00&gt;83.00 (-)

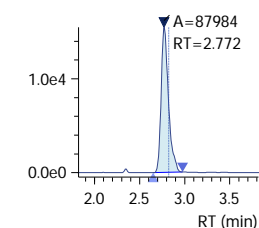
1.55e4

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

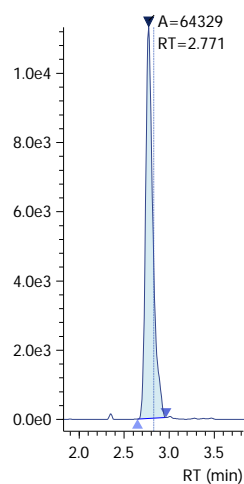
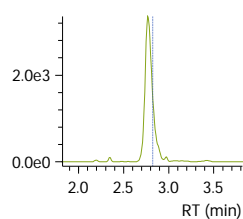
ISTD 107.00&gt;89.00 (-)

1.13e4



R1 101.00&gt;85.00 (-)

3.36e3



## Insight Report

Printed at 8/19/2021 11:57:47 AM

20210804\_024

Sample ID: PERCHLORATEICV

Date Acquired: 8/4/2021 2:41:14 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210804\Before\20210804\_024.lcd

Vial: 30 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

Sodium Perchlorate

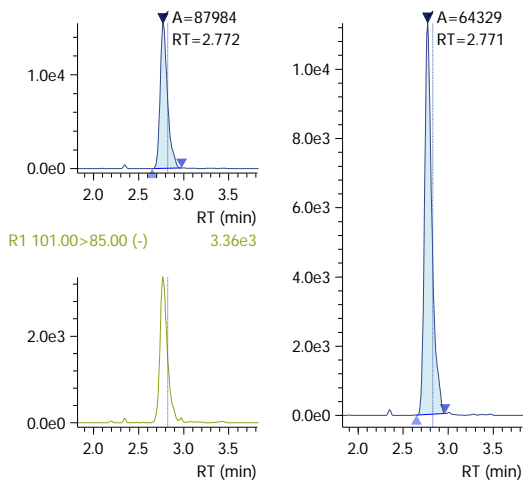
-18O4-IS

Conc 9.3562

Conc 1.0000

R#1 21.51 (0.00)

Q 99.00&gt;83.00 (-) 1.55e4 ISTD 107.00&gt;89.00 (-) 1.13e4







# Chromatograms and Selected Ion Monitoring

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 320, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)



20210813

1st Review:  
2nd Review:Grivera  
Kneir

  
Injection Log  
LCMS01 -Shimadzu 8050

ICAL Date: 8/4/2021  
Cal. Std. xp: 11/26/2021  
ICAL ID: EC2100057

Mobile Phases

A: 0.75% Formic Acid/Water 3100813-09

B: MeOH 218535

		File Name	Acquisition Method	Dilution	R	Comments	Date/Time
1	null	20210813_001	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/13/2021 9:44
2	null	20210813_002	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/13/2021 9:50
3	IB	20210813_003	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/13/2021 9:55
4	IB	20210813_004	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/13/2021 10:04
5	IB	20210813_005	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/13/2021 10:13
6	LODV	20210813_006	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/13/2021 10:21
7	ICS	20210813_007	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/13/2021 10:30
8	PERCHLORATE7	20210813_008	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	3100812-07	8/13/2021 10:38
9	EQ2100496-01	20210813_009	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/13/2021 10:47
10	EQ2100496-02	20210813_010	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/13/2021 10:55
11	EQ2100496-03	20210813_011	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/13/2021 11:04
12	E2100785-001	20210813_012	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/13/2021 11:12
13	E2100785-002	20210813_013	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/13/2021 11:21
14	E2100858-001	20210813_014	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	Over calibration range	8/13/2021 11:30
15	E2100858-002	20210813_015	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/13/2021 11:38
16	E2100879-001	20210813_016	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/13/2021 11:47
17	PERCHLORATE7	20210813_017	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	3100812-07	8/13/2021 11:55
18	PERCHLORATE7	20210813_018	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	3100812-07	8/13/2021 12:38
19	EQ2100498-01	20210813_019	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/13/2021 12:47
20	EQ2100498-02	20210813_020	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/13/2021 13:00
21	EQ2100498-03	20210813_021	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/13/2021 13:08
22	E2100895-001	20210813_022	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	INST out of range	8/13/2021 13:17
23	E2100858-001X10	20210813_023	Perchlorate6850c.lcm	10x	<input checked="" type="checkbox"/>	INST out of range	8/13/2021 13:26
24	PERCHLORATE7	20210813_024	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	3100812-07	8/13/2021 13:34
25	E2100887-001	20210813_025	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	INST out of range	8/13/2021 13:43
26	E2100887-002	20210813_026	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	INST out of range	8/13/2021 13:51
27	E2100887-003	20210813_027	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	INST out of range	8/13/2021 14:00
28	E2100858-001X20	20210813_031	Perchlorate6850c.lcm	20x	<input checked="" type="checkbox"/>		8/13/2021 14:34
29	E2100895-001X2	20210813_032	Perchlorate6850c.lcm	2x	<input checked="" type="checkbox"/>		8/13/2021 14:42
30	PERCHLORATE7	20210813_033	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	3100812-07	8/13/2021 14:51
31							
32							

20210816

1st Review:

2nd Review:

Grivera

Kneir



Injection Log  
LCMS01 - Shimadzu 8050

ICAL Date: 8/4/2021

Cal. Std. sp: 11/26/2021

ICAL ID: EC2100057

Mobile Phases

A: 0.75% Formic Acid/Water 3100814-01

B: MeOH 218535

		File Name	Acquisition Method	Dilution	R	Comments	Date/Time
1	null	20210816_001	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/16/2021 10:20
2	null	20210816_002	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/16/2021 10:25
3	IB	20210816_008	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/16/2021 11:14
4	LODV	20210816_009	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/16/2021 11:22
5	JCS	20210816_010	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/16/2021 11:31
6	PERCHLORATE7	20210816_011	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	3100812-07	8/16/2021 11:39
7	E2100830-001	20210816_012	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/16/2021 11:48
8	E2100830-001	20210816_015	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/16/2021 12:13
9	EQ2100514-01	20210816_016	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/16/2021 12:22
10	EQ2100514-02	20210816_017	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/16/2021 12:31
11	EQ2100514-03	20210816_018	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/16/2021 12:39
12	E2100785-003	20210816_019	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/16/2021 12:48
13	E2100785-004	20210816_020	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/16/2021 12:56
14	PERCHLORATE7	20210816_021	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	3100812-07	8/16/2021 13:05
15	E2100887-001	20210816_022	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	Inst out of range	8/16/2021 13:22
16	E2100887-002	20210816_023	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	Inst out of range	8/16/2021 13:30
17	E2100887-003	20210816_024	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	Inst out of range	8/16/2021 13:39
18	E2100887-004	20210816_025	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	Inst out of range	8/16/2021 13:47
19	E2100887-005	20210816_026	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	Inst out of range	8/16/2021 13:56
20	E2100887-006	20210816_027	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	Inst out of range	8/16/2021 14:05
21	PERCHLORATE7	20210816_028	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	3100812-07	8/16/2021 14:13
22	E2100891-001	20210816_029	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	Inst out of range	8/16/2021 14:22
23	E2100891-002	20210816_030	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	Inst out of range	8/16/2021 14:30
24	E2100891-003	20210816_031	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	Inst out of range	8/16/2021 14:39
25	E2100887-001X2	20210816_032	Perchlorate6850c.lcm	2x	<input checked="" type="checkbox"/>		8/16/2021 14:47
26	E2100887-002X5	20210816_033	Perchlorate6850c.lcm	5x	<input checked="" type="checkbox"/>		8/16/2021 16:14
27	E2100887-003X5	20210816_034	Perchlorate6850c.lcm	5x	<input checked="" type="checkbox"/>	Inst out of range	8/16/2021 16:23
28	E2100887-004X5	20210816_035	Perchlorate6850c.lcm	5x	<input checked="" type="checkbox"/>		8/16/2021 16:32
29	E2100887-005X5	20210816_036	Perchlorate6850c.lcm	5x	<input checked="" type="checkbox"/>	Inst out of range	8/16/2021 16:40
30	E2100887-006X5	20210816_037	Perchlorate6850c.lcm	5x	<input checked="" type="checkbox"/>		8/16/2021 16:49
31	E2100887-007X5	20210816_038	Perchlorate6850c.lcm	5x	<input checked="" type="checkbox"/>		8/16/2021 16:57
32	PERCHLORATE7	20210816_039	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	3100812-07	8/16/2021 17:06
33	E2100887-008X5	20210816_040	Perchlorate6850c.lcm	5x	<input checked="" type="checkbox"/>		8/16/2021 17:15
34	E2100891-001X10	20210816_041	Perchlorate6850c.lcm	10x	<input checked="" type="checkbox"/>	Inst out of range	8/16/2021 17:23
35	E2100891-002X10	20210816_042	Perchlorate6850c.lcm	10x	<input checked="" type="checkbox"/>	Inst out of range	8/16/2021 17:32
36	E2100891-003X10	20210816_043	Perchlorate6850c.lcm	10x	<input checked="" type="checkbox"/>	Inst out of range	8/16/2021 17:40
37	E2100891-004	20210816_044	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	Inst out of range	8/16/2021 17:49
38	E2100891-005	20210816_045	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	Inst out of range	8/16/2021 17:57
39	E2100891-006	20210816_046	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	Inst out of range	8/16/2021 18:06
40	PERCHLORATE7	20210816_047	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	3100812-07	8/16/2021 18:14
41	E2100885-001X10	20210816_048	Perchlorate6850c.lcm	10x	<input checked="" type="checkbox"/>	Inst out of range	8/16/2021 18:23
42	E2100885-002X10	20210816_049	Perchlorate6850c.lcm	10x	<input checked="" type="checkbox"/>	Inst out of range	8/16/2021 18:32
43	E2100885-003X10	20210816_050	Perchlorate6850c.lcm	10x	<input checked="" type="checkbox"/>	Inst out of range	8/16/2021 18:40
44	E2100885-004X10	20210816_051	Perchlorate6850c.lcm	10x	<input checked="" type="checkbox"/>	Inst out of range	8/16/2021 18:49
45	EQ2100494-04X10	20210816_052	Perchlorate6850c.lcm	10x	<input checked="" type="checkbox"/>	Inst out of range	8/16/2021 18:57
46	EQ2100494-05X10	20210816_053	Perchlorate6850c.lcm	10x	<input checked="" type="checkbox"/>	Inst out of range	8/16/2021 19:06
47	PERCHLORATE7	20210816_054	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	3100812-07	8/16/2021 19:14
48							



20210818



ICAL Date: 8/4/2021

Cat. Std. xp: 11/26/2021

ICAL ID: EC2100057

1st Review:

Grivena

2nd Review:

Kneir

Mobile Phases

A: 0.75% Formic Acid/Water 3100814-01

B: MeOH 216350

		File Name	Acquisition Method	Dilution	R	Comments	Date/Time
1	null	20210818_001	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/18/2021 9:12
2	null	20210818_002	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/18/2021 9:20
3	IB	20210818_003	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/18/2021 9:26
4	IB	20210818_004	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/18/2021 9:34
5	IB	20210818_005	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/18/2021 9:43
6	ICS	20210818_006	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/18/2021 9:51
7	LODV	20210818_007	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/18/2021 10:00
8	PERCHLORATE7	20210818_008	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	3100812-07	8/18/2021 10:26
9	E2100887-003X10	20210818_014	Perchlorate6850c.lcm	10x	<input checked="" type="checkbox"/>		8/18/2021 11:21
10	PERCHLORATE7	20210818_019	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	3100812-07	8/18/2021 12:04
11	E2100891-006X10	20210818_025	Perchlorate6850c.lcm	10x	<input checked="" type="checkbox"/>		8/18/2021 12:55
12	E2100891-002X20	20210818_028	Perchlorate6850c.lcm	20x	<input checked="" type="checkbox"/>		8/18/2021 13:21
13	PERCHLORATE7	20210818_030	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	3100812-07	8/18/2021 13:38
14	E2100891-003X10	20210818_035	Perchlorate6850c.lcm	10x	<input checked="" type="checkbox"/>		8/18/2021 14:23
15	PERCHLORATE7	20210818_041	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	3100812-07	8/18/2021 15:26
16	E2100891-004x20	20210818_042	Perchlorate6850c.lcm	20x	<input checked="" type="checkbox"/>		8/18/2021 15:43
17	E2100891-001X40	20210818_043	Perchlorate6850c.lcm	40x	<input checked="" type="checkbox"/>		8/18/2021 16:02
18	E2100891-005x20	20210818_044	Perchlorate6850c.lcm	20x	<input checked="" type="checkbox"/>		8/18/2021 16:18
19	E2100887-005X20	20210818_045	Perchlorate6850c.lcm	20x	<input checked="" type="checkbox"/>		8/18/2021 17:00
20	PERCHLORATE7	20210818_046	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	3100812-07	8/18/2021 17:08
21	EQ2100525-01	20210818_047	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/18/2021 17:17
22	EQ2100525-02	20210818_048	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/18/2021 17:25
23	EQ2100525-03	20210818_049	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>		8/18/2021 17:34
24	E2100915-001	20210818_050	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	INST out of range	8/18/2021 17:43
25	PERCHLORATE7	20210818_051	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	3100812-07	8/18/2021 17:51
26	E2100915-001X20	20210818_052	Perchlorate6850c.lcm	20x	<input checked="" type="checkbox"/>		8/18/2021 18:12
27	PERCHLORATE7	20210818_053	Perchlorate6850c.lcm	1x	<input checked="" type="checkbox"/>	3100812-07	8/18/2021 18:20
28							
29							
30							



## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080336

**Service Request:** E2100887  
**Date Analyzed:** 8/13/21

**Continuing Calibration Verification Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**Analytical Method:** 6850  
**File ID:** I:\LCMS01\DATA\20210813\20210813\_018

**Calibration Date:** 8/4/21  
**Calibration ID:** EC2100057  
**Analysis Lot:** 734969  
**Units:** ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	10.1	0.1426	0.1444	1.2	NA	± 15 %	Average RF



## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080336

**Service Request:** E2100887  
**Date Analyzed:** 8/13/21

**Continuing Calibration Verification Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**Analytical Method:** 6850  
**File ID:** I:\LCMS01\DATA\20210813\20210813\_024

**Calibration Date:** 8/4/21  
**Calibration ID:** EC2100057  
**Analysis Lot:** 734969  
**Units:** ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	9.44	0.1426	0.1346	-5.6	NA	± 15 %	Average RF



## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080336

**Service Request:** E2100887  
**Date Analyzed:** 8/13/21

**Continuing Calibration Verification Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**Analytical Method:** 6850  
**File ID:** I:\LCMS01\DATA\20210813\20210813\_033

**Calibration Date:** 8/4/21  
**Calibration ID:** EC2100057  
**Analysis Lot:** 734969  
**Units:** ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	9.28	0.1426	0.1323	-7.2	NA	± 15 %	Average RF



## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080336

**Service Request:** E2100887  
**Date Analyzed:** 8/16/21

**Continuing Calibration Verification Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**Analytical Method:** 6850  
**File ID:** I:\LCMS01\DATA\20210816\20210816\_028

**Calibration Date:** 8/4/21  
**Calibration ID:** EC2100057  
**Analysis Lot:** 735251  
**Units:** ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	9.51	0.1426	0.1356	-4.9	NA	± 15 %	Average RF





## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080336

**Service Request:** E2100887  
**Date Analyzed:** 8/16/21

**Continuing Calibration Verification Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**Analytical Method:** 6850  
**File ID:** I:\LCMS01\DATA\20210816\20210816\_039

**Calibration Date:** 8/4/21  
**Calibration ID:** EC2100057  
**Analysis Lot:** 735251  
**Units:** ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	8.87	0.1426	0.1265	-11.3	NA	± 15 %	Average RF



## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080336

**Service Request:** E2100887  
**Date Analyzed:** 8/16/21

**Continuing Calibration Verification Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**Analytical Method:** 6850  
**File ID:** I:\LCMS01\DATA\20210816\20210816\_047

**Calibration Date:** 8/4/21  
**Calibration ID:** EC2100057  
**Analysis Lot:** 735251  
**Units:** ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	9.19	0.1426	0.1311	-8.1	NA	± 15 %	Average RF



## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080336

**Service Request:** E2100887  
**Date Analyzed:** 8/18/21

**Continuing Calibration Verification Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**Analytical Method:** 6850  
**File ID:** I:\LCMS01\DATA\20210818\20210818\_008

**Calibration Date:** 8/4/21  
**Calibration ID:** EC2100057  
**Analysis Lot:** 735470  
**Units:** ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	8.52	0.1426	0.1215	-14.8	NA	± 15 %	Average RF



## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080336

**Service Request:** E2100887  
**Date Analyzed:** 8/18/21

**Continuing Calibration Verification Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**Analytical Method:** 6850  
**File ID:** I:\LCMS01\DATA\20210818\20210818\_019

**Calibration Date:** 8/4/21  
**Calibration ID:** EC2100057  
**Analysis Lot:** 735470  
**Units:** ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	8.51	0.1426	0.1213	-14.9	NA	± 15 %	Average RF



## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080336

**Service Request:** E2100887  
**Date Analyzed:** 8/18/21

**Continuing Calibration Verification Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**Analytical Method:** 6850  
**File ID:** I:\LCMS01\DATA\20210818\20210818\_030

**Calibration Date:** 8/4/21  
**Calibration ID:** EC2100057  
**Analysis Lot:** 735470  
**Units:** ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	8.57	0.1426	0.1222	-14.3	NA	± 15 %	Average RF



## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080336

**Service Request:** E2100887  
**Date Analyzed:** 8/18/21

**Continuing Calibration Verification Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**Analytical Method:** 6850  
**File ID:** I:\LCMS01\DATA\20210818\20210818\_041

**Calibration Date:** 8/4/21  
**Calibration ID:** EC2100057  
**Analysis Lot:** 735470  
**Units:** ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	8.97	0.1426	0.1279	-10.3	NA	± 15 %	Average RF



## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080336

**Service Request:** E2100887  
**Date Analyzed:** 8/18/21

**Continuing Calibration Verification Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**Analytical Method:** 6850  
**File ID:** I:\LCMS01\DATA\20210818\20210818\_046

**Calibration Date:** 8/4/21  
**Calibration ID:** EC2100057  
**Analysis Lot:** 735470  
**Units:** ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	8.52	0.1426	0.1214	-14.8	NA	± 15 %	Average RF



## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080336

**Service Request:** E2100887  
**Date Analyzed:** 8/18/21

**Continuing Calibration Verification Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**Analytical Method:** 6850  
**File ID:** I:\LCMS01\DATA\20210818\20210818\_051

**Calibration Date:** 8/4/21  
**Calibration ID:** EC2100057  
**Analysis Lot:** 735470  
**Units:** ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	8.52	0.1426	0.1215	-14.8	NA	± 15 %	Average RF





## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080336

**Service Request:** E2100887  
**Date Analyzed:** 8/18/21

**Continuing Calibration Verification Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**Analytical Method:** 6850  
**File ID:** I:\LCMS01\DATA\20210818\20210818\_053

**Calibration Date:** 8/4/21  
**Calibration ID:** EC2100057  
**Analysis Lot:** 735470  
**Units:** ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	8.52	0.1426	0.1215	-14.8	NA	± 15 %	Average RF



## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080336

**Service Request:** E2100887  
**Date Analyzed:** 8/13/21 12:38

**Internal Standard Area and RT Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**File ID:** I:\LCMS01\DATA\20210813\20210813\_018  
**Instrument ID:** E-LCMS-01  
**Analytical Method:** 6850

**Lab Code:** EQ2100518-01  
**Analysis Lot:** 734969  
**Signal ID:** 1

---

Sodium Perchlorate-18O4

---

	<u>Area</u>	<u>RT</u>
<b>ICAL Average ==&gt;</b>	69,829	2.77
<b>Upper Limit ==&gt;</b>	104,744	4.77
<b>Lower Limit ==&gt;</b>	34,915	0.77

---

*Associated Analyses*

---

Continuing Calibration Verification	EQ2100518-01	41,083	2.66
Method Blank	EQ2100498-01	74,461	2.76
Lab Control Sample	EQ2100498-02	50,919	2.66
Duplicate Lab Control Sample	EQ2100498-03	77,763	2.76

Results flagged with an asterisk (\*) indicate values outside control criteria.



## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080336

**Service Request:** E2100887  
**Date Analyzed:** 8/13/21 13:34

**Internal Standard Area and RT Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**File ID:** I:\LCMS01\DATA\20210813\20210813\_024  
**Instrument ID:** E-LCMS-01  
**Analytical Method:** 6850

**Lab Code:** EQ2100518-02  
**Analysis Lot:** 734969  
**Signal ID:** 1

Sodium Perchlorate-18O4			
		<u>Area</u>	<u>RT</u>
ICAL Average ==>		69,829	2.77
Upper Limit ==>		104,744	4.77
Lower Limit ==>		34,915	0.77
<i>Associated Analyses</i>			
Continuing Calibration Verification	EQ2100518-02	60,036	2.76

Results flagged with an asterisk (\*) indicate values outside control criteria.



## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080336

**Service Request:** E2100887  
**Date Analyzed:** 8/13/21 14:51

**Internal Standard Area and RT Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**File ID:** I:\LCMS01\DATA\20210813\20210813\_033  
**Instrument ID:** E-LCMS-01  
**Analytical Method:** 6850

**Lab Code:** EQ2100518-03  
**Analysis Lot:** 734969  
**Signal ID:** 1

Sodium Perchlorate-18O4			
		<u>Area</u>	<u>RT</u>
ICAL Average ==>		69,829	2.77
Upper Limit ==>		104,744	4.77
Lower Limit ==>		34,915	0.77
<i>Associated Analyses</i>			
Continuing Calibration Verification	EQ2100518-03	62,496	2.76

Results flagged with an asterisk (\*) indicate values outside control criteria.



## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080336

**Service Request:** E2100887  
**Date Analyzed:** 8/16/21 14:13

**Internal Standard Area and RT Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**File ID:** I:\LCMS01\DATA\20210816\20210816\_028  
**Instrument ID:** E-LCMS-01  
**Analytical Method:** 6850

**Lab Code:** EQ2100520-01  
**Analysis Lot:** 735251  
**Signal ID:** 1

## Sodium Perchlorate-18O4

	<u>Area</u>	<u>RT</u>
<b>ICAL Average ==&gt;</b>	69,829	2.77
<b>Upper Limit ==&gt;</b>	104,744	4.77
<b>Lower Limit ==&gt;</b>	34,915	0.77

*Associated Analyses*

Continuing Calibration Verification	EQ2100520-01	62,395	2.76
LHSMW01-210804	E2100887-001	35,049	2.75
04WW04-210804	E2100887-002	48,812	2.67
04WW02-210804	E2100887-004	35,391	2.76
LHSMW02-210804	E2100887-006	55,787	2.68
04WW11-210804	E2100887-007	36,209	2.76

Results flagged with an asterisk (\*) indicate values outside control criteria.



## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080336

**Service Request:** E2100887  
**Date Analyzed:** 8/16/21 17:06

**Internal Standard Area and RT Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**File ID:** I:\LCMS01\DATA\20210816\20210816\_039  
**Instrument ID:** E-LCMS-01  
**Analytical Method:** 6850

**Lab Code:** EQ2100520-02  
**Analysis Lot:** 735251  
**Signal ID:** 1

Sodium Perchlorate-18O4			
		<u>Area</u>	<u>RT</u>
<b>ICAL Average ==&gt;</b>		69,829	2.77
<b>Upper Limit ==&gt;</b>		104,744	4.77
<b>Lower Limit ==&gt;</b>		34,915	0.77
<b>Associated Analyses</b>			
Continuing Calibration Verification	EQ2100520-02	73,192	2.75
04WW11-210804-FD	E2100887-008	35,873	2.76

Results flagged with an asterisk (\*) indicate values outside control criteria.



## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080336

**Service Request:** E2100887  
**Date Analyzed:** 8/16/21 18:14

**Internal Standard Area and RT Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**File ID:** I:\LCMS01\DATA\20210816\20210816\_047  
**Instrument ID:** E-LCMS-01  
**Analytical Method:** 6850

**Lab Code:** EQ2100520-03  
**Analysis Lot:** 735251  
**Signal ID:** 1

Sodium Perchlorate-18O4			
		<u>Area</u>	<u>RT</u>
ICAL Average ==>		69,829	2.77
Upper Limit ==>		104,744	4.77
Lower Limit ==>		34,915	0.77
<i>Associated Analyses</i>			
Continuing Calibration Verification	EQ2100520-03	66,289	2.76

Results flagged with an asterisk (\*) indicate values outside control criteria.



## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080336

**Service Request:** E2100887  
**Date Analyzed:** 8/18/21 10:26

**Internal Standard Area and RT Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**File ID:** I:\LCMS01\DATA\20210818\20210818\_008  
**Instrument ID:** E-LCMS-01  
**Analytical Method:** 6850

**Lab Code:** EQ2100524-01  
**Analysis Lot:** 735470  
**Signal ID:** 1

---

Sodium Perchlorate-18O4

---

	<u>Area</u>	<u>RT</u>
<b>ICAL Average ==&gt;</b>	69,829	2.77
<b>Upper Limit ==&gt;</b>	104,744	4.77
<b>Lower Limit ==&gt;</b>	34,915	0.77

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*Associated Analyses*

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Continuing Calibration Verification	EQ2100524-01	62,544	2.74
04WW08-210804	E2100887-003	50,059	2.66

Results flagged with an asterisk (\*) indicate values outside control criteria.





## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080336

**Service Request:** E2100887  
**Date Analyzed:** 8/18/21 12:04

**Internal Standard Area and RT Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**File ID:** I:\LCMS01\DATA\20210818\20210818\_019  
**Instrument ID:** E-LCMS-01  
**Analytical Method:** 6850

**Lab Code:** EQ2100524-02  
**Analysis Lot:** 735470  
**Signal ID:** 1

Sodium Perchlorate-18O4			
		<u>Area</u>	<u>RT</u>
<b>ICAL Average ==&gt;</b>		69,829	2.77
<b>Upper Limit ==&gt;</b>		104,744	4.77
<b>Lower Limit ==&gt;</b>		34,915	0.77
<i>Associated Analyses</i>			
Continuing Calibration Verification	EQ2100524-02	65,562	2.76

Results flagged with an asterisk (\*) indicate values outside control criteria.



## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080336

**Service Request:** E2100887  
**Date Analyzed:** 8/18/21 13:38

**Internal Standard Area and RT Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**File ID:** I:\LCMS01\DATA\20210818\20210818\_030  
**Instrument ID:** E-LCMS-01  
**Analytical Method:** 6850

**Lab Code:** EQ2100524-03  
**Analysis Lot:** 735470  
**Signal ID:** 1

Sodium Perchlorate-18O4			
		<u>Area</u>	<u>RT</u>
<b>ICAL Average ==&gt;</b>		69,829	2.77
<b>Upper Limit ==&gt;</b>		104,744	4.77
<b>Lower Limit ==&gt;</b>		34,915	0.77
<i>Associated Analyses</i>			
Continuing Calibration Verification	EQ2100524-03	65,415	2.76

Results flagged with an asterisk (\*) indicate values outside control criteria.



## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080336

**Service Request:** E2100887  
**Date Analyzed:** 8/18/21 15:26

**Internal Standard Area and RT Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**File ID:** I:\LCMS01\DATA\20210818\20210818\_041  
**Instrument ID:** E-LCMS-01  
**Analytical Method:** 6850

**Lab Code:** EQ2100524-04  
**Analysis Lot:** 735470  
**Signal ID:** 1

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Sodium Perchlorate-18O4

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	<u>Area</u>	<u>RT</u>
<b>ICAL Average ==&gt;</b>	69,829	2.77
<b>Upper Limit ==&gt;</b>	104,744	4.77
<b>Lower Limit ==&gt;</b>	34,915	0.77

---

*Associated Analyses*

---

Continuing Calibration Verification	EQ2100524-04	44,446	2.66
04WW06-210804	E2100887-005	42,537	2.66

Results flagged with an asterisk (\*) indicate values outside control criteria.



## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080336

**Service Request:** E2100887  
**Date Analyzed:** 8/18/21 17:08

**Internal Standard Area and RT Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**File ID:** I:\LCMS01\DATA\20210818\20210818\_046  
**Instrument ID:** E-LCMS-01  
**Analytical Method:** 6850

**Lab Code:** EQ2100524-05  
**Analysis Lot:** 735470  
**Signal ID:** 1

Sodium Perchlorate-18O4			
		<u>Area</u>	<u>RT</u>
ICAL Average ==>		69,829	2.77
Upper Limit ==>		104,744	4.77
Lower Limit ==>		34,915	0.77
<i>Associated Analyses</i>			
Continuing Calibration Verification	EQ2100524-05	58,887	2.76

Results flagged with an asterisk (\*) indicate values outside control criteria.



## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080336

**Service Request:** E2100887  
**Date Analyzed:** 8/18/21 17:51

**Internal Standard Area and RT Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**File ID:** I:\LCMS01\DATA\20210818\20210818\_051  
**Instrument ID:** E-LCMS-01  
**Analytical Method:** 6850

**Lab Code:** EQ2100524-06  
**Analysis Lot:** 735470  
**Signal ID:** 1

Sodium Perchlorate-18O4			
		<u>Area</u>	<u>RT</u>
ICAL Average ==>		69,829	2.77
Upper Limit ==>		104,744	4.77
Lower Limit ==>		34,915	0.77
<i>Associated Analyses</i>			
Continuing Calibration Verification	EQ2100524-06	52,473	2.76

Results flagged with an asterisk (\*) indicate values outside control criteria.



## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS21080336

**Service Request:** E2100887  
**Date Analyzed:** 8/18/21 18:20

**Internal Standard Area and RT Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**File ID:** I:\LCMS01\DATA\20210818\20210818\_053  
**Instrument ID:** E-LCMS-01  
**Analytical Method:** 6850

**Lab Code:** EQ2100524-07  
**Analysis Lot:** 735470  
**Signal ID:** 1

Sodium Perchlorate-18O4			
		<u>Area</u>	<u>RT</u>
ICAL Average ==>		69,829	2.77
Upper Limit ==>		104,744	4.77
Lower Limit ==>		34,915	0.77
<i>Associated Analyses</i>			
Continuing Calibration Verification	EQ2100524-07	56,245	2.76

Results flagged with an asterisk (\*) indicate values outside control criteria.



## Insight Report

Printed at 8/25/2021 11:31:08 AM

Method File: I:\LCMS01\DATA\20210813\20210813.lcm

Project File: I:\LCMS01\DATA\20210813\20210813.damp

## 20210813\_006

Sample ID: LODV

Date Acquired: 8/13/2021 10:21:44 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210813\20210813\_006.lcd

Vial: 31 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	M	2.775	669	84181	1	0.0557	ng/mL	----	20.35
Sodium Perchlorate-18O4_IS	Auto	2.762	84181	84181	1	1.0000	ng/mL	----	----

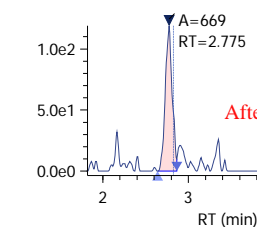
## Perchlorate

Conc 0.0557

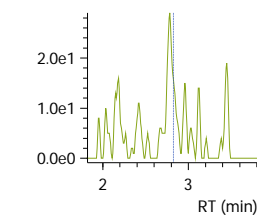
R#1 20.35 (0.00)

Q 99.00&gt;83.00 (-)

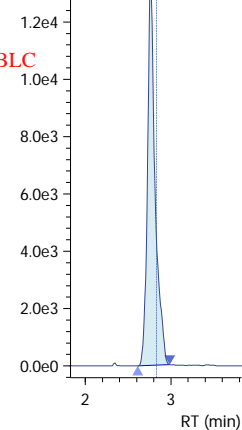
1.19e2 ISTD 107.00&gt;89.00 (-) 1.37e4



R1 101.00&gt;85.00 (-) 2.90e1

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

A=84181  
RT=2.762

## Insight Report

Printed at 8/25/2021 11:33:33 AM

Method File: I:\LCMS01\DATA\20210813\20210813.lcm

## 20210813\_006

Sample ID: LODV

Date Acquired: 8/13/2021 10:21:44 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210813\Before\20210813\_006.lcd

Vial: 31 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

Sodium Perchlorate  
-18O4\_IS

Conc 0.0494

Conc 1.0000

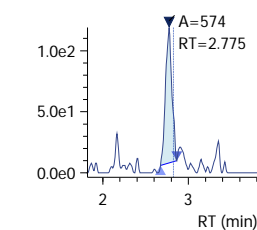
R#1 18.18 (0.00)

Q 99.00&gt;83.00 (-)

1.19e2

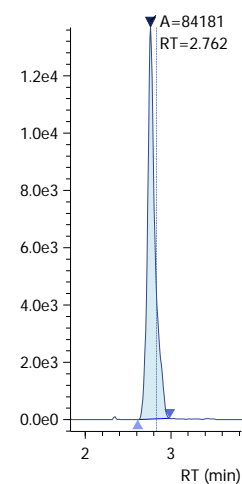
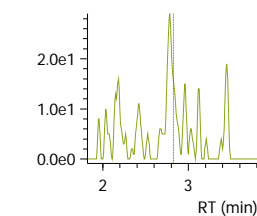
ISTD 107.00&gt;89.00 (-)

1.37e4



R1 101.00&gt;85.00 (-)

2.90e1





## Insight Report

Printed at 8/25/2021 11:31:08 AM

20210813\_007

Sample ID: ICS

Date Acquired: 8/13/2021 10:30:14 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210813\20210813\_007.lcd

Vial: 32 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	M	2.761	10883	77224	1	0.9884	ng/mL	----	21.62
Sodium Perchlorate-18O4_IS	Auto	2.761	77224	77224	1	1.0000	ng/mL	----	----

## Perchlorate

Conc 0.9884

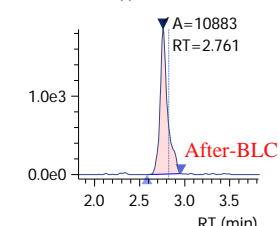
R#1 21.62 (0.00)

Q 99.00&gt;83.00 (-)

1.85e3

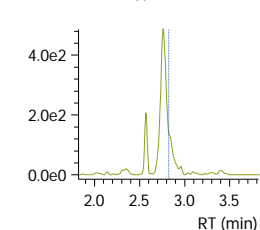
ISTD 107.00&gt;89.00 (-)

1.22e4

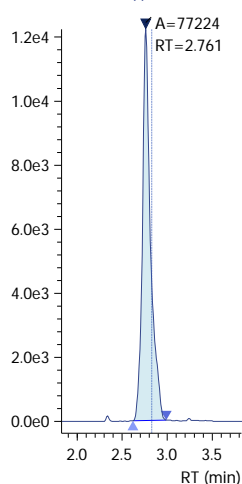


R1 101.00&gt;85.00 (-)

4.86e2

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

A=77224  
RT=2.761

## Insight Report

Printed at 8/25/2021 11:33:33 AM

20210813\_007

Sample ID: ICS

Date Acquired: 8/13/2021 10:30:14 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210813\Before\20210813\_007.lcd

Vial: 32 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

Sodium Perchlorate

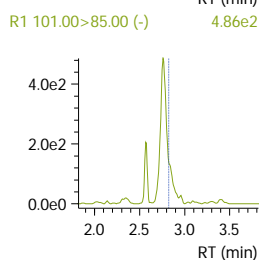
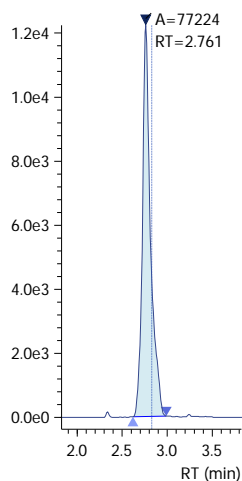
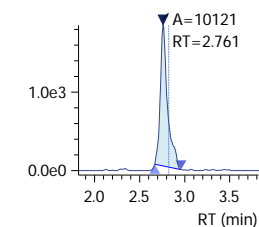
-18O4\_IS

Conc 0.9504

Conc 1.0000

R#1 26.24 (0.00)

Q 99.00&gt;83.00 (-) 1.85e3 ISTD 107.00&gt;89.00 (-) 1.22e4



## Insight Report

Printed at 8/25/2021 11:31:08 AM

20210813\_008

Sample ID: PERCHLORATE7

Date Acquired: 8/13/2021 10:38:45 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210813\20210813\_008.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	Auto	2.764	88702	65399	1	9.5128	ng/mL	10.0000	24.98
Sodium Perchlorate-18O4_IS	Auto	2.761	65399	65399	1	1.0000	ng/mL	1.0000	----

## Perchlorate

Conc 9.5128

R#1 24.98 (0.00)

Q 99.00&gt;83.00 (-)

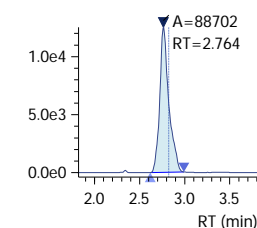
1.25e4

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

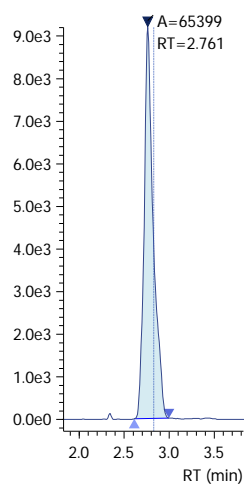
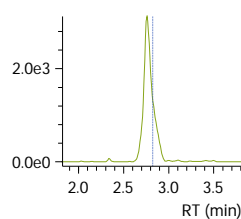
ISTD 107.00&gt;89.00 (-)

9.21e3



R1 101.00&gt;85.00 (-)

3.12e3



## Insight Report

Printed at 8/25/2021 11:33:33 AM

20210813\_008

Sample ID: PERCHLORATE7

Date Acquired: 8/13/2021 10:38:45 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210813\Before\20210813\_008.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

## Perchlorate

## Sodium Perchlorate

-18O4\_IS

Conc 9.8352

Conc 1.0000

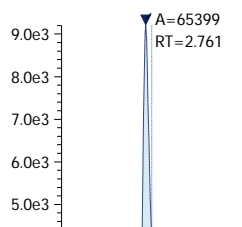
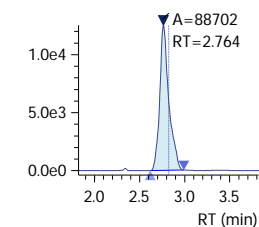
R#1 24.98 (0.00)

Q 99.00&gt;83.00 (-)

1.25e4

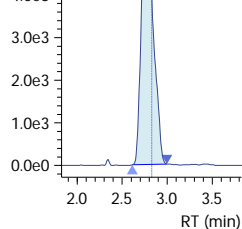
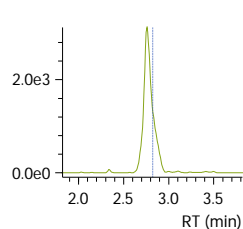
ISTD 107.00&gt;89.00 (-)

9.21e3



R1 101.00&gt;85.00 (-)

3.12e3



## Insight Report

Printed at 8/25/2021 11:31:08 AM

20210813\_018

Sample ID: PERCHLORATE7

Date Acquired: 8/13/2021 12:38:49 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210813\20210813\_018.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	Auto	2.666	59308	41083	1	10.1252	ng/mL	10.0000	21.84
Sodium Perchlorate-18O4_IS	M	2.663	41083	41083	1	1.0000	ng/mL	1.0000	----

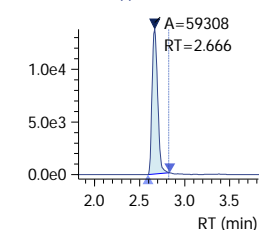
## Perchlorate

Conc 10.1252

R#1 21.84 (0.00)

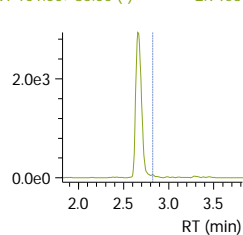
Q 99.00&gt;83.00 (-)

1.38e4



R1 101.00&gt;85.00 (-)

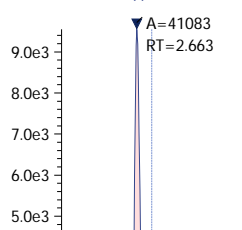
2.94e3

Sodium Perchlorate  
-18O4\_IS

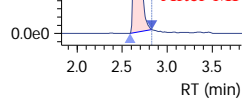
Conc 1.0000

ISTD 107.00&gt;89.00 (-)

9.55e3



After-MP



## Insight Report

Printed at 8/25/2021 11:33:33 AM

20210813\_018

Sample ID: PERCHLORATE7

Date Acquired: 8/13/2021 12:38:49 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210813\Before\20210813\_018.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

Sodium Perchlorate

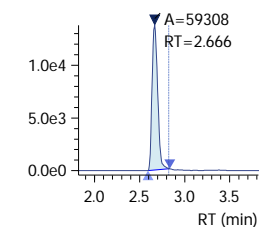
-18O4-IS

Conc 0.0000

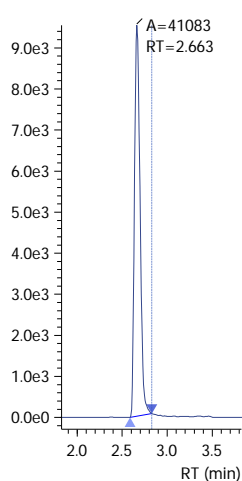
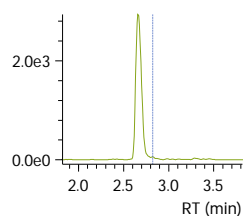
Conc ----

R#1 21.84 (0.00)

Q 99.00&gt;83.00 (-) 1.38e4 ISTD 107.00&gt;89.00 (-) 9.55e3



R1 101.00&gt;85.00 (-) 2.94e3



## Insight Report

Printed at 8/25/2021 11:31:08 AM

20210813\_019

Sample ID: EQ2100498-01

Date Acquired: 8/13/2021 12:47:25 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210813\20210813\_019.lcd

Vial: 22 | Inj. Volume: 25.0000uL | Tray: 4

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	ND(W/B)	----	----	74461	1	----	ng/mL	----	----
Sodium Perchlorate-18O4_IS	Auto	2.756	74461	74461	1	1.0000	ng/mL	----	----

## Perchlorate

Conc ----

R#1 ---- (0.00)

Q 99.00&gt;83.00 (-)

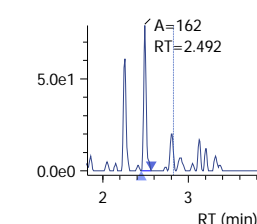
7.90e1

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

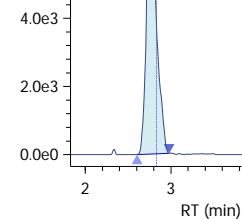
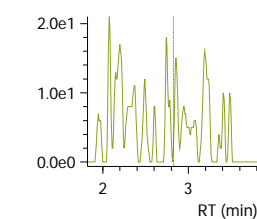
ISTD 107.00&gt;89.00 (-)

1.15e4



R1 101.00&gt;85.00 (-)

2.10e1



## Insight Report

Printed at 8/25/2021 11:33:33 AM

20210813\_019

Sample ID: EQ2100498-01

Date Acquired: 8/13/2021 12:47:25 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210813\Before\20210813\_019.lcd

Vial: 22 | Inj. Volume: 25.0000uL | Tray: 4

Perchlorate

Sodium Perchlorate

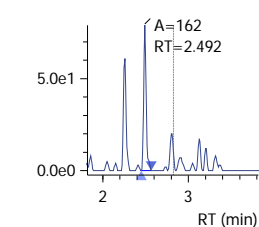
-18O4\_IS

Conc ----

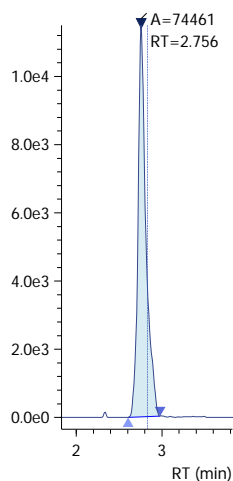
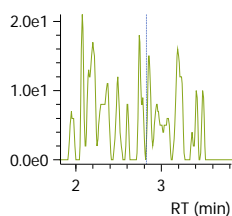
Conc 1.0000

R#1 ---- (0.00)

Q 99.00&gt;83.00 (-) 7.90e1 ISTD 107.00&gt;89.00 (-) 1.15e4



R1 101.00&gt;85.00 (-) 2.10e1





## Insight Report

Printed at 8/25/2021 11:31:08 AM

20210813\_020

Sample ID: EQ2100498-02

Date Acquired: 8/13/2021 1:00:26 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210813\20210813\_020.lcd

Vial: 23 | Inj. Volume: 25.0000uL | Tray: 4

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	M	2.665	838	50919	1	0.1154	ng/mL	----	17.73
Sodium Perchlorate-18O4_IS	M	2.659	50919	50919	1	1.0000	ng/mL	----	----

## Perchlorate

Conc 0.1154

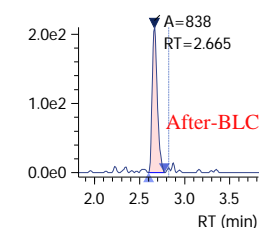
R#1 17.73 (0.00)

Q 99.00&gt;83.00 (-)

2.10e2

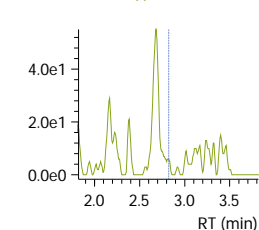
ISTD 107.00&gt;89.00 (-)

1.26e4

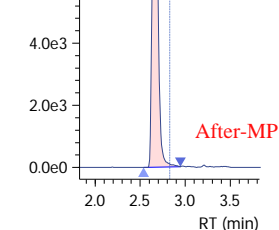


R1 101.00&gt;85.00 (-)

5.50e1



5.50e1



## Insight Report

Printed at 8/25/2021 11:33:33 AM

20210813\_020

Sample ID: EQ2100498-02

Date Acquired: 8/13/2021 1:00:26 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210813\Before\20210813\_020.lcd

Vial: 23 | Inj. Volume: 25.0000uL | Tray: 4

Perchlorate

Sodium Perchlorate

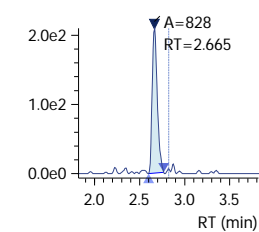
-18O4-IS

Conc 0.0000

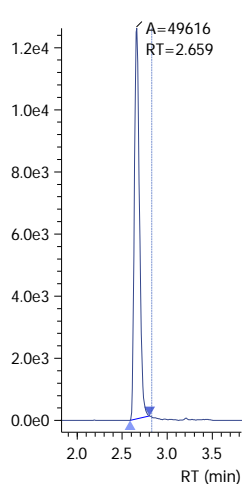
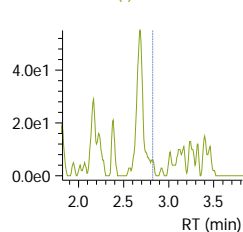
Conc ----

R#1 17.82 (0.00)

Q 99.00&gt;83.00 (-) 2.10e2 ISTD 107.00&gt;89.00 (-) 1.26e4



R1 101.00&gt;85.00 (-) 5.50e1



## Insight Report

Printed at 8/25/2021 11:31:08 AM

20210813\_021

Sample ID: EQ2100498-03

Date Acquired: 8/13/2021 1:08:59 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210813\20210813\_021.lcd

Vial: 24 | Inj. Volume: 25.0000uL | Tray: 4

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	M	2.771	1238	77763	1	0.1117	ng/mL	----	30.77
Sodium Perchlorate-18O4_IS	Auto	2.755	77763	77763	1	1.0000	ng/mL	----	----

## Perchlorate

Conc 0.1117

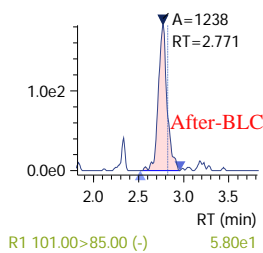
R#1 30.77 (0.00)

Q 99.00&gt;83.00 (-)

1.82e2

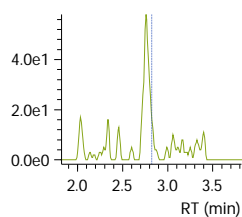
ISTD 107.00&gt;89.00 (-)

1.18e4



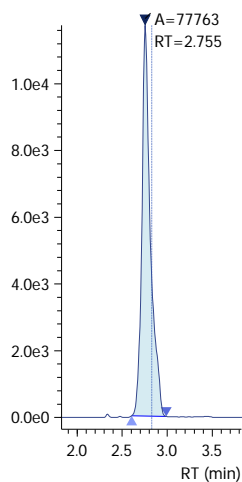
R1 101.00&gt;85.00 (-)

5.80e1



## Sodium Perchlorate-18O4\_IS

Conc 1.0000



## Insight Report

Printed at 8/25/2021 11:33:33 AM

20210813\_021

Sample ID: EQ2100498-03

Date Acquired: 8/13/2021 1:08:59 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210813\Before\20210813\_021.lcd

Vial: 24 | Inj. Volume: 25.0000uL | Tray: 4

Perchlorate

Sodium Perchlorate

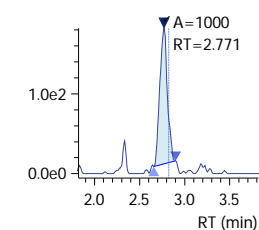
-18O4-IS

Conc 0.0933

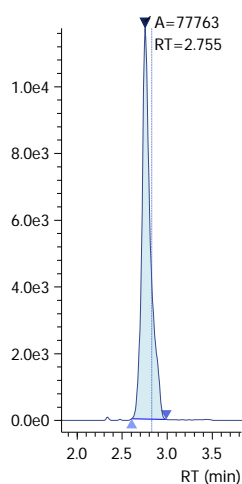
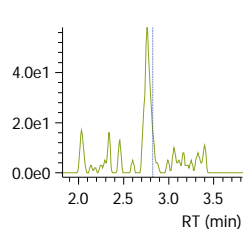
Conc 1.0000

R#1 32.94 (0.00)

Q 99.00&gt;83.00 (-) 1.82e2 ISTD 107.00&gt;89.00 (-) 1.18e4



R1 101.00&gt;85.00 (-) 5.80e1



## Insight Report

Printed at 8/25/2021 11:31:08 AM

20210813\_024

Sample ID: PERCHLORATE7

Date Acquired: 8/13/2021 1:34:36 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210813\20210813\_024.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	Auto	2.757	80791	60036	1	9.4384	ng/mL	10.0000	25.19
Sodium Perchlorate-18O4_IS	Auto	2.757	60036	60036	1	1.0000	ng/mL	1.0000	----

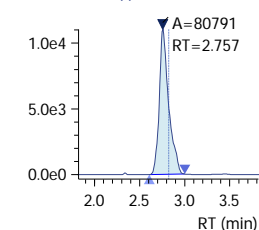
## Perchlorate

Conc 9.4384

R#1 25.19 (0.00)

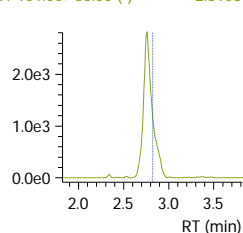
Q 99.00&gt;83.00 (-)

1.11e4



R1 101.00&gt;85.00 (-)

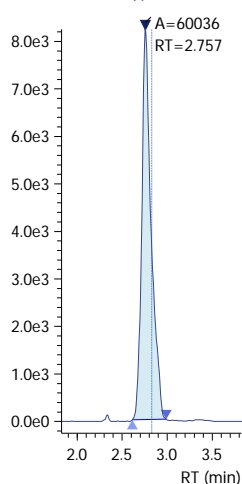
2.81e3

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

ISTD 107.00&gt;89.00 (-)

8.26e3



## Insight Report

Printed at 8/25/2021 11:33:33 AM

20210813\_024

Sample ID: PERCHLORATE7

Date Acquired: 8/13/2021 1:34:36 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210813\Before\20210813\_024.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

Sodium Perchlorate

-18O4\_IS

Conc 9.7583

Conc 1.0000

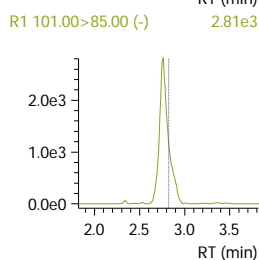
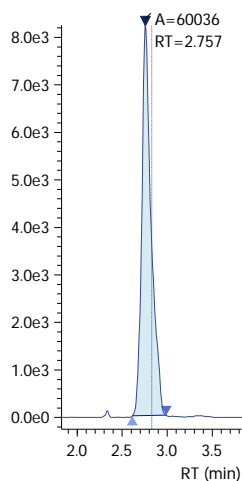
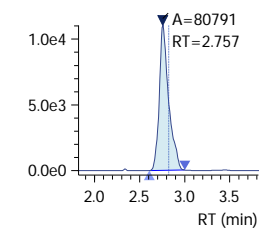
R#1 25.19 (0.00)

Q 99.00&gt;83.00 (-)

1.11e4

ISTD 107.00&gt;89.00 (-)

8.26e3



## Insight Report

Printed at 8/24/2021 3:28:32 PM

Method File: I:\LCMS01\DATA\20210816\20210804.lcm

## 20210816\_009

Sample ID: LODV

Date Acquired: 8/16/2021 11:22:39 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210816\Before\20210816\_009.lcd

Vial: 31 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

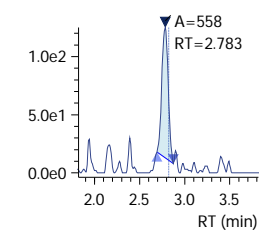
Sodium Perchlorate  
-18O4\_IS

Conc 0.0476

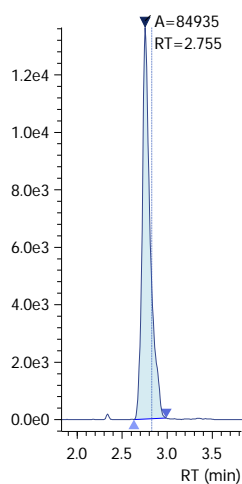
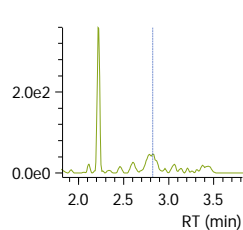
Conc 1.0000

R#1 25.00 (0.00)

Q 99.00&gt;83.00 (-) 1.25e2 ISTD 107.00&gt;89.00 (-) 1.36e4



R1 101.00&gt;85.00 (-) 3.59e2



## Insight Report

Printed at 8/24/2021 4:18:15 PM

Method File: I:\LCMS01\DATA\20210816\20210804.lcm

Project File: I:\LCMS01\DATA\20210816\20210816.damp

## 20210816\_009

Sample ID: LODV

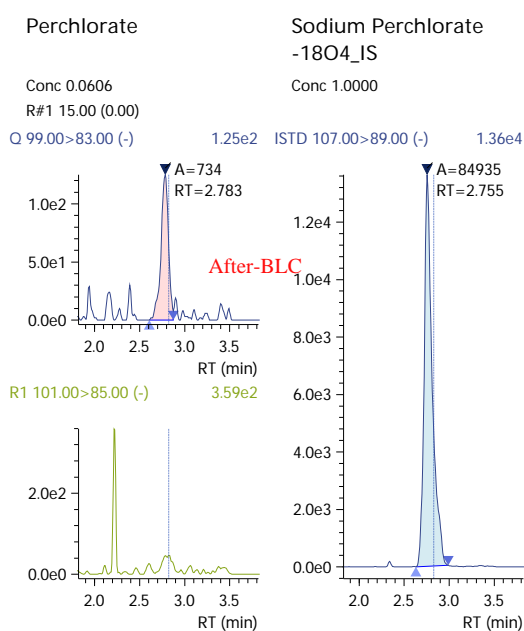
Date Acquired: 8/16/2021 11:22:39 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210816\20210816\_009.lcd

Vial: 31 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	M	2.783	734	84935	1	0.0606	ng/mL	----	15.00
Sodium Perchlorate-18O4-IS	Auto	2.755	84935	84935	1	1.0000	ng/mL	----	----





## Insight Report

Printed at 8/24/2021 3:28:32 PM

20210816\_010

Sample ID: ICS

Date Acquired: 8/16/2021 11:31:10 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210816\Before\20210816\_010.lcd

Vial: 32 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

Sodium Perchlorate

-18O4\_IS

Conc 0.9713

Conc 1.0000

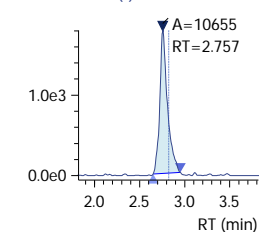
R#1 26.03 (0.00)

Q 99.00&gt;83.00 (-)

1.81e3

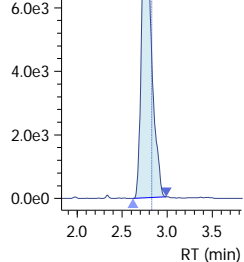
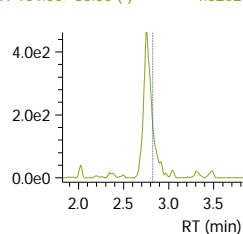
ISTD 107.00&gt;89.00 (-)

1.23e4



R1 101.00&gt;85.00 (-)

4.62e2



## Insight Report

Printed at 8/24/2021 4:18:15 PM

20210816\_010

Sample ID: ICS

Date Acquired: 8/16/2021 11:31:10 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210816\20210816\_010.lcd

Vial: 32 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	M	2.757	11196	79542	1	0.9872	ng/mL	----	25.86
Sodium Perchlorate-18O4_IS	Auto	2.755	79542	79542	1	1.0000	ng/mL	----	----

## Perchlorate

Conc 0.9872

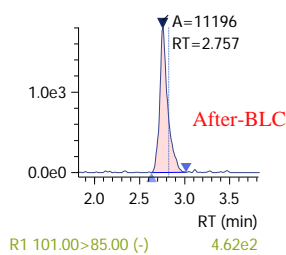
R#1 25.86 (0.00)

Q 99.00&gt;83.00 (-)

1.81e3

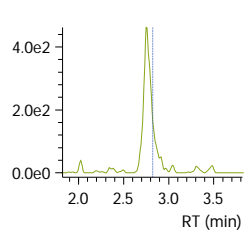
ISTD 107.00&gt;89.00 (-)

1.23e4

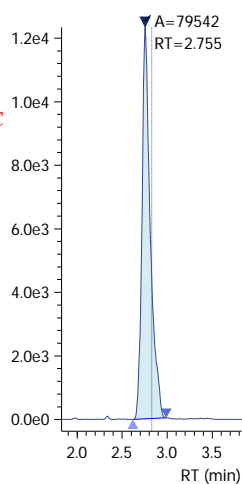


R1 101.00&gt;85.00 (-)

4.62e2

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000



## Insight Report

Printed at 8/24/2021 3:28:32 PM

20210816\_011

Sample ID: PERCHLORATE7

Date Acquired: 8/16/2021 11:39:43 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210816\Before\20210816\_011.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

Sodium Perchlorate

-18O4\_IS

Conc 9.7896

Conc 1.0000

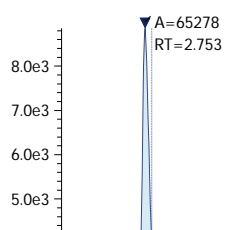
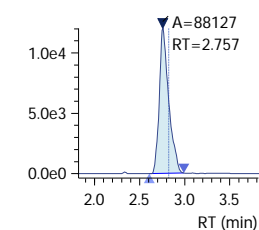
R#1 22.55 (0.00)

Q 99.00&gt;83.00 (-)

1.20e4

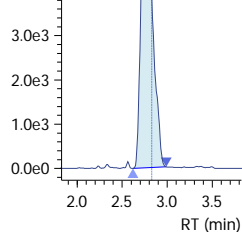
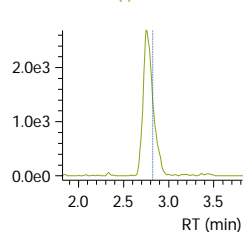
ISTD 107.00&gt;89.00 (-)

8.86e3



R1 101.00&gt;85.00 (-)

2.69e3



## Insight Report

Printed at 8/24/2021 4:18:15 PM

20210816\_011

Sample ID: PERCHLORATE7

Date Acquired: 8/16/2021 11:39:43 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210816\20210816\_011.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	Auto	2.757	88127	65278	1	9.4687	ng/mL	10.0000	22.55
Sodium Perchlorate-18O4_IS	Auto	2.753	65278	65278	1	1.0000	ng/mL	1.0000	----

## Perchlorate

Conc 9.4687

R#1 22.55 (0.00)

Q 99.00&gt;83.00 (-)

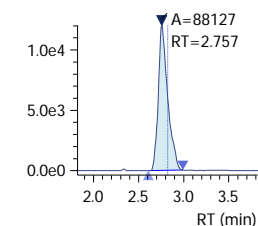
1.20e4

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

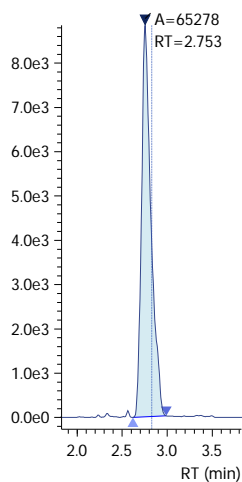
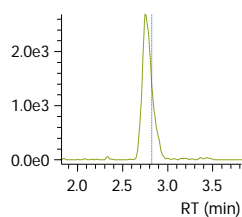
ISTD 107.00&gt;89.00 (-)

8.86e3



R1 101.00&gt;85.00 (-)

2.69e3



## Insight Report

Printed at 8/24/2021 3:28:32 PM

20210816\_028

Sample ID: PERCHLORATE7

Date Acquired: 8/16/2021 2:13:37 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210816\Before\20210816\_028.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

Sodium Perchlorate

-18O4\_IS

Conc 9.8310

Conc 1.0000

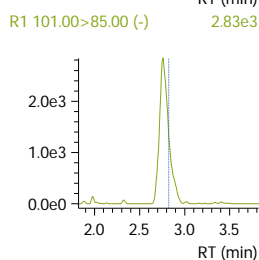
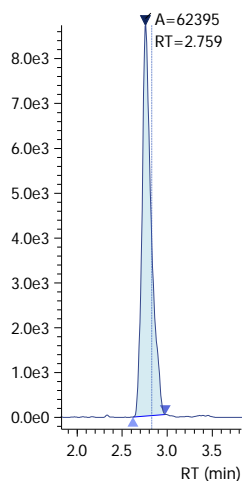
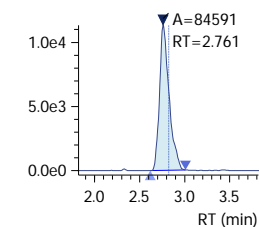
R#1 24.91 (0.00)

Q 99.00&gt;83.00 (-)

1.13e4

ISTD 107.00&gt;89.00 (-)

8.75e3



## Insight Report

Printed at 8/24/2021 4:18:15 PM

20210816\_028

Sample ID: PERCHLORATE7

Date Acquired: 8/16/2021 2:13:37 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210816\20210816\_028.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	Auto	2.761	84591	62395	1	9.5087	ng/mL	10.0000	24.91
Sodium Perchlorate-18O4_IS	Auto	2.759	62395	62395	1	1.0000	ng/mL	1.0000	----

## Perchlorate

Conc 9.5087

R#1 24.91 (0.00)

Q 99.00&gt;83.00 (-)

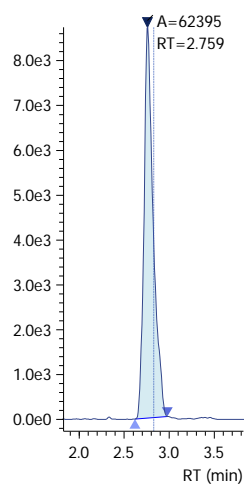
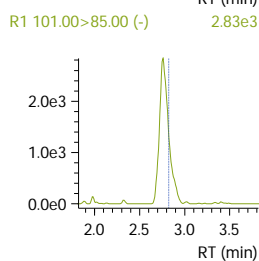
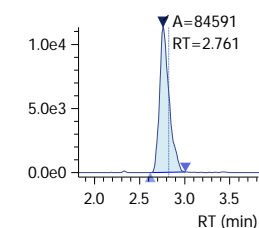
1.13e4

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

ISTD 107.00&gt;89.00 (-)

8.75e3



## Insight Report

Printed at 8/24/2021 3:28:32 PM

20210816\_032

Sample ID: E2100887-001X2

Date Acquired: 8/16/2021 2:47:45 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210816\Before\20210816\_032.lcd

Vial: 13 | Inj. Volume: 25.0000uL | Tray: 4

Perchlorate

Sodium Perchlorate

-18O4\_IS

Conc ----

Conc 1.0000

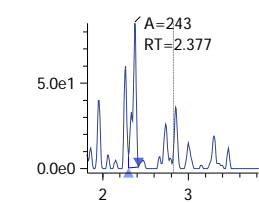
R#1 ---- (0.00)

Q 99.00&gt;83.00 (-)

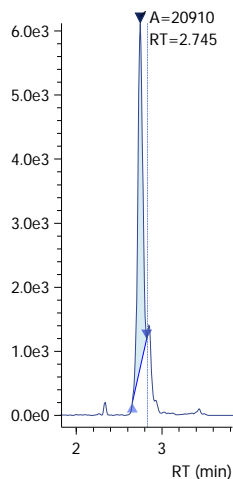
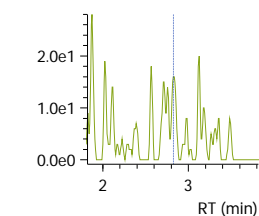
8.50e1

ISTD 107.00&gt;89.00 (-)

6.12e3



R1 101.00&gt;85.00 (-)



## Insight Report

Printed at 8/24/2021 4:18:15 PM

20210816\_032

Sample ID: E2100887-001X2

Date Acquired: 8/16/2021 2:47:45 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210816\20210816\_032.lcd

Vial: 13 | Inj. Volume: 25.0000uL | Tray: 4

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	ND(W/B)	----	----	35049	1	----	ng/mL	----	----
Sodium Perchlorate-18O4_IS	M	2.745	35049	35049	1	1.0000	ng/mL	----	----

## Perchlorate

Conc ----

R#1 ---- (0.00)

Q 99.00&gt;83.00 (-)

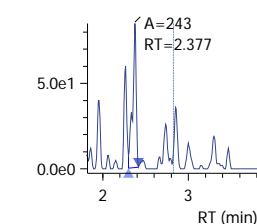
8.50e1

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

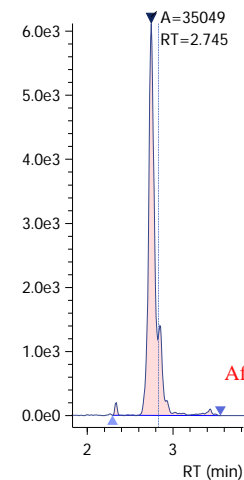
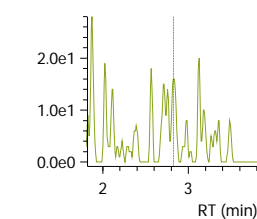
ISTD 107.00&gt;89.00 (-)

6.12e3



R1 101.00&gt;85.00 (-)

2.80e1





## Insight Report

Printed at 8/24/2021 3:28:32 PM

20210816\_033

Sample ID: E2100887-002X5

Date Acquired: 8/16/2021 4:14:57 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210816\Before\20210816\_033.lcd

Vial: 14 | Inj. Volume: 25.0000uL | Tray: 4

Perchlorate

Sodium Perchlorate

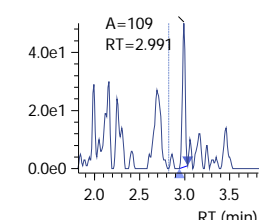
-18O4\_IS

Conc ----

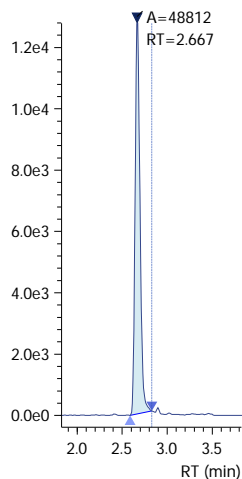
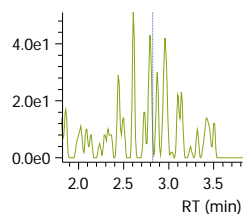
Conc 1.0000

R#1 ---- (0.00)

Q 99.00&gt;83.00 (-) 5.00e1 ISTD 107.00&gt;89.00 (-) 1.28e4



R1 101.00&gt;85.00 (-) 5.10e1



## Insight Report

Printed at 8/24/2021 4:18:15 PM

20210816\_033

Sample ID: E2100887-002X5

Date Acquired: 8/16/2021 4:14:57 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210816\20210816\_033.lcd

Vial: 14 | Inj. Volume: 25.0000uL | Tray: 4

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	M	2.694	147	48812	1	0.0211	ng/mL	----	0.00
Sodium Perchlorate-18O4_IS	Auto	2.667	48812	48812	1	1.0000	ng/mL	----	----

## Perchlorate

Conc 0.0211

R#1 0.00 (0.00)

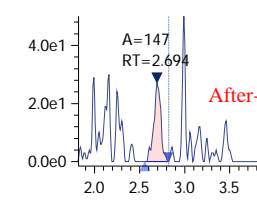
Q 99.00&gt;83.00 (-)

Sodium Perchlorate  
-18O4\_IS

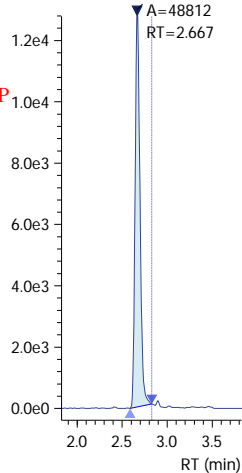
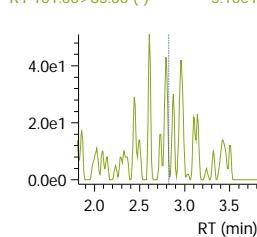
Conc 1.0000

ISTD 107.00&gt;89.00 (-)

1.28e4



R1 101.00&gt;85.00 (-)



## Insight Report

Printed at 8/24/2021 3:28:32 PM

20210816\_035

Sample ID: E2100887-004X5

Date Acquired: 8/16/2021 4:32:02 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210816\Before\20210816\_035.lcd

Vial: 16 | Inj. Volume: 25.0000uL | Tray: 4

Perchlorate

Sodium Perchlorate

-18O4-IS

Conc ----

Conc 1.0000

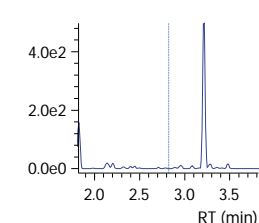
R#1 ---- (0.00)

Q 99.00&gt;83.00 (-)

4.97e2

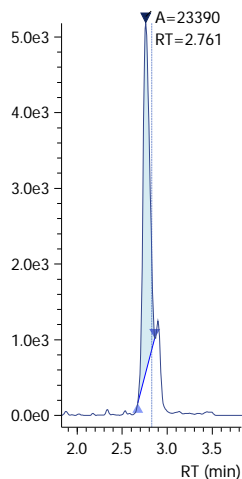
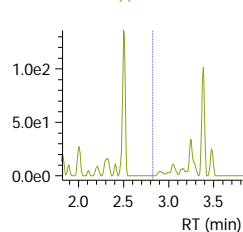
ISTD 107.00&gt;89.00 (-)

5.18e3



R1 101.00&gt;85.00 (-)

1.36e2



## Insight Report

Printed at 8/24/2021 4:18:15 PM

20210816\_035

Sample ID: E2100887-004X5

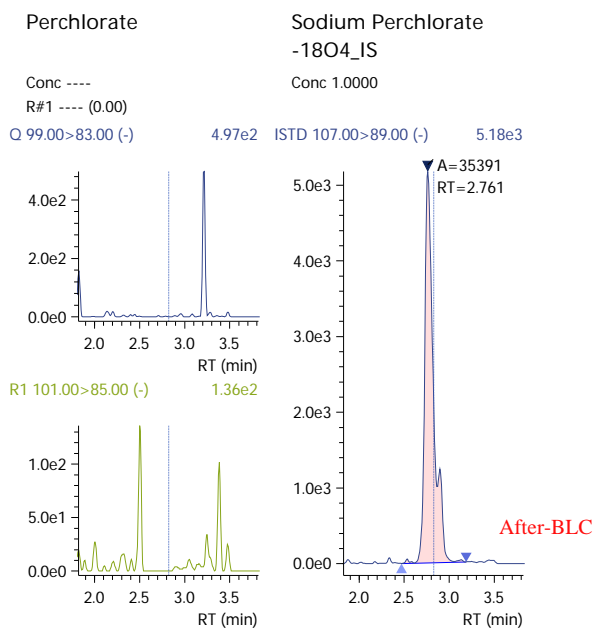
Date Acquired: 8/16/2021 4:32:02 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210816\20210816\_035.lcd

Vial: 16 | Inj. Volume: 25.0000uL | Tray: 4

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	ND(W/B)	----	----	35391	1	----	ng/mL	----	----
Sodium Perchlorate-18O4_IS	M	2.761	35391	35391	1	1.0000	ng/mL	----	----



## Insight Report

Printed at 8/24/2021 3:28:32 PM

20210816\_037

Sample ID: E2100887-006X5

Date Acquired: 8/16/2021 4:49:21 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210816\Before\20210816\_037.lcd

Vial: 18 | Inj. Volume: 25.0000uL | Tray: 4

Perchlorate

Sodium Perchlorate

-18O4\_IS

Conc ----

Conc 1.0000

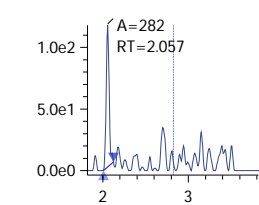
R#1 ---- (0.00)

Q 99.00&gt;83.00 (-)

1.18e2

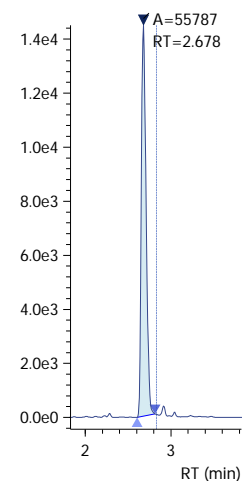
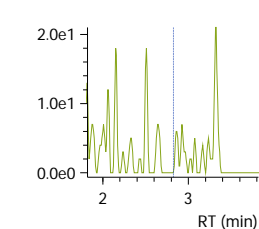
ISTD 107.00&gt;89.00 (-)

1.45e4



R1 101.00&gt;85.00 (-)

2.10e1



## Insight Report

Printed at 8/24/2021 4:18:15 PM

20210816\_037

Sample ID: E2100887-006X5

Date Acquired: 8/16/2021 4:49:21 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210816\20210816\_037.lcd

Vial: 18 | Inj. Volume: 25.0000uL | Tray: 4

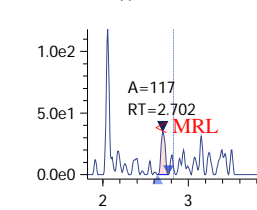
Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	M	2.702	117	55787	1	0.0147	ng/mL	----	0.00
Sodium Perchlorate-18O4_IS	Auto	2.678	55787	55787	1	1.0000	ng/mL	----	----

## Perchlorate

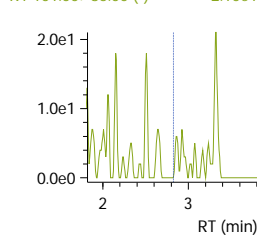
Conc 0.0147

R#1 0.00 (0.00)

Q 99.00&gt;83.00 (-)

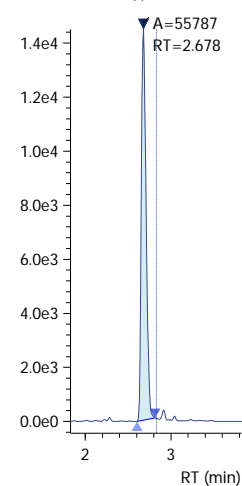


R1 101.00&gt;85.00 (-)

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

ISTD 107.00&gt;89.00 (-)



## Insight Report

Printed at 8/24/2021 3:28:32 PM

20210816\_038

Sample ID: E2100887-007X5

Date Acquired: 8/16/2021 4:57:53 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210816\Before\20210816\_038.lcd

Vial: 19 | Inj. Volume: 25.0000uL | Tray: 4

Perchlorate

Sodium Perchlorate

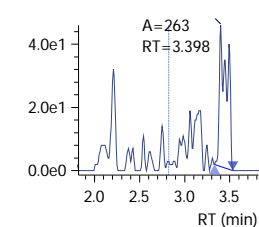
-18O4\_IS

Conc ----

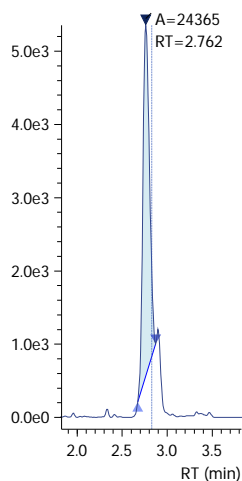
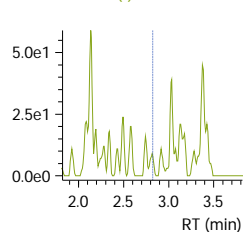
Conc 1.0000

R#1 ---- (0.00)

Q 99.00&gt;83.00 (-) 4.60e1 ISTD 107.00&gt;89.00 (-) 5.35e3



R1 101.00&gt;85.00 (-) 5.90e1



## Insight Report

Printed at 8/24/2021 4:18:15 PM

20210816\_038

Sample ID: E2100887-007X5

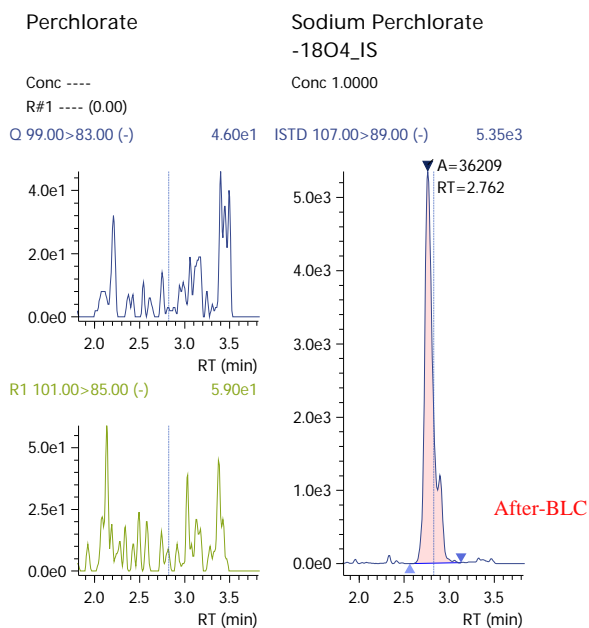
Date Acquired: 8/16/2021 4:57:53 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210816\20210816\_038.lcd

Vial: 19 | Inj. Volume: 25.0000uL | Tray: 4

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	ND(W/B)	----	----	36209	1	----	ng/mL	----	----
Sodium Perchlorate-18O4_IS	M	2.762	36209	36209	1	1.0000	ng/mL	----	----





## Insight Report

Printed at 8/24/2021 3:28:32 PM

20210816\_039

Sample ID: PERCHLORATE7

Date Acquired: 8/16/2021 5:06:29 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210816\Before\20210816\_039.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

Sodium Perchlorate

-18O4\_IS

Conc 9.1755

Conc 1.0000

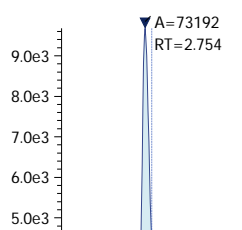
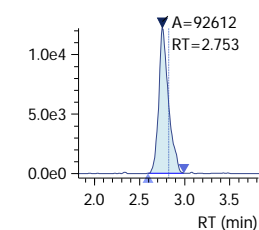
R#1 22.25 (0.00)

Q 99.00&gt;83.00 (-)

1.22e4

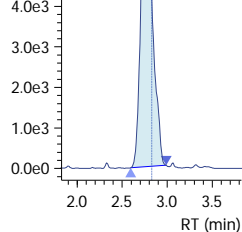
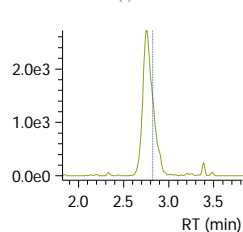
ISTD 107.00&gt;89.00 (-)

9.68e3



R1 101.00&gt;85.00 (-)

2.72e3



## Insight Report

Printed at 8/24/2021 4:18:15 PM

20210816\_039

Sample ID: PERCHLORATE7

Date Acquired: 8/16/2021 5:06:29 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210816\20210816\_039.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	Auto	2.753	92612	73192	1	8.8747	ng/mL	10.0000	22.25
Sodium Perchlorate-18O4_IS	Auto	2.754	73192	73192	1	1.0000	ng/mL	1.0000	----

## Perchlorate

Conc 8.8747

R#1 22.25 (0.00)

Q 99.00&gt;83.00 (-)

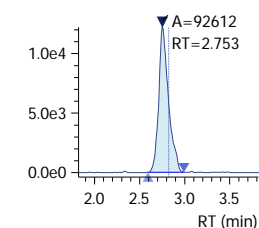
1.22e4

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

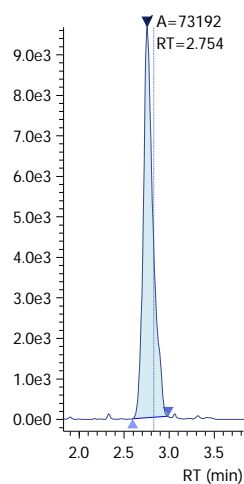
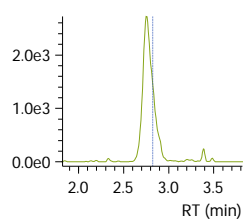
ISTD 107.00&gt;89.00 (-)

9.68e3



R1 101.00&gt;85.00 (-)

2.72e3



## Insight Report

Printed at 8/24/2021 3:28:32 PM

20210816\_040

Sample ID: E2100887-008X5

Date Acquired: 8/16/2021 5:15:00 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210816\Before\20210816\_040.lcd

Vial: 20 | Inj. Volume: 25.0000uL | Tray: 4

Perchlorate

Sodium Perchlorate

-18O4\_IS

Conc ----

Conc 1.0000

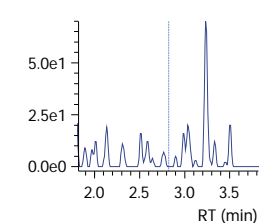
R#1 ---- (0.00)

Q 99.00&gt;83.00 (-)

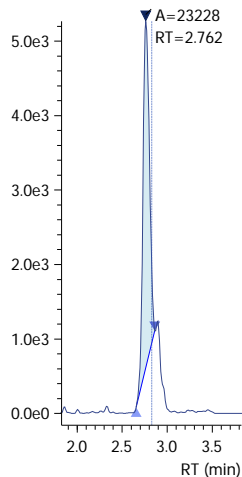
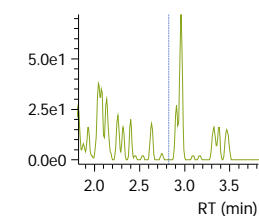
7.00e1

ISTD 107.00&gt;89.00 (-)

5.27e3



R1 101.00&gt;85.00 (-)



## Insight Report

Printed at 8/24/2021 4:18:15 PM

20210816\_040

Sample ID: E2100887-008X5

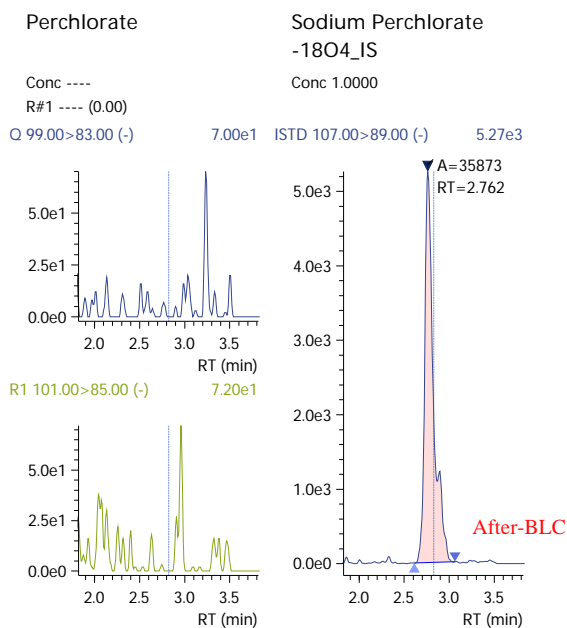
Date Acquired: 8/16/2021 5:15:00 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210816\20210816\_040.lcd

Vial: 20 | Inj. Volume: 25.0000uL | Tray: 4

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	ND(W/B)	----	----	35873	1	----	ng/mL	----	----
Sodium Perchlorate-18O4_IS	M	2.762	35873	35873	1	1.0000	ng/mL	----	----



## Insight Report

Printed at 8/24/2021 3:28:32 PM

20210816\_047

Sample ID: PERCHLORATE7

Date Acquired: 8/16/2021 6:14:55 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210816\Before\20210816\_047.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

Sodium Perchlorate

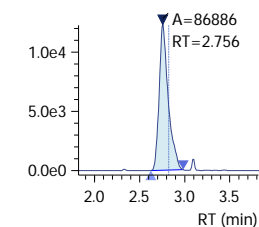
-18O4\_IS

Conc 9.5046

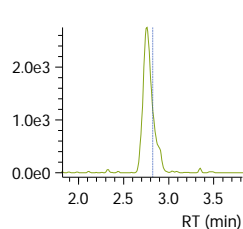
Conc 1.0000

R#1 22.49 (0.00)

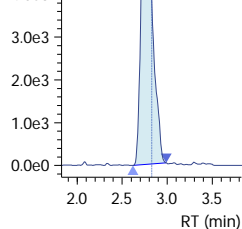
Q 99.00&gt;83.00 (-) 1.23e4 ISTD 107.00&gt;89.00 (-) 9.17e3



R1 101.00&gt;85.00 (-) 2.75e3



R1 101.00&gt;85.00 (-) 2.75e3



## Insight Report

Printed at 8/24/2021 4:18:15 PM

20210816\_047

Sample ID: PERCHLORATE7

Date Acquired: 8/16/2021 6:14:55 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210816\20210816\_047.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	Auto	2.756	86886	66289	1	9.1930	ng/mL	10.0000	22.49
Sodium Perchlorate-18O4_IS	Auto	2.755	66289	66289	1	1.0000	ng/mL	1.0000	----

## Perchlorate

Conc 9.1930

R#1 22.49 (0.00)

Q 99.00&gt;83.00 (-)

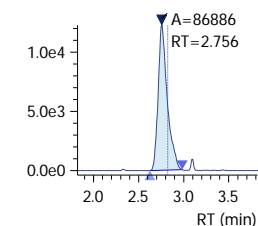
1.23e4

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

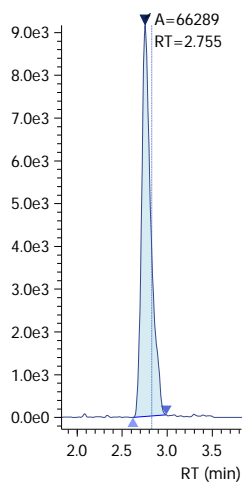
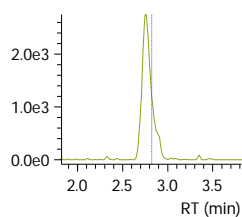
ISTD 107.00&gt;89.00 (-)

9.17e3



R1 101.00&gt;85.00 (-)

2.75e3



## Insight Report

Printed at 8/19/2021 10:08:37 AM

Method File: I:\LCMS01\DATA\20210818\20210804.lcm

Project File: I:\LCMS01\DATA\20210818\20210818-1.damIp

## 20210818\_006

Sample ID: ICS

Date Acquired: 8/18/2021 9:51:50 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210818\20210818\_006.lcd

Vial: 32 | Inj. Volume: 25.0000uL | Tray: 1

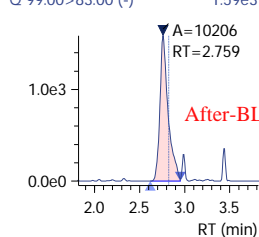
Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	M	2.759	10206	79202	1	0.9038	ng/mL	----	20.80
Sodium Perchlorate-18O4_IS	Auto	2.759	79202	79202	1	1.0000	ng/mL	----	----

## Perchlorate

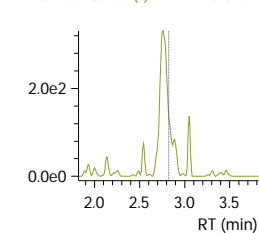
Conc 0.9038

R#1 20.80 (0.00)

Q 99.00&gt;83.00 (-)

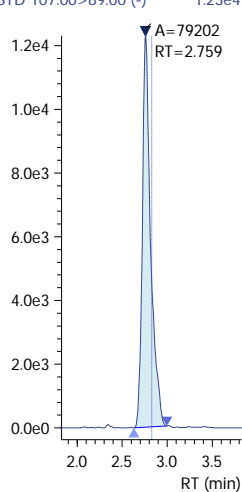


R1 101.00&gt;85.00 (-)

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

ISTD 107.00&gt;89.00 (-)



## Insight Report

Printed at 8/19/2021 10:20:17 AM

Method File: I:\LCMS01\DATA\20210818\20210804.lcm

## 20210818\_006

Sample ID: ICS

Date Acquired: 8/18/2021 9:51:50 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210818\Before\20210818\_006.lcd

Vial: 32 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

Sodium Perchlorate  
-18O4\_IS

Conc 0.8987

Conc 1.0000

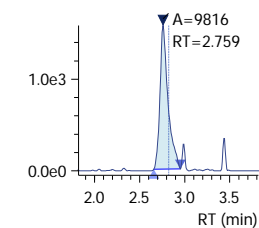
R#1 20.87 (0.00)

Q 99.00&gt;83.00 (-)

1.59e3

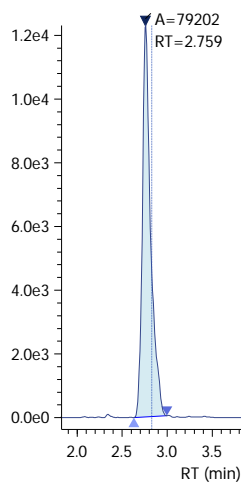
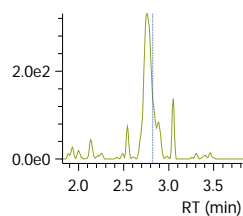
ISTD 107.00&gt;89.00 (-)

1.23e4



R1 101.00&gt;85.00 (-)

3.31e2





## Insight Report

Printed at 8/19/2021 10:08:37 AM

20210818\_007

Sample ID: LODV

Date Acquired: 8/18/2021 10:00:22 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210818\20210818\_007.lcd

Vial: 31 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	M	2.779	652	83461	1	0.0548	ng/mL	----	24.39
Sodium Perchlorate-18O4_IS	Auto	2.759	83461	83461	1	1.0000	ng/mL	----	----

## Perchlorate

Conc 0.0548

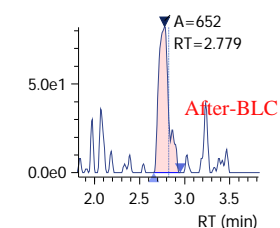
R#1 24.39 (0.00)

Q 99.00&gt;83.00 (-)

8.20e1

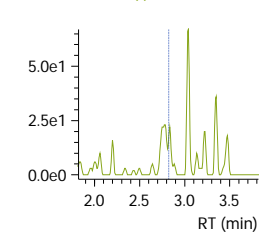
ISTD 107.00&gt;89.00 (-)

1.32e4

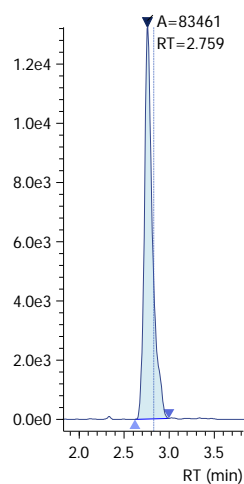


R1 101.00&gt;85.00 (-)

6.70e1

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000



## Insight Report

Printed at 8/19/2021 10:20:17 AM

20210818\_007

Sample ID: LODV

Date Acquired: 8/18/2021 10:00:22 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210818\Before\20210818\_007.lcd

Vial: 31 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

Sodium Perchlorate

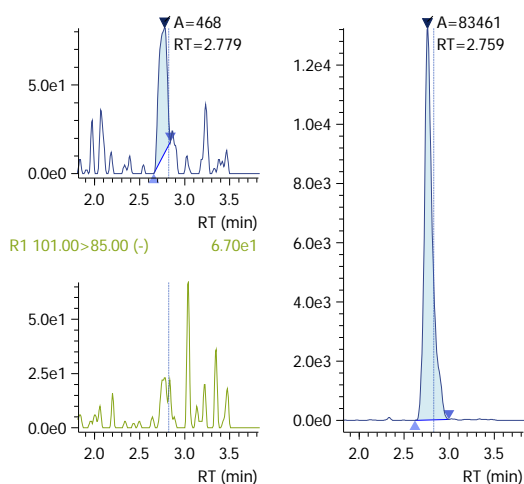
-18O4\_IS

Conc 0.0406

Conc 1.0000

R#1 12.68 (0.00)

Q 99.00&gt;83.00 (-) 8.20e1 ISTD 107.00&gt;89.00 (-) 1.32e4



## Insight Report

Printed at 8/24/2021 2:15:50 PM

Method File: I:\LCMS01\DATA\20210818\20210804.lcm

Project File: I:\LCMS01\DATA\20210818\20210818-1.dam\p

## 20210818\_008

Sample ID: PERCHLORATE7

Date Acquired: 8/18/2021 10:26:04 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210818\20210818\_008.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	M	2.735	76004	62544	1	8.5231	ng/mL	10.0000	24.53
Sodium Perchlorate-18O4_IS	Auto	2.736	62544	62544	1	1.0000	ng/mL	1.0000	----

## Perchlorate

Conc 8.5231

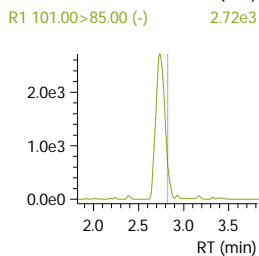
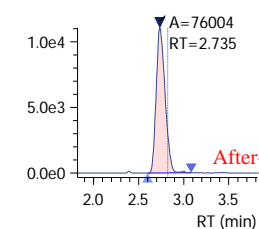
R#1 24.53 (0.00)

Q 99.00&gt;83.00 (-)

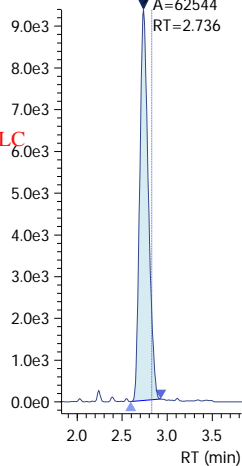
1.11e4

ISTD 107.00&gt;89.00 (-)

9.39e3

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

A=62544  
RT=2.736

## Insight Report

Printed at 8/19/2021 10:20:17 AM

20210818\_008

Sample ID: PERCHLORATE7

Date Acquired: 8/18/2021 10:26:04 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210818\Before\20210818\_008.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

Sodium Perchlorate

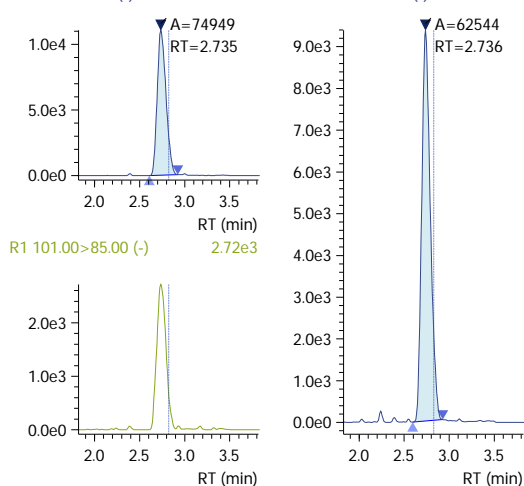
-18O4\_IS

Conc 8.6897

Conc 1.0000

R#1 24.35 (0.00)

Q 99.00&gt;83.00 (-) 1.11e4 ISTD 107.00&gt;89.00 (-) 9.39e3



## Insight Report

Printed at 8/19/2021 10:08:37 AM

20210818\_014

Sample ID: E2100887-003X10

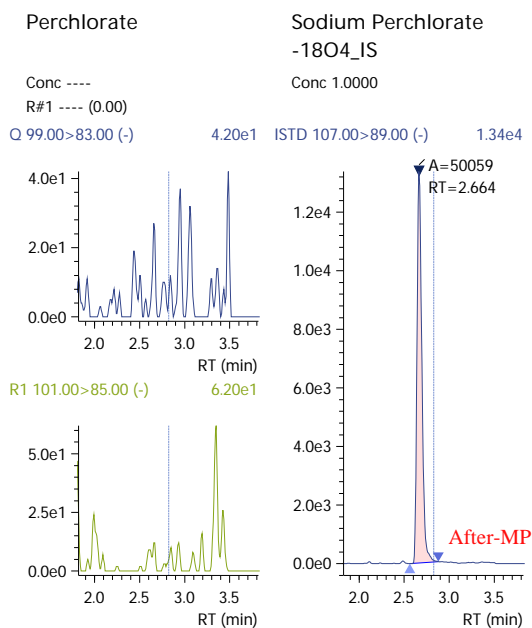
Date Acquired: 8/18/2021 11:21:23 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210818\20210818\_014.lcd

Vial: 15 | Inj. Volume: 25.0000uL | Tray: 4

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	ND(W/B)	----	----	50059	1	----	ng/mL	----	----
Sodium Perchlorate-18O4_IS	M	2.664	50059	50059	1	1.0000	ng/mL	----	----



## Insight Report

Printed at 8/19/2021 10:20:17 AM

20210818\_014

Sample ID: E2100887-003X10

Date Acquired: 8/18/2021 11:21:23 AM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210818\Before\20210818\_014.lcd

Vial: 15 | Inj. Volume: 25.0000uL | Tray: 4

Perchlorate

Sodium Perchlorate

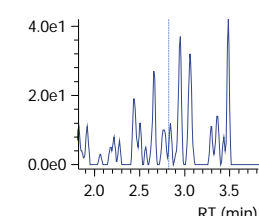
-18O4\_IS

Conc ----

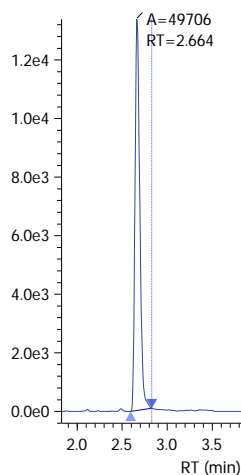
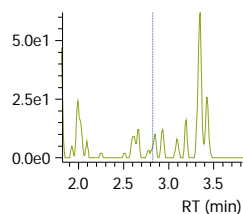
Conc ----

R#1 ---- (0.00)

Q 99.00&gt;83.00 (-) 4.20e1 ISTD 107.00&gt;89.00 (-) 1.34e4



R1 101.00&gt;85.00 (-) 6.20e1



## Insight Report

Printed at 8/24/2021 2:15:50 PM

20210818\_019

Sample ID: PERCHLORATE7

Date Acquired: 8/18/2021 12:04:06 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210818\20210818\_019.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	M	2.759	79518	65562	1	8.5067	ng/mL	10.0000	24.12
Sodium Perchlorate-18O4_IS	Auto	2.757	65562	65562	1	1.0000	ng/mL	1.0000	----

## Perchlorate

Conc 8.5067

R#1 24.12 (0.00)

Q 99.00&gt;83.00 (-)

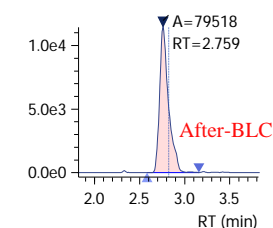
1.14e4

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

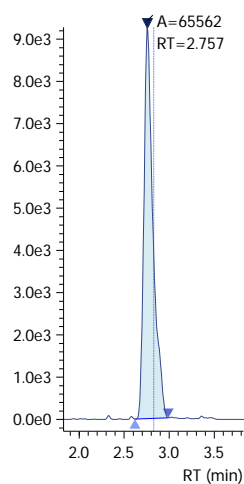
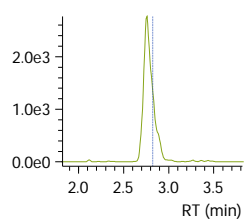
ISTD 107.00&gt;89.00 (-)

9.28e3



R1 101.00&gt;85.00 (-)

2.77e3



## Insight Report

Printed at 8/19/2021 10:20:17 AM

20210818\_019

Sample ID: PERCHLORATE7

Date Acquired: 8/18/2021 12:04:06 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210818\Before\20210818\_019.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

Sodium Perchlorate

-18O4\_IS

Conc 8.6947

Conc 1.0000

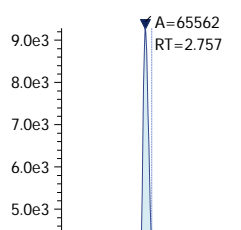
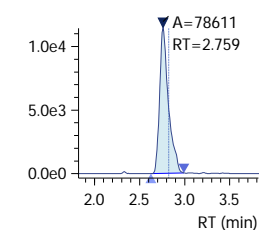
R#1 24.04 (0.00)

Q 99.00&gt;83.00 (-)

1.14e4

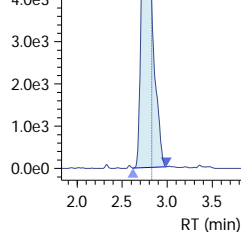
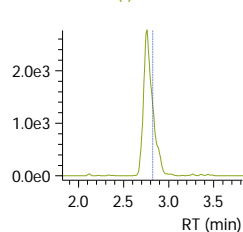
ISTD 107.00&gt;89.00 (-)

9.28e3



R1 101.00&gt;85.00 (-)

2.77e3





## Insight Report

Printed at 8/19/2021 10:08:37 AM

20210818\_041

Sample ID: PERCHLORATE7

Date Acquired: 8/18/2021 3:26:12 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210818\20210818\_041.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	M	2.659	56862	44446	1	8.9730	ng/mL	10.0000	24.56
Sodium Perchlorate-18O4_IS	M	2.657	44446	44446	1	1.0000	ng/mL	1.0000	----

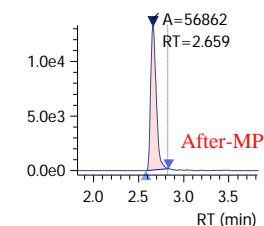
## Perchlorate

Conc 8.9730

R#1 24.56 (0.00)

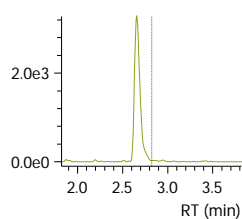
Q 99.00&gt;83.00 (-)

1.33e4



R1 101.00&gt;85.00 (-)

3.28e3

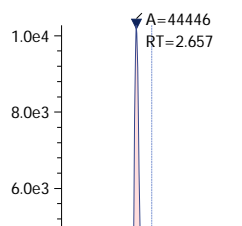


## Sodium Perchlorate-18O4\_IS

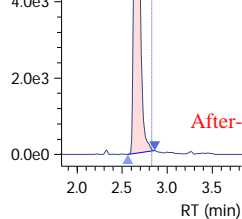
Conc 1.0000

ISTD 107.00&gt;89.00 (-)

1.03e4



R1 101.00&gt;85.00 (-)



## Insight Report

Printed at 8/19/2021 10:20:17 AM

20210818\_041

Sample ID: PERCHLORATE7

Date Acquired: 8/18/2021 3:26:12 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210818\Before\20210818\_041.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

Sodium Perchlorate

-18O4-IS

Conc ----

Conc ----

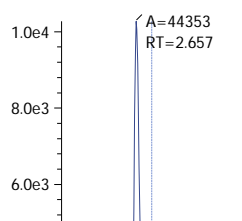
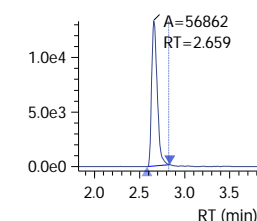
R#1 ---- (0.00)

Q 99.00&gt;83.00 (-)

1.33e4

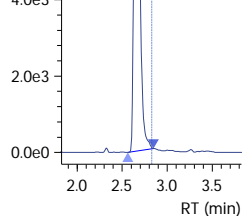
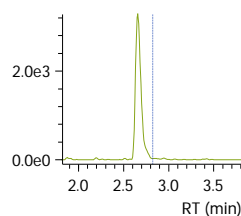
ISTD 107.00&gt;89.00 (-)

1.03e4



R1 101.00&gt;85.00 (-)

3.28e3



## Insight Report

Printed at 8/19/2021 10:08:37 AM

## 20210818\_045~1

Sample ID: E2100887-005X20-CARBON

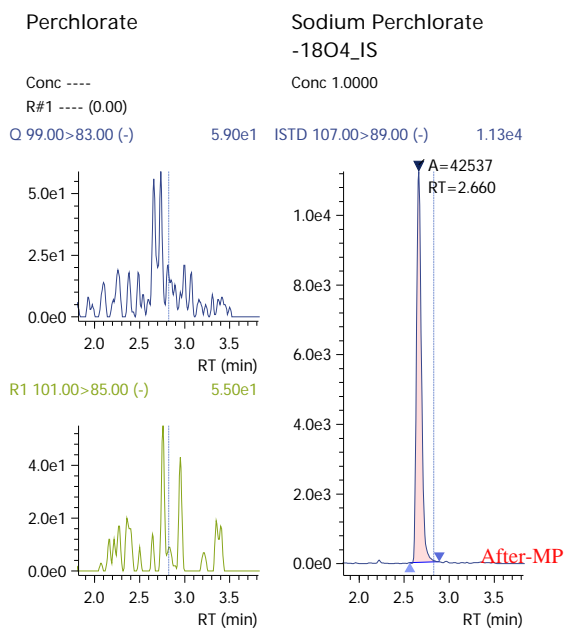
Date Acquired: 8/18/2021 5:00:21 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210818\20210818\_045~1.lcd

Vial: 32 | Inj. Volume: 20.0000uL | Tray: 4

Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	ND(W/B)	----	----	42537	1	----	ng/mL	----	----
Sodium Perchlorate-18O4_IS	M	2.660	42537	42537	1	1.0000	ng/mL	----	----



## Insight Report

Printed at 8/19/2021 10:20:17 AM

20210818\_045~1

Sample ID: E2100887-005X20-CARBON

Date Acquired: 8/18/2021 5:00:21 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210818\Before\20210818\_045~1.lcd

Vial: 32 | Inj. Volume: 20.0000uL | Tray: 4

Perchlorate

Sodium Perchlorate

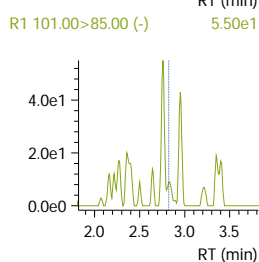
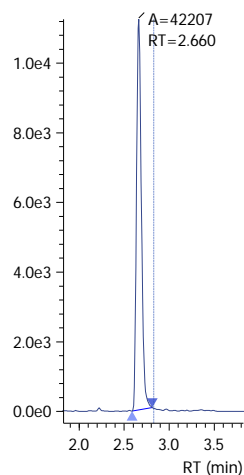
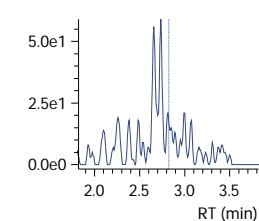
-18O4\_IS

Conc ----

Conc ----

R#1 ---- (0.00)

Q 99.00&gt;83.00 (-) 5.90e1 ISTD 107.00&gt;89.00 (-) 1.13e4



## Insight Report

Printed at 8/19/2021 10:08:37 AM

20210818\_046

Sample ID: PERCHLORATE7

Date Acquired: 8/18/2021 5:08:54 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210818\20210818\_046.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

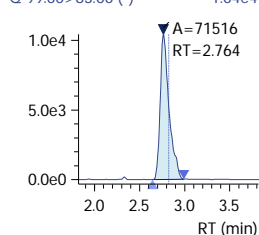
Name	Mode ID	Found RT	Area	ISTD Area	ISTD Group	Conc.	Unit	Std. Conc.	Ref 1 Actual Ratio
Perchlorate	Auto	2.764	71516	58887	1	8.5179	ng/mL	10.0000	25.71
Sodium Perchlorate-18O4_IS	Auto	2.763	58887	58887	1	1.0000	ng/mL	1.0000	----

## Perchlorate

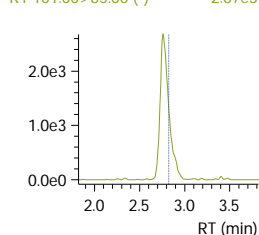
Conc 8.5179

R#1 25.71 (0.00)

Q 99.00&gt;83.00 (-)

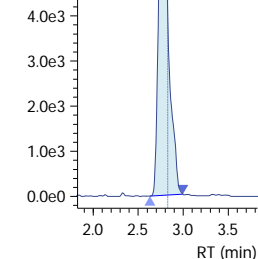
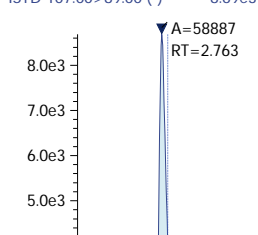


R1 101.00&gt;85.00 (-)

Sodium Perchlorate  
-18O4\_IS

Conc 1.0000

ISTD 107.00&gt;89.00 (-)



## Insight Report

Printed at 8/19/2021 10:20:17 AM

20210818\_046

Sample ID: PERCHLORATE7

Date Acquired: 8/18/2021 5:08:54 PM

Acquired by: System Administrator

Data File: I:\LCMS01\DATA\20210818\Before\20210818\_046.lcd

Vial: 26 | Inj. Volume: 25.0000uL | Tray: 1

Perchlorate

Sodium Perchlorate

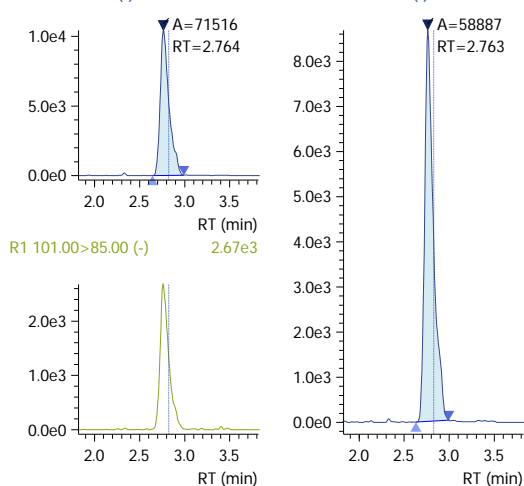
-18O4\_IS

Conc 8.8066

Conc 1.0000

R#1 25.71 (0.00)

Q 99.00&gt;83.00 (-) 1.04e4 ISTD 107.00&gt;89.00 (-) 8.69e3



# HS21110549 LHAAP 04 November 2021 Cover Page

ALS WO# HS21110549



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COC

HS21110549 9056\_W IC

HS21110549 Wet Chem







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**WorkOrder: HS21110549**

**LHAAP 04 November 2021**

**Aptim Environmental & Infrastructure, Inc.**

Vicki Graves  
10333 Richmond Ave Ste 1030  
Houston TX 77042

**14-Jan-2022**



# HS21110549 LHAAP 04 November 2021 Final

ALS WO# HS21110549





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10450 Stancliff Rd. Suite 210  
Houston, TX 77099  
T: +1 281 530 5656  
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November 19, 2021

Vicki Graves  
Aptim Environmental & Infrastructure, Inc.  
10333 Richmond Ave  
Ste 1030  
Houston, TX 77042

Work Order: **HS21110549**

Laboratory Results for: **LHAAP 04 November 2021**

Dear Vicki Graves ,

ALS Environmental received 5 sample(s) on Nov 10, 2021 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

A handwritten signature in black ink, appearing to read 'Ragen Giga'.

Generated By: JUMOKE.LAWAL

Ragen Giga  
Project Manager



## ALS Houston, US

Date: 19-Nov-21

**Client:** Aptim Environmental & Infrastructure, Inc.  
**Project:** LHAAP 04 November 2021  
**Work Order:** HS21110549

**SAMPLE SUMMARY**

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS21110549-01	04WW07-211109	GW		09-Nov-2021 07:45	10-Nov-2021 10:35	<input type="checkbox"/>
HS21110549-02	04WW07-211109-FD	GW		09-Nov-2021 07:45	10-Nov-2021 10:35	<input type="checkbox"/>
HS21110549-03	04WW05-211109	GW		09-Nov-2021 08:30	10-Nov-2021 10:35	<input type="checkbox"/>
HS21110549-04	04WW09-211109	GW		09-Nov-2021 09:15	10-Nov-2021 10:35	<input type="checkbox"/>
HS21110549-05	04WW10-211109	GW		09-Nov-2021 10:00	10-Nov-2021 10:35	<input type="checkbox"/>

ALS Houston, US

Date: 19-Nov-21

**Client:** Aptim Environmental & Infrastructure, Inc.  
**Project:** LHAAP 04 November 2021  
**Work Order:** HS21110549

**CASE NARRATIVE**

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**WetChemistry by Method SM5310B****Batch ID: R395803,R396089**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

---

**WetChemistry by Method SM2320B****Batch ID: R395482**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

---

**WetChemistry by Method SW9056****Batch ID: R395406****Sample ID: 04WW10-211109 (HS21110549-05MS)**

- The MS and/or MSD recovery was outside of the control limits; however, the result in the parent sample is greater than 4x the spike amount. (Sulfate)
  - The recovery of the Matrix Spike (MS) and/or Matrix Spike Duplicate (MSD) associated with this analyte was outside of the established control limits. However, the LCS was within control limits. The recovery of the MS/MSD may be due to sample matrix interference. (Nitrogen, Nitrite (As N))
-

## ALS Houston, US

Date: 19-Nov-21

Client: Aptim Environmental & Infrastructure, Inc.  
 Project: LHAAP 04 November 2021  
 Sample ID: 04WW07-211109  
 Collection Date: 09-Nov-2021 07:45

**ANALYTICAL REPORT**

WorkOrder:HS21110549  
 Lab ID:HS21110549-01  
 Matrix:GW

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>ALKALINITY BY SM 2320B-2011</b>		<b>Method:SM2320B</b>						Analyst: TH
Alkalinity, Total (As CaCO <sub>3</sub> )	723		5.00	5.00	5.00	mg/L	1	12-Nov-2021 00:24
<b>TOTAL ORGANIC CARBON - SM5310B-2011</b>		<b>Method:SM5310B</b>						Analyst: JAC
Organic Carbon, Total	12.1		0.500	1.00	1.00	mg/L	1	16-Nov-2021 08:49
<b>ANIONS BY SW9056A</b>		<b>Method:SW9056</b>						Analyst: YP
Nitrogen, Nitrate (As N)	0.0562	J	0.0300	0.100	0.100	mg/L	1	10-Nov-2021 13:36
Nitrogen, Nitrite (As N)	0.100	U	0.0300	0.100	0.100	mg/L	1	10-Nov-2021 13:36
Sulfate	112		1.00	2.50	2.50	mg/L	5	10-Nov-2021 22:15

Note: See Qualifiers Page for a list of qualifiers and their explanation.



## ALS Houston, US

Date: 19-Nov-21

Client: Aptim Environmental & Infrastructure, Inc.  
 Project: LHAAP 04 November 2021  
 Sample ID: 04WW07-211109-FD  
 Collection Date: 09-Nov-2021 07:45

**ANALYTICAL REPORT**

WorkOrder:HS21110549  
 Lab ID:HS21110549-02  
 Matrix:GW

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>ALKALINITY BY SM 2320B-2011</b>		<b>Method:SM2320B</b>						Analyst: TH
Alkalinity, Total (As CaCO <sub>3</sub> )	719		5.00	5.00	5.00	mg/L	1	12-Nov-2021 00:31
<b>TOTAL ORGANIC CARBON - SM5310B-2011</b>		<b>Method:SM5310B</b>						Analyst: JAC
Organic Carbon, Total	15.3		0.500	1.00	1.00	mg/L	1	16-Nov-2021 09:05
<b>ANIONS BY SW9056A</b>		<b>Method:SW9056</b>						Analyst: YP
Nitrogen, Nitrate (As N)	0.0585	J	0.0300	0.100	0.100	mg/L	1	10-Nov-2021 13:44
Nitrogen, Nitrite (As N)	0.100	U	0.0300	0.100	0.100	mg/L	1	10-Nov-2021 13:44
Sulfate	109		1.00	2.50	2.50	mg/L	5	10-Nov-2021 22:22

Note: See Qualifiers Page for a list of qualifiers and their explanation.



## ALS Houston, US

Date: 19-Nov-21

Client: Aptim Environmental & Infrastructure, Inc.  
 Project: LHAAP 04 November 2021  
 Sample ID: 04WW05-211109  
 Collection Date: 09-Nov-2021 08:30

**ANALYTICAL REPORT**

WorkOrder:HS21110549  
 Lab ID:HS21110549-03  
 Matrix:GW

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>ALKALINITY BY SM 2320B-2011</b>		<b>Method:SM2320B</b>						Analyst: TH
Alkalinity, Total (As CaCO <sub>3</sub> )	606		5.00	5.00	5.00	mg/L	1	12-Nov-2021 00:38
<b>TOTAL ORGANIC CARBON - SM5310B-2011</b>		<b>Method:SM5310B</b>						Analyst: JAC
Organic Carbon, Total	6.29		0.500	1.00	1.00	mg/L	1	16-Nov-2021 09:21
<b>ANIONS BY SW9056A</b>		<b>Method:SW9056</b>						Analyst: YP
Nitrogen, Nitrate (As N)	0.0598	J	0.0300	0.100	0.100	mg/L	1	10-Nov-2021 13:51
Nitrogen, Nitrite (As N)	0.100	U	0.0300	0.100	0.100	mg/L	1	10-Nov-2021 13:51
Sulfate	119		1.00	2.50	2.50	mg/L	5	10-Nov-2021 22:30

Note: See Qualifiers Page for a list of qualifiers and their explanation.





## ALS Houston, US

Date: 19-Nov-21

Client: Aptim Environmental & Infrastructure, Inc.  
 Project: LHAAP 04 November 2021  
 Sample ID: 04WW09-211109  
 Collection Date: 09-Nov-2021 09:15

**ANALYTICAL REPORT**

WorkOrder:HS21110549  
 Lab ID:HS21110549-04  
 Matrix:GW

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>ALKALINITY BY SM 2320B-2011</b>		<b>Method:SM2320B</b>						Analyst: TH
Alkalinity, Total (As CaCO <sub>3</sub> )	838		5.00	5.00	5.00	mg/L	1	12-Nov-2021 00:46
<b>TOTAL ORGANIC CARBON - SM5310B-2011</b>		<b>Method:SM5310B</b>						Analyst: JAC
Organic Carbon, Total	60.8		5.00	10.0	10.0	mg/L	10	19-Nov-2021 03:51
<b>ANIONS BY SW9056A</b>		<b>Method:SW9056</b>						Analyst: YP
Nitrogen, Nitrate (As N)	0.0600	J	0.0300	0.100	0.100	mg/L	1	10-Nov-2021 13:59
Nitrogen, Nitrite (As N)	0.100	U	0.0300	0.100	0.100	mg/L	1	10-Nov-2021 13:59
Sulfate	11.9		0.200	0.500	0.500	mg/L	1	10-Nov-2021 13:59

Note: See Qualifiers Page for a list of qualifiers and their explanation.



## ALS Houston, US

Date: 19-Nov-21

Client: Aptim Environmental & Infrastructure, Inc.  
 Project: LHAAP 04 November 2021  
 Sample ID: 04WW10-211109  
 Collection Date: 09-Nov-2021 10:00

**ANALYTICAL REPORT**

WorkOrder:HS21110549  
 Lab ID:HS21110549-05  
 Matrix:GW

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>ALKALINITY BY SM 2320B-2011</b>		<b>Method:SM2320B</b>						Analyst: TH
Alkalinity, Total (As CaCO <sub>3</sub> )	614		5.00	5.00	5.00	mg/L	1	12-Nov-2021 00:09
<b>TOTAL ORGANIC CARBON - SM5310B-2011</b>		<b>Method:SM5310B</b>						Analyst: JAC
Organic Carbon, Total	3.52		0.500	1.00	1.00	mg/L	1	19-Nov-2021 04:07
<b>ANIONS BY SW9056A</b>		<b>Method:SW9056</b>						Analyst: YP
Nitrogen, Nitrate (As N)	0.100	U	0.0300	0.100	0.100	mg/L	1	10-Nov-2021 16:00
Nitrogen, Nitrite (As N)	0.100	U	0.0300	0.100	0.100	mg/L	1	10-Nov-2021 16:00
Sulfate	686		4.00	10.0	10.0	mg/L	20	10-Nov-2021 22:52

Note: See Qualifiers Page for a list of qualifiers and their explanation.



ALS Houston, US

Date: 19-Nov-21

**Client:** Aptim Environmental & Infrastructure, Inc.  
**Project:** LHAAP 04 November 2021  
**WorkOrder:** HS21110549

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> R395406 ( 0 )		<b>Test Name :</b> ANIONS BY SW9056A			<b>Matrix:</b> GW	
HS21110549-01	04WW07-211109	09 Nov 2021 07:45			10 Nov 2021 22:15	5
HS21110549-01	04WW07-211109	09 Nov 2021 07:45			10 Nov 2021 13:36	1
HS21110549-02	04WW07-211109-FD	09 Nov 2021 07:45			10 Nov 2021 22:22	5
HS21110549-02	04WW07-211109-FD	09 Nov 2021 07:45			10 Nov 2021 13:44	1
HS21110549-03	04WW05-211109	09 Nov 2021 08:30			10 Nov 2021 22:30	5
HS21110549-03	04WW05-211109	09 Nov 2021 08:30			10 Nov 2021 13:51	1
HS21110549-04	04WW09-211109	09 Nov 2021 09:15			10 Nov 2021 13:59	1
HS21110549-05	04WW10-211109	09 Nov 2021 10:00			10 Nov 2021 22:52	20
HS21110549-05	04WW10-211109	09 Nov 2021 10:00			10 Nov 2021 16:00	1
<b>Batch ID:</b> R395482 ( 0 )		<b>Test Name :</b> ALKALINITY BY SM 2320B-2011			<b>Matrix:</b> GW	
HS21110549-01	04WW07-211109	09 Nov 2021 07:45			12 Nov 2021 00:24	1
HS21110549-02	04WW07-211109-FD	09 Nov 2021 07:45			12 Nov 2021 00:31	1
HS21110549-03	04WW05-211109	09 Nov 2021 08:30			12 Nov 2021 00:38	1
HS21110549-04	04WW09-211109	09 Nov 2021 09:15			12 Nov 2021 00:46	1
HS21110549-05	04WW10-211109	09 Nov 2021 10:00			12 Nov 2021 00:09	1
<b>Batch ID:</b> R395803 ( 0 )		<b>Test Name :</b> TOTAL ORGANIC CARBON - SM5310B-2011			<b>Matrix:</b> GW	
HS21110549-01	04WW07-211109	09 Nov 2021 07:45			16 Nov 2021 08:49	1
HS21110549-02	04WW07-211109-FD	09 Nov 2021 07:45			16 Nov 2021 09:05	1
HS21110549-03	04WW05-211109	09 Nov 2021 08:30			16 Nov 2021 09:21	1
<b>Batch ID:</b> R396089 ( 0 )		<b>Test Name :</b> TOTAL ORGANIC CARBON - SM5310B-2011			<b>Matrix:</b> GW	
HS21110549-04	04WW09-211109	09 Nov 2021 09:15			19 Nov 2021 03:51	10
HS21110549-05	04WW10-211109	09 Nov 2021 10:00			19 Nov 2021 04:07	1



## ALS Houston, US

Date: 19-Nov-21

**Client:** Aptim Environmental & Infrastructure, Inc.  
**Project:** LHAAP 04 November 2021  
**WorkOrder:** HS21110549

## QC BATCH REPORT

Batch ID: R395406 ( 0 )		Instrument: ICS-Integrion		Method: ANIONS BY SW9056A					
MBLK	Sample ID: MBLK	Units: mg/L			Analysis Date: 10-Nov-2021 13:06				
Client ID:	Run ID: ICS-Integrion_395406		SeqNo: 6365824		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Nitrogen, Nitrate (As N)	0.100	0.100							U
Nitrogen, Nitrite (As N)	0.0472	0.100							J
Sulfate	0.500	0.500							U
LCS	Sample ID: LCS	Units: mg/L			Analysis Date: 10-Nov-2021 13:14				
Client ID:	Run ID: ICS-Integrion_395406		SeqNo: 6365825		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Nitrogen, Nitrate (As N)	3.879	0.100	4	0	97.0	80 - 120			
Nitrogen, Nitrite (As N)	3.922	0.100	4	0	98.1	80 - 120			
Sulfate	19.69	0.500	20	0	98.4	80 - 120			
MS	Sample ID: HS21110549-05MS	Units: mg/L			Analysis Date: 10-Nov-2021 16:08				
Client ID: 04WW10-211109	Run ID: ICS-Integrion_395406		SeqNo: 6365833		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Nitrogen, Nitrate (As N)	1.888	0.100	2	0	94.4	80 - 120			
Nitrogen, Nitrite (As N)	1.576	0.100	2	0	78.8	80 - 120			S
Sulfate	653.1	0.500	10	655.3	-22.8	80 - 120			SEO
MSD	Sample ID: HS21110549-05MSD	Units: mg/L			Analysis Date: 10-Nov-2021 16:15				
Client ID: 04WW10-211109	Run ID: ICS-Integrion_395406		SeqNo: 6365834		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Nitrogen, Nitrate (As N)	1.897	0.100	2	0	94.9	80 - 120	1.888	0.476	20
Nitrogen, Nitrite (As N)	1.582	0.100	2	0	79.1	80 - 120	1.576	0.386	20 S
Sulfate	651.6	0.500	10	655.3	-37.6	80 - 120	653.1	0.227	20 SEO
The following samples were analyzed in this batch:									
HS21110549-01		HS21110549-02		HS21110549-03		HS21110549-04			
HS21110549-05									



## ALS Houston, US

Date: 19-Nov-21

**Client:** Aptim Environmental & Infrastructure, Inc.  
**Project:** LHAAP 04 November 2021  
**WorkOrder:** HS21110549

**QC BATCH REPORT**

Batch ID: R395482 ( 0 )		Instrument: ManTech01		Method: ALKALINITY BY SM 2320B-2011						
MBLK	Sample ID: WBLKW2-211111	Units: mg/L			Analysis Date: 12-Nov-2021 00:02					
Client ID:	Run ID: ManTech01_395482	SeqNo: 6367879		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Total (As CaCO3)		5.00	5.00	U						
LCS	Sample ID: WLCS2-211111	Units: mg/L			Analysis Date: 11-Nov-2021 23:29					
Client ID:	Run ID: ManTech01_395482	SeqNo: 6367875		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Total (As CaCO3)		1046	5.00	1000	0	105	85 - 115			
LCSD	Sample ID: WLCSD2-211111	Units: mg/L			Analysis Date: 11-Nov-2021 23:39					
Client ID:	Run ID: ManTech01_395482	SeqNo: 6367876		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Total (As CaCO3)		1062	5.00	1000	0	106	85 - 115	1046	1.47	20
DUP	Sample ID: HS21110549-05DUP	Units: mg/L			Analysis Date: 12-Nov-2021 00:16					
Client ID: 04WW10-211109	Run ID: ManTech01_395482	SeqNo: 6367881		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Total (As CaCO3)		622.5	5.00	613.8 1.4 20						
The following samples were analyzed in this batch:				HS21110549-01	HS21110549-02	HS21110549-03	HS21110549-04			
				HS21110549-05						



## ALS Houston, US

Date: 19-Nov-21

**Client:** Aptim Environmental & Infrastructure, Inc.  
**Project:** LHAAP 04 November 2021  
**WorkOrder:** HS21110549

**QC BATCH REPORT**

Batch ID: R395803 ( 0 )		Instrument: TOC_04		Method: TOTAL ORGANIC CARBON - SM5310B-2011						
<b>MBLK</b>	Sample ID: MBLK-11152021	Units: mg/L		Analysis Date: 16-Nov-2021 05:03						
Client ID:	Run ID: TOC_04_395803	SeqNo: 6375850		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	1.00	1.00								U
<b>LCS</b>	Sample ID: LCS-11152021	Units: mg/L		Analysis Date: 16-Nov-2021 05:19						
Client ID:	Run ID: TOC_04_395803	SeqNo: 6375851		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	10.67	1.00	10	0	107	85 - 115				
<b>LCSD</b>	Sample ID: LCSD-11152021	Units: mg/L		Analysis Date: 16-Nov-2021 05:35						
Client ID:	Run ID: TOC_04_395803	SeqNo: 6375852		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	10.63	1.00	10	0	106	85 - 115	10.67	0.376	20	
<b>MS</b>	Sample ID: HS21110521-04MS	Units: mg/L		Analysis Date: 16-Nov-2021 06:07						
Client ID:	Run ID: TOC_04_395803	SeqNo: 6375854		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	11.52	1.00	10	0.7102	108	80 - 120				
The following samples were analyzed in this batch:										
HS21110549-01			HS21110549-02			HS21110549-03				



## ALS Houston, US

Date: 19-Nov-21

**Client:** Aptim Environmental & Infrastructure, Inc.  
**Project:** LHAAP 04 November 2021  
**WorkOrder:** HS21110549

**QC BATCH REPORT**

Batch ID: R396089 ( 0 )		Instrument: TOC_04		Method: TOTAL ORGANIC CARBON - SM5310B-2011						
<b>MBLK</b>	Sample ID: MBLK-11182021	Units: mg/L		Analysis Date: 19-Nov-2021 02:14						
Client ID:	Run ID: TOC_04_396089	SeqNo: 6383193		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	1.00	1.00								U
<b>LCS</b>	Sample ID: LCS-11182021	Units: mg/L		Analysis Date: 19-Nov-2021 02:30						
Client ID:	Run ID: TOC_04_396089	SeqNo: 6383194		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	10.73	1.00	10	0	107	85 - 115				
<b>LCSD</b>	Sample ID: LCSD-11182021	Units: mg/L		Analysis Date: 19-Nov-2021 02:47						
Client ID:	Run ID: TOC_04_396089	SeqNo: 6383195		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	10.72	1.00	10	0	107	85 - 115	10.73	0.0932	20	
<b>MS</b>	Sample ID: HS21110549-05MS	Units: mg/L		Analysis Date: 19-Nov-2021 04:23						
Client ID: 04WW10-211109	Run ID: TOC_04_396089	SeqNo: 6383201		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	14.94	1.00	10	3.522	114	80 - 120				
The following samples were analyzed in this batch:										
			HS21110549-04 HS21110549-05							



**ALS Houston, US**

Date: 19-Nov-21

**Client:** Aptim Environmental & Infrastructure, Inc.  
**Project:** LHAAP 04 November 2021  
**WorkOrder:** HS21110549

**QUALIFIERS,  
ACRONYMS, UNITS**

<b>Qualifier</b>	<b>Description</b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

<b>Acronym</b>	<b>Description</b>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program





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**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

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Agency	Number	Expire Date
Arkansas	21-022-0	26-Mar-2022
Dept of Defense	PJLA L20-507-R2	22-Dec-2021
Florida	E87611-33	30-Jun-2022
Illinois	2000322021-7	09-May-2022
Kansas	E-10352 2021-2022	31-Jul-2022
Kentucky	123043, 2021-2022	30-Apr-2022
Louisiana	03087, 2021-2022	30-Jun-2022
North Carolina	624-2021	31-Dec-2021
Texas	T104704231-21-28	30-Apr-2022

ALS Houston, US

Date: 19-Nov-21

## Sample Receipt Checklist

Work Order ID: HS21110549

Date/Time Received: 10-Nov-2021 10:35

Client Name: CBI-Houston

Received by: Pablo Martinez

Completed By: <u>/S/ Pablo Martinez</u>	10-Nov-2021 12:47	Reviewed by: <u>/S/ Ragen Giga</u>	10-Nov-2021 20:53
eSignature	Date/Time	eSignature	Date/Time

Matrices: **WATER**Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	1 Page(s)
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	COC IDs: CLIENT
Samplers name present on COC?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	

Temperature(s)/Thermometer(s):

0.8°C UC/C

IR 31

Cooler(s)/Kit(s):

46425

Date/Time sample(s) sent to storage:

11/10/21 12:55

Water - VOA vials have zero headspace?

Yes ☒No ☐No VOA vials submitted ☐

Water - pH acceptable upon receipt?

Yes ☐No ☐N/A ☒

pH adjusted?

Yes ☐No ☐N/A ☒

pH adjusted by:

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:


Corrective Action:



Name Of Lab Shipping To: ALS 10450 Stanchiff Rd. Suite 210 Houston, TX, 77099 (281) 530-5656 ATTN: Ragen Giga

## CHAIN OF CUSTODY


Page 1 of 1

<b>Project:</b> APTIM LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS			<b>Project No.</b> 501032		<b>Analyses</b>										<b>HS21110549</b> Aptim Environmental & Infrastructure, Inc. LHAAP 04 November 2021								
<b>Job:</b> LHAAP 04 November 2021					Anions (nitrate, nitrite and sulfate) by SW9056 and Alkalinity by SM2320B																		
<b>Prepared By:</b> Scott Beesinger			<b>P.O. Number</b>												<b>Remarks (Preservatives, etc.)</b>		<b>Lab I.D.#</b>						
<b>Field Sample I.D.</b>			<b>Sample Matrix</b>		<b>Date / Time</b>		<b>MS / MSD</b>		<b>No. OF CONTAINERS</b>		<b>TOC by SM5310</b>		<b>Anions (nitrate, nitrite and sulfate) by SW9056 and Alkalinity by SM2320B</b>		<b>Remarks (Preservatives, etc.)</b>		<b>Lab I.D.#</b>						
04WW07-211109			W6		11/9/21/0745		3		X		X												
04WW07-211109-FD			W6		11/9/21/0745		3		X		X												
04WW05-211109			W6		11/9/21/0830		3		X		X												
04WW09-211109			W6		11/9/21/0915		3		X		X												
04WW10-211109			W6		11/9/21/1000		3		X		X												
04WW10-211109-MS			W6		11/9/21/1000		3		X		X												
04WW10-211109-MSD			W6		11/9/21/1000		3		X		X												
<b>Additional Remarks:</b> Standard TAT on all parameters. Please email results to <a href="mailto:Vicki.Graves@aptim.com">Vicki.Graves@aptim.com</a> and invoices to <a href="mailto:fedinvoices@aptim.com">fedinvoices@aptim.com</a>																							
<b>Relinquished By:</b> Scott Beesinger		<b>Date</b> 11/9/21		<b>Time</b> 1330		<b>Received By:</b> Pulli R...		<b>Date</b> 11/10/21		<b>Time</b> 1635		<b>Relinquished By:</b>		<b>Date</b>		<b>Time</b>		<b>Received By:</b>		<b>Date</b>		<b>Time</b>	
<b>Received At Lab By:</b>		<b>Date</b>		<b>Time</b>		<b>Airbill No.</b>		<b>Opened By:</b>		<b>Date</b>		<b>Time</b>		<b>Temp of Container</b>		<b>Seal No.</b>		<b>Condition</b>		<b>Remarks:</b>			

46425 0.20

1/23/21 LFC



 <b>ALS</b> 10450 Stancliff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5656 Fax. +1 281 530 5887	<b>CUSTODY SEAL</b> Date: <u>11/9/21</u> Time: <u>1430</u> Name: <u>Scott Beesinger</u> Company: <u>SGRA</u>		Seal Broken By: <u>SM</u> Date: <u>11/10/21</u>
	46425		

46425 NOV 16 2021



46425

ORIGIN ID: SGRA (903) 930-6193  
 ATT: SCOTT BEESINGER  
 APT: M  
 1203-B EAST GRAND AVE PMB202  
 MARSHALL, TX 75670  
 UNITED STATES US

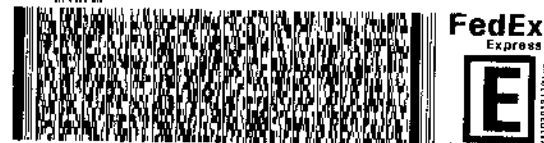
SHIP DATE: 27OCT21  
 ACTWGT: 1.00 LB HAN  
 CAD: 0221247/CNFE3507  
 DIMS: 15x16x13 IN

TO SHIPPING DEPT  
 ALS LABORATORY GROUP  
 10450 STANCLIFF RD  
 SUITE 210  
 HOUSTON TX 77099

(201) 530-5656

REF: LHAAP 04 NOV - 2021 - QTRLY - BD 81503

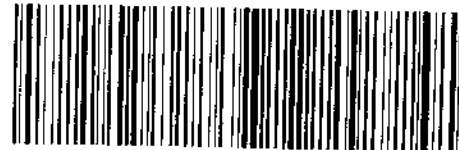
RMA: III III III



5300 5224 1102 PRIORITY OVERNIGHT

AB SGRA

77099  
 TX-US  
 IAH



3973701 09Nov2021 CGGA 56002/9A37/11023



HS21110549 9056\_W IC

ALS WO# HS21110549

Sequence: 111021  
Last Update Operator: ALSHS.NoUser

CD	Name	Comment	Type	Position	Dilution	Level	Instrument Method	Processing Method	Volume	Status	Inject Time
	STD1		Calibration	BB1	1.00	1	Anions Program IS	Anions Proc	5.0	Finished	11/3/2021 4:47:51 PM -05:00
	STD2		Calibration	BB2	1.00	2	Anions Program IS	Anions Proc	5.0	Finished	11/3/2021 4:55:19 PM -05:00
	STD3		Calibration	BB3	1.00	3	Anions Program IS	Anions Proc	5.0	Finished	11/3/2021 5:02:47 PM -05:00
	STD4		Calibration	BB4	1.00	4	Anions Program IS	Anions Proc	5.0	Finished	11/3/2021 5:10:15 PM -05:00
	STD5		Calibration	BB5	1.00	5	Anions Program IS	Anions Proc	5.0	Finished	11/3/2021 5:17:44 PM -05:00
	STD6		Calibration	BB6	1.00	6	Anions Program IS	Anions Proc	5.0	Finished	11/3/2021 5:25:12 PM -05:00
	ICV		Unknown	BA7	1.00		Anions Program IS	Anions Proc	5.0	Finished	11/3/2021 5:34:10 PM -05:00
	ICB		Unknown	BA8	1.00		Anions Program IS	Anions Proc	5.0	Finished	11/3/2021 5:41:38 PM -05:00
	CCV1		Unknown	R3	1.00		Anions Program IS	Anions Proc	5.0	Finished	11/10/2021 12:51:48 PM -06:00
	CCB		Unknown	R8	1.00		Anions Program IS	Anions Proc	5.0	Finished	11/10/2021 12:59:17 PM -06:00
	MBLK		Unknown	R5	1.00		Anions Program IS	Anions Proc	5.0	Finished	11/10/2021 1:06:47 PM -06:00
	LCS		Unknown	R2	1.00		Anions Program IS	Anions Proc	5.0	Finished	11/10/2021 1:14:16 PM -06:00
	HS21110549-01		Unknown	RA1	1.00		Anions Program IS	Anions Proc	5.0	Finished	11/10/2021 1:36:44 PM -06:00
	HS21110549-02		Unknown	RA2	1.00		Anions Program IS	Anions Proc	5.0	Finished	11/10/2021 1:44:14 PM -06:00
	HS21110549-03		Unknown	RA3	1.00		Anions Program IS	Anions Proc	5.0	Finished	11/10/2021 1:51:43 PM -06:00
	HS21110549-04		Unknown	RA4	1.00		Anions Program IS	Anions Proc	5.0	Finished	11/10/2021 1:59:01 PM -06:00
	CCV		Unknown	R1	1.00		Anions Program IS	Anions Proc	5.0	Finished	11/10/2021 2:06:31 PM -06:00
	CCB		Unknown	R4	1.00		Anions Program IS	Anions Proc	5.0	Finished	11/10/2021 2:14:00 PM -06:00
	HS21110549-05		Unknown	RA5	1.00		Anions Program IS	Anions Proc	5.0	Finished	11/10/2021 4:00:51 PM -06:00
	HS21110549-05MS		Unknown	RA6	1.00		Anions Program IS	Anions Proc	5.0	Finished	11/10/2021 4:08:20 PM -06:00
	HS21110549-05MSD		Unknown	RA7	1.00		Anions Program IS	Anions Proc	5.0	Finished	11/10/2021 4:15:50 PM -06:00
	CCV1		Unknown	R3	1.00		Anions Program IS	Anions Proc	5.0	Finished	11/10/2021 4:23:19 PM -06:00
	CCB		Unknown	R8	1.00		Anions Program IS	Anions Proc	5.0	Finished	11/10/2021 4:30:49 PM -06:00
	CCV		Unknown	R1	1.00		Anions Program IS	Anions Proc	5.0	Finished	11/10/2021 9:01:03 PM -06:00
	CCB		Unknown	R4	1.00		Anions Program IS	Anions Proc	5.0	Finished	11/10/2021 9:15:56 PM -06:00
	HS21110549-01		Unknown	RE3	5.00		Anions Program IS	Anions Proc	5.0	Finished	11/10/2021 10:15:25 PM -06:00
	HS21110549-02		Unknown	RE4	5.00		Anions Program IS	Anions Proc	5.0	Finished	11/10/2021 10:22:51 PM -06:00
	HS21110549-03		Unknown	RE5	5.00		Anions Program IS	Anions Proc	5.0	Finished	11/10/2021 10:30:17 PM -06:00
	CCV1		Unknown	R3	1.00		Anions Program IS	Anions Proc	5.0	Finished	11/10/2021 10:37:42 PM -06:00
	CCB		Unknown	R8	1.00		Anions Program IS	Anions Proc	5.0	Finished	11/10/2021 10:45:08 PM -06:00
	HS21110549-05		Unknown	RE6	20.00		Anions Program IS	Anions Proc	5.0	Finished	11/10/2021 10:52:34 PM -06:00
	CCV		Unknown	R1	1.00		Anions Program IS	Anions Proc	5.0	Finished	11/10/2021 11:59:22 PM -06:00
	CCB		Unknown	R4	1.00		Anions Program IS	Anions Proc	5.0	Finished	11/11/2021 12:14:12 AM -06:00



Sequence: 111021  
Injection #6: STD6

Calibration

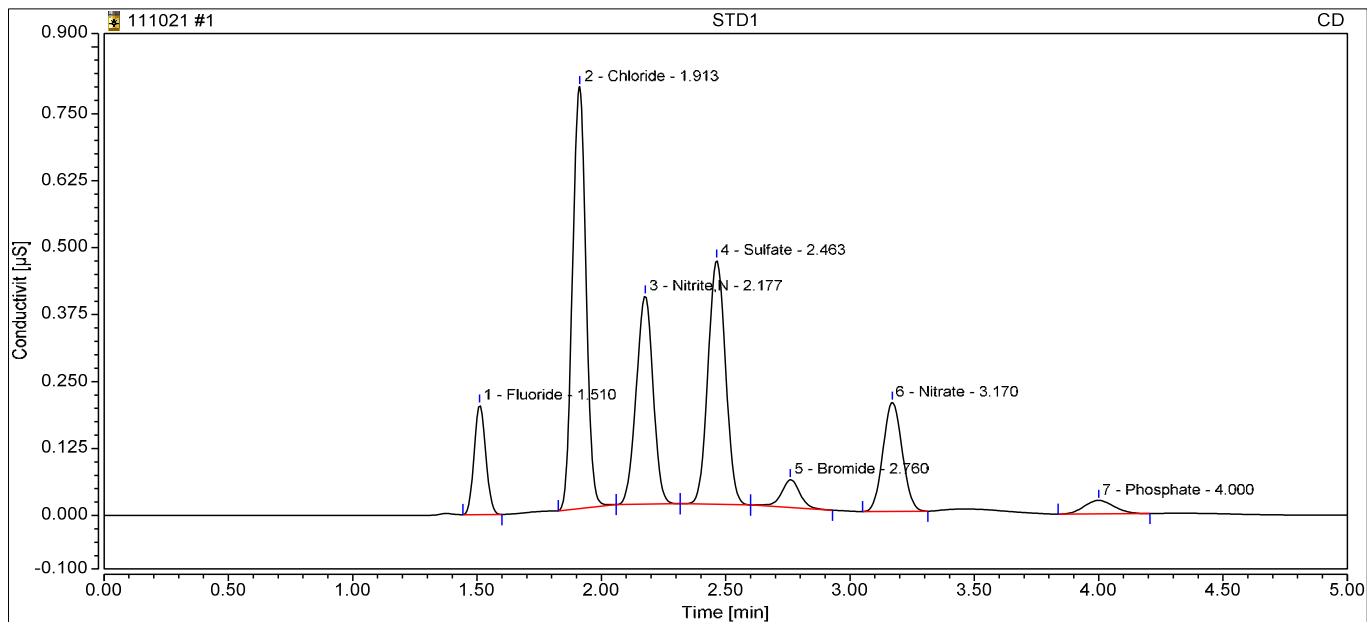
Peak No.	Peak Name	Cal.Type	Eval.Type	Number of Points	Rel.Std.Dev. %	Coeff.of Determination	C0 (Offset)	C1 (Slope)	C2 (Curve)
1	Fluoride	Lin, WithOffset, 1//	Area	6	27.8876	0.99658	-0.0083	0.2107	0.0000
2	Chloride	Lin, WithOffset, 1//	Area	6	10.8147	0.99945	-0.0187	0.1414	0.0000
3	Nitrite,N	Quad, WithOffset,	Area	6	13.6827	0.99907	-0.0001	0.3141	-0.0036
4	Sulfate	Lin, WithOffset, 1//	Area	6	12.4596	0.99926	-0.0126	0.1039	0.0000
5	Bromide	Lin, WithOffset, 1//	Area	6	18.4384	0.99858	-0.0030	0.0609	0.0000
6	Nitrate	Lin, WithOffset, 1//	Area	6	10.9439	0.99950	-0.0172	0.3553	0.0000
n.a.	Chlorate	Lin, WithOffset, 1//	Area	0	n.a.	n.a.	n.a.	n.a.	n.a.
n.a.	Phosphate	Quad, WithOffset,	Area	5	27.6931	0.99780	-0.0107	0.1204	0.0006
Maximum					27.8876	0.99950			
Minimum					10.8147	0.99658			



1 STD1

Sample Name: **STD1**  
 Vial Number: **BB1**  
 Sample Type: **Calibration Standard**  
 Control Program: **Anions Program ISO37mM 150mm short 0.4**  
 Quantif. Method: **Anions Processing Method ISO**  
 Recording Time: **11/03/2021 16:47**  
 Run Time:

Injection Volume: **5.00**  
 Channel: **CD**  
 Wavelength: **210**  
 Bandwidth: **n.a.**  
 Dilution Factor: **1.0000**  
 Sample Weight: **1.0000**



## Integration Results

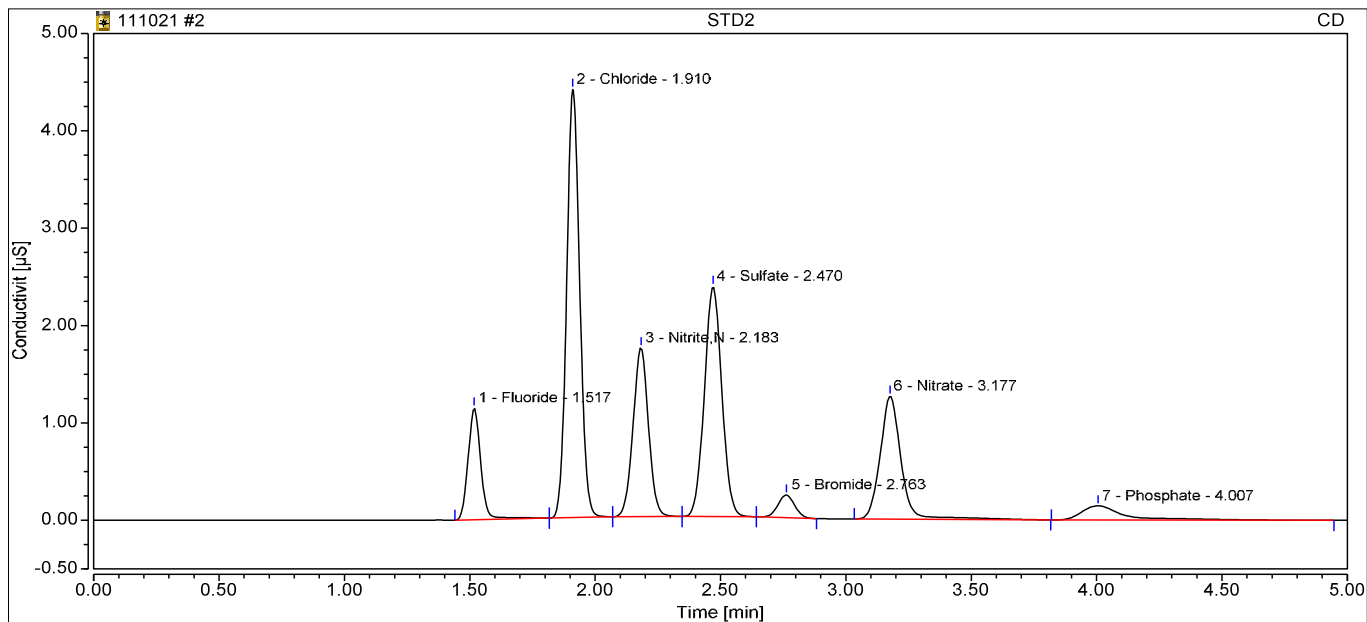
No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
1	1.51	Fluoride	BMB	0.011	0.0921	0.0921	1.0000
2	1.91	Chloride	BMB	0.049	0.4810	0.4810	1.0000
3	2.18	Nitrite,N	BMB	0.031	0.0978	0.0978	1.0000
4	2.46	Sulfate	BMB	0.037	0.4805	0.4805	1.0000
5	2.76	Bromide	BMB	0.004	0.1226	0.1226	1.0000
6	3.17	Nitrate	BMB	0.018	0.0999	0.0999	1.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	1.0000
7	4.00	Phosphate	BMB	0.004	0.1178	0.1178	1.0000
<b>Total:</b>			<b>0.000</b>	<b>0.155</b>	<b>1.49</b>		



2 STD2

Sample Name: **STD2**  
 Vial Number: **BB2**  
 Sample Type: **Calibration Standard**  
 Control Program: **Anions Program ISO37mM 150mm short 0.4**  
 Quantif. Method: **Anions Processing Method ISO**  
 Recording Time: **11/03/2021 16:55**  
 Run Time:

Injection Volume: **5.00**  
 Channel: **CD**  
 Wavelength: **210**  
 Bandwidth: **n.a.**  
 Dilution Factor: **1.0000**  
 Sample Weight: **1.0000**



## Integration Results

No.	Retention min	Peak Name	Peak Type	Area $\mu\text{S}\cdot\text{min}$	Amount ppm	Concentration ppm	Dilution
1	1.52	Fluoride	BMB	0.068	0.3607	0.3607	1.0000
2	1.91	Chloride	BMB	0.265	2.0057	2.0057	1.0000
3	2.18	Nitrite,N	BMB	0.123	0.3950	0.3950	1.0000
4	2.47	Sulfate	BMB	0.191	1.9556	1.9556	1.0000
5	2.76	Bromide	BMB	0.018	0.3462	0.3462	1.0000
6	3.18	Nitrate	BMB	0.122	0.3914	0.3914	1.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	1.0000
7	4.01	Phosphate	BMB	0.029	0.3309	0.3309	1.0000
<b>Total:</b>			<b>0.000</b>	<b>0.816</b>	<b>5.79</b>		

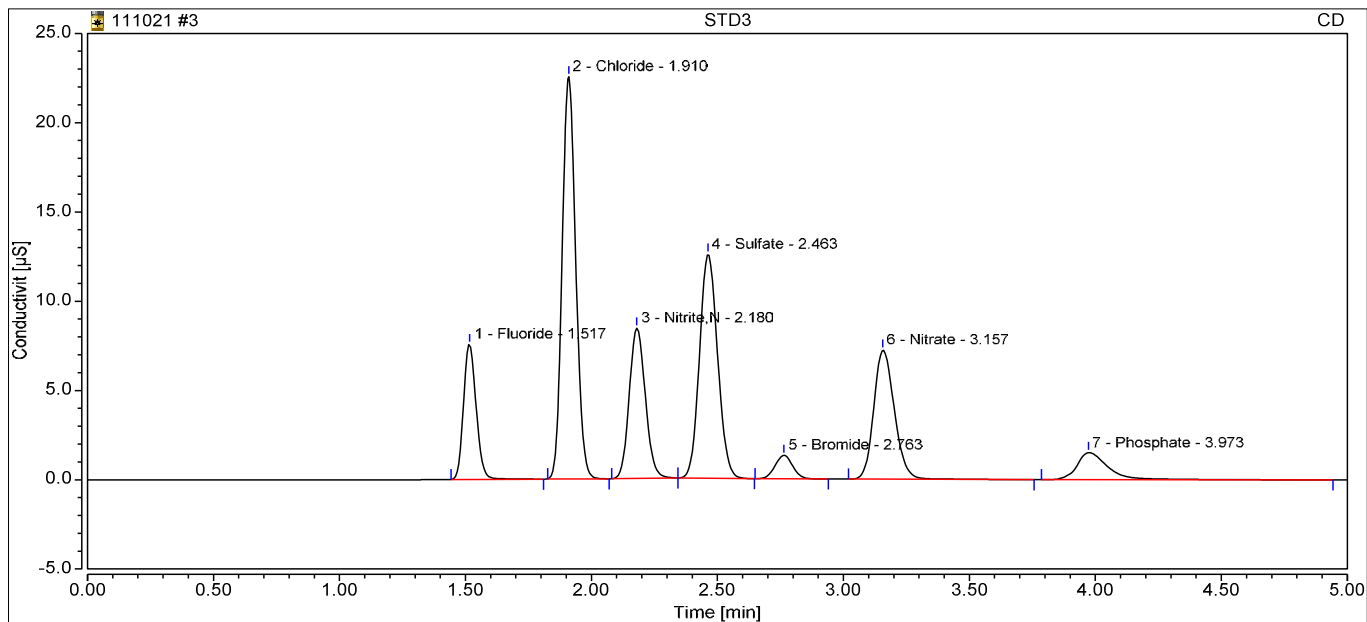
3 STD3

Sample Name: **STD3**  
 Vial Number: **BB3**  
 Sample Type: **Calibration Standard**  
 Control Program: **Anions Program ISO37mM 150mm short 0.4**  
 Quantif. Method: **Anions Processing Method ISO**

Injection Volume: **5.00**  
 Channel: **CD**  
 Wavelength: **210**  
 Bandwidth: **n.a.**  
 Dilution Factor: **1.0000**  
 Sample Weight: **1.0000**

Recording Time: 11/03/2021 17:02

Run Time:



## Integration Results

No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
1	1.52	Fluoride	BMB	0.442	2.1349	2.1349	1.0000
2	1.91	Chloride	BMB	1.402	10.0450	10.0450	1.0000
3	2.18	Nitrite, N	BMB	0.623	2.0307	2.0307	1.0000
4	2.46	Sulfate	BMB	1.041	10.1470	10.1470	1.0000
5	2.76	Bromide	BMB	0.106	1.7946	1.7946	1.0000
6	3.16	Nitrate	BMB	0.689	1.9863	1.9863	1.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	1.0000
7	3.97	Phosphate	BMB	0.219	1.8914	1.8914	1.0000
<b>Total:</b>			<b>0.000</b>	<b>4.522</b>	<b>30.03</b>		

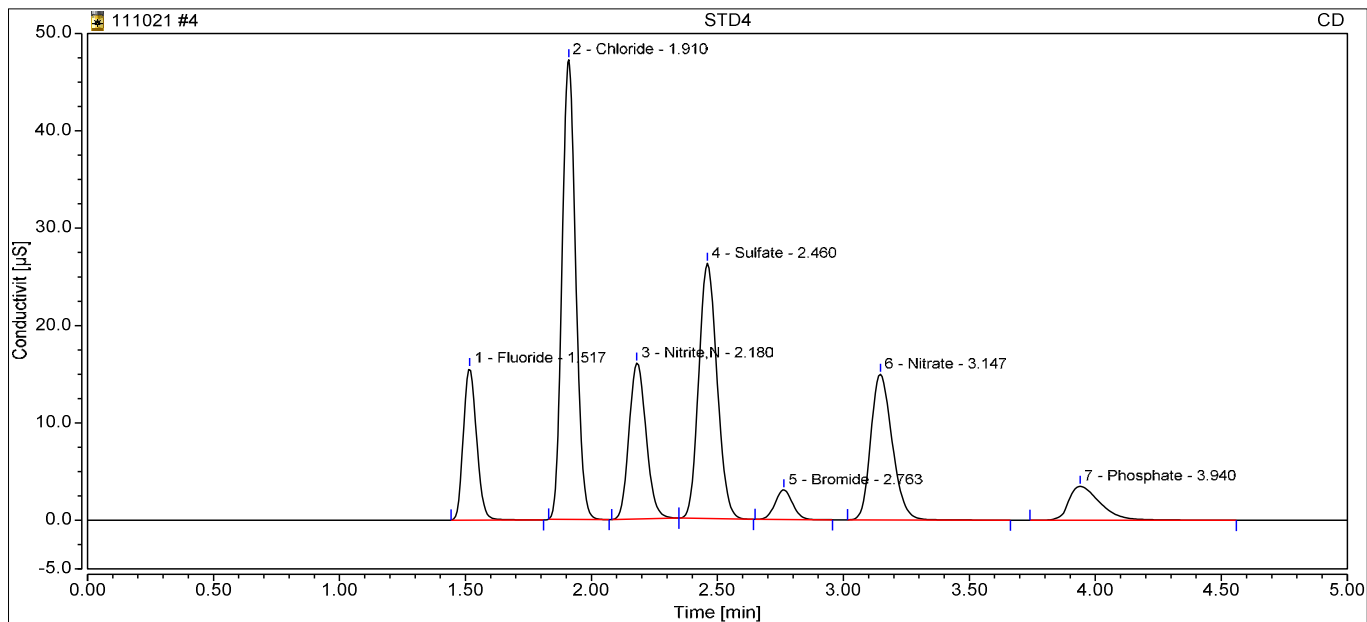
## 4 STD4

Sample Name: **STD4**  
 Vial Number: **BB4**  
 Sample Type: **Calibration Standard**  
 Control Program: **Anions Program ISO37mM 150mm short 0.4**  
 Quantif. Method: **Anions Processing Method ISO**

Injection Volume: **5.00**  
 Channel: **CD**  
 Wavelength: **210**  
 Bandwidth: **n.a.**  
 Dilution Factor: **1.0000**  
 Sample Weight: **1.0000**

Recording Time: **11/03/2021 17:10**

Run Time:



## Integration Results

No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
1	1.52	Fluoride	BMB	0.950	4.5474	4.5474	1.0000
2	1.91	Chloride	BMB	2.964	21.0908	21.0908	1.0000
3	2.18	Nitrite,N	BMB	1.258	4.2075	4.2075	1.0000
4	2.46	Sulfate	BMB	2.212	21.4145	21.4145	1.0000
5	2.76	Bromide	BMB	0.244	4.0546	4.0546	1.0000
6	3.15	Nitrate	BMB	1.476	4.2029	4.2029	1.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	1.0000
7	3.94	Phosphate	BMB	0.509	4.2200	4.2200	1.0000
<b>Total:</b>			<b>0.000</b>	<b>9.612</b>	<b>63.74</b>		

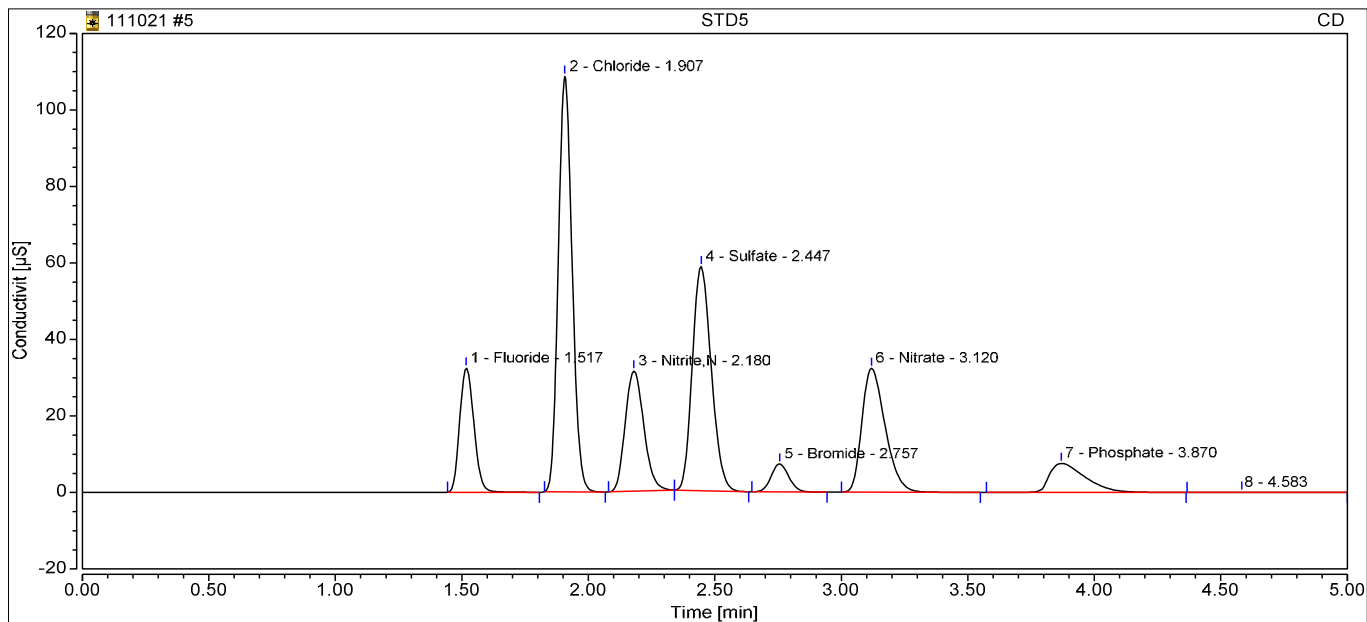
5 STD5

Sample Name: **STD5**  
 Vial Number: **BB5**  
 Sample Type: **Calibration Standard**  
 Control Program: **Anions Program ISO37mM 150mm short 0.4**  
 Quantif. Method: **Anions Processing Method ISO**

Injection Volume: **5.00**  
 Channel: **CD**  
 Wavelength: **210**  
 Bandwidth: **n.a.**  
 Dilution Factor: **1.0000**  
 Sample Weight: **1.0000**

Recording Time: 11/03/2021 17:17

Run Time:



Integration Results							
No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
1	1.52	Fluoride	BMB	2.119	10.0932	10.0932	1.0000
2	1.91	Chloride	BMB	6.872	48.7329	48.7329	1.0000
3	2.18	Nitrite, N	BMB	2.675	9.5625	9.5625	1.0000
4	2.45	Sulfate	BMB	5.085	49.0735	49.0735	1.0000
5	2.76	Bromide	BMB	0.592	9.7669	9.7669	1.0000
6	3.12	Nitrate	BMB	3.447	9.7499	9.7499	1.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	1.0000
7	3.87	Phosphate	BMB	1.248	9.9393	9.9393	1.0000
<b>Total:</b>			<b>0.000</b>	<b>22.037</b>	<b>146.92</b>		

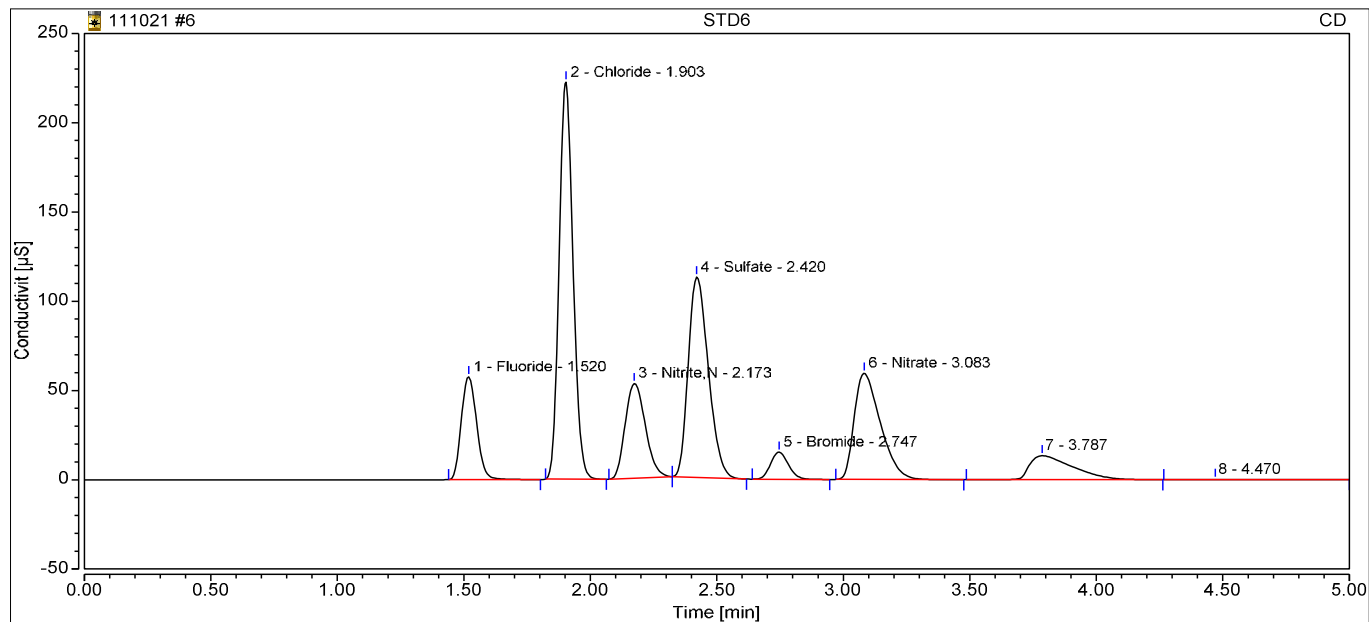
6 STD6

Sample Name: **STD6**  
 Vial Number: **BB6**  
 Sample Type: **Calibration Standard**  
 Control Program: **Anions Program ISO37mM 150mm short 0.4**  
 Quantif. Method: **Anions Processing Method ISO**

Injection Volume: **5.00**  
 Channel: **CD**  
 Wavelength: **210**  
 Bandwidth: **n.a.**  
 Dilution Factor: **1.0000**  
 Sample Weight: **1.0000**

Recording Time: 11/03/2021 17:25

Run Time:



## Integration Results

No.	Retention min	Peak Name	Peak Type	Area $\mu\text{S} \cdot \text{min}$	Amount ppm	Concentration ppm	Dilution
1	1.52	Fluoride	BMB	4.053	19.2717	19.2717	1.0000
2	1.90	Chloride	BMB	14.142	100.1446	100.1446	1.0000
3	2.17	Nitrite, N	BMB	4.884	20.2397	20.2397	1.0000
4	2.42	Sulfate	BMB	10.316	99.4289	99.4289	1.0000
5	2.75	Bromide	BMB	1.240	20.4151	20.4151	1.0000
6	3.08	Nitrate	BMB	7.113	20.0696	20.0696	1.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Phosphate	n.a.	n.a.	n.a.	n.a.	1.0000
<b>Total:</b>			<b>0.000</b>	<b>41.749</b>	<b>279.57</b>		

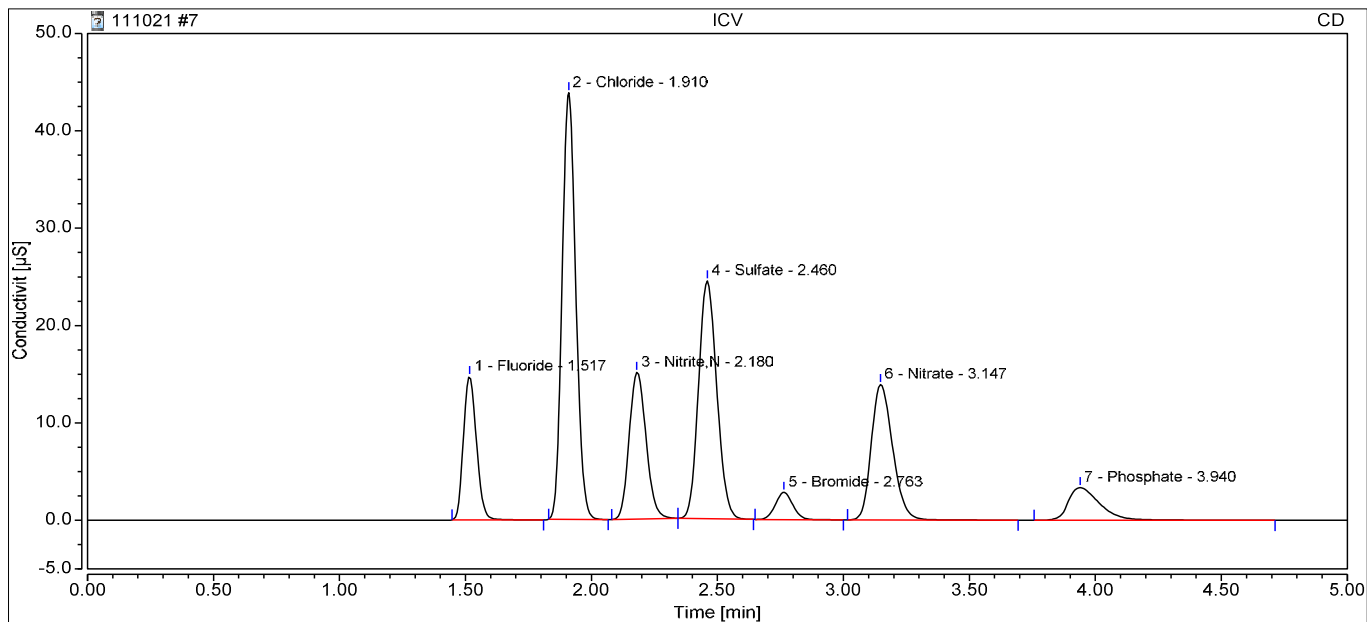
7 ICV

Sample Name: ICV  
 Vial Number: BA7  
 Sample Type: Unknown  
 Control Program: Anions Program ISO37mM 150mm short 0.4  
 Quantif. Method: Anions Processing Method ISO

Injection Volume: 5.00  
 Channel: CD  
 Wavelength: 210  
 Bandwidth: n.a.  
 Dilution Factor: 1.0000  
 Sample Weight: 1.0000

Recording Time: 11/03/2021 17:34

Run Time:



## Integration Results

No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
1	1.52	Fluoride	BMB	0.887	4.2482	4.2482	1.0000
2	1.91	Chloride	BMB	2.749	19.5719	19.5719	1.0000
3	2.18	Nitrite,N	BMB	1.174	3.9149	3.9149	1.0000
4	2.46	Sulfate	BMB	2.051	19.8617	19.8617	1.0000
5	2.76	Bromide	BMB	0.224	3.7196	3.7196	1.0000
6	3.15	Nitrate	BMB	1.365	3.8915	3.8915	1.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	1.0000
7	3.94	Phosphate	BMB	0.490	4.0717	4.0717	1.0000
Total:			0.000	8.940	59.28		

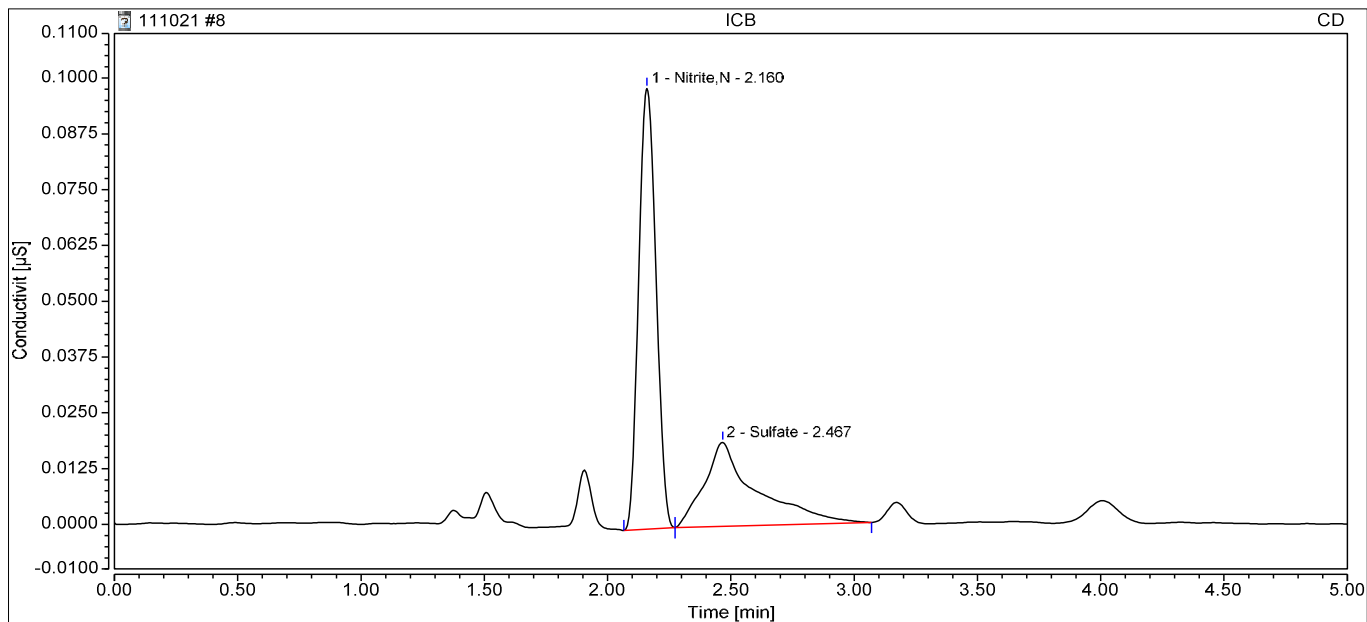
8 ICB

Sample Name: ICB  
 Vial Number: BA8  
 Sample Type: Unknown  
 Control Program: Anions Program ISO37mM 150mm short 0.4  
 Quantif. Method: Anions Processing Method ISO

Injection Volume: 5.00  
 Channel: CD  
 Wavelength: 210  
 Bandwidth: n.a.  
 Dilution Factor: 1.0000  
 Sample Weight: 1.0000

Recording Time: 11/03/2021 17:41

Run Time:



## Integration Results

No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
n.a.	n.a.	Fluoride	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Chloride	n.a.	n.a.	n.a.	n.a.	1.0000
1	2.16	Nitrite, N	BMB	0.008	0.0260	0.0260	1.0000
2	2.47	Sulfate	BMB	0.005	0.1656	0.1656	1.0000
n.a.	n.a.	Bromide	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Nitrate	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Phosphate	n.a.	n.a.	n.a.	n.a.	1.0000
Total:			0.000	0.013	0.19		

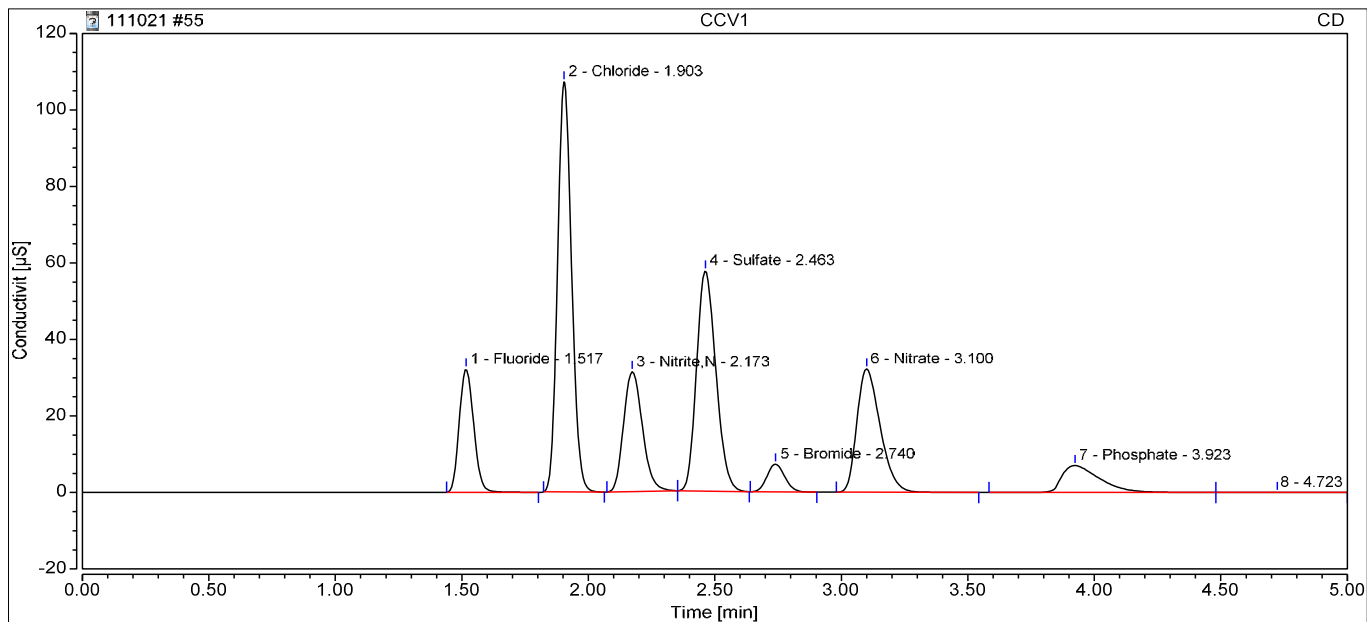
55 CCV1

Sample Name: CCV1  
 Vial Number: R3  
 Sample Type: Unknown  
 Control Program: Anions Program ISO37mM 150mm short 0.4  
 Quantif. Method: Anions Processing Method ISO

Injection Volume: 5.00  
 Channel: CD  
 Wavelength: 210  
 Bandwidth: n.a.  
 Dilution Factor: 1.0000  
 Sample Weight: 1.0000

Recording Time: 11/10/2021 12:51

Run Time:



## Integration Results

No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
1	1.52	Fluoride	BMB	2.133	10.1622	10.1622	1.0000
2	1.90	Chloride	BMB	6.875	48.7545	48.7545	1.0000
3	2.17	Nitrite,N	BMB	2.699	9.6622	9.6622	1.0000
4	2.46	Sulfate	BMB	5.092	49.1399	49.1399	1.0000
5	2.74	Bromide	BMB	0.590	9.7353	9.7353	1.0000
6	3.10	Nitrate	BMB	3.442	9.7357	9.7357	1.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	1.0000
7	3.92	Phosphate	BMB	1.216	9.6983	9.6983	1.0000
Total:			0.000	22.047	146.89		



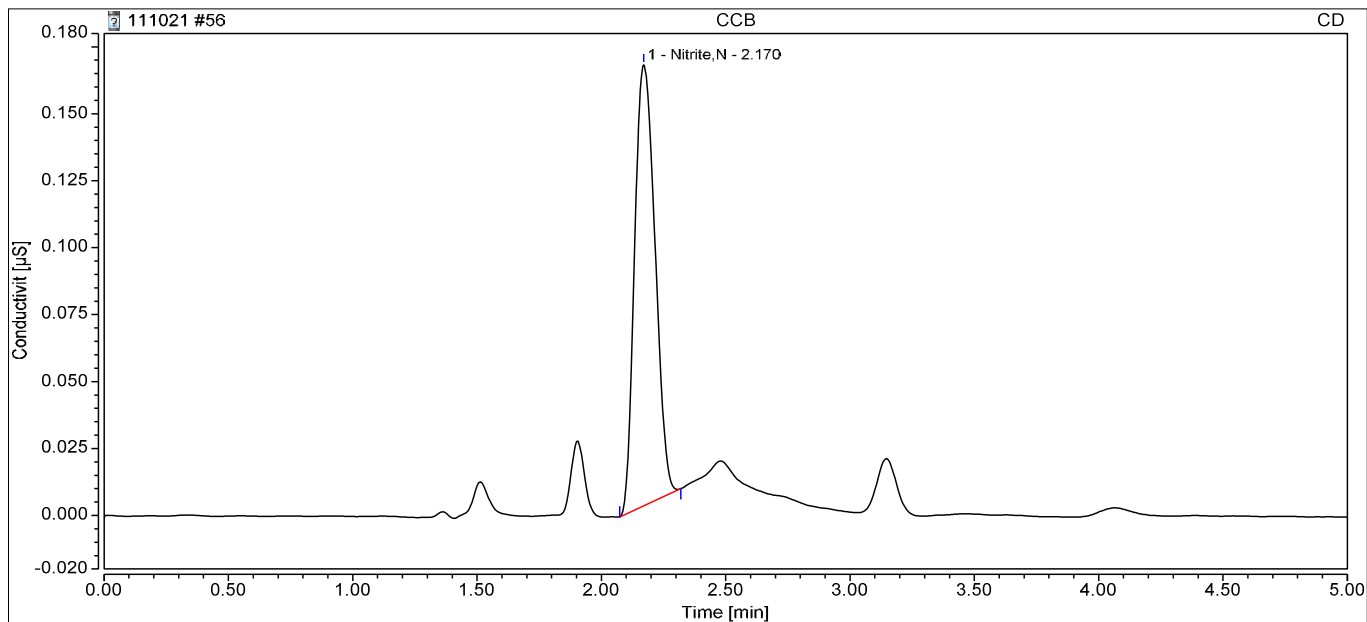
56 CCB

Sample Name: CCB  
 Vial Number: R8  
 Sample Type: Unknown  
 Control Program: Anions Program ISO37mM 150mm short 0.4  
 Quantif. Method: Anions Processing Method ISO

Injection Volume: 5.00  
 Channel: CD  
 Wavelength: 210  
 Bandwidth: n.a.  
 Dilution Factor: 1.0000  
 Sample Weight: 1.0000

Recording Time: 11/10/2021 12:59

Run Time:



## Integration Results

No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
n.a.	n.a.	Fluoride	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Chloride	n.a.	n.a.	n.a.	n.a.	1.0000
1	2.17	Nitrite,N	BMB	0.016	0.0502	0.0502	1.0000
n.a.	n.a.	Sulfate	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Bromide	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Nitrate	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Phosphate	n.a.	n.a.	n.a.	n.a.	1.0000
Total:			0.000	0.016	0.05		

57 MBLK

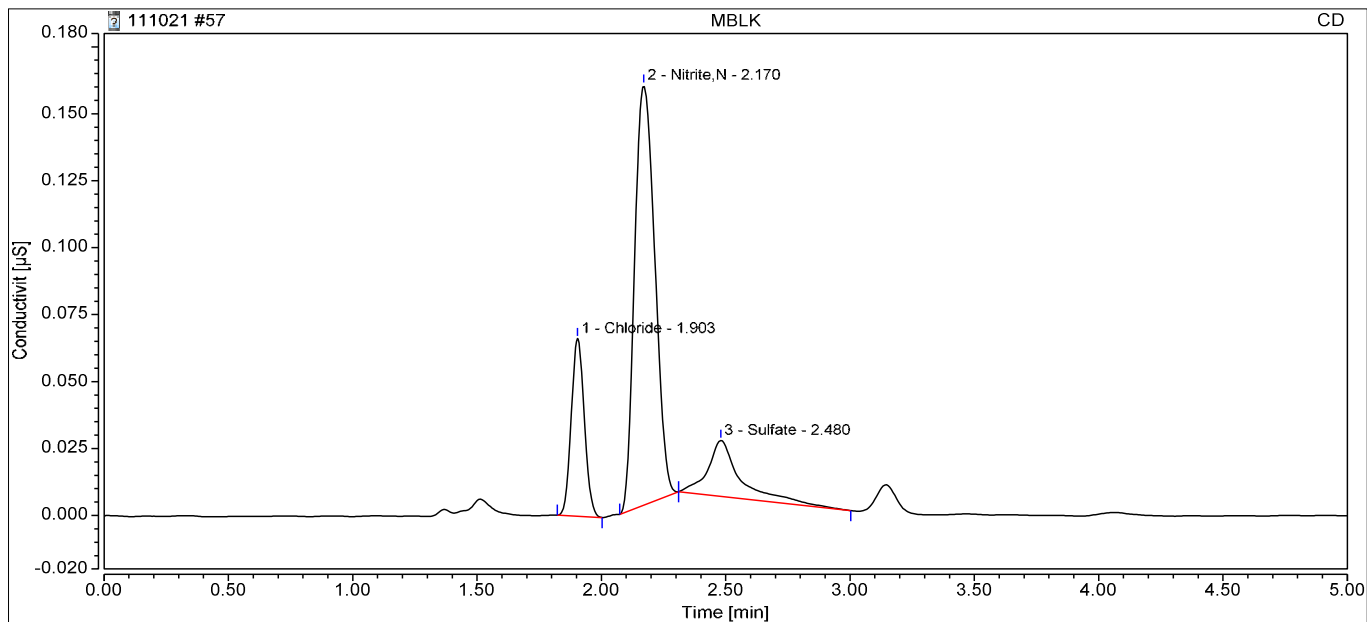
Sample Name: MBLK  
 Vial Number: R5  
 Sample Type: Unknown  
 Control Program: Anions Program ISO37mM 150mm short 0.4  
 Quantif. Method: Anions Processing Method ISO

Injection Volume: 5.00  
 Channel: CD  
 Wavelength: 210  
 Bandwidth: n.a.  
 Dilution Factor: 1.0000  
 Sample Weight: 1.0000

Recording Time:

11/10/2021 13:06

Run Time:



## Integration Results

No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
n.a.	n.a.	Fluoride	n.a.	n.a.	n.a.	n.a.	1.0000
1	1.90	Chloride	BMB	0.004	0.1606	0.1606	1.0000
2	2.17	Nitrite, N	BMB	0.015	0.0472	0.0472	1.0000
3	2.48	Sulfate	BMB	0.003	0.1523	0.1523	1.0000
n.a.	n.a.	Bromide	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Nitrate	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Phosphate	n.a.	n.a.	n.a.	n.a.	1.0000
Total:			0.000	0.022	0.36		

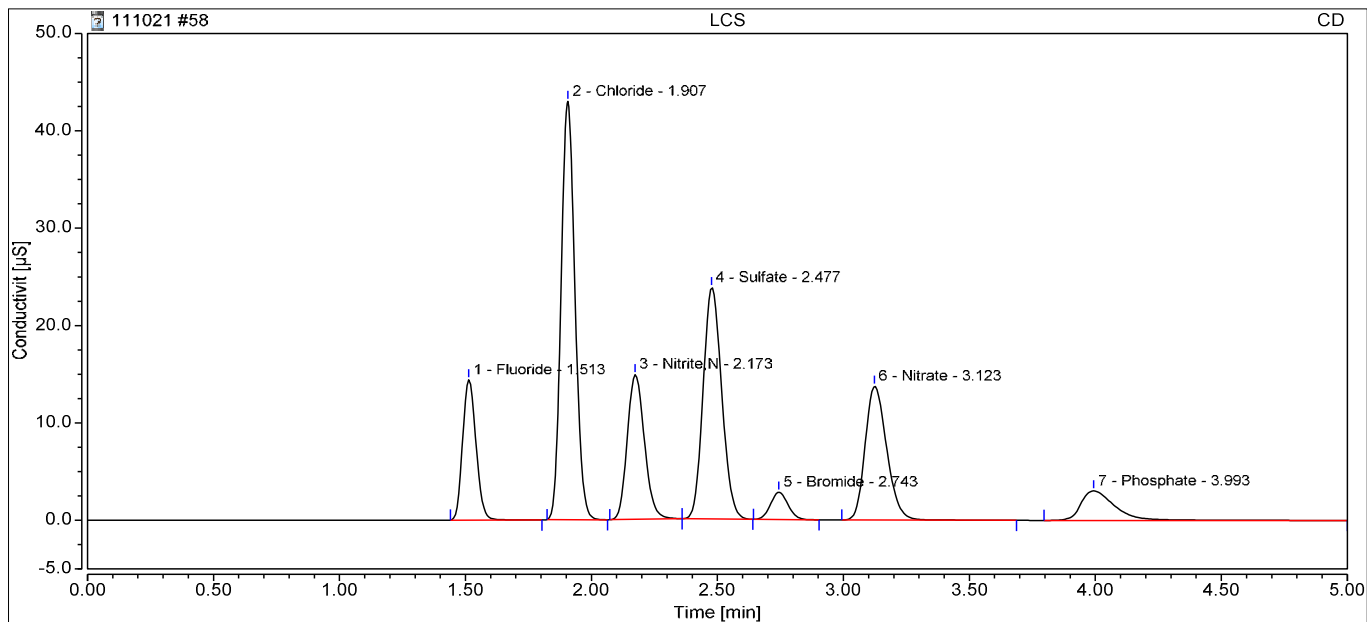
58 LCS

Sample Name: LCS  
 Vial Number: R2  
 Sample Type: Unknown  
 Control Program: Anions Program ISO37mM 150mm short 0.4  
 Quantif. Method: Anions Processing Method ISO

Injection Volume: 5.00  
 Channel: CD  
 Wavelength: 210  
 Bandwidth: n.a.  
 Dilution Factor: 1.0000  
 Sample Weight: 1.0000

Recording Time: 11/10/2021 13:14

Run Time:



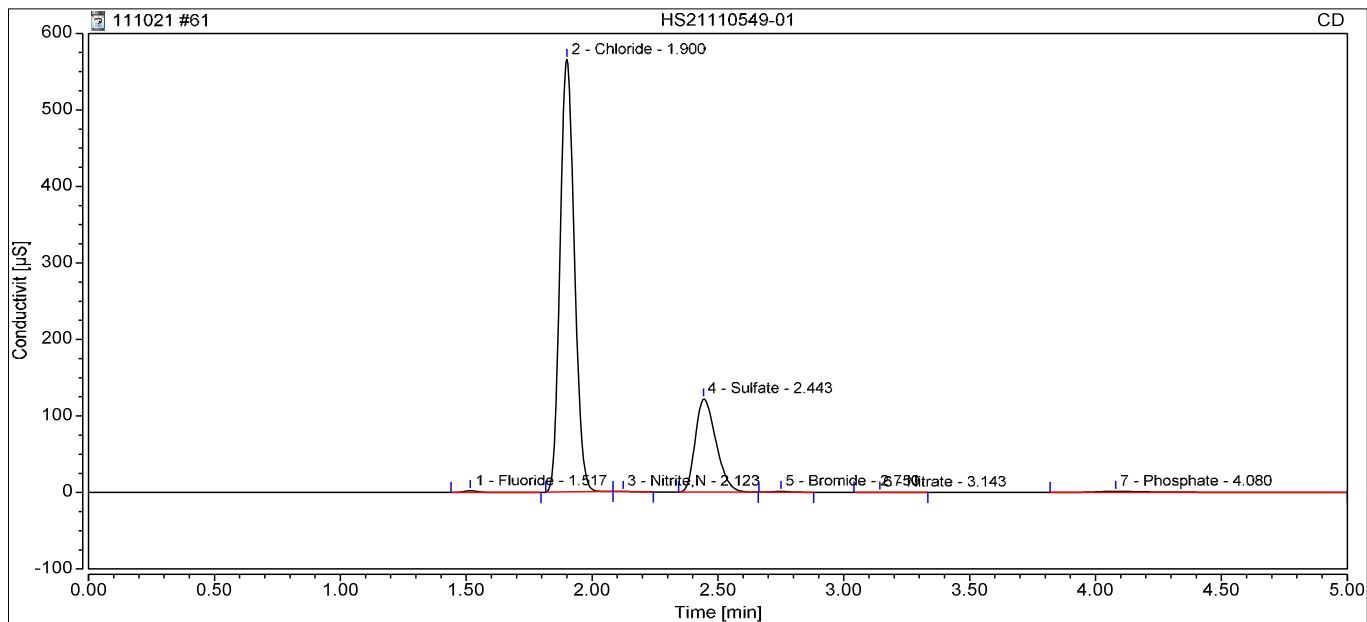
## Integration Results

No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
1	1.51	Fluoride	BMB	0.888	4.2519	4.2519	1.0000
2	1.91	Chloride	BMB	2.735	19.4750	19.4750	1.0000
3	2.17	Nitrite,N	BMB	1.177	3.9224	3.9224	1.0000
4	2.48	Sulfate	BMB	2.032	19.6855	19.6855	1.0000
5	2.74	Bromide	BMB	0.225	3.7518	3.7518	1.0000
6	3.12	Nitrate	BMB	1.361	3.8792	3.8792	1.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	1.0000
7	3.99	Phosphate	BMB	0.473	3.9405	3.9405	1.0000
Total:			0.000	8.892	58.91		

61 HS21110549-01

Sample Name: **HS21110549-01**  
 Vial Number: **RA1**  
 Sample Type: **Unknown**  
 Control Program: **Anions Program ISO37mM 150mm short 0.4**  
 Quantif. Method: **Anions Processing Method ISO**  
 Recording Time: **11/10/2021 13:36**  
 Run Time:

Injection Volume: **5.00**  
 Channel: **CD**  
 Wavelength: **210**  
 Bandwidth: **n.a.**  
 Dilution Factor: **1.0000**  
 Sample Weight: **1.0000**

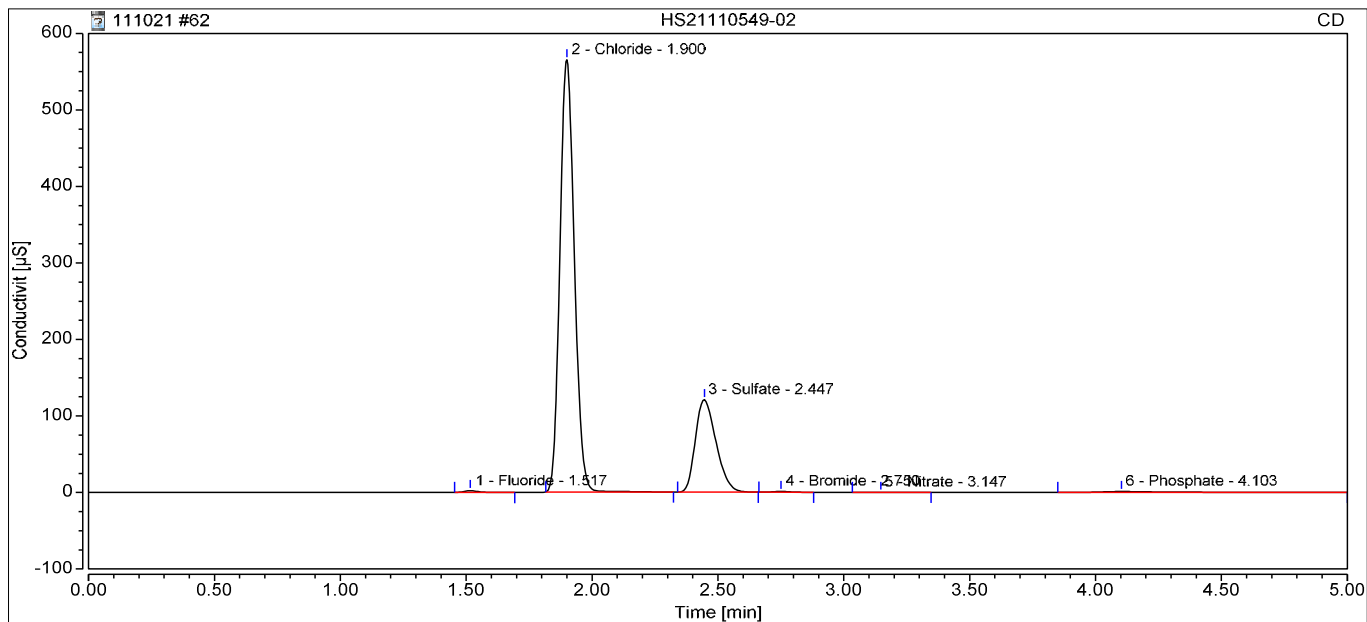
**Integration Results**

No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
1	1.52	Fluoride	BMB	0.158	0.7876	0.7876	1.0000
2	1.90	Chloride	BMB	37.325	264.0939	264.0939	1.0000
3	2.12	Nitrite,N	BMB	0.002	0.0072	0.0072	1.0000
4	2.44	Sulfate	BMB	11.617	111.9506	111.9506	1.0000
5	2.75	Bromide	BMB	0.082	1.3923	1.3923	1.0000
6	3.14	Nitrate	BMB	0.003	0.0562	0.0562	1.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	1.0000
7	4.08	Phosphate	BMB	0.372	3.1310	3.1310	1.0000
<b>Total:</b>			<b>0.000</b>	<b>49.559</b>	<b>381.42</b>		

62 HS21110549-02

Sample Name: **HS21110549-02**  
 Vial Number: **RA2**  
 Sample Type: **Unknown**  
 Control Program: **Anions Program ISO37mM 150mm short 0.4**  
 Quantif. Method: **Anions Processing Method ISO**  
 Recording Time: **11/10/2021 13:44**  
 Run Time:

Injection Volume: **5.00**  
 Channel: **CD**  
 Wavelength: **210**  
 Bandwidth: **n.a.**  
 Dilution Factor: **1.0000**  
 Sample Weight: **1.0000**



## Integration Results

No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
1	1.52	Fluoride	BMB	0.150	0.7507	0.7507	1.0000
2	1.90	Chloride	BMB	37.542	265.6293	265.6293	1.0000
n.a.	n.a.	Nitrite,N	n.a.	n.a.	n.a.	n.a.	1.0000
3	2.45	Sulfate	BMB	11.511	110.9334	110.9334	1.0000
4	2.75	Bromide	BMB	0.081	1.3859	1.3859	1.0000
5	3.15	Nitrate	BMB	0.004	0.0585	0.0585	1.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	1.0000
6	4.10	Phosphate	BMB	0.345	2.9098	2.9098	1.0000
<b>Total:</b>			<b>0.000</b>	<b>49.633</b>	<b>381.67</b>		

63 HS21110549-03

Sample Name: HS21110549-03

Vial Number: RA3

Sample Type: Unknown

Control Program: Anions Program ISO37mM 150mm short 0.4

Quantif. Method: Anions Processing Method ISO

Recording Time: 11/10/2021 13:51

Run Time:

Injection Volume: 5.00

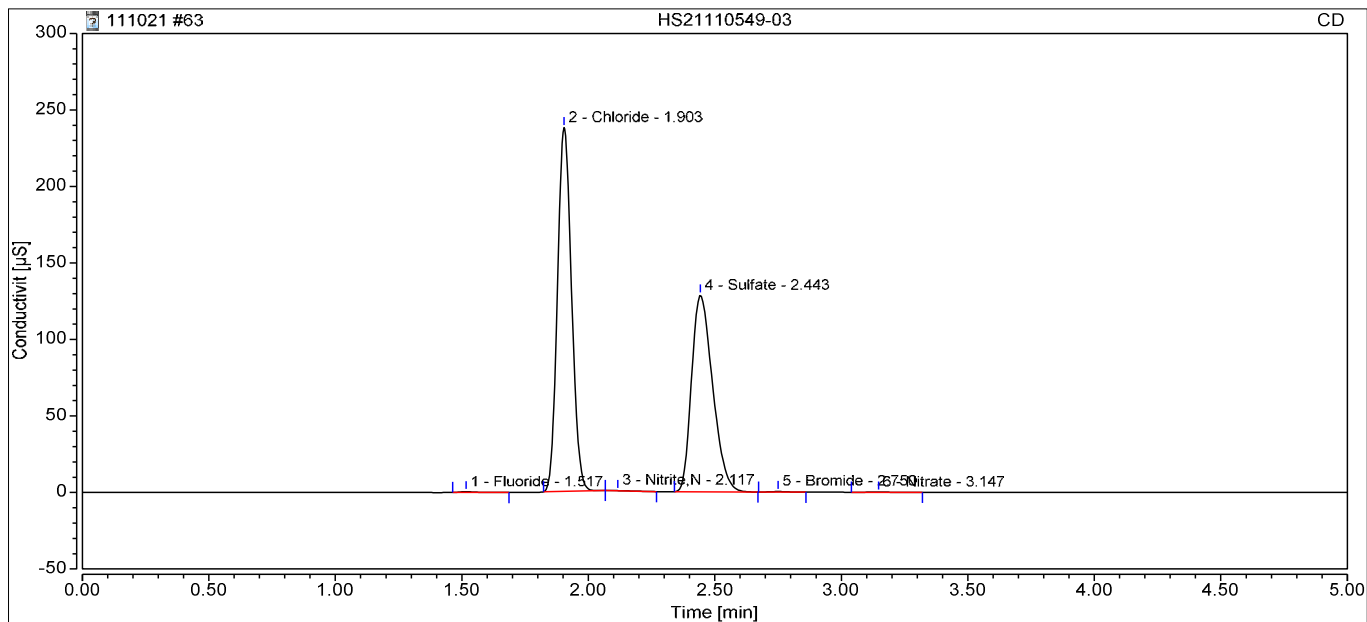
Channel: CD

Wavelength: 210

Bandwidth: n.a.

Dilution Factor: 1.0000

Sample Weight: 1.0000



## Integration Results

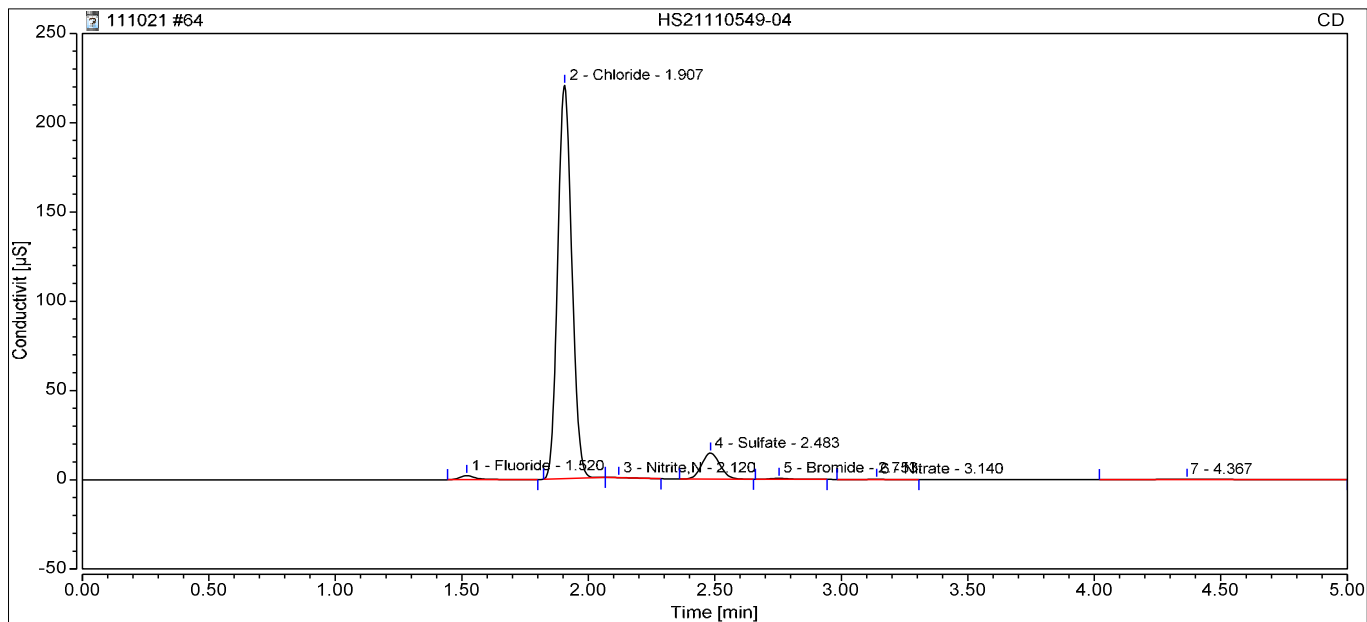
No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
1	1.52	Fluoride	BMB	0.036	0.2118	0.2118	1.0000
2	1.90	Chloride	BMB	15.318	108.4605	108.4605	1.0000
3	2.12	Nitrite,N	BMB	0.007	0.0234	0.0234	1.0000
4	2.44	Sulfate	BMB	12.380	119.2963	119.2963	1.0000
5	2.75	Bromide	BMB	0.026	0.4792	0.4792	1.0000
6	3.15	Nitrate	BMB	0.004	0.0598	0.0598	1.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Phosphate	n.a.	n.a.	n.a.	n.a.	1.0000
Total:			0.000	27.772	228.53		

64 HS21110549-04

Sample Name: HS21110549-04  
 Vial Number: RA4  
 Sample Type: Unknown  
 Control Program: Anions Program ISO37mM 150mm short 0.4  
 Quantif. Method: Anions Processing Method ISO

Injection Volume: 5.00  
 Channel: CD  
 Wavelength: 210  
 Bandwidth: n.a.  
 Dilution Factor: 1.0000  
 Sample Weight: 1.0000

Run Time:



## Integration Results

No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
1	1.52	Fluoride	BMB	0.173	0.8610	0.8610	1.0000
2	1.91	Chloride	BMB	14.186	100.4574	100.4574	1.0000
3	2.12	Nitrite,N	BMB	0.008	0.0242	0.0242	1.0000
4	2.48	Sulfate	BMB	1.222	11.8827	11.8827	1.0000
5	2.75	Bromide	BMB	0.043	0.7545	0.7545	1.0000
6	3.14	Nitrate	BMB	0.004	0.0600	0.0600	1.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Phosphate	n.a.	n.a.	n.a.	n.a.	1.0000
Total:			0.000	15.636		114.04	

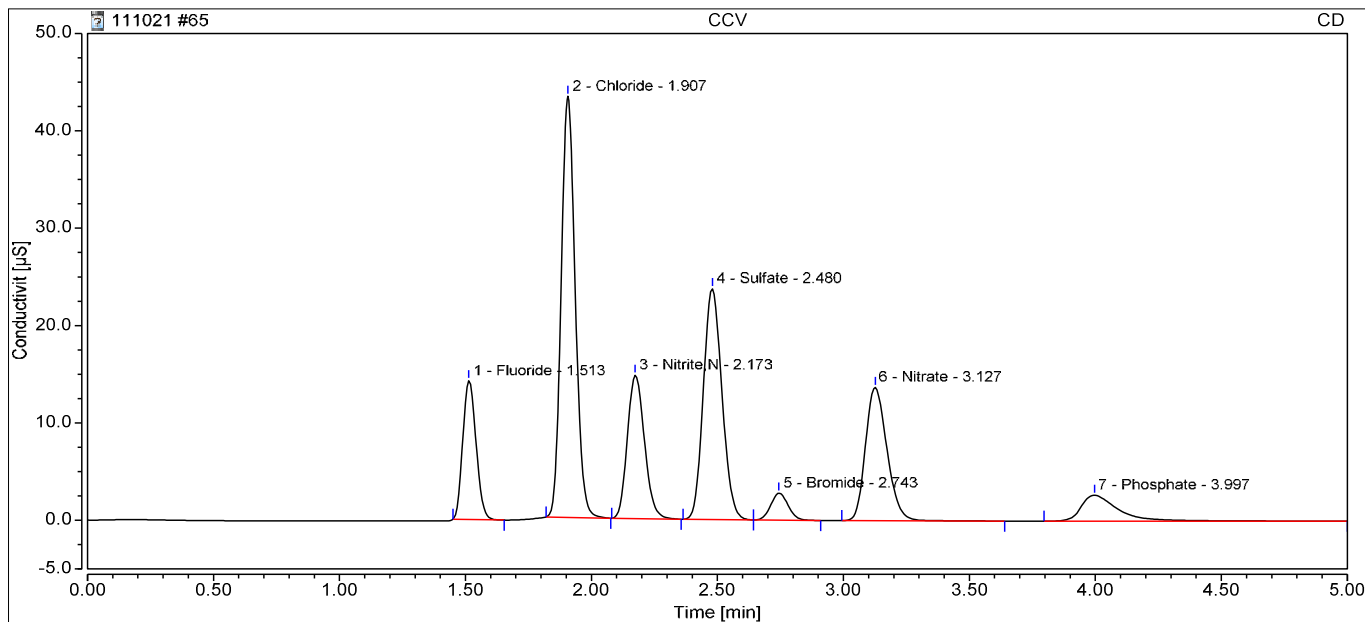
65 CCV

Sample Name: CCV  
 Vial Number: R1  
 Sample Type: Unknown  
 Control Program: Anions Program ISO37mM 150mm short 0.4  
 Quantif. Method: Anions Processing Method ISO

Injection Volume: 5.00  
 Channel: CD  
 Wavelength: 210  
 Bandwidth: n.a.  
 Dilution Factor: 1.0000  
 Sample Weight: 1.0000

Recording Time: 11/10/2021 14:06

Run Time:



## Integration Results

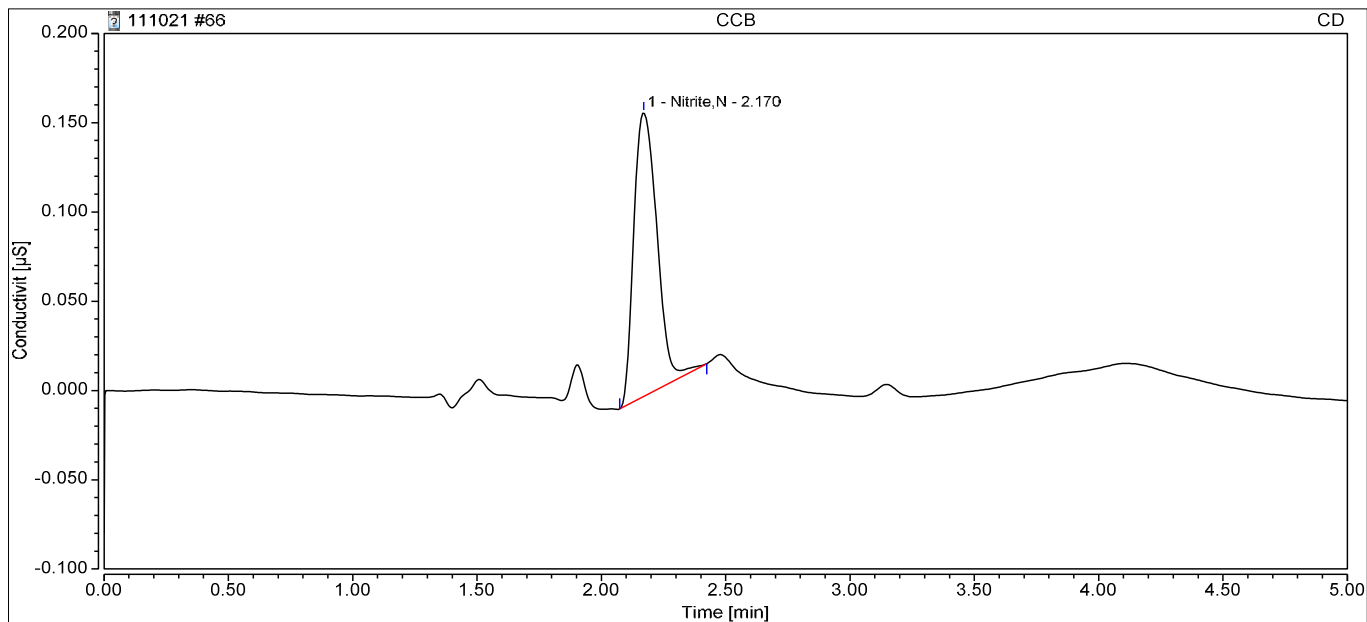
No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
1	1.51	Fluoride	BMB	0.873	4.1824	4.1824	1.0000
2	1.91	Chloride	BMB	2.788	19.8472	19.8472	1.0000
3	2.17	Nitrite,N	BMB	1.161	3.8664	3.8664	1.0000
4	2.48	Sulfate	BMB	2.027	19.6335	19.6335	1.0000
5	2.74	Bromide	BMB	0.222	3.6898	3.6898	1.0000
6	3.13	Nitrate	BMB	1.355	3.8633	3.8633	1.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	1.0000
7	4.00	Phosphate	BMB	0.458	3.8178	3.8178	1.0000
Total:			0.000	8.883	58.90		



66 CCB

Sample Name: CCB  
 Vial Number: R4  
 Sample Type: Unknown  
 Control Program: Anions Program ISO37mM 150mm short 0.4  
 Quantif. Method: Anions Processing Method ISO  
 Recording Time: 11/10/2021 14:14  
 Run Time:

Injection Volume: 5.00  
 Channel: CD  
 Wavelength: 210  
 Bandwidth: n.a.  
 Dilution Factor: 1.0000  
 Sample Weight: 1.0000



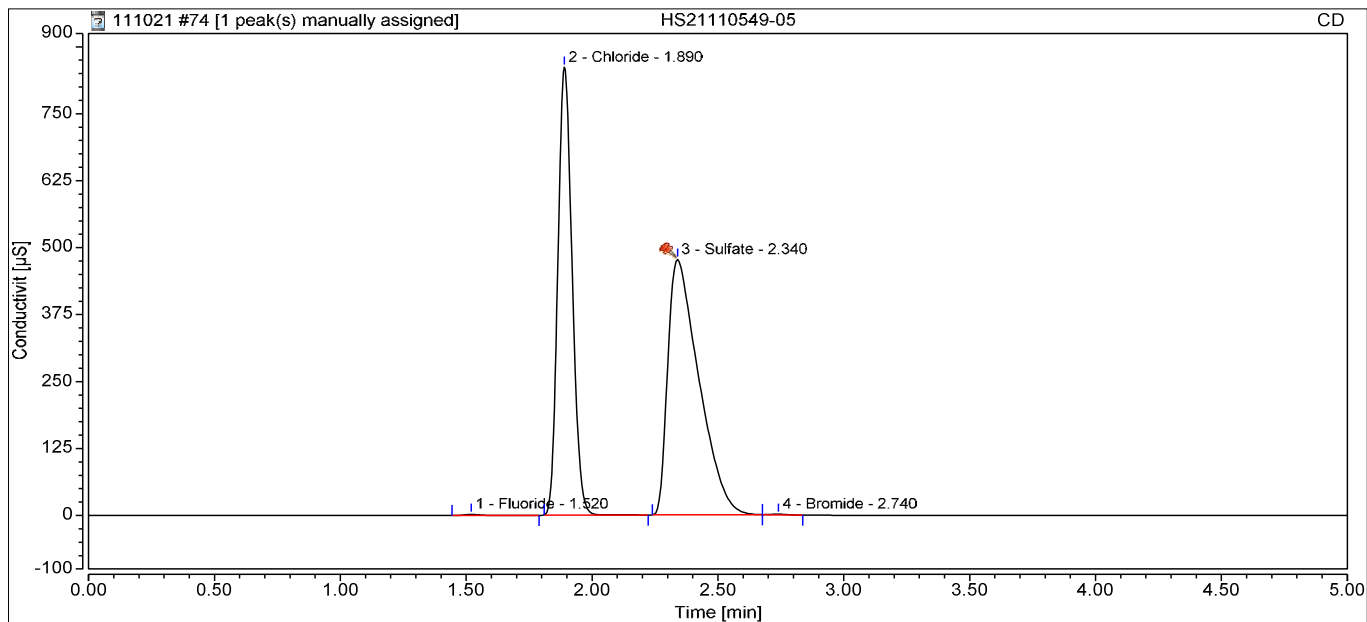
## Integration Results

No.	Retention min	Peak Name	Peak Type	Area $\mu\text{S}\cdot\text{min}$	Amount ppm	Concentration ppm	Dilution
n.a.	n.a.	Fluoride	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Chloride	n.a.	n.a.	n.a.	n.a.	1.0000
1	2.17	Nitrite,N	BMB	0.017	0.0548	0.0548	1.0000
n.a.	n.a.	Sulfate	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Bromide	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Nitrate	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Phosphate	n.a.	n.a.	n.a.	n.a.	1.0000
Total:			0.000	0.017	0.05		

74 HS21110549-05

Sample Name: **HS21110549-05**  
 Vial Number: **RA5**  
 Sample Type: **Unknown**  
 Control Program: **Anions Program ISO37mM 150mm short 0.4**  
 Quantif. Method: **Anions Processing Method ISO**  
 Recording Time: **11/10/2021 16:00**  
 Run Time:

Injection Volume: **5.00**  
 Channel: **CD**  
 Wavelength: **210**  
 Bandwidth: **n.a.**  
 Dilution Factor: **1.0000**  
 Sample Weight: **1.0000**



## Integration Results

No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
1	1.52	Fluoride	BMB	0.143	0.7165	0.7165	1.0000
2	1.89	Chloride	BMB	55.084	389.6826	389.6826	1.0000
n.a.	n.a.	Nitrite,N	n.a.	n.a.	n.a.	n.a.	1.0000
3	2.34	Sulfate	BMB^	68.064	655.3402	655.3402	1.0000
4	2.74	Bromide	BMB	0.091	1.5394	1.5394	1.0000
n.a.	n.a.	Nitrate	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Phosphate	n.a.	n.a.	n.a.	n.a.	1.0000
<b>Total:</b>			<b>0.000</b>	<b>123.381</b>	<b>1047.28</b>		

75 HS21110549-05MS

Sample Name: HS21110549-05MS

Vial Number: RA6

Sample Type: Unknown

Control Program: Anions Program ISO37mM 150mm short 0.4

Quantif. Method: Anions Processing Method ISO

Recording Time: 11/10/2021 16:08

Run Time:

Injection Volume: 5.00

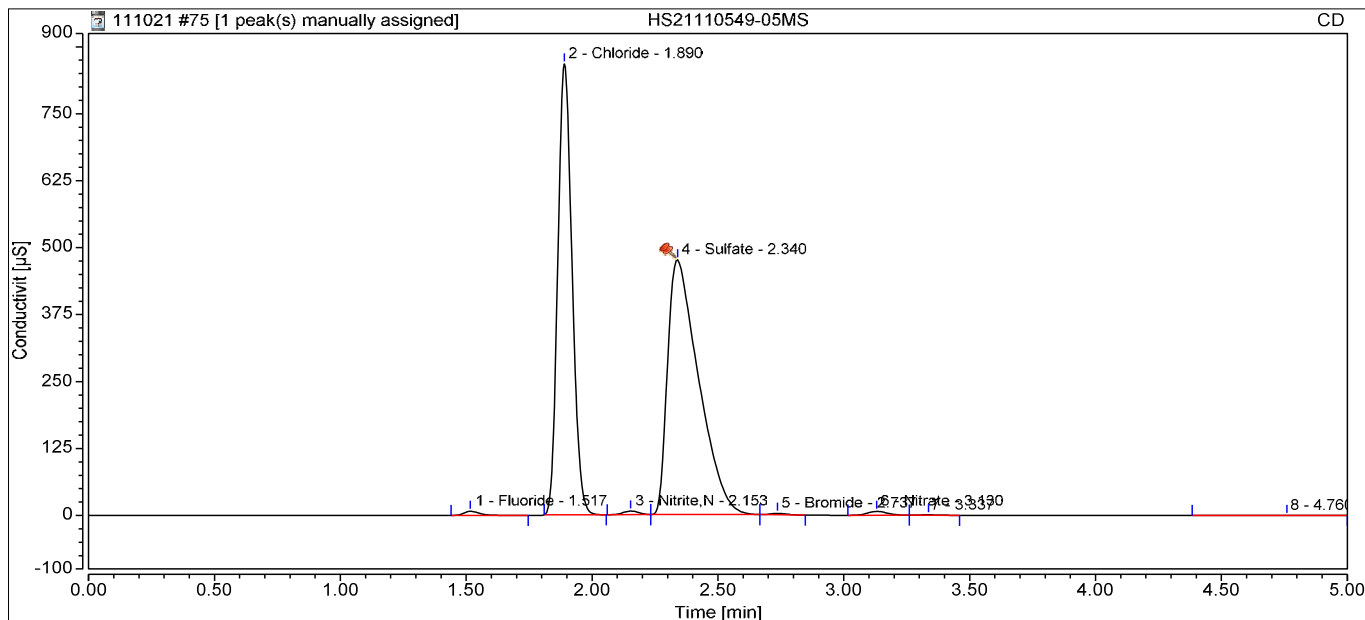
Channel: CD

Wavelength: 210

Bandwidth: n.a.

Dilution Factor: 1.0000

Sample Weight: 1.0000



## Integration Results

No.	Retention min	Peak Name	Peak Type	Area $\mu\text{S} \cdot \text{min}$	Amount ppm	Concentration ppm	Dilution
1	1.52	Fluoride	BMB	0.565	2.7223	2.7223	1.0000
2	1.89	Chloride	BMB	55.327	391.3994	391.3994	1.0000
3	2.15	Nitrite,N	BMB	0.486	1.5760	1.5760	1.0000
4	2.34	Sulfate	BMB^	67.827	653.0591	653.0591	1.0000
5	2.74	Bromide	BMB	0.195	3.2435	3.2435	1.0000
6	3.13	Nitrate	BMB	0.654	1.8882	1.8882	1.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Phosphate	n.a.	n.a.	n.a.	n.a.	1.0000
Total:			0.000	125.053	1053.89		

76 HS21110549-05MSD

Sample Name: HS21110549-05MSD

Vial Number: RA7

Sample Type: Unknown

Control Program: Anions Program ISO37mM 150mm short 0.4

Quantif. Method: Anions Processing Method ISO

Recording Time: 11/10/2021 16:15

Run Time:

Injection Volume: 5.00

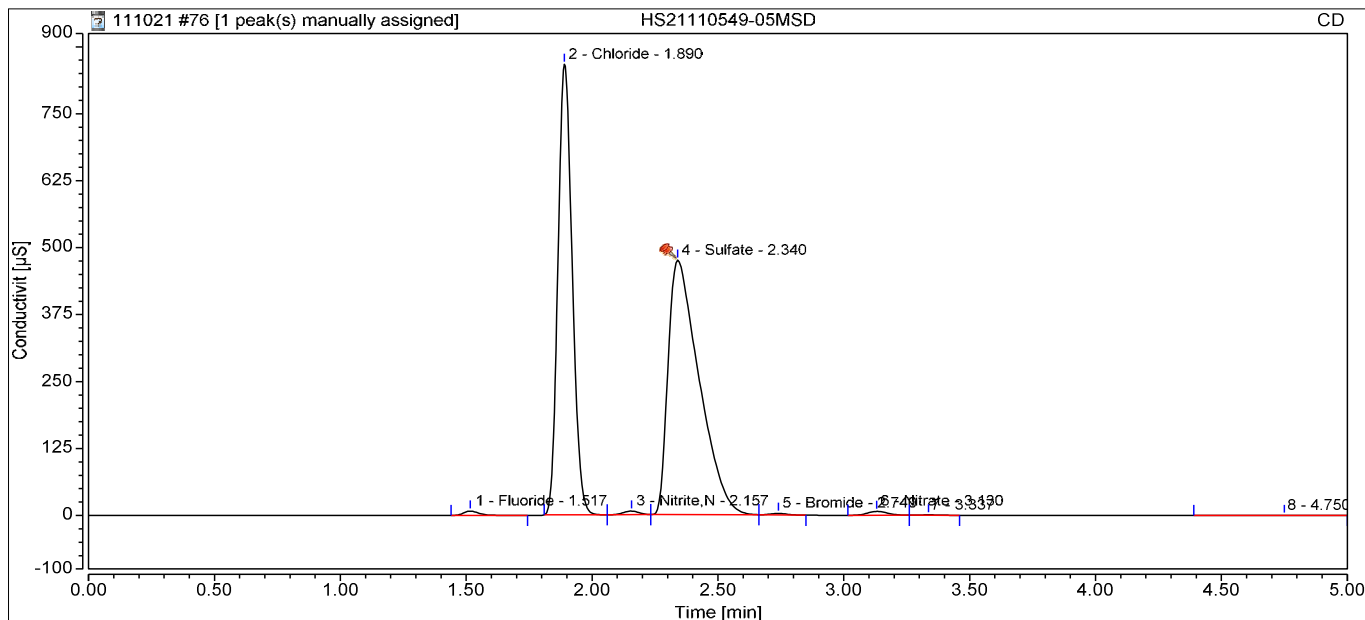
Channel: CD

Wavelength: 210

Bandwidth: n.a.

Dilution Factor: 1.0000

Sample Weight: 1.0000



## Integration Results

No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
1	1.52	Fluoride	BMB	0.568	2.7340	2.7340	1.0000
2	1.89	Chloride	BMB	55.349	391.5519	391.5519	1.0000
3	2.16	Nitrite,N	BMB	0.488	1.5821	1.5821	1.0000
4	2.34	Sulfate	BMB^	67.673	651.5785	651.5785	1.0000
5	2.74	Bromide	BMB	0.204	3.4072	3.4072	1.0000
6	3.13	Nitrate	BMB	0.657	1.8972	1.8972	1.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Phosphate	n.a.	n.a.	n.a.	n.a.	1.0000
Total:			0.000	124.939	1052.75		

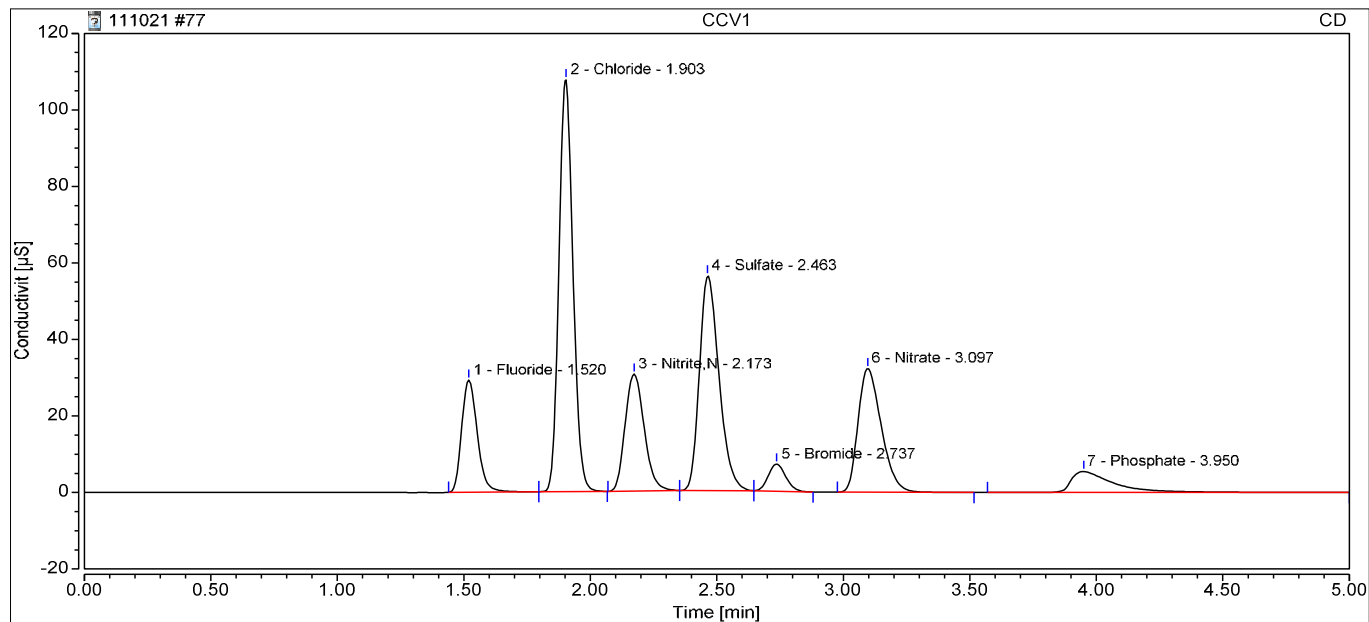
77 CCV1

Sample Name: CCV1  
 Vial Number: R3  
 Sample Type: Unknown  
 Control Program: Anions Program ISO37mM 150mm short 0.4  
 Quantif. Method: Anions Processing Method ISO

Recording Time: 11/10/2021 16:23

Run Time:

Injection Volume: 5.00  
 Channel: CD  
 Wavelength: 210  
 Bandwidth: n.a.  
 Dilution Factor: 1.0000  
 Sample Weight: 1.0000



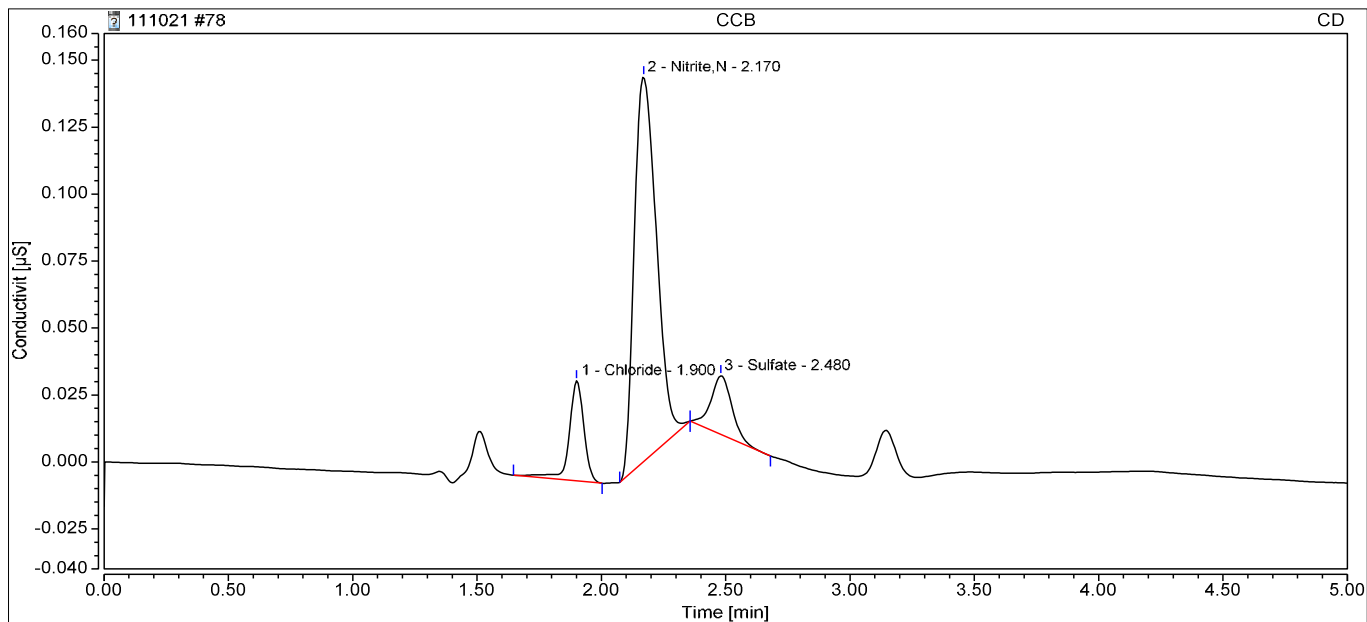
## Integration Results

No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
1	1.52	Fluoride	BMB	2.091	9.9630	9.9630	1.0000
2	1.90	Chloride	BMB	6.914	49.0276	49.0276	1.0000
3	2.17	Nitrite,N	BMB	2.674	9.5604	9.5604	1.0000
4	2.46	Sulfate	BMB	5.030	48.5432	48.5432	1.0000
5	2.74	Bromide	BMB	0.564	9.3048	9.3048	1.0000
6	3.10	Nitrate	BMB	3.434	9.7150	9.7150	1.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	1.0000
7	3.95	Phosphate	BMB	1.080	8.6673	8.6673	1.0000
Total:			0.000	21.787	144.78		

78 CCB

Sample Name: CCB  
 Vial Number: R8  
 Sample Type: Unknown  
 Control Program: Anions Program ISO37mM 150mm short 0.4  
 Quantif. Method: Anions Processing Method ISO  
 Recording Time: 11/10/2021 16:30  
 Run Time:

Injection Volume: 5.00  
 Channel: CD  
 Wavelength: 210  
 Bandwidth: n.a.  
 Dilution Factor: 1.0000  
 Sample Weight: 1.0000



## Integration Results

No.	Retention min	Peak Name	Peak Type	Area $\mu\text{S} \cdot \text{min}$	Amount ppm	Concentration ppm	Dilution
n.a.	n.a.	Fluoride	n.a.	n.a.	n.a.	n.a.	1.0000
1	1.90	Chloride	BMB	0.003	0.1501	0.1501	1.0000
2	2.17	Nitrite, N	BMB	0.015	0.0474	0.0474	1.0000
3	2.48	Sulfate	BMB	0.002	0.1421	0.1421	1.0000
n.a.	n.a.	Bromide	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Nitrate	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Phosphate	n.a.	n.a.	n.a.	n.a.	1.0000
Total:			0.000	0.020	0.34		

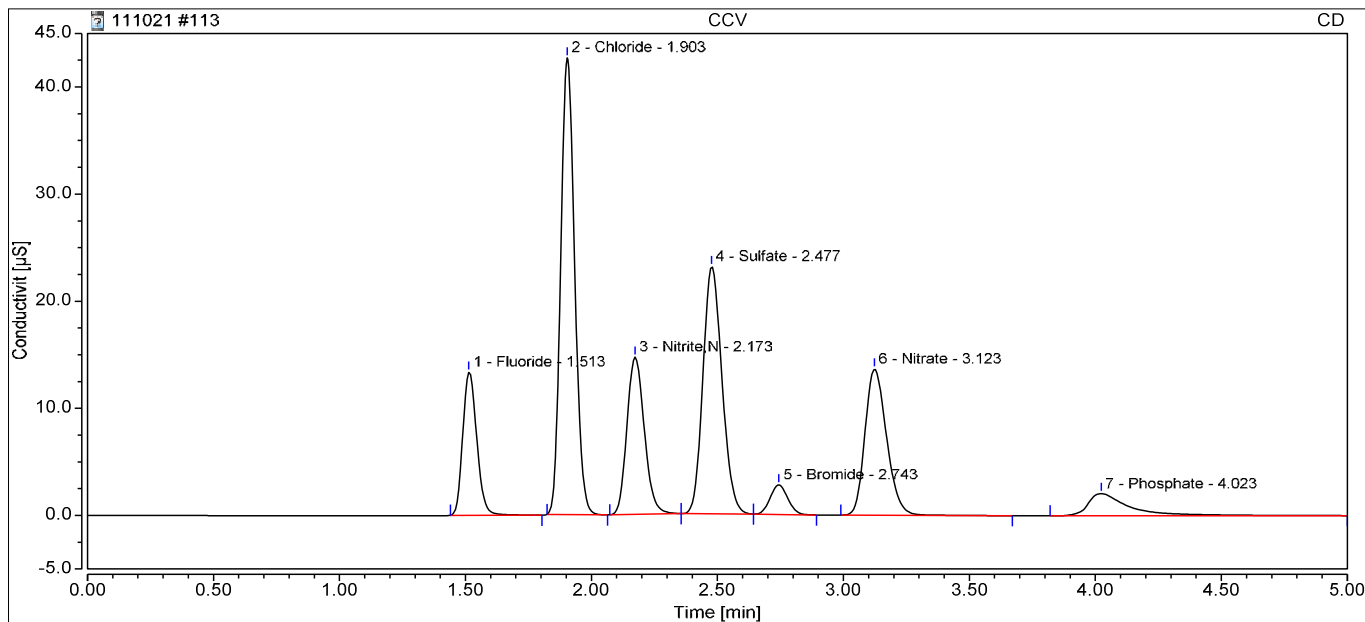
113 CCV

Sample Name: **CCV**  
 Vial Number: **R1**  
 Sample Type: **Unknown**  
 Control Program: **Anions Program ISO37mM 150mm short 0.4**  
 Quantif. Method: **Anions Processing Method ISO**

Injection Volume: **5.00**  
 Channel: **CD**  
 Wavelength: **210**  
 Bandwidth: **n.a.**  
 Dilution Factor: **1.0000**  
 Sample Weight: **1.0000**

Recording Time: 11/10/2021 21:01

Run Time:



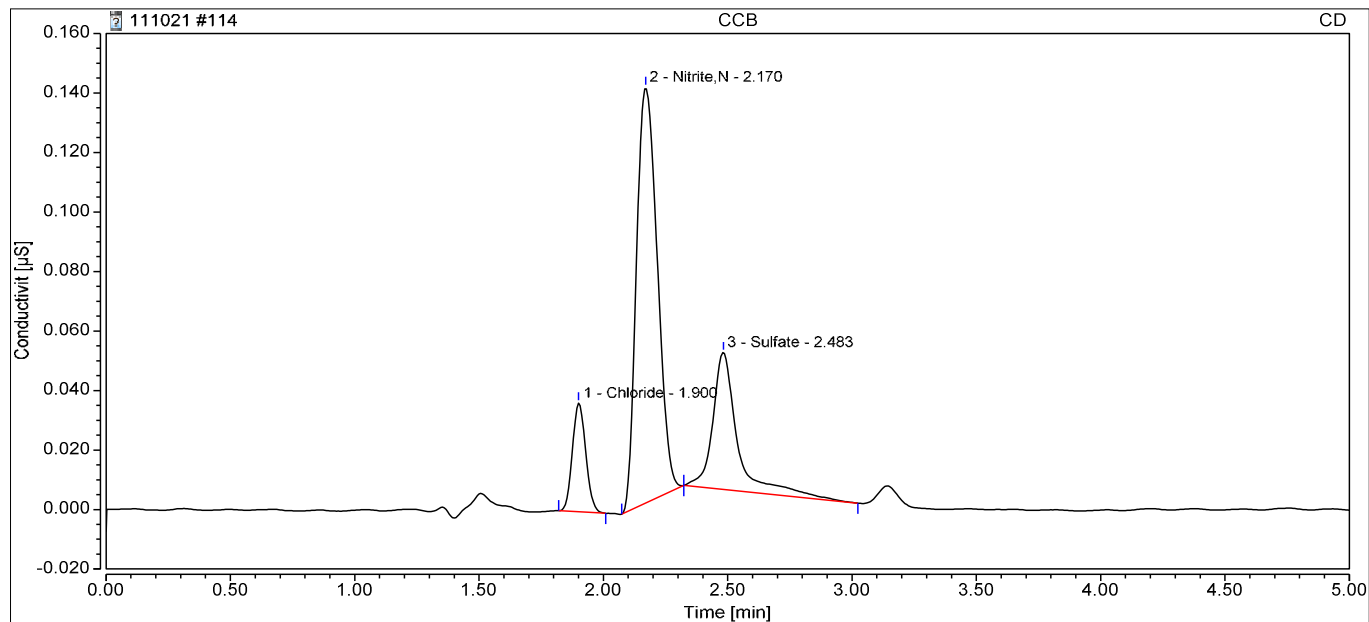
## Integration Results

No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
1	1.51	Fluoride	BMB	0.864	4.1411	4.1411	1.0000
2	1.90	Chloride	BMB	2.732	19.4545	19.4545	1.0000
3	2.17	Nitrite,N	BMB	1.176	3.9216	3.9216	1.0000
4	2.48	Sulfate	BMB	2.025	19.6102	19.6102	1.0000
5	2.74	Bromide	BMB	0.223	3.7082	3.7082	1.0000
6	3.12	Nitrate	BMB	1.358	3.8719	3.8719	1.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	1.0000
7	4.02	Phosphate	BMB	0.394	3.3062	3.3062	1.0000
<b>Total:</b>			<b>0.000</b>	<b>8.773</b>	<b>58.01</b>		

114 CCB

Sample Name: CCB  
 Vial Number: R4  
 Sample Type: Unknown  
 Control Program: Anions Program ISO37mM 150mm short 0.4  
 Quantif. Method: Anions Processing Method ISO  
 Recording Time: 11/10/2021 21:15  
 Run Time:

Injection Volume: 5.00  
 Channel: CD  
 Wavelength: 210  
 Bandwidth: n.a.  
 Dilution Factor: 1.0000  
 Sample Weight: 1.0000



## Integration Results

No.	Retention min	Peak Name	Peak Type	Area $\mu\text{S} \cdot \text{min}$	Amount ppm	Concentration ppm	Dilution
n.a.	n.a.	Fluoride	n.a.	n.a.	n.a.	n.a.	1.0000
1	1.90	Chloride	BMB	0.002	0.1481	0.1481	1.0000
2	2.17	Nitrite, N	BMB	0.014	0.0434	0.0434	1.0000
3	2.48	Sulfate	BMB	0.005	0.1725	0.1725	1.0000
n.a.	n.a.	Bromide	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Nitrate	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Phosphate	n.a.	n.a.	n.a.	n.a.	1.0000
Total:			0.000	0.021	0.36		



122 HS21110549-01

Sample Name: HS21110549-01

Vial Number: RE3

Sample Type: Unknown

Control Program: Anions Program ISO37mM 150mm short 0.4

Quantif. Method: Anions Processing Method ISO

Recording Time: 11/10/2021 22:15

Run Time:

Injection Volume: 5.00

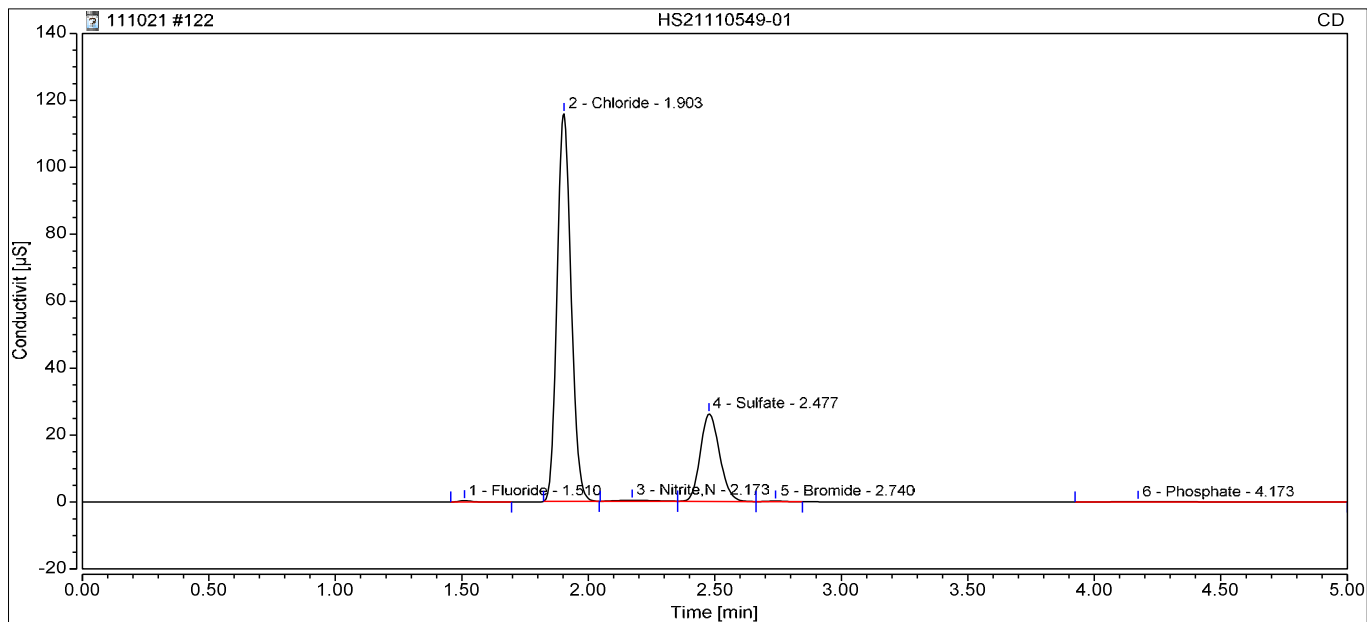
Channel: CD

Wavelength: 210

Bandwidth: n.a.

Dilution Factor: 5.0000

Sample Weight: 1.0000



## Integration Results

No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
1	1.51	Fluoride	BMB	0.024	0.1516	0.7582	5.0000
2	1.90	Chloride	BMB	7.429	52.6694	263.3471	5.0000
3	2.17	Nitrite,N	BMB	0.051	0.1627	0.8135	5.0000
4	2.48	Sulfate	BMB	2.305	22.3063	111.5316	5.0000
5	2.74	Bromide	BMB	0.013	0.2639	1.3196	5.0000
n.a.	n.a.	Nitrate	n.a.	n.a.	n.a.	n.a.	5.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	5.0000
6	4.17	Phosphate	BMB	0.051	0.5071	2.5356	5.0000
Total:			0.000	9.872	380.31		

123 HS21110549-02

Sample Name: HS21110549-02

Vial Number: RE4

Sample Type: Unknown

Control Program: Anions Program ISO37mM 150mm short 0.4

Quantif. Method: Anions Processing Method ISO

Recording Time: 11/10/2021 22:22

Run Time:

Injection Volume: 5.00

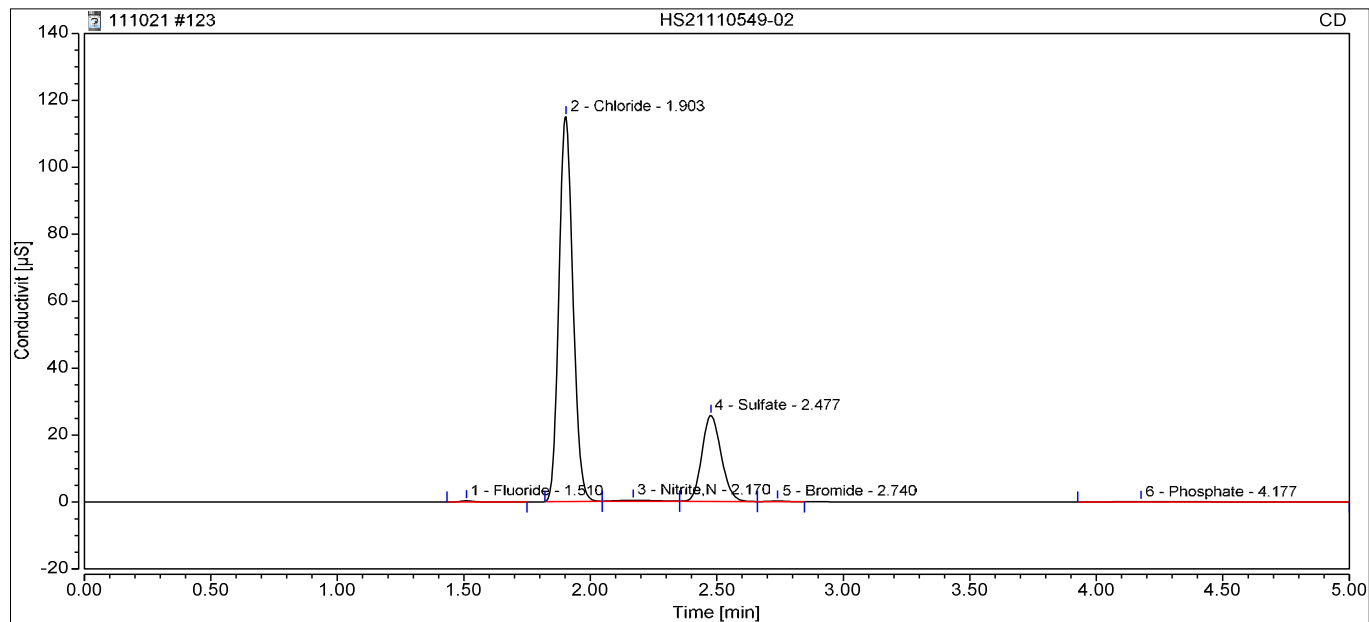
Channel: CD

Wavelength: 210

Bandwidth: n.a.

Dilution Factor: 5.0000

Sample Weight: 1.0000



## Integration Results

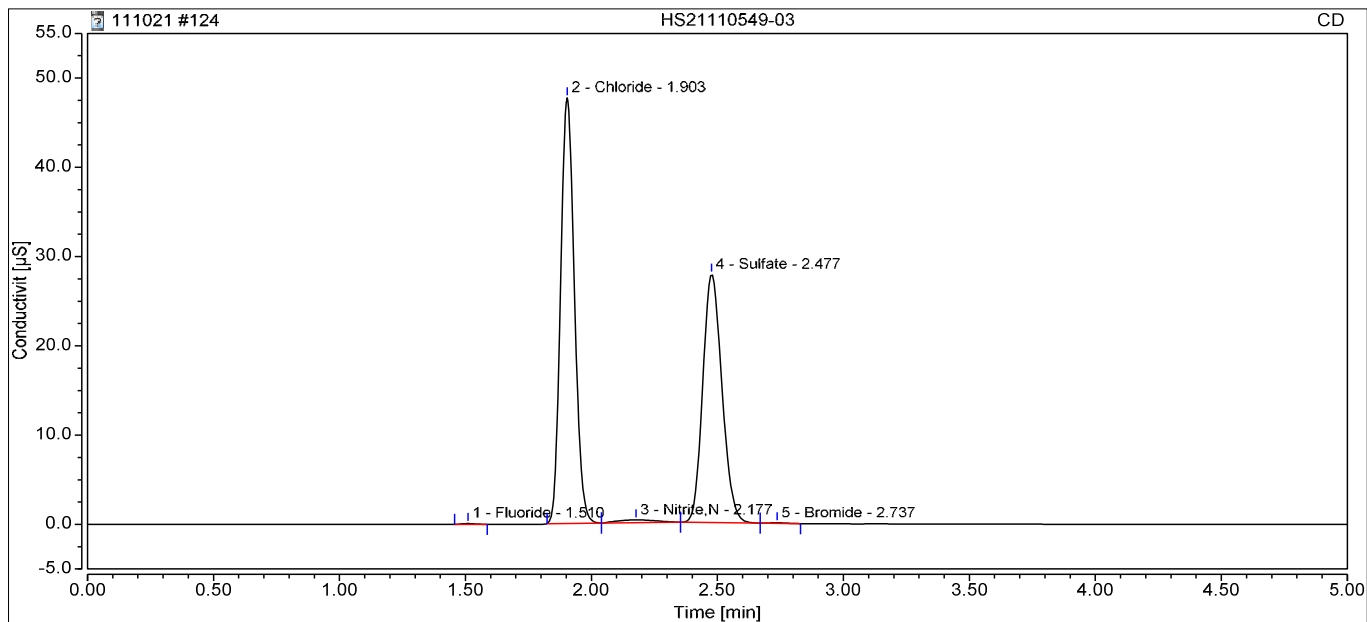
No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
1	1.51	Fluoride	BMB	0.025	0.1563	0.7814	5.0000
2	1.90	Chloride	BMB	7.382	52.3339	261.6694	5.0000
3	2.17	Nitrite,N	BMB	0.049	0.1555	0.7775	5.0000
4	2.48	Sulfate	BMB	2.259	21.8650	109.3249	5.0000
5	2.74	Bromide	BMB	0.013	0.2618	1.3088	5.0000
n.a.	n.a.	Nitrate	n.a.	n.a.	n.a.	n.a.	5.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	5.0000
6	4.18	Phosphate	BMB	0.051	0.5130	2.5650	5.0000
Total:			0.000	9.778	376.43		

124 HS21110549-03

Sample Name: **HS21110549-03**  
 Vial Number: **RE5**  
 Sample Type: **Unknown**  
 Control Program: **Anions Program ISO37mM 150mm short 0.4**  
 Quantif. Method: **Anions Processing Method ISO**

Injection Volume: **5.00**  
 Channel: **CD**  
 Wavelength: **210**  
 Bandwidth: **n.a.**  
 Dilution Factor: **5.0000**  
 Sample Weight: **1.0000**

Run Time:



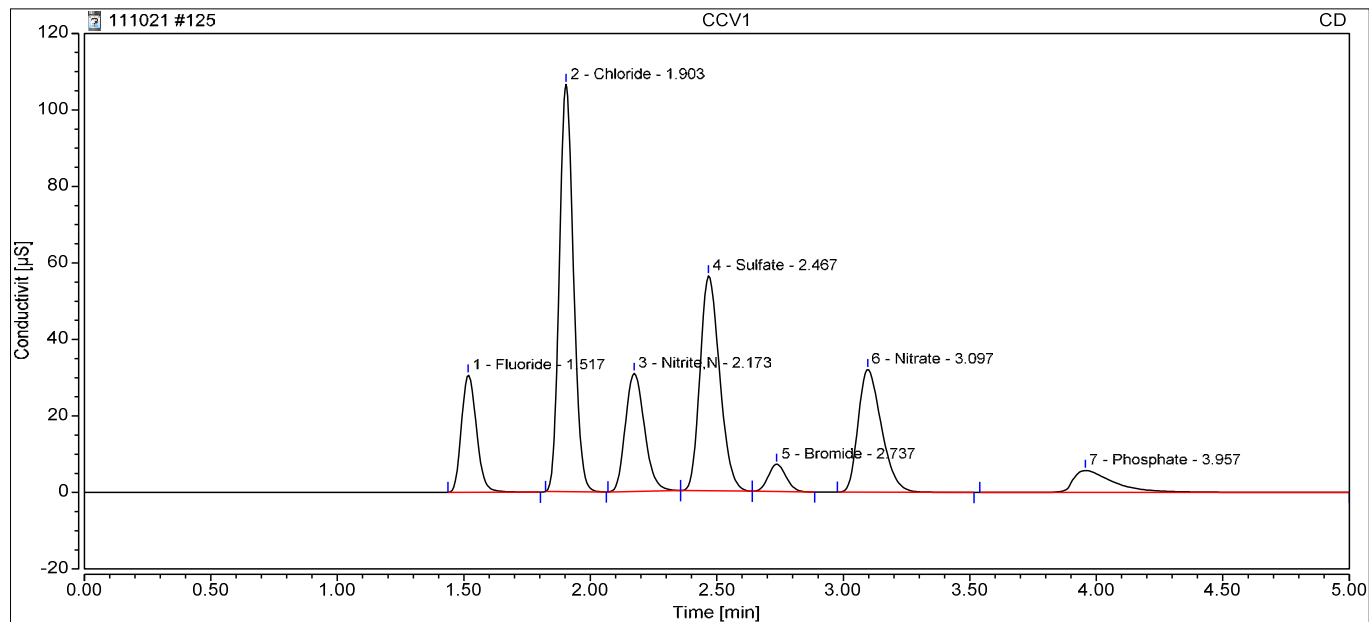
## Integration Results

No.	Retention min	Peak Name	Peak Type	Area $\mu\text{S}\cdot\text{min}$	Amount ppm	Concentration ppm	Dilution
1	1.51	Fluoride	BMB	0.005	0.0634	0.3169	5.0000
2	1.90	Chloride	BMB	3.034	21.5902	107.9509	5.0000
3	2.18	Nitrite,N	BMB	0.055	0.1746	0.8728	5.0000
4	2.48	Sulfate	BMB	2.454	23.7455	118.7277	5.0000
5	2.74	Bromide	BMB	0.004	0.1191	0.5954	5.0000
n.a.	n.a.	Nitrate	n.a.	n.a.	n.a.	n.a.	5.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	5.0000
n.a.	n.a.	Phosphate	n.a.	n.a.	n.a.	n.a.	5.0000
<b>Total:</b>			<b>0.000</b>	<b>5.552</b>	<b>228.46</b>		

125 CCV1

Sample Name: **CCV1**  
 Vial Number: **R3**  
 Sample Type: **Unknown**  
 Control Program: **Anions Program ISO37mM 150mm short 0.4**  
 Quantif. Method: **Anions Processing Method ISO**  
 Recording Time: **11/10/2021 22:37**  
 Run Time:

Injection Volume: **5.00**  
 Channel: **CD**  
 Wavelength: **210**  
 Bandwidth: **n.a.**  
 Dilution Factor: **1.0000**  
 Sample Weight: **1.0000**



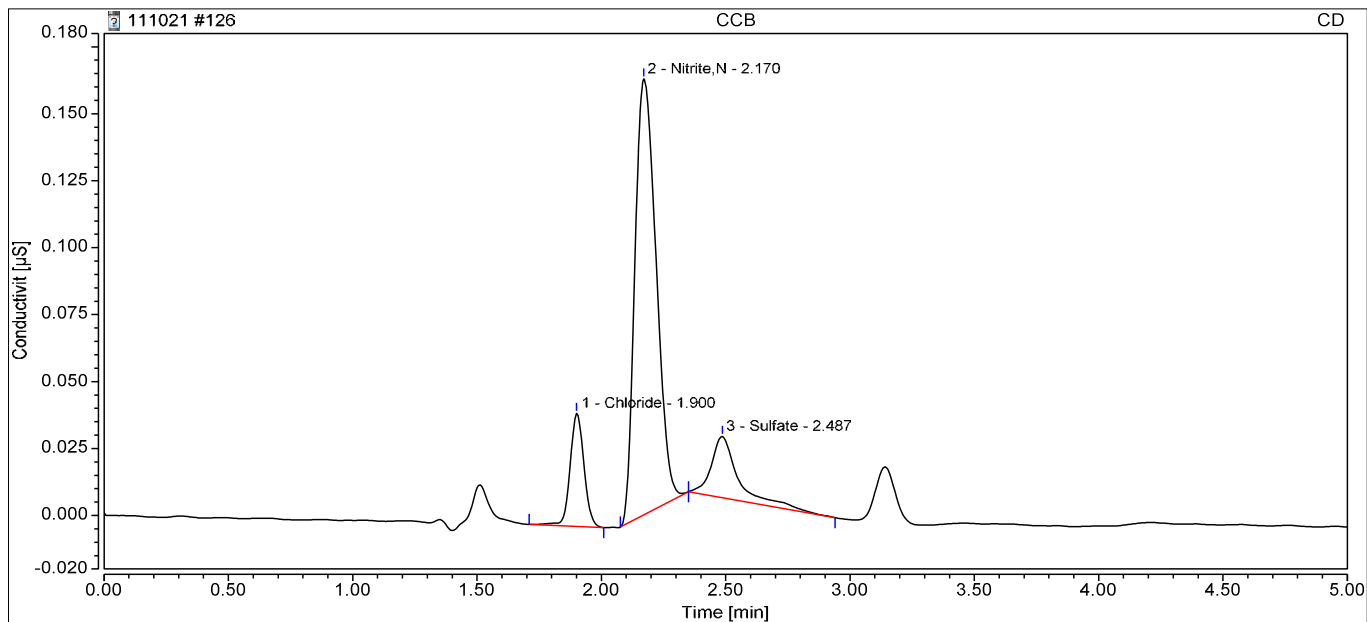
Integration Results							
No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
1	1.52	Fluoride	BMB	2.126	10.1286	10.1286	1.0000
2	1.90	Chloride	BMB	6.857	48.6211	48.6211	1.0000
3	2.17	Nitrite,N	BMB	2.701	9.6691	9.6691	1.0000
4	2.47	Sulfate	BMB	5.051	48.7414	48.7414	1.0000
5	2.74	Bromide	BMB	0.580	9.5817	9.5817	1.0000
6	3.10	Nitrate	BMB	3.434	9.7137	9.7137	1.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	1.0000
7	3.96	Phosphate	BMB	1.079	8.6601	8.6601	1.0000
<b>Total:</b>			<b>0.000</b>	<b>21.827</b>	<b>145.12</b>		

126 CCB

Sample Name: CCB  
 Vial Number: R8  
 Sample Type: Unknown  
 Control Program: Anions Program ISO37mM 150mm short 0.4  
 Quantif. Method: Anions Processing Method ISO

Injection Volume: 5.00  
 Channel: CD  
 Wavelength: 210  
 Bandwidth: n.a.  
 Dilution Factor: 1.0000  
 Sample Weight: 1.0000

Run Time:



## Integration Results

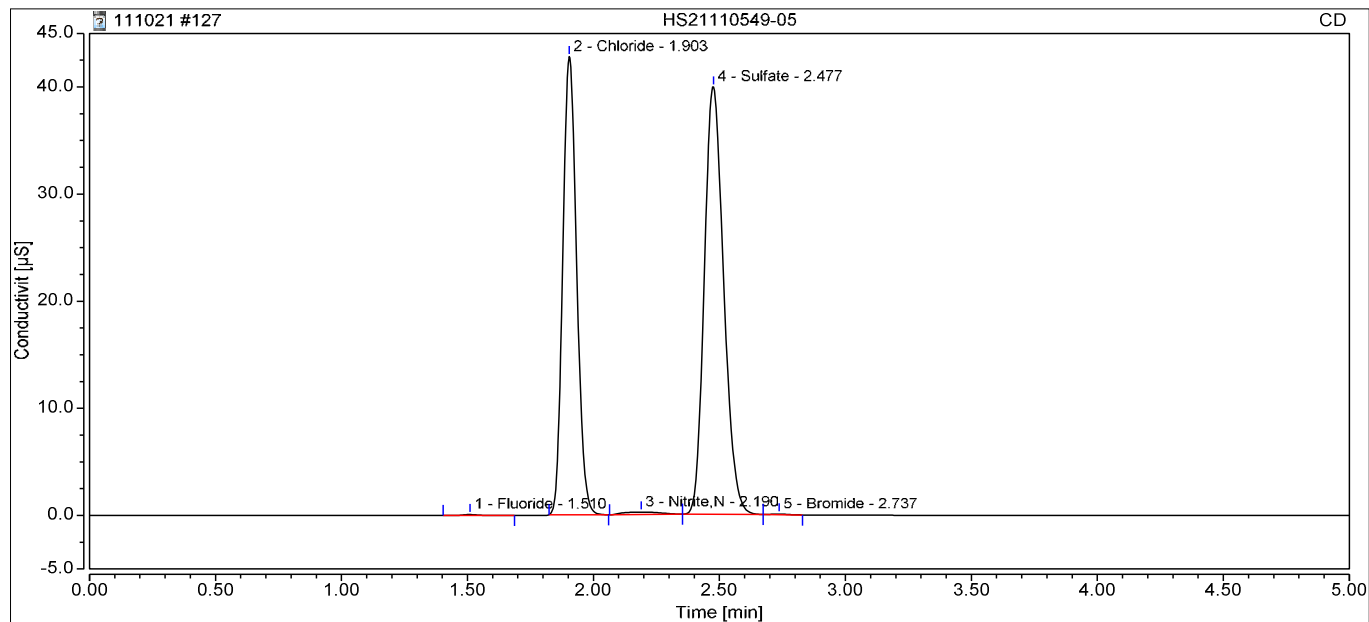
No.	Retention min	Peak Name	Peak Type	Area $\mu\text{S} \cdot \text{min}$	Amount ppm	Concentration ppm	Dilution
n.a.	n.a.	Fluoride	n.a.	n.a.	n.a.	n.a.	1.0000
1	1.90	Chloride	BMB	0.003	0.1514	0.1514	1.0000
2	2.17	Nitrite, N	BMB	0.016	0.0514	0.0514	1.0000
3	2.49	Sulfate	BMB	0.003	0.1492	0.1492	1.0000
n.a.	n.a.	Bromide	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Nitrate	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Phosphate	n.a.	n.a.	n.a.	n.a.	1.0000
Total:			0.000	0.022	0.35		

127 HS21110549-05

Sample Name: HS21110549-05  
 Vial Number: RE6  
 Sample Type: Unknown  
 Control Program: Anions Program ISO37mM 150mm short 0.4  
 Quantif. Method: Anions Processing Method ISO

Injection Volume: 5.00  
 Channel: CD  
 Wavelength: 210  
 Bandwidth: n.a.  
 Dilution Factor: 20.0000  
 Sample Weight: 1.0000

Run Time:



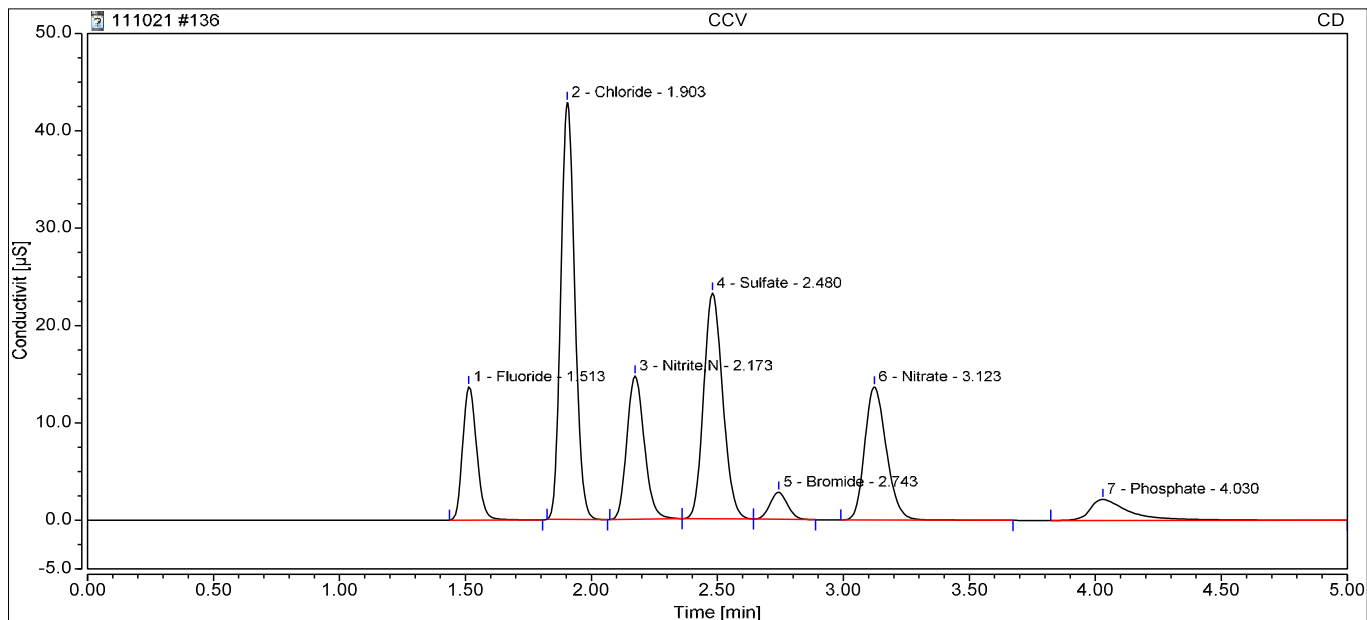
Integration Results							
No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
1	1.51	Fluoride	BMB	0.005	0.0654	1.3085	20.0000
2	1.90	Chloride	BMB	2.732	19.4544	389.0879	20.0000
3	2.19	Nitrite, N	BMB	0.039	0.1243	2.4856	20.0000
4	2.48	Sulfate	BMB	3.552	34.3122	686.2444	20.0000
5	2.74	Bromide	BMB	0.004	0.1184	2.3677	20.0000
n.a.	n.a.	Nitrate	n.a.	n.a.	n.a.	n.a.	20.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	20.0000
n.a.	n.a.	Phosphate	n.a.	n.a.	n.a.	n.a.	20.0000
Total:			0.000	6.333	1081.49		

136 CCV

Sample Name: CCV  
 Vial Number: R1  
 Sample Type: Unknown  
 Control Program: Anions Program ISO37mM 150mm short 0.4  
 Quantif. Method: Anions Processing Method ISO

Injection Volume: 5.00  
 Channel: CD  
 Wavelength: 210  
 Bandwidth: n.a.  
 Dilution Factor: 1.0000  
 Sample Weight: 1.0000

Recording Time: 11/10/2021 23:59  
 Run Time:



## Integration Results

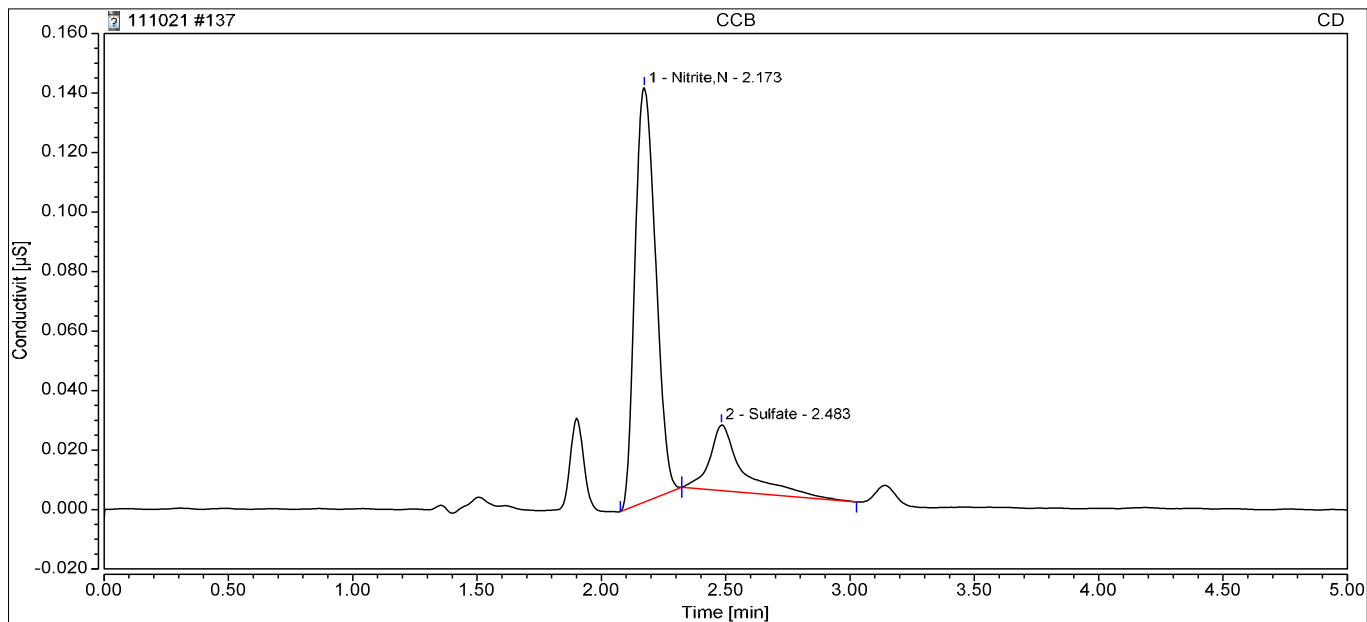
No.	Retention min	Peak Name	Peak Type	Area $\mu\text{S}\cdot\text{min}$	Amount ppm	Concentration ppm	Dilution
1	1.51	Fluoride	BMB	0.884	4.2358	4.2358	1.0000
2	1.90	Chloride	BMB	2.746	19.5490	19.5490	1.0000
3	2.17	Nitrite,N	BMB	1.178	3.9260	3.9260	1.0000
4	2.48	Sulfate	BMB	2.029	19.6511	19.6511	1.0000
5	2.74	Bromide	BMB	0.223	3.7181	3.7181	1.0000
6	3.12	Nitrate	BMB	1.361	3.8788	3.8788	1.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	1.0000
7	4.03	Phosphate	BMB	0.394	3.3056	3.3056	1.0000
Total:			0.000	8.815	58.26		

137 CCB

Sample Name: CCB  
 Vial Number: R4  
 Sample Type: Unknown  
 Control Program: Anions Program ISO37mM 150mm short 0.4  
 Quantif. Method: Anions Processing Method ISO

Injection Volume: 5.00  
 Channel: CD  
 Wavelength: 210  
 Bandwidth: n.a.  
 Dilution Factor: 1.0000  
 Sample Weight: 1.0000

Recording Time: 11/11/2021 00:14  
 Run Time:



## Integration Results

No.	Retention min	Peak Name	Peak Type	Area $\mu\text{S} \cdot \text{min}$	Amount ppm	Concentration ppm	Dilution
n.a.	n.a.	Fluoride	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Chloride	n.a.	n.a.	n.a.	n.a.	1.0000
1	2.17	Nitrite, N	BMB	0.013	0.0429	0.0429	1.0000
2	2.48	Sulfate	BMB	0.003	0.1545	0.1545	1.0000
n.a.	n.a.	Bromide	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Nitrate	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	1.0000
n.a.	n.a.	Phosphate	n.a.	n.a.	n.a.	n.a.	1.0000
Total:			0.000	0.017	0.20		



# HS21110549 Wet Chem

ALS WO# HS21110549



C:\TOC-L\Data\2021\_10\_25\_002.tlx

HS2110549

	Type	Analysis	Sample Name	Sample ID	Origin	Manual Diluti	Result	Notes
1	Unknown	NPOC	RINSE		10_18_2021	1.000	NPOC:0.06454mg/L	
2	Unknown	NPOC	RINSE		10_18_2021	1.000	NPOC:0.06455mg/L	
3	Unknown	NPOC	RINSE		10_18_2021	1.000	NPOC:0.07074mg/L	
4	Standard	NPOC	CAL	3100604915	10_25_2021	1.000		
5	Unknown	NPOC	ICB		10_25_2021	1.000	NPOC:0.09179mg/L	
6	Unknown	NPOC	ICV	3100604423	10_25_2021	1.000	NPOC:10.60mg/L	
7	Unknown	NPOC	ICB		10_25_2021	1.000	NPOC:0.05172mg/L	
8	Unknown	NPOC	CCV	317195504	10_25_2021	1.000	NPOC:25.73mg/L	
9	Unknown	NPOC	CCB		10_25_2021	1.000	NPOC:0.06181mg/L	
10	Unknown	NPOC	MBLK-10252021		10_25_2021	1.000	NPOC:0.05600mg/L	
11	Unknown	NPOC	LCS-10252021	3100604423	10_25_2021	1.000	NPOC:9.287mg/L	
12	Unknown	NPOC	LCSD-10252021	3100604423	10_25_2021	1.000	NPOC:10.83mg/L	
13	Unknown	NPOC	HS21101075-01DF10		10_25_2021	1.000	NPOC:0.2805mg/L	
14	Unknown	NPOC	HS21101075-01MSDF10		10_25_2021	1.000	NPOC:12.37mg/L	
15	Unknown	NPOC	HS21101075-02DF10		10_25_2021	1.000	NPOC:0.3788mg/L	
16	Unknown	NPOC	HS21101075-03DF10		10_25_2021	1.000	NPOC:0.2410mg/L	
17	Unknown	NPOC	HS21101075-04DF10		10_25_2021	1.000	NPOC:0.3913mg/L	
18	Unknown	NPOC	HS21101075-05DF10		10_25_2021	1.000	NPOC:0.2171mg/L	
19	Unknown	NPOC	HS21101075-06DF10		10_25_2021	1.000	NPOC:0.1665mg/L	
20	Unknown	NPOC	CCV	317195504	10_25_2021	1.000	NPOC:25.66mg/L	
21	Unknown	NPOC	CCB		10_25_2021	1.000	NPOC:0.05208mg/L	
22	Unknown	NPOC	HS21101075-07DF10		10_25_2021	1.000	NPOC:0.1747mg/L	
23	Unknown	NPOC	HS21101075-08DF10		10_25_2021	1.000	NPOC:0.1648mg/L	
24	Unknown	NPOC	HS21101075-09DF10		10_25_2021	1.000	NPOC:0.1167mg/L	
25	Unknown	NPOC	HS21101075-10DF10		10_25_2021	1.000	NPOC:0.1071mg/L	
26	Unknown	NPOC	CCV	317195504	10_25_2021	1.000	NPOC:25.76mg/L	
27	Unknown	NPOC	CCB		10_25_2021	1.000	NPOC:0.05571mg/L	
28	Unknown	NPOC	MBLK-10252021		10_25_2021	1.000	NPOC:0.06486mg/L	
29	Unknown	NPOC	LCS-10252021	3100604423	10_25_2021	1.000	NPOC:9.320mg/L	
30	Unknown	NPOC	LCSD-10252021	3100604423	10_25_2021	1.000	NPOC:10.96mg/L	
31	Unknown	NPOC	HS21101075-11DF10		10_25_2021	1.000	NPOC:0.1323mg/L	
32	Unknown	NPOC	HS21101075-11MSDF10		10_25_2021	1.000	NPOC:11.21mg/L	
33	Unknown	NPOC	HS21101075-12DF10		10_25_2021	1.000	NPOC:0.2792mg/L	
34	Unknown	NPOC	HS21101080-01DF10		10_25_2021	1.000	NPOC:0.1261mg/L	
35	Unknown	NPOC	HS21101080-02DF10		10_25_2021	1.000	NPOC:0.1407mg/L	
36	Unknown	NPOC	HS21101080-03DF10		10_25_2021	1.000	NPOC:0.1267mg/L	
37	Unknown	NPOC	HS21101080-04DF10		10_25_2021	1.000	NPOC:0.1381mg/L	
38	Unknown	NPOC	CCV	317195504	10_25_2021	1.000	NPOC:25.74mg/L	
39	Unknown	NPOC	CCB		10_25_2021	1.000	NPOC:0.09212mg/L	
40	Unknown	NPOC	HS21101080-05DF10		10_25_2021	1.000	NPOC:0.1654mg/L	
41	Unknown	NPOC	HS21101080-06DF10		10_25_2021	1.000	NPOC:0.1460mg/L	
42	Unknown	NPOC	HS21101080-07DF10		10_25_2021	1.000	NPOC:0.1360mg/L	
43	Unknown	NPOC	HS21101080-08DF10		10_25_2021	1.000	NPOC:0.1453mg/L	
44	Unknown	NPOC	CCV	317195504	10_25_2021	1.000	NPOC:25.54mg/L	
45	Unknown	NPOC	CCB		10_25_2021	1.000	NPOC:0.1296mg/L	
46	Unknown	NPOC	MBLK-10252021		10_25_2021	1.000	NPOC:0.05576mg/L	
47	Unknown	NPOC	LCS-10252021	3100604423	10_25_2021	1.000	NPOC:9.292mg/L	
48	Unknown	NPOC	LCSD-10252021	3100604423	10_25_2021	1.000	NPOC:10.94mg/L	
49	Unknown	NPOC	HS21101080-09DF10		10_25_2021	1.000	NPOC:0.2259mg/L	
50	Unknown	NPOC	HS21101080-09MSDF10		10_25_2021	1.000	NPOC:11.03mg/L	
51	Unknown	NPOC	HS21101080-10DF10		10_25_2021	1.000	NPOC:0.1935mg/L	



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	Type	Analysis	Sample Name	Sample ID	Origin	Manual Diluti	Result	Notes
52	Unknown	NPOC	HS21101080-11DF10		10_25_2021	1.000	NPOC:0.1278mg/L	
53	Unknown	NPOC	HS21101080-12DF10		10_25_2021	1.000	NPOC:0.1284mg/L	
54	Unknown	NPOC	HS21101080-13DF10		10_25_2021	1.000	NPOC:0.1196mg/L	
55	Unknown	NPOC	HS21101080-14DF10		10_25_2021	1.000	NPOC:0.2314mg/L	
56	Unknown	NPOC	CCV	317195504	10_25_2021	1.000	NPOC:25.69mg/L	
57	Unknown	NPOC	CCB		10_25_2021	1.000	NPOC:0.02809mg/L	
58	Unknown	NPOC	HS21101083-01DF10		10_25_2021	1.000	NPOC:0.2332mg/L	
59	Unknown	NPOC	HS21101083-02DF10		10_25_2021	1.000	NPOC:0.2108mg/L	
60	Unknown	NPOC	HS21101083-03DF10		10_25_2021	1.000	NPOC:0.2038mg/L	
61	Unknown	NPOC	HS21101083-04DF10		10_25_2021	1.000	NPOC:0.3380mg/L	
62	Unknown	NPOC	CCV	317195504	10_25_2021	1.000	NPOC:25.53mg/L	
63	Unknown	NPOC	CCB		10_25_2021	1.000	NPOC:0.1115mg/L	
64	Unknown	NPOC	MBLK-10252021		10_25_2021	1.000	NPOC:0.06795mg/L	
65	Unknown	NPOC	LCS-10252021	3100604423	10_25_2021	1.000	NPOC:9.230mg/L	
66	Unknown	NPOC	LCSD-10252021	3100604423	10_25_2021	1.000	NPOC:10.89mg/L	
67	Unknown	NPOC	HS21101083-05DF10		10_25_2021	1.000	NPOC:0.4956mg/L	
68	Unknown	NPOC	HS21101083-05MSDF10		10_25_2021	1.000	NPOC:11.17mg/L	
69	Unknown	NPOC	HS21101083-06DF10		10_25_2021	1.000	NPOC:0.2640mg/L	
70	Unknown	NPOC	HS21101083-07DF10		10_25_2021	1.000	NPOC:0.2414mg/L	
71	Unknown	NPOC	HS21101083-08DF10		10_25_2021	1.000	NPOC:0.2102mg/L	
72	Unknown	NPOC	HS21101083-09DF10		10_25_2021	1.000	NPOC:0.1629mg/L	
73	Unknown	NPOC	HS21101083-10DF10		10_25_2021	1.000	NPOC:0.1838mg/L	
74	Unknown	NPOC	CCV	317195504	10_25_2021	1.000	NPOC:25.60mg/L	
75	Unknown	NPOC	CCB		10_25_2021	1.000	NPOC:0.1118mg/L	
76	Unknown	NPOC	HS21101083-11DF10		10_25_2021	1.000	NPOC:0.1718mg/L	
77	Unknown	NPOC	HS21101083-12DF10		10_25_2021	1.000	NPOC:0.1978mg/L	
78	Unknown	NPOC	HS21101083-13DF10		10_25_2021	1.000	NPOC:0.2415mg/L	
79	Unknown	NPOC	HS21101083-14DF10		10_25_2021	1.000	NPOC:0.2981mg/L	
80	Unknown	NPOC	CCV	317195504	10_25_2021	1.000	NPOC:25.57mg/L	
81	Unknown	NPOC	CCB		10_25_2021	1.000	NPOC:0.1184mg/L	



	Status	Date / Time	Vial
1	Completed	10/25/2021 6:02:30	64
2	Completed	10/25/2021 6:13:46	65
3	Completed	10/25/2021 6:24:47	66
4	Completed	10/25/2021 8:13:11	1, 2, 3, 4, 5,
5	Completed	10/25/2021 8:29:06	1
6	Completed	10/25/2021 8:45:09	8
7	Completed	10/25/2021 9:01:04	1
8	Completed	10/25/2021 10:05:19	9
9	Completed	10/25/2021 10:21:02	10
10	Completed	10/25/2021 10:36:45	11
11	Completed	10/25/2021 10:52:59	12
12	Completed	10/25/2021 11:09:01	13
13	Completed	10/25/2021 11:24:44	14
14	Completed	10/25/2021 11:40:52	15
15	Completed	10/25/2021 11:56:35	16
16	Completed	10/26/2021 12:12:18	17
17	Completed	10/26/2021 12:28:01	18
18	Completed	10/26/2021 12:43:44	19
19	Completed	10/26/2021 12:59:27	20
20	Completed	10/26/2021 1:15:58	9
21	Completed	10/26/2021 1:31:41	10
22	Completed	10/26/2021 1:47:30	21
23	Completed	10/26/2021 2:03:13	22
24	Completed	10/26/2021 2:18:56	23
25	Completed	10/26/2021 2:34:39	24
26	Completed	10/26/2021 2:50:56	9
27	Completed	10/26/2021 3:06:39	10
28	Completed	10/26/2021 3:22:22	11
29	Completed	10/26/2021 3:38:27	12
30	Completed	10/26/2021 3:54:35	13
31	Completed	10/26/2021 4:10:25	25
32	Completed	10/26/2021 4:26:25	26
33	Completed	10/26/2021 4:42:08	27
34	Completed	10/26/2021 4:57:52	28
35	Completed	10/26/2021 5:13:36	29
36	Completed	10/26/2021 5:29:20	30
37	Completed	10/26/2021 5:45:04	31
38	Completed	10/26/2021 6:01:22	32
39	Completed	10/26/2021 6:17:06	33
40	Completed	10/26/2021 6:32:50	34
41	Completed	10/26/2021 6:48:35	35
42	Completed	10/26/2021 7:04:19	36
43	Completed	10/26/2021 7:20:02	37
44	Completed	10/26/2021 7:36:27	32
45	Completed	10/26/2021 7:52:11	33
46	Completed	10/26/2021 8:07:55	11
47	Completed	10/26/2021 8:23:52	12
48	Completed	10/26/2021 8:39:51	13
49	Completed	10/26/2021 8:55:33	38
50	Completed	10/26/2021 9:11:37	39
51	Completed	10/26/2021 9:27:20	40



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	Status	Date / Time	Vial
52	Completed	10/26/2021 9:43:06	41
53	Completed	10/26/2021 9:58:51	42
54	Completed	10/26/2021 10:14:35	43
55	Completed	10/26/2021 10:30:21	44
56	Completed	10/26/2021 10:46:46	32
57	Completed	10/26/2021 11:02:30	33
58	Completed	10/26/2021 11:18:23	45
59	Completed	10/26/2021 11:34:07	46
60	Completed	10/26/2021 11:49:51	47
61	Completed	10/26/2021 12:05:36	48
62	Completed	10/26/2021 12:21:57	49
63	Completed	10/26/2021 12:37:42	50
64	Completed	10/26/2021 12:53:28	11
65	Completed	10/26/2021 1:09:27	12
66	Completed	10/26/2021 1:25:38	13
67	Completed	10/26/2021 1:41:34	51
68	Completed	10/26/2021 1:57:34	52
69	Completed	10/26/2021 2:13:19	53
70	Completed	10/26/2021 2:29:04	54
71	Completed	10/26/2021 2:44:49	55
72	Completed	10/26/2021 3:00:34	56
73	Completed	10/26/2021 3:16:19	57
74	Completed	10/26/2021 3:32:39	49
75	Completed	10/26/2021 3:48:24	50
76	Completed	10/26/2021 4:04:17	58
77	Completed	10/26/2021 4:20:02	59
78	Completed	10/26/2021 4:35:47	60
79	Completed	10/26/2021 4:51:32	61
80	Completed	10/26/2021 5:07:56	49
81	Completed	10/26/2021 5:23:41	50



# TOC-Control L Report

2021\_10\_25\_002.tlx

## Instr. Information

Instrument Options  
Catalyst

TOC/ASI/IC Unit/  
Regular Sensitivity

## Cal. Curve

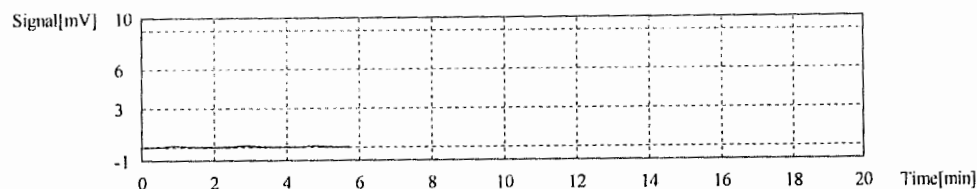
Sample Name: CAL  
Sample ID: 10\_25\_2021\_CAL.2021\_10\_25\_18\_24\_47.cal  
Cal. Curve: Completed  
Status:

Type	Anal.
Standard	NPOC

Conc: 0.000mg/L

No.	Area	Inj. Vol.	Aut. Dil.	Rem.	Ex.	Date / Time
1	0.1779	50uL	1.000	*****		10/25/2021 6:33:22 PM
2	0.000	50uL	1.000	*****		10/25/2021 6:36:36 PM
3	0.000	50uL	1.000	*****		10/25/2021 6:39:50 PM

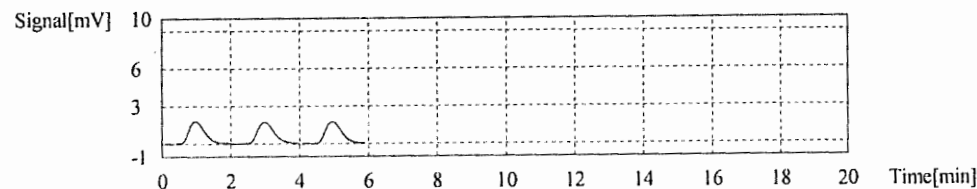
Acid Add. 1.500%  
Spurge Gas Flow 80mL/min  
Sp. Time 120.0sec  
Mean Area 0.05930



Conc: 1.000mg/L

No.	Area	Inj. Vol.	Aut. Dil.	Rem.	Ex.	Date / Time
1	5.679	50uL	1.000	*****		10/25/2021 6:48:38 PM
2	5.762	50uL	1.000	*****		10/25/2021 6:51:52 PM
3	5.629	50uL	1.000	*****		10/25/2021 6:55:02 PM

Acid Add. 1.500%  
Spurge Gas Flow 80mL/min  
Sp. Time 120.0sec  
Mean Area 5.690



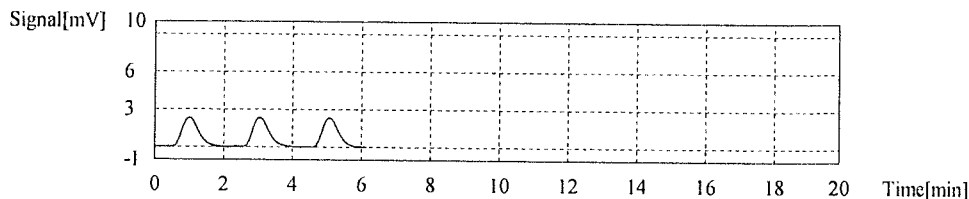
Conc: 2.000mg/L

No.	Area	Inj. Vol.	Aut. Dil.	Rem.	Ex.	Date / Time
1	7.704	50uL	1.000	*****		10/25/2021 7:03:55 PM
2	7.453	50uL	1.000	*****		10/25/2021 7:07:06 PM
3	7.508	50uL	1.000	*****		10/25/2021 7:10:22 PM

# TOC-Control L Report

2021\_10\_25\_002.tif

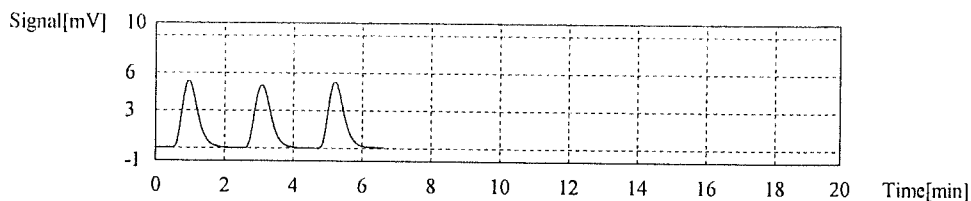
Acid Add. 1.500%  
 Spurge Gas Flow 80mL/min  
 Sp. Time 120.0sec  
 Mean Area 7.555



Conc: 5.000mg/L

No.	Area	Inj. Vol.	Aut. Dil.	Rem.	Ex.	Date / Time
1	16.62	50uL	1.000	*****		10/25/2021 7:19:15 PM
2	16.58	50uL	1.000	*****		10/25/2021 7:22:33 PM
3	16.79	50uL	1.000	*****		10/25/2021 7:26:01 PM

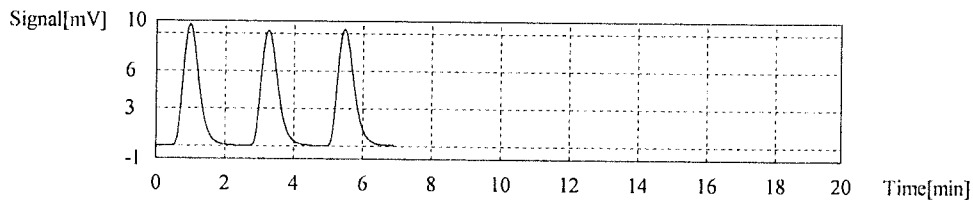
Acid Add. 1.500%  
 Spurge Gas Flow 80mL/min  
 Sp. Time 120.0sec  
 Mean Area 16.66



Conc: 10.00mg/L

No.	Area	Inj. Vol.	Aut. Dil.	Rem.	Ex.	Date / Time
1	30.96	50uL	1.000	*****		10/25/2021 7:35:05 PM
2	31.10	50uL	1.000	*****		10/25/2021 7:38:17 PM
3	31.16	50uL	1.000	*****		10/25/2021 7:41:41 PM

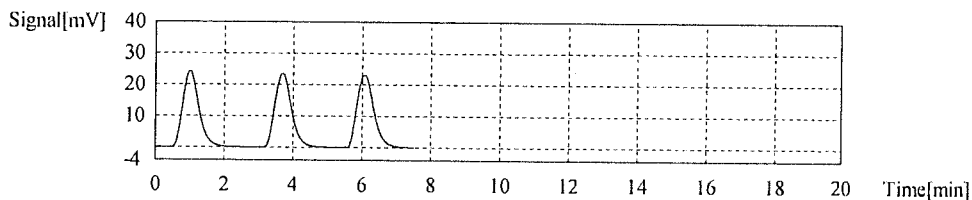
Acid Add. 1.500%  
 Spurge Gas Flow 80mL/min  
 Sp. Time 120.0sec  
 Mean Area 31.07



Conc: 25.00mg/L

No.	Area	Inj. Vol.	Aut. Dil.	Rem.	Ex.	Date / Time
1	79.10	50uL	1.000	*****		10/25/2021 7:51:09 PM
2	79.56	50uL	1.000	*****		10/25/2021 7:54:09 PM
3	79.35	50uL	1.000	*****		10/25/2021 7:57:24 PM

Acid Add. 1.500%  
 Spurge Gas Flow 80mL/min  
 Sp. Time 120.0sec  
 Mean Area 79.44



Conc: 50.00mg/L

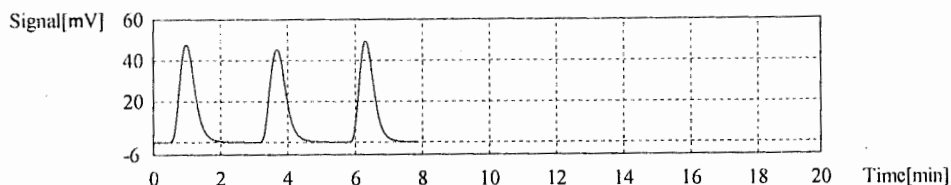


# TOC-Control L Report

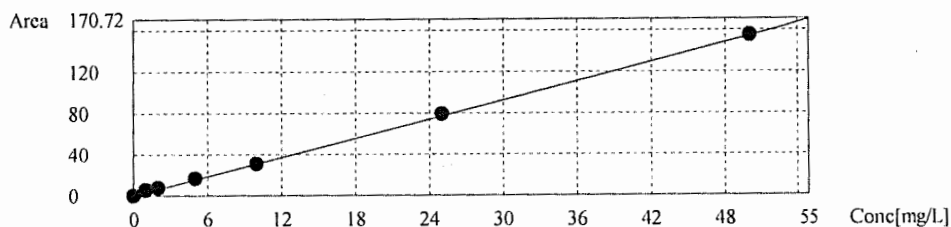
2021\_10\_25\_002.tlx

No.	Area	Inj. Vol.	Aut. Dil.	Rem.	Ex.	Date / Time
1	156.1	50ul	1.000	*****		10/25/2021 8:06:53 PM
2	154.0	50ul	1.000	*****		10/25/2021 8:10:05 PM
3	155.5	50ul	1.000	*****		10/25/2021 8:13:11 PM

Acid Add. 1.500%  
 Spurge Gas Flow 80mL/min  
 Sp. Time 120.0sec  
 Mean Area 155.2



Slope: 3.086  
 Intercept: 0.000  
 $r^2$ : 0.9997  
 $r$ : 0.9999  
 RSE(%): N/A  
 Zero Shift: Yes



## Sample

Sample Name: ICV  
 Sample ID: 3100604423  
 Origin: 10\_25\_2021\_CAL.cal  
 Status: Completed  
 Chk. Result

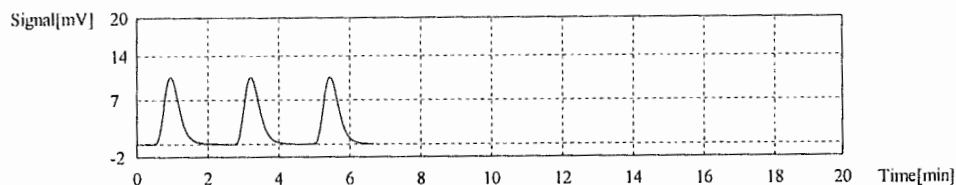
Type	Anal.	Manual Dilution	Result
Unknown	NPOC	1.000	NPOC: 10.60mg/L

1. Det

Anal.: NPOC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	32.74	10.61mg/L	50ul	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	10/25/2021 8:38:14 PM
2	32.74	10.61mg/L	50ul	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	10/25/2021 8:41:41 PM
3	32.67	10.59mg/L	50ul	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	10/25/2021 8:45:09 PM

Mean Area 32.72  
 Mean Conc. 10.60mg/L



## Sample



# TOC-Control L Report

2021\_10\_25\_002.ltx

Sample Name: ICB  
 Sample ID: 10\_25\_2021\_CAL.cal  
 Origin: Completed  
 Status: Completed  
 Chk. Result:

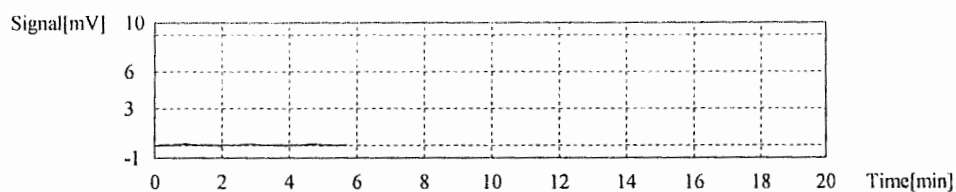
Type	Anal.	Manual Dilution	Result
Unknown	NPOC	1.000	NPOC: 0.05172mg/L

1. Det

Anal.: NPOC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	0.1343	0.04352mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	10/25/2021 8:54:04 PM
2	0.1944	0.06299mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	10/25/2021 8:57:34 PM
3	0.1502	0.04867mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	10/25/2021 9:01:04 PM

Mean Area 0.1596  
 Mean Conc. 0.05172mg/L



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	Type	Analysis	Sample Name	Sample ID	Origin	Manual Diluti	Result	Notes
1	Unknown	NPOC	CCB		10_25_2021	1.000	NPOC:0.3293mg/L	
2	Unknown	NPOC	CCB		10_25_2021	1.000	NPOC:0.3146mg/L	
3	Unknown	NPOC	CCB		10_25_2021	1.000	NPOC:0.2373mg/L	
4	Unknown	NPOC	CCB		10_25_2021	1.000	NPOC:0.2141mg/L	
5	Unknown	NPOC	CCV	317197001	10_25_2021	1.000	NPOC:24.57mg/L	
6	Unknown	NPOC	CCB		10_25_2021	1.000	NPOC:0.2515mg/L	
7	Unknown	NPOC	MBLK-11182021		10_25_2021	1.000	NPOC:0.2448mg/L	
8	Unknown	NPOC	LCS-11182021	3100604423	10_25_2021	1.000	NPOC:10.74mg/L	
9	Unknown	NPOC	LCSD-11182021	3100604423	10_25_2021	1.000	NPOC:10.82mg/L	
10	Unknown	NPOC	HS21110956-01DF10		10_25_2021	1.000	NPOC:0.2968mg/L	
11	Unknown	NPOC	HS21110956-01MSDF10		10_25_2021	1.000	NPOC:12.01mg/L	
12	Unknown	NPOC	HS21110956-02DF10		10_25_2021	1.000	NPOC:0.4360mg/L	
13	Unknown	NPOC	HS21110956-03DF10		10_25_2021	1.000	NPOC:0.3626mg/L	
14	Unknown	NPOC	HS21110956-04DF20		10_25_2021	1.000	NPOC:0.3809mg/L	
15	Unknown	NPOC	HS21110956-05DF10		10_25_2021	1.000	NPOC:0.6706mg/L	
16	Unknown	NPOC	HS21110956-06DF10		10_25_2021	1.000	NPOC:0.4764mg/L	
17	Unknown	NPOC	CCV	317197001	10_25_2021	1.000	NPOC:24.49mg/L	
18	Unknown	NPOC	CCB		10_25_2021	1.000	NPOC:0.2324mg/L	
19	Unknown	NPOC	HS21110956-07DF10		10_25_2021	1.000	NPOC:0.3862mg/L	
20	Unknown	NPOC	HS21110956-08DF10		10_25_2021	1.000	NPOC:0.2618mg/L	
21	Unknown	NPOC	HS21110956-09DF10		10_25_2021	1.000	NPOC:0.2560mg/L	
22	Unknown	NPOC	HS21110956-10DF10		10_25_2021	1.000	NPOC:0.2414mg/L	
23	Unknown	NPOC	CCV	317197001	10_25_2021	1.000	NPOC:24.51mg/L	
24	Unknown	NPOC	CCB		10_25_2021	1.000	NPOC:0.2611mg/L	
25	Unknown	NPOC	MBLK-11182021		10_25_2021	1.000	NPOC:0.2064mg/L	
26	Unknown	NPOC	LCS-11182021	3100604423	10_25_2021	1.000	NPOC:10.73mg/L	
27	Unknown	NPOC	LCSD-11182021	3100604423	10_25_2021	1.000	NPOC:10.72mg/L	
28	Unknown	NPOC	HS21110996-01DF10		10_25_2021	1.000	NPOC:13.78mg/L	
29	Unknown	NPOC	HS21110998-01DF10		10_25_2021	1.000	NPOC:11.34mg/L	
30	Unknown	NPOC	HS21110999-01DF2		10_25_2021	1.000	NPOC:22.92mg/L	
31	Unknown	NPOC	HS21110549-04DF10		10_25_2021	1.000	NPOC:6.081mg/L	
32	Unknown	NPOC	HS21110549-05		10_25_2021	1.000	NPOC:3.522mg/L	
33	Unknown	NPOC	HS21110549-05MS		10_25_2021	1.000	NPOC:14.94mg/L	
34	Unknown	NPOC	HS21111024-01DF20		10_25_2021	1.000	NPOC:2.040mg/L	
35	Unknown	NPOC	CCV	317197001	10_25_2021	1.000	NPOC:24.41mg/L	
36	Unknown	NPOC	CCB		10_25_2021	1.000	NPOC:0.2321mg/L	
37	Unknown	NPOC	HS21111041-01		10_25_2021	1.000	NPOC:9.049mg/L	
38	Unknown	NPOC	HS21111044-01		10_25_2021	1.000	NPOC:12.24mg/L	
39	Unknown	NPOC	HS21111046-01		10_25_2021	1.000	NPOC:11.83mg/L	
40	Unknown	NPOC	HS211110626-01		10_25_2021	1.000	NPOC:4.730mg/L	
41	Unknown	NPOC	CCV	317197001	10_25_2021	1.000	NPOC:24.27mg/L	
42	Unknown	NPOC	CCB		10_25_2021	1.000	NPOC:0.2960mg/L	
43	Unknown	NPOC	MBLK-11182021		10_25_2021	1.000	NPOC:0.2312mg/L	
44	Unknown	NPOC	LCS-11182021	3100604423	10_25_2021	1.000	NPOC:10.75mg/L	
45	Unknown	NPOC	LCSD-11182021	3100604423	10_25_2021	1.000	NPOC:10.70mg/L	
46	Unknown	NPOC	HS211110626-02DF5		10_25_2021	1.000	NPOC:10.88mg/L	
47	Unknown	NPOC	HS211110626-03		10_25_2021	1.000	NPOC:3.219mg/L	
48	Unknown	NPOC	HS211110721-01		10_25_2021	1.000	NPOC:1.227mg/L	
49	Unknown	NPOC	HS211110813-13		10_25_2021	1.000	NPOC:4.709mg/L	
50	Unknown	NPOC	HS211110813-13MS		10_25_2021	1.000	NPOC:16.59mg/L	
51	Unknown	NPOC	HS211110813-15		10_25_2021	1.000	NPOC:3.995mg/L	



C:\TOC-L\Data\2021\_11\_18\_001.tlx

	Type	Analysis	Sample Name	Sample ID	Origin	Manual Diluti	Result	Notes
52	Unknown	NPOC	HS21110813-16		10_25_2021	1.000	NPOC:4.606mg/L	
53	Unknown	NPOC	CCV	317197001	10_25_2021	1.000	NPOC:24.67mg/L	
54	Unknown	NPOC	CCB		10_25_2021	1.000	NPOC:0.3170mg/L	
55	Unknown	NPOC	HS21110831-01		10_25_2021	1.000	NPOC:11.78mg/L	
56	Unknown	NPOC	HS21110831-02		10_25_2021	1.000	NPOC:9.752mg/L	
57	Unknown	NPOC	HS21110831-03		10_25_2021	1.000	NPOC:9.442mg/L	
58	Unknown	NPOC	HS21110831-04		10_25_2021	1.000	NPOC:9.542mg/L	
59	Unknown	NPOC	CCV	317197001	10_25_2021	1.000	NPOC:24.65mg/L	
60	Unknown	NPOC	CCB		10_25_2021	1.000	NPOC:0.3577mg/L	

	Status	Date / Time	Vial
1	Completed	11/18/2021 5:44:44	43
2	Completed	11/18/2021 6:00:28	44
3	Completed	11/18/2021 6:16:27	43
4	Completed	11/18/2021 6:32:11	44
5	Completed	11/18/2021 7:23:27	1
6	Completed	11/18/2021 7:39:09	2
7	Completed	11/18/2021 7:54:52	3
8	Completed	11/18/2021 9:13:47	4
9	Completed	11/18/2021 9:29:50	5
10	Completed	11/18/2021 9:45:33	6
11	Completed	11/18/2021 10:01:37	7
12	Completed	11/18/2021 10:17:21	8
13	Completed	11/18/2021 10:33:05	9
14	Completed	11/18/2021 10:48:48	10
15	Completed	11/18/2021 11:04:31	11
16	Completed	11/18/2021 11:20:14	12
17	Completed	11/18/2021 11:52:31	1
18	Completed	11/19/2021 12:08:14	2
19	Completed	11/19/2021 12:24:03	13
20	Completed	11/19/2021 12:39:46	14
21	Completed	11/19/2021 12:55:29	15
22	Completed	11/19/2021 1:11:12	16
23	Completed	11/19/2021 1:43:22	1
24	Completed	11/19/2021 1:59:05	2
25	Completed	11/19/2021 2:14:48	3
26	Completed	11/19/2021 2:30:57	4
27	Completed	11/19/2021 2:47:10	5
28	Completed	11/19/2021 3:03:18	17
29	Completed	11/19/2021 3:19:19	18
30	Completed	11/19/2021 3:35:30	19
31	Completed	11/19/2021 3:51:28	20
32	Completed	11/19/2021 4:07:18	21
33	Completed	11/19/2021 4:23:40	22
34	Completed	11/19/2021 4:39:28	23
35	Completed	11/19/2021 5:11:43	24
36	Completed	11/19/2021 5:27:26	25
37	Completed	11/19/2021 5:43:23	26
38	Completed	11/19/2021 5:59:31	27
39	Completed	11/19/2021 6:15:39	28
40	Completed	11/19/2021 6:31:48	29
41	Completed	11/19/2021 7:03:57	24
42	Completed	11/19/2021 7:19:40	25
43	Completed	11/19/2021 7:35:25	3
44	Completed	11/19/2021 7:51:30	4
45	Completed	11/19/2021 8:07:36	5
46	Completed	11/19/2021 8:24:00	30
47	Completed	11/19/2021 8:40:03	31
48	Completed	11/19/2021 8:55:56	32
49	Completed	11/19/2021 9:11:47	33
50	Completed	11/19/2021 9:27:59	34
51	Completed	11/19/2021 9:43:52	35

	Status	Date / Time	Vial
52	Completed	11/19/2021 9:59:44	36
53	Completed	11/19/2021 10:32:02	24
54	Completed	11/19/2021 10:47:44	25
55	Completed	11/19/2021 11:04:07	37
56	Completed	11/19/2021 11:20:09	38
57	Completed	11/19/2021 11:36:23	39
58	Completed	11/19/2021 11:52:31	40
59	Completed	11/19/2021 12:24:32	24
60	Completed	11/19/2021 12:40:15	25



# TOC-Control L Report

2021\_11\_18\_001.tlx

## Instr. Information

Instrument Options  
Catalyst

TOC/ASI/IC Unit/  
Regular Sensitivity

## Sample

Sample Name: CCV  
Sample ID: 317197001  
Origin: 10\_25\_2021\_CAL.cal  
Status: Completed  
Chk. Result

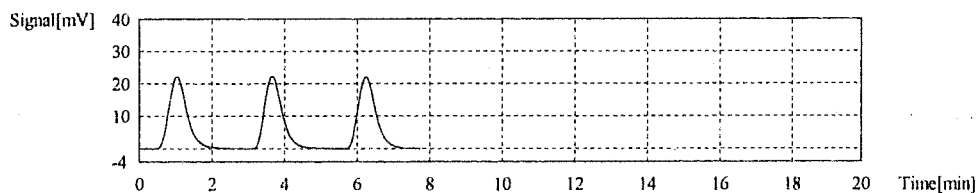
Type	Anal.	Manual Dilution	Result
Unknown	NPOC	1.000	NPOC: 24.51mg/L

1. Det

Anal.: NPOC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	75.98	24.62mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/19/2021 1:36:29 AM
2	75.69	24.52mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/19/2021 1:39:53 AM
3	75.22	24.37mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/19/2021 1:43:22 AM

Mean Area: 75.63  
Mean Conc.: 24.51mg/L



## Sample

Sample Name: CCB  
Sample ID: 317197001  
Origin: 10\_25\_2021\_CAL.cal  
Status: Completed  
Chk. Result

Type	Anal.	Manual Dilution	Result
Unknown	NPOC	1.000	NPOC: 0.2611mg/L

1. Det

Anal.: NPOC

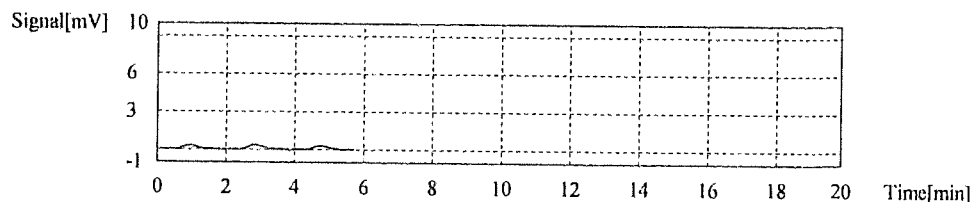
No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	0.7621	0.2469mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/19/2021 1:52:05 AM
2	0.8684	0.2814mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/19/2021 1:55:35 AM
3	0.7869	0.2550mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/19/2021 1:59:05 AM



# TOC-Control L Report

2021\_11\_18\_001.tlx

Mean Area 0.8058  
Mean Conc. 0.2611mg/L



## Sample

Sample Name: MBLK-11182021  
Sample ID:  
Origin: 10\_25\_2021\_CAL.cal  
Status: Completed  
Chk. Result

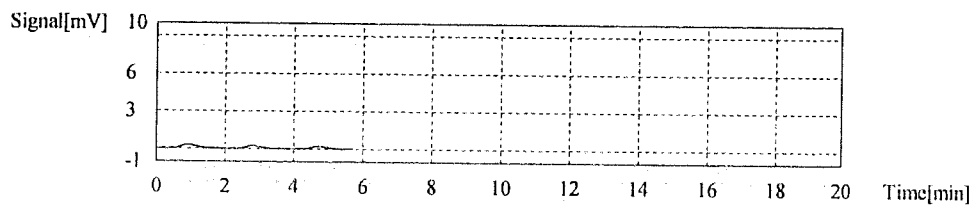
Type	Anal.	Manual Dilution	Result
Unknown	NPOC	1.000	NPOC:0.2064mg/L

1. Det

Anal.: NPOC

No.	Area	Conc.	Inj. Vol	Aut. Dil	Ex	Cal Curve	Date / Time
1	0.6907	0.2238mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/19/2021 2:07:48 AM
2	0.6051	0.1961mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/19/2021 2:11:18 AM
3	0.6152	0.1993mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/19/2021 2:14:48 AM

Mean Area 0.6370  
Mean Conc. 0.2064mg/L



## Sample

Sample Name: LCS-11182021  
Sample ID: 3100604423  
Origin: 10\_25\_2021\_CAL.cal  
Status: Completed  
Chk. Result

Type	Anal.	Manual Dilution	Result
Unknown	NPOC	1.000	NPOC:10.73mg/L

1. Det

Anal.: NPOC

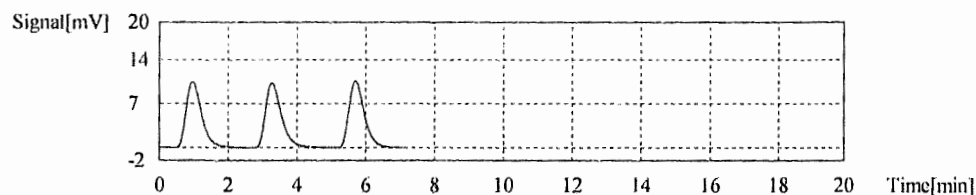


# TOC-Control L Report

2021\_11\_18\_001.tlx

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	32.94	10.67mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/19/2021 2:23:56 AM
2	33.06	10.71mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/19/2021 2:27:32 AM
3	33.33	10.80mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/19/2021 2:30:57 AM

Mean Area 33.11  
Mean Conc. 10.73mg/L



## Sample

Sample Name: I.CSID-11182021  
Sample ID: 3100604423  
Origin: 10\_25\_2021\_CAL.cal  
Status: Completed  
Chk. Result

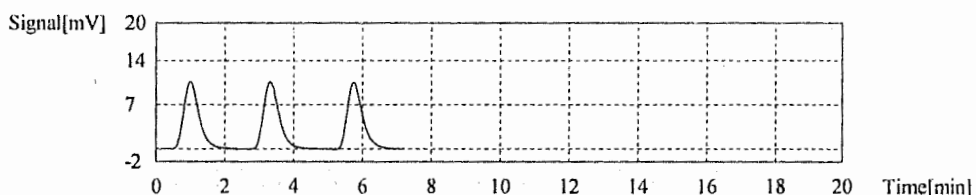
Type	Anal.	Manual Dilution	Result
Unknown	NPOC	1.000	NPOC:10.72mg/L

1. Det

Anal.: NPOC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	32.85	10.64mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/19/2021 2:40:05 AM
2	33.15	10.74mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/19/2021 2:43:44 AM
3	33.27	10.78mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/19/2021 2:47:10 AM

Mean Area 33.09  
Mean Conc. 10.72mg/L



## Sample

Sample Name: HS21110549-05  
Sample ID:  
Origin: 10\_25\_2021\_CAL.cal  
Status: Completed  
Chk. Result

Type	Anal.	Manual Dilution	Result
Unknown	NPOC	1.000	NPOC:3.522mg/L

1. Det





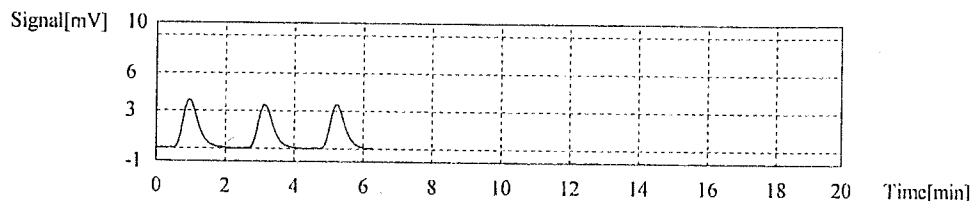
# TOC-Control L Report

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Anal.: NPOC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	11.65	3.775mg/L	50ul	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/19/2021 4:00:26 AM
2	10.60	3.435mg/L	50ul	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/19/2021 4:03:53 AM
3	10.36	3.357mg/L	50ul	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/19/2021 4:07:18 AM

Mean Area 10.87  
Mean Conc. 3.522mg/L



## Sample

Sample Name: HS21110549-05MS  
Sample ID:  
Origin: 10\_25\_2021\_CAL.cal  
Status: Completed  
Chk. Result

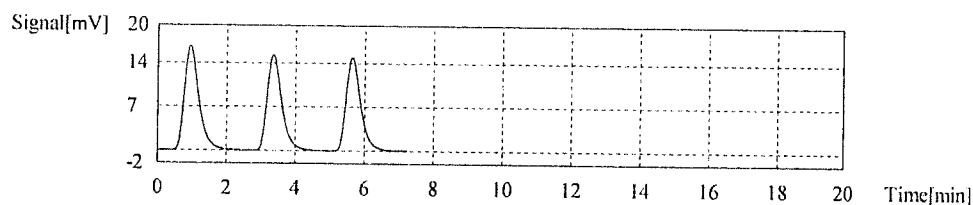
Type	Anal.	Manual Dilution	Result
Unknown	NPOC	1.000	NPOC:14.94mg/L

1. Det

Anal.: NPOC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	49.16	15.93mg/L	50ul	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/19/2021 4:16:30 AM
2	45.35	14.69mg/L	50ul	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/19/2021 4:19:55 AM
3	43.84	14.20mg/L	50ul	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/19/2021 4:23:40 AM

Mean Area 46.12  
Mean Conc. 14.94mg/L



## Sample

Sample Name: CCV  
Sample ID: 317197001  
Origin: 10\_25\_2021\_CAL.cal  
Status: Completed  
Chk. Result

Type	Anal.	Manual Dilution	Result
Unknown	NPOC	1.000	NPOC:24.41mg/L



# TOC-Control L Report

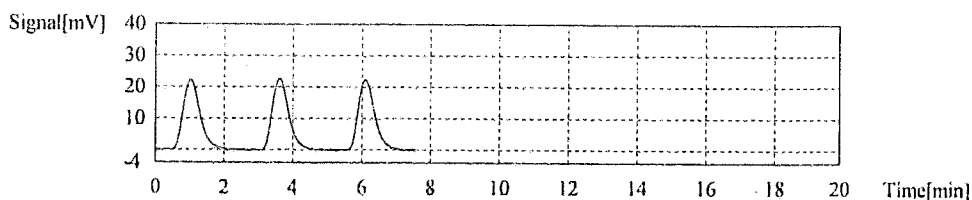
2021\_11\_18\_001.tlx

1. Det

Anal.: NPOC

No.	Area	Conc	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	75.71	24.53mg/L	50ul	1.000		10_25_2021_CAL_2021_10_25_18_24_47.cal	11/19/2021 5:04:52 AM
2	75.33	24.41mg/L	50ul	1.000		10_25_2021_CAL_2021_10_25_18_24_47.cal	11/19/2021 5:08:16 AM
3	74.94	24.28mg/L	50ul	1.000		10_25_2021_CAL_2021_10_25_18_24_47.cal	11/19/2021 5:11:43 AM

Mean Area 75.33  
Mean Conc. 24.41mg/L



## Sample

Sample Name: CCB  
Sample ID:  
Origin: 10\_25\_2021\_CAL.cal  
Status: Completed  
Chk. Result

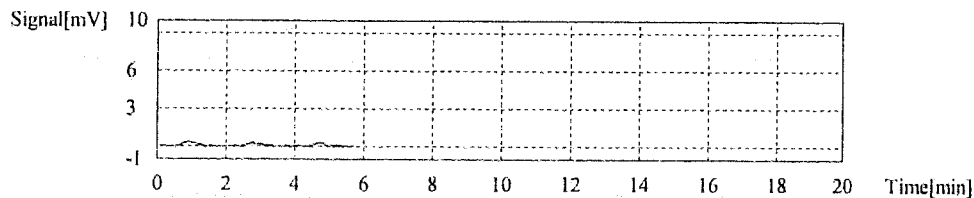
Type	Anal.	Manual Dilution	Result
Unknown	NPOC	1.000	NPOC:0.2321mg/L

1. Det

Anal.: NPOC

No.	Area	Conc	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	0.8013	0.2596mg/L	50ul	1.000		10_25_2021_CAL_2021_10_25_18_24_47.cal	11/19/2021 5:20:26 AM
2	0.6873	0.2227mg/L	50ul	1.000		10_25_2021_CAL_2021_10_25_18_24_47.cal	11/19/2021 5:23:56 AM
3	0.6602	0.2139mg/L	50ul	1.000		10_25_2021_CAL_2021_10_25_18_24_47.cal	11/19/2021 5:27:26 AM

Mean Area 0.7163  
Mean Conc. 0.2321mg/L



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	Type	Analysis	Sample Name	Sample ID	Origin	Manual Diluti	Result	Notes
1	Unknown	NPOC	CCV	317196509	10_25_2021	1.000	NPOC:25.39mg/L	
2	Unknown	NPOC	CCB		10_25_2021	1.000	NPOC:0.1907mg/L	
3	Unknown	NPOC	MBLK-11152021		10_25_2021	1.000	NPOC:0.1718mg/L	
4	Unknown	NPOC	LCS-11152021	3100604423	10_25_2021	1.000	NPOC:10.64mg/L	
5	Unknown	NPOC	LCSD-11152021	3100604423	10_25_2021	1.000	NPOC:10.51mg/L	
6	Unknown	NPOC	HS21110474-04DF10		10_25_2021	1.000	NPOC:0.1928mg/L	
7	Unknown	NPOC	HS21110474-04MSDF10		10_25_2021	1.000	NPOC:11.27mg/L	
8	Unknown	NPOC	HS21110474-05DF10		10_25_2021	1.000	NPOC:0.000mg/L	
9	Unknown	NPOC	HS21110474-06DF10		10_25_2021	1.000	NPOC:0.3213mg/L	
10	Unknown	NPOC	HS21110474-07DF10		10_25_2021	1.000	NPOC:0.3486mg/L	
11	Unknown	NPOC	HS21110474-09DF10		10_25_2021	1.000	NPOC:0.2898mg/L	
12	Unknown	NPOC	HS21110474-10DF10		10_25_2021	1.000	NPOC:0.000mg/L	
13	Unknown	NPOC	CCV	317196509	10_25_2021	1.000	NPOC:24.90mg/L	
14	Unknown	NPOC	CCB		10_25_2021	1.000	NPOC:0.2175mg/L	
15	Unknown	NPOC	HS21110474-11DF10		10_25_2021	1.000	NPOC:0.2883mg/L	
16	Unknown	NPOC	HS21110474-12DF10		10_25_2021	1.000	NPOC:0.3302mg/L	
17	Unknown	NPOC	HS21110474-13DF10		10_25_2021	1.000	NPOC:0.1838mg/L	
18	Unknown	NPOC	HS21110474-14DF10		10_25_2021	1.000	NPOC:0.5258mg/L	
19	Unknown	NPOC	CCV	317196509	10_25_2021	1.000	NPOC:24.81mg/L	
20	Unknown	NPOC	CCB		10_25_2021	1.000	NPOC:0.1987mg/L	
21	Unknown	NPOC	MBLK-11152021		10_25_2021	1.000	NPOC:0.1523mg/L	
22	Unknown	NPOC	LCS-11152021	3100604423	10_25_2021	1.000	NPOC:10.59mg/L	
23	Unknown	NPOC	LCSD-11152021	3100604423	10_25_2021	1.000	NPOC:10.62mg/L	
24	Unknown	NPOC	HS21110762-01		10_25_2021	1.000	NPOC:5.702mg/L	
25	Unknown	NPOC	HS21110762-02		10_25_2021	1.000	NPOC:12.50mg/L	
26	Unknown	NPOC	HS21110762-03DF10		10_25_2021	1.000	NPOC:6.177mg/L	
27	Unknown	NPOC	HS21110762-04		10_25_2021	1.000	NPOC:44.66mg/L	
28	Unknown	NPOC	HS21110762-05		10_25_2021	1.000	NPOC:56.44mg/L	
29	Unknown	NPOC	HS21110762-06		10_25_2021	1.000	NPOC:19.49mg/L	
30	Unknown	NPOC	HS21110762-07DF10		10_25_2021	1.000	NPOC:36.77mg/L	
31	Unknown	NPOC	CCV	317196509	10_25_2021	1.000	NPOC:25.25mg/L	
32	Unknown	NPOC	CCB		10_25_2021	1.000	NPOC:0.04765mg/L	
33	Unknown	NPOC	HS21110521-01		10_25_2021	1.000	NPOC:0.000mg/L	
34	Unknown	NPOC	HS21110521-01MS		10_25_2021	1.000	NPOC:206.6mg/L	
35	Unknown	NPOC	HS21110521-02		10_25_2021	1.000	NPOC:2.037mg/L	
36	Unknown	NPOC	HS21110521-03		10_25_2021	1.000	NPOC:1.543mg/L	
37	Unknown	NPOC	CCV	317196509	10_25_2021	1.000	NPOC:25.21mg/L	
38	Unknown	NPOC	CCB		10_25_2021	1.000	NPOC:0.2130mg/L	
39	Unknown	NPOC	MBLK-11152021		10_25_2021	1.000	NPOC:0.2032mg/L	
40	Unknown	NPOC	LCS-11152021	3100604423	10_25_2021	1.000	NPOC:10.67mg/L	
41	Unknown	NPOC	LCSD-11152021	3100604423	10_25_2021	1.000	NPOC:10.63mg/L	
42	Unknown	NPOC	HS21110521-04		10_25_2021	1.000	NPOC:0.7102mg/L	
43	Unknown	NPOC	HS21110521-04MS		10_25_2021	1.000	NPOC:11.52mg/L	
44	Unknown	NPOC	HS21110522-01		10_25_2021	1.000	NPOC:261.8mg/L	
45	Unknown	NPOC	HS21110522-02		10_25_2021	1.000	NPOC:99.60mg/L	
46	Unknown	NPOC	HS21110788-01		10_25_2021	1.000	NPOC:13.04mg/L	
47	Unknown	NPOC	HS21110838-01		10_25_2021	1.000	NPOC:9.674mg/L	
48	Unknown	NPOC	HS21110900-01		10_25_2021	1.000	NPOC:9.851mg/L	
49	Unknown	NPOC	CCV	317196509	10_25_2021	1.000	NPOC:25.44mg/L	
50	Unknown	NPOC	CCB		10_25_2021	1.000	NPOC:0.2939mg/L	
51	Unknown	NPOC	HS21110901-01		10_25_2021	1.000	NPOC:11.73mg/L	





C:\TOC-L\Data\2021\_11\_15\_001.tlx

	Type	Analysis	Sample Name	Sample ID	Origin	Manual Diluti	Result	Notes
52	Unknown	NPOC	HS21110549-01		10_25_2021	1.000	NPOC:12.13mg/L	
53	Unknown	NPOC	HS21110549-02		10_25_2021	1.000	NPOC:15.27mg/L	
54	Unknown	NPOC	HS21110549-03		10_25_2021	1.000	NPOC:6.291mg/L	
55	Unknown	NPOC	CCV	317196509	10_25_2021	1.000	NPOC:25.61mg/L	
56	Unknown	NPOC	CCB		10_25_2021	1.000	NPOC:0.3588mg/L	
57	Unknown	NPOC	CCV	317196509	TOC_W 906	1.000	NPOC:24.84mg/L	
58	Unknown	NPOC	CCB		TOC_W 906	1.000	NPOC:0.2215mg/L	
59	Unknown	NPOC	MBLK-11152021		TOC_W 906	1.000	NPOC:0.1559mg/L	
60	Unknown	NPOC	LCS-11152021	3100604423	TOC_W 906	1.000	NPOC:10.44mg/L	
61	Unknown	NPOC	LCSD-11152021	3100604423	TOC_W 906	1.000	NPOC:10.60mg/L	
62	Unknown	NPOC	HS21110161-07DF40		TOC_W 906	1.000	NPOC:34.48mg/L	
63	Unknown	NPOC	HS21110161-08DF10		TOC_W 906	1.000	NPOC:16.48mg/L	
64	Unknown	NPOC	HS21110161-08MSDF10		TOC_W 906	1.000	NPOC:26.42mg/L	
65	Unknown	NPOC	CCV	317196509	TOC_W 906	1.000	NPOC:24.71mg/L	
66	Unknown	NPOC	CCB		TOC_W 906	1.000	NPOC:0.1906mg/L	
67	Unknown	NPOC	HS21110474-05DF10		10_25_2021	1.000	NPOC:0.4740mg/L	
68	Unknown	NPOC	HS21110474-10DF10		10_25_2021	1.000	NPOC:0.5037mg/L	
69	Unknown	NPOC	HS21110521-01		10_25_2021	1.000	NPOC:6.923mg/L	
70	Unknown	NPOC	HS21110521-01MS		10_25_2021	1.000	NPOC:17.23mg/L	
71	Unknown	NPOC	CCV	317196509	10_25_2021	1.000	NPOC:25.12mg/L	
72	Unknown	NPOC	CCB		10_25_2021	1.000	NPOC:0.2650mg/L	

C:\TOC-L\lData\2021\_11\_15\_001.tlx

	Status	Date / Time	Vial
1	Completed	11/15/2021 5:54:34	1
2	Completed	11/15/2021 6:10:17	2
3	Completed	11/15/2021 6:25:59	3
4	Completed	11/15/2021 6:42:10	4
5	Completed	11/15/2021 6:58:12	5
6	Completed	11/15/2021 7:13:55	6
7	Completed	11/15/2021 7:29:53	7
8	Completed	11/15/2021 7:45:36	8
9	Completed	11/15/2021 8:01:13	9
10	Completed	11/15/2021 8:16:56	10
11	Completed	11/15/2021 8:32:39	11
12	Completed	11/15/2021 8:48:22	12
13	Completed	11/15/2021 9:20:17	1
14	Completed	11/15/2021 9:36:00	2
15	Completed	11/15/2021 9:52:05	13
16	Completed	11/15/2021 10:07:47	14
17	Completed	11/15/2021 10:23:30	15
18	Completed	11/15/2021 10:39:12	16
19	Completed	11/15/2021 11:11:10	1
20	Completed	11/15/2021 11:26:53	2
21	Completed	11/15/2021 11:42:36	3
22	Completed	11/15/2021 11:58:38	4
23	Completed	11/16/2021 12:14:40	5
24	Completed	11/16/2021 12:30:43	17
25	Completed	11/16/2021 12:46:44	18
26	Completed	11/16/2021 1:02:41	19
27	Completed	11/16/2021 1:19:03	20
28	Completed	11/16/2021 1:35:18	21
29	Completed	11/16/2021 1:51:31	22
30	Completed	11/16/2021 2:07:42	23
31	Completed	11/16/2021 2:39:56	24
32	Completed	11/16/2021 2:55:39	25
33	Completed	11/16/2021 3:11:16	26
34	Completed	11/16/2021 3:27:50	27
35	Completed	11/16/2021 3:43:34	28
36	Completed	11/16/2021 3:59:18	29
37	Completed	11/16/2021 4:31:47	24
38	Completed	11/16/2021 4:47:30	25
39	Completed	11/16/2021 5:03:17	3
40	Completed	11/16/2021 5:19:18	4
41	Completed	11/16/2021 5:35:24	5
42	Completed	11/16/2021 5:51:24	30
43	Completed	11/16/2021 6:07:31	31
44	Completed	11/16/2021 6:24:10	32
45	Completed	11/16/2021 6:40:31	33
46	Completed	11/16/2021 6:56:38	34
47	Completed	11/16/2021 7:12:42	35
48	Completed	11/16/2021 7:28:47	36
49	Completed	11/16/2021 8:01:08	24
50	Completed	11/16/2021 8:16:51	25
51	Completed	11/16/2021 8:33:33	37



	Status	Date / Time	Vial
52	Completed	11/16/2021 8:49:38	38
53	Completed	11/16/2021 9:05:44	39
54	Completed	11/16/2021 9:21:33	40
55	Completed	11/16/2021 9:53:48	41
56	Completed	11/16/2021 10:09:32	42
57	Completed	11/16/2021 10:26:47	41
58	Completed	11/16/2021 10:41:13	42
59	Completed	11/16/2021 10:55:42	3
60	Completed	11/16/2021 11:11:30	4
61	Completed	11/16/2021 11:27:27	5
62	Completed	11/16/2021 11:43:33	43
63	Completed	11/16/2021 11:59:31	44
64	Completed	11/16/2021 12:18:45	45
65	Completed	11/16/2021 12:49:47	41
66	Completed	11/16/2021 1:04:16	42
67	Completed	11/16/2021 1:53:31	8
68	Completed	11/16/2021 2:09:15	12
69	Completed	11/16/2021 2:25:28	26
70	Completed	11/16/2021 3:22:33	27
71	Completed	11/16/2021 3:54:45	1
72	Completed	11/16/2021 4:10:28	2

# TOC-Control L Report

2021\_11\_15\_001.lnk

## Inst. Information

Instrument Options  
Catalyst

TOC/AS/IC Unit/  
Regular Sensitivity

## Sample

Sample Name: CCV  
Sample ID: 317196509  
Origin: 10\_25\_2021\_CAL.cal  
Status: Completed  
Chk. Result:

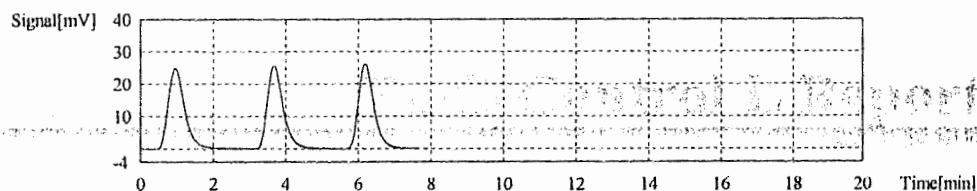
Type	Anal.	Manual Dilution	Result
Unknown	NPOC	1.000	NPOC:25.21mg/L

1. Det

Anal.: NPOC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	77.89	25.24mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 4:25:04 AM
2	77.96	25.26mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 4:28:19 AM
3	77.57	25.13mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 4:31:47 AM

Mean Area 77.81  
Mean Conc. 25.21mg/L



## Sample

Sample Name: CC3  
Sample ID: 10\_25\_2021\_CAL.cal  
Origin: Completed  
Status: Completed  
Chk. Result:

Type	Anal.	Manual Dilution	Result
Unknown	NPOC	1.000	NPOC:0.2130mg/L

1. Det

Anal.: NPOC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	0.8336	0.2701mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 4:40:30 AM
2	0.6319	0.2047mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 4:44:00 AM
3	0.5070	0.1643mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 4:47:30 AM

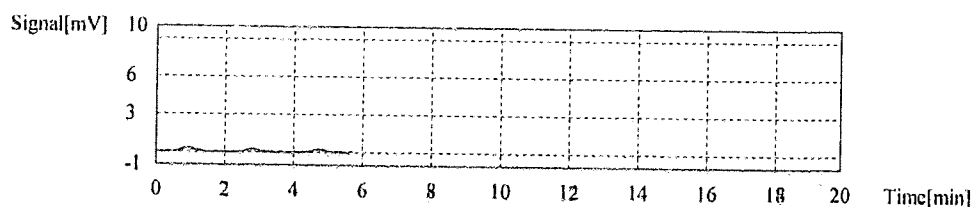




# TOC-Control L Report

2021\_11\_15\_001.tlx

Mean Area  
Mean Conc. 0.6575  
0.2130mg/L



## Sample

Sample Name: MBLK-11152021  
Sample ID:  
Origin: 10\_25\_2021\_CAL.cal  
Status: Completed  
Chk. Result

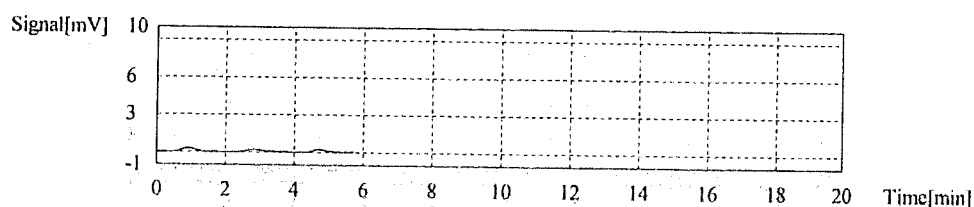
Type	Anal.	Manual Dilution	Result
Unknown	NPOC	1.000	NPOC:0.2032mg/L

1. Det

Anal.: NPOC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	0.7530	0.2440mg/L	50ul	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 4:56:17 AM
2	0.5983	0.1939mg/L	50ul	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 4:59:47 AM
3	0.5304	0.1719mg/L	50ul	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 5:03:17 AM

Mean Area  
Mean Conc. 0.6272  
0.2032mg/L



## Sample

Sample Name: LCS-11152021  
Sample ID: 3100604423  
Origin: 10\_25\_2021\_CAL.cal  
Status: Completed  
Chk. Result

Type	Anal.	Manual Dilution	Result
Unknown	NPOC	1.000	NPOC:10.67mg/L

1. Det

Anal.: NPOC

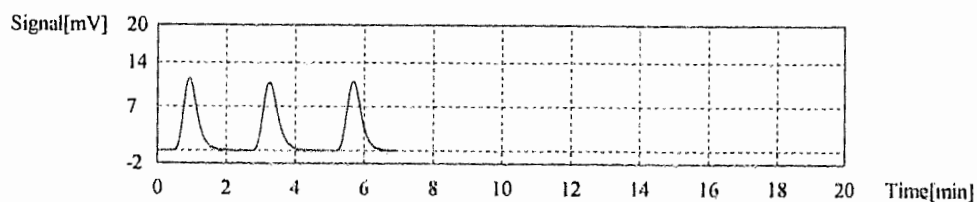


# TOC-Control L Report

2021\_11\_15\_001.lix

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	33.02	10.70mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 5:12:25 AM
2	33.04	10.71mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 5:16:00 AM
3	32.74	10.61mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 5:19:18 AM

Mean Area 32.93  
Mean Conc. 10.67mg/L



## Sample

Sample Name: LCSD-11152021  
Sample ID: 3100604423  
Origin: 10\_25\_2021\_CAL.cal  
Status: Completed  
Chk. Result

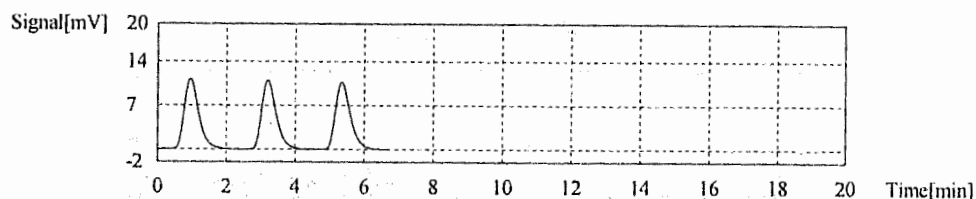
Type	Anal.	Manual Dilution	Result
Unknown	NPOC	1.000	NPOC:10.63mg/L

1. Det

Anal.: NPOC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	33.35	10.81mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 5:28:22 AM
2	32.49	10.53mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 5:31:46 AM
3	32.60	10.56mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 5:35:24 AM

Mean Area 32.81  
Mean Conc. 10.63mg/L



## Sample

Sample Name: HS21110521-04  
Sample ID:  
Origin: 10\_25\_2021\_CAL.cal  
Status: Completed  
Chk. Result

Type	Anal.	Manual Dilution	Result
Unknown	NPOC	1.000	NPOC:0.7102mg/L

1. Det



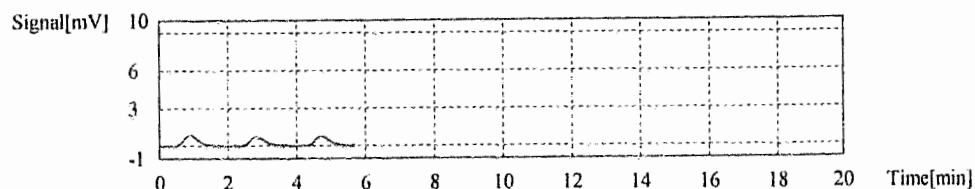
# TOC-Control L Report

2021\_11\_15\_001.tlx

Anal.: NPOC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	2.356	0.7634mg/L	50ul	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 5:44:24 AM
2	2.095	0.6788mg/L	50ul	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 5:47:54 AM
3	2.125	0.6885mg/L	50ul	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 5:51:24 AM

Mean Area 2.192  
Mean Conc. 0.7102mg/L



## Sample

Sample Name: HS21110521-04MS  
Sample ID:  
Origin: 10\_25\_2021\_CAL.cal  
Status: Completed  
Chk. Result

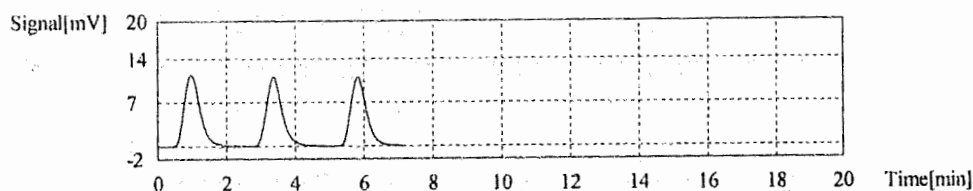
Type	Anal.	Manual Dilution	Result
Unknown	NPOC	1.000	NPOC:11.52mg/L

1. Det

Anal.: NPOC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	36.85	11.94mg/L	50ul	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 6:00:36 AM
2	35.13	11.38mg/L	50ul	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 6:04:14 AM
3	34.72	11.25mg/L	50ul	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 6:07:31 AM

Mean Area 35.57  
Mean Conc. 11.52mg/L



## Sample

Sample Name: HS21110549-01  
Sample ID:  
Origin: 10\_25\_2021\_CAL.cal  
Status: Completed  
Chk. Result

Type	Anal.	Manual Dilution	Result
Unknown	NPOC	1.000	NPOC:12.13mg/L



# TOC-Control L Report

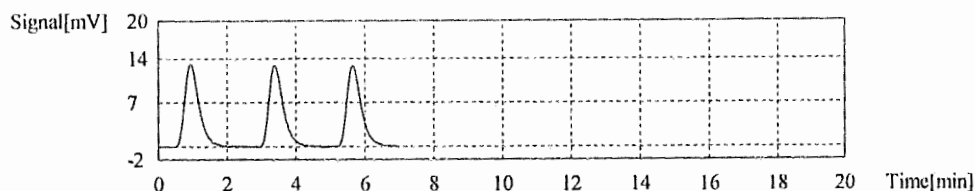
2021\_11\_15\_001.tlx

1. Det

Anal.: NPOC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	38.29	12.41mg/L	50ul	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 8:42:50 AM
2	36.97	11.98mg/L	50ul	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 8:46:09 AM
3	37.08	12.01mg/L	50ul	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 8:49:38 AM

Mean Area 37.45  
Mean Conc. 12.13mg/L



## Sample

Sample Name: HS21110549-02  
Sample ID:  
Origin: 10\_25\_2021\_CAL.cal  
Status: Completed  
Chk. Result

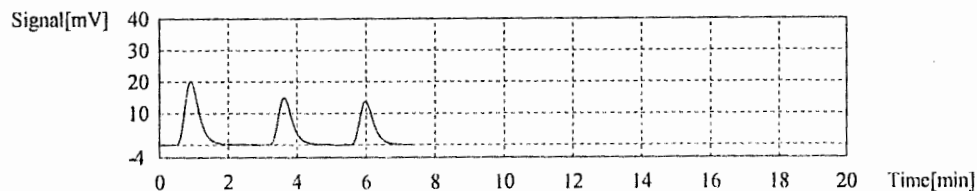
Type	Anal.	Manual Dilution	Result
Unknown	NPOC	1.000	NPOC: 15.27mg/L

1. Det

Anal.: NPOC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	59.05	19.13mg/L	50ul	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 8:59:10 AM
2	42.82	13.87mg/L	50ul	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 9:02:19 AM
3	39.54	12.81mg/L	50ul	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 9:05:44 AM

Mean Area 47.14  
Mean Conc. 15.27mg/L



## Sample

Sample Name: HS21110549-03  
Sample ID:  
Origin: 10\_25\_2021\_CAL.cal  
Status: Completed  
Chk. Result





# TOC-Control L Report

2021\_11\_15\_001.tlx

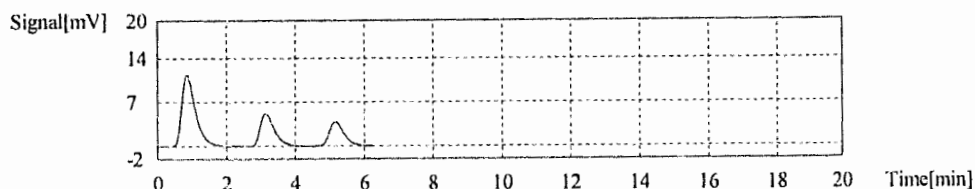
Type	Anal.	Manual Dilution	Result
Unknown	NPOC	1.000	NPOC:6.291mg/L

1. Det

Anal.: NPOC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	31.91	10.34mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 9:14:49 AM
2	15.08	4.886mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 9:18:03 AM
3	11.26	3.648mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 9:21:33 AM

Mean Area 19.42  
Mean Conc. 6.291mg/L



## Sample

Sample Name: CCV  
Sample ID: 317196509  
Origin: 10\_25\_2021\_CAL.cal  
Status: Completed  
Chk. Result:

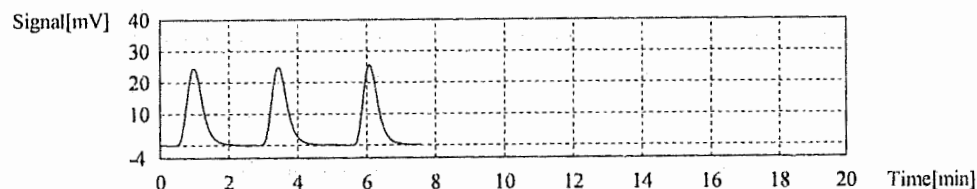
Type	Anal.	Manual Dilution	Result
Unknown	NPOC	1.000	NPOC:25.61mg/L

1. Det

Anal.: NPOC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	79.35	25.71mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 9:46:50 AM
2	79.60	25.79mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 9:50:31 AM
3	78.20	25.34mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 9:53:48 AM

Mean Area 79.05  
Mean Conc. 25.61mg/L



## Sample



# TOC-Control L Report

2021\_11\_15\_001.tlx

Sample Name: CCB  
 Sample ID:  
 Origin: 10\_25\_2021\_CAL.cal  
 Status: Completed  
 Chk. Result:

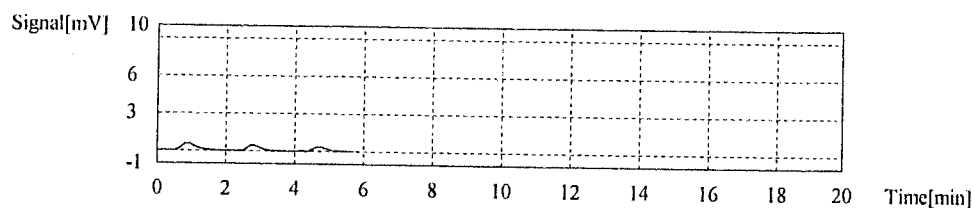
Type	Anal.	Manual Dilution	Result
Unknown	NPOC	1.000	NPOC:0.3588mg/L

1. Det

Anal.: NPOC

No.	Area	Conc.	Inj. Vol.	Aut. Dil.	Ex.	Cal. Curve	Date / Time
1	1.418	0.4692mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 10:02:32 AM
2	1.028	0.3331mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 10:06:02 AM
3	0.8458	0.2741mg/L	50uL	1.000		10_25_2021_CAL.2021_10_25_18_24_47.cal	11/16/2021 10:09:32 AM

Mean Area 1.107  
 Mean Conc. 0.3588mg/L



1521110549

Report Date: 11/11/2021 : 6:54 PM

# PC-Titration PLUS

## Calibration Report

Calibration Record # 2423

**Calibration Settings**

Calibration ID	PH CAL 4-7-10	Date	11/11/2021
Channel	1	Time	6:54 PM
Probe Type	pH	Temperature	296.72 K 23.57 C
Probe ID	PH ELECTRODE	Analysis Type	Single Line Fit

**Calibration Results**

Slope	-58.673	CorrCoeff	0.9999
Intercept	-1.663	Equation: Y = (-58.673) X + (-1.663)	

Calibration Validity True

Operator

	Result	Minimum	Maximum
Slope	-58.673	-65.00	-53.00
Intercept	-1.663	-100.00	100.00
Correlation Coefficient	0.9999	0.99	1.00

Note: "True" means the calibration was within the specified ranges

"False" means the calibration was NOT within the specified ranges

**Calibration Data**

Standard	Reading
4.00	175.78
7.00	-4.51
10.00	-176.26

#395480 (A)

#395482 (B)

#395483 (D)

pm  
11/14/2021



Report Date: 11/12/2021 : 7:19 AM

# PC-TitratiON PLUS

## Water Analysis Report

Run Number		4217		Order Number		20211111-2									
SampleID	RunDate	RunTime	Temp	cond (uS)	pH	alk-ppm	alk-ppm	bcarb-ppm	carb-ppm	hydr-ppm	mLs @ 8.3	mLs @ 4.5	mLs @ 4.2		
ICV-PH	11/11/2021	7:40 PM	23.56	-1.00	6.07	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00
TAP WATER	11/11/2021	7:46 PM	23.56	-1.00	6.84	-1.00	212.34	212.34	.00	.00	.00	2.02	2.02		
WBLKW1-211111	11/11/2021	7:52 PM	23.60	-1.00	5.90	-1.00	1.61	1.61	.00	.00	.00	.05	.05		
LCS1-211111	11/11/2021	8:01 PM	23.75	-1.00	10.76	532.96	1,052.88	.00	1,039.83	13.04	5.08	10.03	10.03		
LCSD1-211111	11/11/2021	8:09 PM	23.84	-1.00	10.75	535.44	1,056.93	.00	1,042.97	13.95	5.10	10.07	10.07		
HS21110660-02	11/11/2021	8:16 PM	23.84	-1.00	8.14	-1.00	153.60	153.60	.00	.00	.00	1.46	1.46		
HS21110660-02DUP	11/11/2021	8:23 PM	23.65	-1.00	8.16	-1.00	168.72	168.72	.00	.00	.00	1.61	1.61		
HS21110660-03	11/11/2021	8:29 PM	23.67	-1.00	8.01	-1.00	148.77	148.77	.00	.00	.00	1.42	1.42		
HS21110440-01	11/11/2021	8:41 PM	23.64	-1.00	6.80	-1.00	1,989.83	1,989.83	.00	.00	.00	18.95	18.95		
HS21110439-01df2	11/11/2021	8:48 PM	23.04	-1.00	9.22	35.72	147.35	75.90	71.45	.00	.34	1.40	1.40		
HS21110339-01	11/11/2021	8:55 PM	23.17	-1.00	8.55	13.63	505.11	477.84	27.27	.00	.13	4.81	4.81		
CCV-PH	11/11/2021	8:59 PM	23.57	-1.00	7.10	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00
CCV-ALK	11/11/2021	9:07 PM	23.47	-1.00	10.63	486.44	1,114.71	141.83	972.88	.00	4.63	10.62	10.62		
DI RINSE	11/11/2021	9:13 PM	23.65	-1.00	6.43	-1.00	1.58	1.58	.00	.00	.00	.05	.05		
HS21110493-01	11/11/2021	9:19 PM	23.62	-1.00	5.75	-1.00	.89	.89	.00	.00	.00	.04	.04		
HS21110339-02	11/11/2021	9:28 PM	23.59	-1.00	8.60	38.41	1,146.00	1,069.17	76.82	.00	.37	10.91	10.91		
HS21110339-03	11/11/2021	9:35 PM	23.73	-1.00	8.42	7.51	381.47	366.45	15.02	.00	.07	3.63	3.63		
HS21110339-04	11/11/2021	9:41 PM	23.73	-1.00	8.31	1.36	314.91	312.20	2.71	.00	.01	3.00	3.00		
HS21110339-05	11/11/2021	9:47 PM	23.78	-1.00	8.42	7.23	392.46	377.99	14.45	.00	.07	3.74	3.74		
HS21110674-01	11/11/2021	9:54 PM	23.92	-1.00	7.57	-1.00	290.98	290.98	.00	.00	.00	2.77	2.77		
HS21110677-01	11/11/2021	10:00 PM	23.97	-1.00	8.39	7.00	427.85	413.84	14.01	.00	.07	4.07	4.07		
HS21110678-01	11/11/2021	10:06 PM	23.91	-1.00	8.52	7.71	201.11	185.68	15.43	.00	.07	1.92	1.92		
HS21110679-01	11/11/2021	10:12 PM	23.96	-1.00	6.97	-1.00	226.32	226.32	.00	.00	.00	2.16	2.16		
CCV-PH	11/11/2021	10:16 PM	23.99	-1.00	7.09	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00
CCV-ALK	11/11/2021	10:25 PM	23.75	-1.00	10.60	501.34	1,131.56	128.88	1,002.68	.00	4.77	10.78	10.78		
DI RINSE	11/11/2021	10:31 PM	23.97	-1.00	6.49	-1.00	1.51	1.51	.00	.00	.00	.04	.04		
HS21110680-01	11/11/2021	10:37 PM	23.89	-1.00	7.08	-1.00	245.68	245.68	.00	.00	.00	2.34	2.34		





<u>Run Number</u>		4217	<u>Order Number</u>		20211111-2								
<u>SampleID</u>	<u>RunDate</u>	<u>RunTime</u>	<u>Temp</u>	<u>cond (uS)</u>	<u>pH</u>	<u>palk-ppm</u>	<u>talk-ppm</u>	<u>bcarb-ppm</u>	<u>carb-ppm</u>	<u>hydr-ppm</u>	<u>mLs @ 8.3</u>	<u>mLs @ 4.5</u>	<u>mLs @ 4.2</u>
HS21110547-01	11/11/2021	10:45 PM	23.89	-1.00	8.45	15.40	742.61	711.81	30.80	.00	.15	7.07	7.07
HS21110547-02	11/11/2021	10:52 PM	24.12	-1.00	8.20	.00	467.85	467.85	.00	.00	.00	4.46	4.46
HS21110547-03	11/11/2021	11:00 PM	24.17	-1.00	8.03	.00	441.56	441.56	.00	.00	.00	4.21	4.21
HS21110547-04	11/11/2021	11:09 PM	24.17	-1.00	8.31	5.14	1,466.16	1,455.87	10.29	.00	.05	13.96	13.96
HS21110547-05	11/11/2021	11:20 PM	24.10	-1.00	8.43	28.90	1,644.55	1,586.74	57.80	.00	.28	15.66	15.66
WLCS2-211111	11/11/2021	11:29 PM	24.15	-1.00	10.72	522.23	1,046.17	1.72	1,044.45	.00	4.97	9.96	9.96
WLCS2-211111	11/11/2021	11:39 PM	24.07	-1.00	10.72	521.22	1,061.64	19.19	1,042.44	.00	4.96	10.11	10.11
CCV-PH	11/11/2021	11:42 PM	24.00	-1.00	7.08	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00
CCVALK	11/11/2021	11:50 PM	23.76	-1.00	10.57	482.26	1,113.19	148.67	964.52	.00	4.59	10.60	10.60
DI RINSE	11/11/2021	11:56 PM	24.07	-1.00	6.41	.00	2.22	2.22	.00	.00	.00	.05	.05
WBLKW2-211111	11/12/2021	12:02 AM	24.02	-1.00	5.75	.00	1.55	1.55	.00	.00	.00	.05	.05
HS21110549-05	11/12/2021	12:09 AM	23.92	-1.00	6.48	.00	613.83	613.83	.00	.00	.00	5.85	5.85
HS21110549-05DUP	11/12/2021	12:16 AM	23.91	-1.00	6.47	.00	622.51	622.51	.00	.00	.00	5.93	5.93
HS21110549-01	11/12/2021	12:24 AM	23.86	-1.00	6.16	.00	723.00	723.00	.00	.00	.00	6.89	6.89
HS21110549-02	11/12/2021	12:31 AM	23.84	-1.00	6.19	.00	719.48	719.48	.00	.00	.00	6.85	6.85
HS21110549-03	11/12/2021	12:38 AM	23.76	-1.00	6.13	.00	606.13	606.13	.00	.00	.00	5.77	5.77
HS21110549-04	11/12/2021	12:46 AM	23.70	-1.00	6.26	.00	838.50	838.50	.00	.00	.00	7.99	7.99
HS21110547-06	11/12/2021	12:56 AM	23.78	-1.00	8.25	.00	1,610.54	1,610.54	.00	.00	.00	15.34	15.34
HS21110588-01	11/12/2021	1:03 AM	23.94	-1.00	7.57	.00	417.40	417.40	.00	.00	.00	3.98	3.98
HS21110588-02	11/12/2021	1:11 AM	23.80	-1.00	7.67	.00	587.47	587.47	.00	.00	.00	5.59	5.59
CCV-PH	11/12/2021	1:14 AM	23.78	-1.00	7.08	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00
CCV-ALK	11/12/2021	1:23 AM	23.54	-1.00	10.55	476.92	1,116.73	162.88	953.84	.00	4.54	10.64	10.64
DI RINSE	11/12/2021	1:28 AM	23.64	-1.00	6.16	.00	2.11	2.11	.00	.00	.00	.05	.05
HS21110588-04	11/12/2021	1:35 AM	23.54	-1.00	7.55	.00	389.54	389.54	.00	.00	.00	3.71	3.71
HS21110588-05	11/12/2021	1:43 AM	23.59	-1.00	7.50	.00	586.10	586.10	.00	.00	.00	5.58	5.58
HS21110588-06	11/12/2021	1:49 AM	23.64	-1.00	7.52	.00	453.10	453.10	.00	.00	.00	4.32	4.32
HS21110626-01	11/12/2021	1:57 AM	23.62	-1.00	7.52	.00	699.30	699.30	.00	.00	.00	6.66	6.66
HS21110626-02	11/12/2021	2:09 AM	23.84	-1.00	7.15	.00	1,863.69	1,863.69	.00	.00	.00	17.75	17.75
HS21110626-03	11/12/2021	2:17 AM	25.21	-1.00	7.42	.00	737.94	737.94	.00	.00	.00	7.03	7.03
HS21110642-01	11/12/2021	2:28 AM	25.16	-1.00	8.09	.00	1,597.35	1,597.35	.00	.00	.00	15.21	15.21





<u>Run Number</u>		4217		<u>Order Number</u>		20211111-2						<u>mLs</u> <u>@ 8.3</u>	<u>mLs</u> <u>@ 4.5</u>	<u>mLs</u> <u>@ 4.2</u>
<u>SampleID</u>	<u>RunDate</u>	<u>RunTime</u>	<u>Temp</u>	<u>cond (uS)</u>	<u>pH</u>	<u>palk-ppm</u>	<u>talk-ppm</u>	<u>bcarb-ppm</u>	<u>carb-ppm</u>	<u>hydr-ppm</u>				
HS21110642-02	11/12/2021	2:37 AM	25.20	-1.00	8.30	3.00	1,379.53	1,373.53	5.99	.00	.03	13.14	13.14	
HS21110642-03	11/12/2021	2:47 AM	25.21	-1.00	8.41	18.11	1,384.55	1,348.33	36.22	.00	.17	13.19	13.19	
CCV-PH	11/12/2021	2:50 AM	25.20	-1.00	7.08	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	
CCV-ALK	11/12/2021	2:59 AM	25.04	-1.00	10.52	473.88	1,118.02	170.26	947.76	.00	4.51	10.65	10.65	
DI RINSE	11/12/2021	3:05 AM	25.16	-1.00	6.25	.00	1.40	1.40	.00	.00	.00	.04	.04	
HS21110642-04	11/12/2021	3:14 AM	25.23	-1.00	8.27	.00	1,260.20	1,260.20	.00	.00	.00	12.00	12.00	
HS21110642-05	11/12/2021	3:23 AM	25.14	-1.00	8.41	16.98	1,266.64	1,232.68	33.97	.00	.16	12.06	12.06	
HS21110642-06	11/12/2021	3:34 AM	25.16	-1.00	8.44	23.24	1,416.90	1,370.41	46.49	.00	.22	13.49	13.49	
LCS3-211111	11/12/2021	3:42 AM	25.13	-1.00	10.65	515.70	1,054.17	22.77	1,031.40	.00	4.91	10.04	10.04	
LCSD3-211111	11/12/2021	3:52 AM	25.00	-1.00	10.65	516.93	1,052.14	18.29	1,033.85	.00	4.92	10.02	10.02	
HS21110585-02	11/12/2021	3:59 AM	24.92	-1.00	8.08	.00	156.09	156.09	.00	.00	.00	1.49	1.49	
HS21110585-02DUP	11/12/2021	4:05 AM	24.87	-1.00	8.10	.00	144.04	144.04	.00	.00	.00	1.37	1.37	
HS21110581-01	11/12/2021	4:12 AM	24.85	-1.00	7.29	.00	440.20	440.20	.00	.00	.00	4.19	4.19	
HS21110591-01	11/12/2021	4:19 AM	24.79	-1.00	7.60	.00	815.38	815.38	.00	.00	.00	7.77	7.77	
CCV-PH	11/12/2021	4:22 AM	24.89	-1.00	7.09	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	
CCV-ALK	11/12/2021	4:30 AM	24.77	-1.00	10.53	472.68	1,106.82	161.45	945.37	.00	4.50	10.54	10.54	
DI RINSE	11/12/2021	4:37 AM	24.79	-1.00	6.31	.00	1.55	1.55	.00	.00	.00	.05	.05	
WBLKW3-211111	11/12/2021	4:42 AM	24.70	-1.00	5.71	.00	10.73	10.73	.00	.00	.00	.14	.14	
HS21110594-03	11/12/2021	4:49 AM	24.62	-1.00	8.11	.00	143.78	143.78	.00	.00	.00	1.37	1.37	
HS21110596-02	11/12/2021	4:55 AM	24.62	-1.00	8.13	.00	145.51	145.51	.00	.00	.00	1.39	1.39	
HS21110596-01	11/12/2021	5:02 AM	24.54	-1.00	8.13	.00	143.86	143.86	.00	.00	.00	1.37	1.37	
HS21110594-01	11/12/2021	5:08 AM	24.40	-1.00	8.17	.00	144.35	144.35	.00	.00	.00	1.37	1.37	
HS21110591-03	11/12/2021	5:15 AM	24.55	-1.00	7.94	.00	924.30	924.30	.00	.00	.00	8.80	8.80	
HS21110585-03	11/12/2021	5:22 AM	24.60	-1.00	8.07	.00	142.64	142.64	.00	.00	.00	1.36	1.36	
HS21110581-02	11/12/2021	5:28 AM	24.57	-1.00	6.99	.00	202.06	202.06	.00	.00	.00	1.92	1.92	
HS21110581-03	11/12/2021	5:34 AM	24.54	-1.00	7.04	.00	141.38	141.38	.00	.00	.00	1.35	1.35	
CCV-PH	11/12/2021	5:37 AM	24.47	-1.00	7.10	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	
CCV-ALK	11/12/2021	5:47 AM	24.34	-1.00	10.55	470.69	1,128.32	186.94	941.38	.00	4.48	10.75	10.75	
DI RINSE	11/12/2021	5:53 AM	24.44	-1.00	6.43	.00	1.41	1.41	.00	.00	.00	.05	.05	
HS21110585-01	11/12/2021	5:59 AM	24.35	-1.00	8.12	.00	141.80	141.80	.00	.00	.00	1.35	1.35	



<u>Run Number</u>			4217		<u>Order Number</u>		20211111-2						
<u>SampleID</u>	<u>RunDate</u>	<u>RunTime</u>	<u>Temp</u>	<u>cond (uS)</u>	<u>pH</u>	<u>paik-ppm</u>	<u>talk-ppm</u>	<u>bcarb-ppm</u>	<u>carb-ppm</u>	<u>hydr-ppm</u>	<u>mLs</u> <u>@ 8.3</u>	<u>mLs</u> <u>@ 4.5</u>	<u>mLs</u> <u>@ 4.2</u>
HS21110590-03	11/12/2021	6:06 AM	24.30	-1.00	6.97	.00	499.53	499.53	.00	.00	.00	4.76	4.76
HS21110594-02	11/12/2021	6:13 AM	24.39	-1.00	8.15	.00	137.73	137.73	.00	.00	.00	1.31	1.31
HS21110595-03	11/12/2021	6:21 AM	24.35	-1.00	10.07	28.25	94.21	37.72	56.49	.00	.27	.90	.90
HS21110595-01	11/12/2021	6:29 AM	24.30	-1.00	9.92	26.38	95.84	43.08	52.76	.00	.25	.91	.91
HS21110595-02	11/12/2021	6:37 AM	24.24	-1.00	9.94	27.74	99.77	44.29	55.48	.00	.26	.95	.95
HS21110590-02	11/12/2021	6:44 AM	24.24	-1.00	6.94	.00	480.11	480.11	.00	.00	.00	4.57	4.57
HS21110590-01	11/12/2021	6:52 AM	24.15	-1.00	6.96	.00	505.54	505.54	.00	.00	.00	4.81	4.81
HS21110591-02	11/12/2021	6:59 AM	24.14	-1.00	7.73	.00	850.01	850.01	.00	.00	.00	8.10	8.10
CCV-PH	11/12/2021	7:02 AM	24.19	-1.00	7.09	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00
CCV-ALK	11/12/2021	7:11 AM	24.27	-1.00	10.48	465.04	1,121.11	191.02	930.08	.00	4.43	10.68	10.68
DI RINSE	11/12/2021	7:17 AM	24.34	-1.00	6.30	.00	1.18	1.18	.00	.00	.00	.04	.04





Microbac Laboratories Inc., - Marietta, OH

Level IV QA/QC Data Package

Laboratory Report Number:

**M1K0338**

Client Project ID:

**LHAAP**

For:

Vicki Graves

**APTIM Tennessee**

2410 Cherahala BLVD

Knoxville, TN 37932

**Project Requested Certification:**

Microbac Laboratories Inc., - Marietta, OH

2936.01

American Association for Laboratory Accreditation

**Project State of Origin: Texas**

*All test results meet the requirements of the QAPP and other applicable contract terms and conditions. Any exceptions are attached to this cover page or addressed in the method narratives presented in the report. I certify that all test results meet all of the requirements of the accrediting authority listed within this report. Analytical results are reported on a 'as received' basis unless specified otherwise. Analytical results for solids with units ending in (dry) are reported on a dry weight basis. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories. The reported results are related only to the samples analyzed as received. The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.*

**Laboratory Project Manager:**

Stephanie Mossburg  
Customer Relations Manager  
Stephanie.Mossburg@microbac.com

**Authorized By:**

Stephanie Mossburg  
Customer Relations Manager  
Issued: 12/06/2021

**Microbac Laboratories, Inc.**

158 Starlite Drive | Marietta, OH 45750 | 800.373.4071 p | [www.microbac.com](http://www.microbac.com)



**Laboratory Report Number: M1K0338**

**Client Project ID: LHAAP**

**Microbac Laboratories Inc., - Marietta, OH**

### Cooler Receipt Log

**Cooler ID:** Default Cooler

**Temp:** 3.2°C

### Cooler Inspection Checklist

Ice Present or not required?	Yes	Shipping containers sealed or not required?	Yes
Custody seals intact or not required?	Yes	Chain of Custody (COC) Present?	Yes
COC includes customer information?	Yes	Relinquished and received signature on COC?	Yes
Sample collector identified on COC?	Yes	Sample type identified on COC?	Yes
Correct type of Containers Received	Yes	Correct number of containers listed on COC?	Yes
Containers Intact?	Yes	COC includes requested analyses?	Yes
Enough sample volume for indicated tests received?	Yes	Sample labels match COC (Name, Date & Time?)	Yes
Samples arrived within hold time?	Yes	Correct preservatives on COC or not required?	Yes
Chemical preservations checked or not required?	Yes	Preservation checks meet method requirements?	Yes
VOA vials have zero headspace, or not recd.?	Yes		

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# Sample Summary

## Sample Summary

Laboratory Report Number: M1K0338

Client Project ID: LHAAP

Microbac Laboratories Inc., - Marietta, OH

Client Sample ID:	Lab Sample ID:	Sampled:
LHSMW01-211104	M1K0338-01	11/04/21 07:55
LHSMW01-211104-FD	M1K0338-02	11/04/21 07:55
04WW04-211104	M1K0338-03	11/04/21 08:45
04WW08-211104	M1K0338-04	11/04/21 09:30
04WW02-211104	M1K0338-05	11/04/21 10:15
04WW06-211104	M1K0338-06	11/04/21 10:55
LHSMW02-211104	M1K0338-07	11/04/21 11:35
04WW11-211104	M1K0338-08	11/04/21 12:15
04WW01-211104	M1K0338-09	11/04/21 13:00

# Holding Time Summary





**Specific Method: EPA 6850**

**Hold Time**

**Laboratory Report Number: M1K0338**

**Matrix: Aqueous**

**Client Project ID: LHAAP**

**Microbac Laboratories Inc., - Marietta, OH**

Laboratory ID	Date Collected	Date Received	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
LHSMW01-211104	11/04/21 07:55	11/05/21 09:30	11/23/21 19:48	19.50	28.00	
LHSMW01-211104-FD	11/04/21 07:55	11/05/21 09:30	11/23/21 20:02	19.50	28.00	
04WW04-211104	11/04/21 08:45	11/05/21 09:30	11/23/21 20:15	19.48	28.00	
04WW08-211104	11/04/21 09:30	11/05/21 09:30	11/23/21 20:28	19.46	28.00	
04WW02-211104	11/04/21 10:15	11/05/21 09:30	11/23/21 20:41	19.44	28.00	
04WW06-211104	11/04/21 10:55	11/05/21 09:30	11/23/21 20:55	19.42	28.00	
LHSMW02-211104	11/04/21 11:35	11/05/21 09:30	11/23/21 21:08	19.40	28.00	
04WW11-211104	11/04/21 12:15	11/05/21 09:30	11/23/21 22:01	19.41	28.00	
04WW01-211104	11/04/21 13:00	11/05/21 09:30	11/23/21 22:14	19.39	28.00	

\* - Holding time exceeded.

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Analysis Class

# HPLC Organics



### HPLC Organics - Class Narrative and Notes

All test results meet the requirements of the QAPP and other applicable contract terms and conditions. Any exceptions are listed below in the sample and qc notes sections. Analytical results are reported on a 'as received' basis unless specified otherwise. Analytical results for solids with units ending in (dry) are reported on a dry weight basis. A statement of uncertainty for each analysis is available upon request.

### QC Sample Notes



The analyte was analyzed for but was not detected above the reported quantitation limit. The quantitation limit has been adjusted for any dilution or concentration of the sample.

### EPA 6850

#### Perchlorate

S1K0467-CCB1	Calibration Blank	S1K0467-CCB2	Calibration Blank
S1K0467-CCB3	Calibration Blank	S1K0467-CCB4	Calibration Blank
S1K0467-ICB1	Initial Cal Blank		

---



# **HPLC Organics**

## **EPA 6850**



# **FORM I: HPLC Organics EPA 6850 RESULTS SUMMARY**



Laboratory Report Number: M1K0338

CERTIFICATE OF ANALYSIS

Client Project ID: LHAAP

FORM I

Microbac Laboratories Inc., - Marietta, OH

Perchlorate by LCMS

<b>Client ID:</b> LHSMW01-211104		<b>Collection Date:</b> 11/04/2021 07:55						
<b>Laboratory ID:</b> M1K0338-01		<b>Prep Date:</b> 11/23/2021 09:23						
<b>Matrix:</b> Aqueous		<b>Analyzed:</b> 11/23/2021 19:48						
<b>Batch / Sequence:</b> B1K1411 / S1K0467		<b>Analytical Method:</b> EPA 6850		<b>Calibration:</b> 21K0035				
<b>Instrument:</b> LCMS2		<b>Units:</b> ug/L		<b>File ID:</b> 2LM032270				
<b>Analyst:</b> CAS		<b>Dilution:</b> 1						
<b>Analyte</b>		<b>CAS Number</b>	<b>Result</b>	<b>DL</b>	<b>LOD</b>	<b>LOQ</b>	<b>Flag</b>	<b>Qual</b>
Perchlorate		14797-73-0	0.200	0.100	0.200	0.400	U	

**Notes and Definitions**

DL: Detection Limit

LOD: Limit of Detection

LOQ: Limit of Quantitation

U: The analyte was analyzed for but was not detected above the reported quantitation limit. The quantitation limit has been adjusted for any dilution or concentration of the sample.

ug/L: Micrograms per Liter

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Laboratory Report Number: M1K0338

CERTIFICATE OF ANALYSIS

Client Project ID: LHAAP

FORM I

Microbac Laboratories Inc., - Marietta, OH

Perchlorate by LCMS

<b>Client ID:</b> LHSMW01-211104-FD		<b>Collection Date:</b> 11/04/2021 07:55					
<b>Laboratory ID:</b> M1K0338-02		<b>Prep Date:</b> 11/23/2021 09:23					
<b>Matrix:</b> Aqueous		<b>Analyzed:</b> 11/23/2021 20:02					
<b>Batch / Sequence:</b> B1K1411 / S1K0467	<b>Analytical Method:</b> EPA 6850	<b>Calibration:</b> 21K0035					
<b>Instrument:</b> LCMS2	<b>Units:</b> ug/L	<b>File ID:</b> 2LM032271					
<b>Analyst:</b> CAS	<b>Dilution:</b> 1						
Analyte	CAS Number	Result	DL	LOD	LOQ	Flag	Qual
Perchlorate	14797-73-0	0.200	0.100	0.200	0.400	U	

**Notes and Definitions**

DL: Detection Limit

LOD: Limit of Detection

LOQ: Limit of Quantitation

U: The analyte was analyzed for but was not detected above the reported quantitation limit. The quantitation limit has been adjusted for any dilution or concentration of the sample.

ug/L: Micrograms per Liter

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Laboratory Report Number: M1K0338

CERTIFICATE OF ANALYSIS

Client Project ID: LHAAP

FORM I

Microbac Laboratories Inc., - Marietta, OH

Perchlorate by LCMS

<b>Client ID:</b> 04WW04-211104		<b>Collection Date:</b> 11/04/2021 08:45						
<b>Laboratory ID:</b> M1K0338-03		<b>Prep Date:</b> 11/23/2021 09:23						
<b>Matrix:</b> Aqueous		<b>Analyzed:</b> 11/23/2021 20:15						
<b>Batch / Sequence:</b> B1K1411 / S1K0467		<b>Analytical Method:</b> EPA 6850		<b>Calibration:</b> 21K0035				
<b>Instrument:</b> LCMS2		<b>Units:</b> ug/L		<b>File ID:</b> 2LM032272				
<b>Analyst:</b> CAS		<b>Dilution:</b> 1						
<b>Analyte</b>		<b>CAS Number</b>	<b>Result</b>	<b>DL</b>	<b>LOD</b>	<b>LOQ</b>	<b>Flag</b>	<b>Qual</b>
Perchlorate		14797-73-0	0.200	0.100	0.200	0.400	U	

**Notes and Definitions**

DL: Detection Limit

LOD: Limit of Detection

LOQ: Limit of Quantitation

U: The analyte was analyzed for but was not detected above the reported quantitation limit. The quantitation limit has been adjusted for any dilution or concentration of the sample.

ug/L: Micrograms per Liter

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Laboratory Report Number: M1K0338

CERTIFICATE OF ANALYSIS

Client Project ID: LHAAP

FORM I

Microbac Laboratories Inc., - Marietta, OH

Perchlorate by LCMS

<b>Client ID:</b> 04WW08-211104		<b>Collection Date:</b> 11/04/2021 09:30						
<b>Laboratory ID:</b> M1K0338-04		<b>Prep Date:</b> 11/23/2021 09:23						
<b>Matrix:</b> Aqueous		<b>Analyzed:</b> 11/23/2021 20:28						
<b>Batch / Sequence:</b> B1K1411 / S1K0467		<b>Analytical Method:</b> EPA 6850		<b>Calibration:</b> 21K0035				
<b>Instrument:</b> LCMS2		<b>Units:</b> ug/L		<b>File ID:</b> 2LM032273				
<b>Analyst:</b> CAS		<b>Dilution:</b> 1						
<b>Analyte</b>		<b>CAS Number</b>	<b>Result</b>	<b>DL</b>	<b>LOD</b>	<b>LOQ</b>	<b>Flag</b>	<b>Qual</b>
Perchlorate		14797-73-0	0.200	0.100	0.200	0.400	U	

**Notes and Definitions**

DL: Detection Limit

LOD: Limit of Detection

LOQ: Limit of Quantitation

U: The analyte was analyzed for but was not detected above the reported quantitation limit. The quantitation limit has been adjusted for any dilution or concentration of the sample.

ug/L: Micrograms per Liter

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Laboratory Report Number: M1K0338

CERTIFICATE OF ANALYSIS

Client Project ID: LHAAP

FORM I

Microbac Laboratories Inc., - Marietta, OH

Perchlorate by LCMS

Client ID: 04WW02-211104		Collection Date: 11/04/2021 10:15						
Laboratory ID: M1K0338-05		Prep Date: 11/23/2021 09:23						
Matrix: Aqueous		Analyzed: 11/23/2021 20:41						
Batch / Sequence: B1K1411 / S1K0467		Analytical Method: EPA 6850		Calibration: 21K0035				
Instrument: LCMS2		Units: ug/L		File ID: 2LM032274				
Analyst: CAS		Dilution: 1						
Analyte		CAS Number	Result	DL	LOD	LOQ	Flag	Qual
Perchlorate		14797-73-0	0.200	0.100	0.200	0.400	U	

**Notes and Definitions**

DL: Detection Limit

LOD: Limit of Detection

LOQ: Limit of Quantitation

U: The analyte was analyzed for but was not detected above the reported quantitation limit. The quantitation limit has been adjusted for any dilution or concentration of the sample.

ug/L: Micrograms per Liter

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Laboratory Report Number: M1K0338

CERTIFICATE OF ANALYSIS

Client Project ID: LHAAP

FORM I

Microbac Laboratories Inc., - Marietta, OH

Perchlorate by LCMS

<b>Client ID:</b> 04WW06-211104		<b>Collection Date:</b> 11/04/2021 10:55						
<b>Laboratory ID:</b> M1K0338-06		<b>Prep Date:</b> 11/23/2021 09:23						
<b>Matrix:</b> Aqueous		<b>Analyzed:</b> 11/23/2021 20:55						
<b>Batch / Sequence:</b> B1K1411 / S1K0467		<b>Analytical Method:</b> EPA 6850		<b>Calibration:</b> 21K0035				
<b>Instrument:</b> LCMS2		<b>Units:</b> ug/L		<b>File ID:</b> 2LM032275				
<b>Analyst:</b> CAS		<b>Dilution:</b> 1						
<b>Analyte</b>		<b>CAS Number</b>	<b>Result</b>	<b>DL</b>	<b>LOD</b>	<b>LOQ</b>	<b>Flag</b>	<b>Qual</b>
Perchlorate		14797-73-0	0.200	0.100	0.200	0.400	U	

**Notes and Definitions**

DL: Detection Limit

LOD: Limit of Detection

LOQ: Limit of Quantitation

U: The analyte was analyzed for but was not detected above the reported quantitation limit. The quantitation limit has been adjusted for any dilution or concentration of the sample.

ug/L: Micrograms per Liter

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Laboratory Report Number: M1K0338

CERTIFICATE OF ANALYSIS

Client Project ID: LHAAP

FORM I

Microbac Laboratories Inc., - Marietta, OH

Perchlorate by LCMS

<b>Client ID:</b> LHSMW02-211104			<b>Collection Date:</b> 11/04/2021 11:35					
<b>Laboratory ID:</b> M1K0338-07			<b>Prep Date:</b> 11/23/2021 09:23					
<b>Matrix:</b> Aqueous			<b>Analyzed:</b> 11/23/2021 21:08					
<b>Batch / Sequence:</b> B1K1411 / S1K0467		<b>Analytical Method:</b> EPA 6850		<b>Calibration:</b> 21K0035			<b>File ID:</b> 2LM032276	
<b>Instrument:</b> LCMS2		<b>Units:</b> ug/L						
<b>Analyst:</b> CAS		<b>Dilution:</b> 1						
<b>Analyte</b>		<b>CAS Number</b>	<b>Result</b>	<b>DL</b>	<b>LOD</b>	<b>LOQ</b>	<b>Flag</b>	<b>Qual</b>
Perchlorate		14797-73-0	0.200	0.100	0.200	0.400	U	

**Notes and Definitions**

DL: Detection Limit

LOD: Limit of Detection

LOQ: Limit of Quantitation

U: The analyte was analyzed for but was not detected above the reported quantitation limit. The quantitation limit has been adjusted for any dilution or concentration of the sample.

ug/L: Micrograms per Liter

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Laboratory Report Number: M1K0338

CERTIFICATE OF ANALYSIS

Client Project ID: LHAAP

FORM I

Microbac Laboratories Inc., - Marietta, OH

Perchlorate by LCMS

<b>Client ID:</b> 04WW11-211104		<b>Collection Date:</b> 11/04/2021 12:15					
<b>Laboratory ID:</b> M1K0338-08		<b>Prep Date:</b> 11/23/2021 09:23					
<b>Matrix:</b> Aqueous		<b>Analyzed:</b> 11/23/2021 22:01					
<b>Batch / Sequence:</b> B1K1411 / S1K0467	<b>Analytical Method:</b> EPA 6850	<b>Calibration:</b> 21K0035					
<b>Instrument:</b> LCMS2	<b>Units:</b> ug/L	<b>File ID:</b> 2LM032280					
<b>Analyst:</b> CAS	<b>Dilution:</b> 1						
Analyte	CAS Number	Result	DL	LOD	LOQ	Flag	Qual
Perchlorate	14797-73-0	0.200	0.100	0.200	0.400	U	

**Notes and Definitions**

DL: Detection Limit

LOD: Limit of Detection

LOQ: Limit of Quantitation

U: The analyte was analyzed for but was not detected above the reported quantitation limit. The quantitation limit has been adjusted for any dilution or concentration of the sample.

ug/L: Micrograms per Liter

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Laboratory Report Number: M1K0338

CERTIFICATE OF ANALYSIS

Client Project ID: LHAAP

FORM I

Microbac Laboratories Inc., - Marietta, OH

Perchlorate by LCMS

<b>Client ID:</b> 04WW01-211104		<b>Collection Date:</b> 11/04/2021 13:00						
<b>Laboratory ID:</b> M1K0338-09		<b>Prep Date:</b> 11/23/2021 09:23						
<b>Matrix:</b> Aqueous		<b>Analyzed:</b> 11/23/2021 22:14						
<b>Batch / Sequence:</b> B1K1411 / S1K0467		<b>Analytical Method:</b> EPA 6850		<b>Calibration:</b> 21K0035				
<b>Instrument:</b> LCMS2		<b>Units:</b> ug/L		<b>File ID:</b> 2LM032281				
<b>Analyst:</b> CAS		<b>Dilution:</b> 1						
<b>Analyte</b>		<b>CAS Number</b>	<b>Result</b>	<b>DL</b>	<b>LOD</b>	<b>LOQ</b>	<b>Flag</b>	<b>Qual</b>
Perchlorate		14797-73-0	0.200	0.100	0.200	0.400	U	

**Notes and Definitions**

DL: Detection Limit

LOD: Limit of Detection

LOQ: Limit of Quantitation

U: The analyte was analyzed for but was not detected above the reported quantitation limit. The quantitation limit has been adjusted for any dilution or concentration of the sample.

ug/L: Micrograms per Liter

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**FORM III:  
HPLC Organics  
EPA 6850  
BS/BSD, MS/MSD, DUP**



Laboratory Report Number: M1K0338

BLANK SPIKE (BS)

Client Project ID: LHAAP

FORM IIIB

<b>Method:</b> EPA 6850		<b>Blank Spike</b>			
<b>Batch:</b> B1K1411		<b>Spike ID:</b> B1K1411-BS1			
<b>Analyst:</b> CAS		<b>Prepared:</b> 11/23/21 09:23			
<b>Matrix:</b> Aqueous		<b>Analyzed:</b> 11/23/21 19:35			
<b>Units:</b> ug/L		<b>File ID:</b> 2LM032269			
<b>Instrument:</b> LCMS2		<b>Initial/Final:</b> 10mL/10mL			
<b>Calibration:</b> 21K0035					
Analyte	BS Spiked	BS Found	BS %Rec	%Rec Limts	Q
Perchlorate	0.200	0.202	101	84 - 119	

\* - Does not meet %Rec acceptance criteria.

# - Does not meet RPD acceptance criteria.

NS - Analyte Not Spiked

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# **FORM IV: HPLC Organics EPA 6850 METHOD BLANK SUMMARY**



Laboratory Report Number: M1K0338

Client Project ID: LHAAP

**METHOD BLANK SUMMARY  
FORM IVA**

**Blank ID:** B1K1411-BLK1  
**Blank File ID:** 2LM032268  
**Prepared:** 11/23/2021 9:23  
**Analyzed:** 11/23/2021 19:22

**Batch:** B1K1411  
**Instrument:** LCMS2  
**Method:** EPA 6850  
**Analyst:** CAS

**This Method Blank Applies To The Following Samples:**

Client Sample ID	Laboratory Sample ID	Lab File ID	Time Analyzed
Blank	B1K1411-BLK1	2LM032268	11/23/2021 19:22
LCS	B1K1411-BS1	2LM032269	11/23/2021 19:35
LHSMW01-211104	M1K0338-01	2LM032270	11/23/2021 19:48
LHSMW01-211104-FD	M1K0338-02	2LM032271	11/23/2021 20:02
04WW04-211104	M1K0338-03	2LM032272	11/23/2021 20:15
04WW08-211104	M1K0338-04	2LM032273	11/23/2021 20:28
04WW02-211104	M1K0338-05	2LM032274	11/23/2021 20:41
04WW06-211104	M1K0338-06	2LM032275	11/23/2021 20:55
LHSMW02-211104	M1K0338-07	2LM032276	11/23/2021 21:08
04WW11-211104	M1K0338-08	2LM032280	11/23/2021 22:01
04WW01-211104	M1K0338-09	2LM032281	11/23/2021 22:14



Laboratory Report Number: M1K0338

METHOD BLANK

Client Project ID: LHAAP

FORM IVB

<b>Sample ID:</b> B1K1411-BLK1	<b>Prep Date:</b> 11/23/21 09:23	<b>Matrix:</b> Aqueous
<b>Instrument:</b> LCMS2	<b>Analyzed:</b> 11/23/21 19:22	<b>Method:</b> EPA 6850
<b>File ID:</b> 2LM032268	<b>Sequence:</b> S1K0467	<b>Analyst:</b> CAS
<b>Batch:</b> B1K1411	<b>Units:</b> ug/L	<b>Calibration:</b> 21K0035

Analyte	Result	DL	LOD	LOQ	Dilution	Flag	Q
Perchlorate	0.200	0.100	0.200	0.400	1	U	

**Notes and Definitions**

\* - Detected in the associated method Blank at a concentration  $\geq 1/2 \times \text{RL}$

U: The analyte was analyzed for but was not detected above the reported quantitation limit. The quantitation limit has been adjusted for any dilution or concentration of the sample.



# **FORM VII: HPLC Organics EPA 6850 ICV/CCV**



Laboratory Report Number: M1K0338

Initial Calibration Verification (ICV)

Client Project ID: LHAAP

FORM VIIA

<b>Sample ID:</b> S1K0467-ICV1 <b>Instrument:</b> LCMS2 <b>File ID:</b> 2LM032263			<b>Analyzed:</b> 11/23/21 18:16 <b>Calibration:</b> 21K0035 <b>Units:</b> ug/L			<b>Method:</b> EPA 6850 <b>Sequence:</b> S1K0467 <b>Analyst:</b> CAS		
Analyte	Response	Limit	Q	Expected	Found	% Drift / % Diff	UCL	Q
Perchlorate	0.8800185			1.00	0.956	-4.4	15	

\* - Does not meet acceptance criteria.

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Laboratory Report Number: M1K0338

Client Project ID: LHAAP

Continuing Calibration Verification (CCV)

FORM VIIB

Laboratory ID: S1K0467-CCV1		Analyzed: 11/23/21 18:42			Method: EPA 6850			
Instrument: LCMS2		Calibration: 21K0035			Sequence: S1K0467			
File ID: 2LM032265		Units: ug/L			Analyst: CAS			
Analyte	Response	Limit	Q	Expected	Found	% Drift / % Diff	UCL	Q
Perchlorate	0.8675141			1.00	0.943	-5.7	15	

\* - Does not meet acceptance criteria.

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Laboratory Report Number: M1K0338

Client Project ID: LHAAP

Continuing Calibration Verification (CCV)

FORM VIIB

<b>Laboratory ID:</b> S1K0467-CCV2		<b>Analyzed:</b> 11/23/21 21:21			<b>Method:</b> EPA 6850			
<b>Instrument:</b> LCMS2		<b>Calibration:</b> 21K0035			<b>Sequence:</b> S1K0467			
<b>File ID:</b> 2LM032277		<b>Units:</b> ug/L			<b>Analyst:</b> CAS			
<b>Analyte</b>	<b>Response</b>	<b>Limit</b>	<b>Q</b>	<b>Expected</b>	<b>Found</b>	<b>% Drift / % Diff</b>	<b>UCL</b>	<b>Q</b>
Perchlorate	0.8778172			1.00	0.954	-4.6	15	

\* - Does not meet acceptance criteria.

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Laboratory Report Number: M1K0338

Client Project ID: LHAAP

Continuing Calibration Verification (CCV)

FORM VIIB

<b>Laboratory ID:</b> S1K0467-CCV3		<b>Analyzed:</b> 11/24/21 00:13			<b>Method:</b> EPA 6850			
<b>Instrument:</b> LCMS2		<b>Calibration:</b> 21K0035			<b>Sequence:</b> S1K0467			
<b>File ID:</b> 2LM032290		<b>Units:</b> ug/L			<b>Analyst:</b> CAS			
<b>Analyte</b>	<b>Response</b>	<b>Limit</b>	<b>Q</b>	<b>Expected</b>	<b>Found</b>	<b>% Drift / % Diff</b>	<b>UCL</b>	<b>Q</b>
Perchlorate	0.8809337			1.00	0.957	-4.3	15	

\* - Does not meet acceptance criteria.

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Laboratory Report Number: M1K0338

Client Project ID: LHAAP

Continuing Calibration Verification (CCV)

FORM VIIB

<b>Laboratory ID:</b> S1K0467-CCV4		<b>Analyzed:</b> 11/24/21 03:06			<b>Method:</b> EPA 6850			
<b>Instrument:</b> LCMS2		<b>Calibration:</b> 21K0035			<b>Sequence:</b> S1K0467			
<b>File ID:</b> 2LM032303		<b>Units:</b> ug/L			<b>Analyst:</b> CAS			
<b>Analyte</b>	<b>Response</b>	<b>Limit</b>	<b>Q</b>	<b>Expected</b>	<b>Found</b>	<b>% Drift / % Diff</b>	<b>UCL</b>	<b>Q</b>
Perchlorate	0.8622645			1.00	0.937	-6.3	15	

\* - Does not meet acceptance criteria.

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Laboratory Report Number: M1K0338

Client Project ID: LHAAP

Instrument Reporting Limit Check (CRL)  
FORM VIIB

<b>Laboratory ID:</b> S1K0467-CRL1		<b>Analyzed:</b> 11/23/21 18:55		<b>Method:</b> EPA 6850		
<b>Instrument:</b> LCMS2		<b>Calibration:</b> 21K0035		<b>Sequence:</b> S1K0467		
<b>File ID:</b> 2LM032266		<b>Units:</b> ug/L				
Analyte	Expected	Found	Recovery	LCL	UCL	Q
Perchlorate	0.200	0.186	93.0	70	130	

\* - Does not meet acceptance criteria.

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Laboratory Report Number: M1K0338

Client Project ID: LHAAP

Instrument Reporting Limit Check (CRL)

FORM VIIB

Laboratory ID: S1K0467-CRL2		Analyzed: 11/23/21 21:34		Method: EPA 6850		
Instrument: LCMS2		Calibration: 21K0035		Sequence: S1K0467		
File ID: 2LM032278		Units: ug/L				
Analyte	Expected	Found	Recovery	LCL	UCL	Q
Perchlorate	0.200	0.184	92.0	70	130	

\* - Does not meet acceptance criteria.

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Laboratory Report Number: M1K0338

Client Project ID: LHAAP

Instrument Reporting Limit Check (CRL)

FORM VIIB

<b>Laboratory ID:</b> S1K0467-CRL3		<b>Analyzed:</b> 11/24/21 00:27		<b>Method:</b> EPA 6850		
<b>Instrument:</b> LCMS2		<b>Calibration:</b> 21K0035		<b>Sequence:</b> S1K0467		
<b>File ID:</b> 2LM032291		<b>Units:</b> ug/L				
Analyte	Expected	Found	Recovery	LCL	UCL	Q
Perchlorate	0.200	0.188	94.0	70	130	

\* - Does not meet acceptance criteria.

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Laboratory Report Number: M1K0338

Client Project ID: LHAAP

Instrument Reporting Limit Check (CRL)

FORM VIIB

Laboratory ID: S1K0467-CRL4		Analyzed: 11/24/21 03:19		Method: EPA 6850		
Instrument: LCMS2		Calibration: 21K0035		Sequence: S1K0467		
File ID: 2LM032304		Units: ug/L				
Analyte	Expected	Found	Recovery	LCL	UCL	Q
Perchlorate	0.200	0.183	91.5	70	130	

\* - Does not meet acceptance criteria.

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Laboratory Report Number: M1K0338

Client Project ID: LHAAP

MATRIX CONDUCTIVITY TEST

FORM VII

<b>Laboratory ID:</b> S1K0467-IFA1		<b>Run Date:</b> 11/23/21 19:09		<b>Matrix:</b> Aqueous			
<b>Instrument:</b> LCMS2		<b>Calibration:</b> 21K0035		<b>Method:</b> EPA 6850			
<b>File ID:</b> 2LM032267		<b>Analyst:</b> CAS		<b>Batch ID:</b> S1K0467			
Analyte	Known (ug/L)	Result (ug/L)	Recovery	LCL	UCL	MRL (ug/L)	Flags
Perchlorate	0.20000	0.238	119	80	120	0.4000	



# **FORM VIII: HPLC Organics EPA 6850 Internal Standard Area and RT**



Laboratory Report Number: M1K0338

INTERNAL STANDARD AREA SUMMARY

Client Project ID: LHAAP

FORM VIIIA

<b>Laboratory:</b>	Microbac Laboratories Inc., - Marietta, OH	<b>SDG:</b>	M1K0338
<b>Client:</b>	APTIM Tennessee	<b>Project:</b>	Longhorn AAP
<b>Sequence:</b>	S1K0467	<b>Instrument:</b>	LCMS2
		<b>Calibration:</b>	21K0035

## Blank (B1K1411-BLK1 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1094479	7.03	1316163	6.96	83	50 - 150		0.0700	+/-2.00	

## LCS (B1K1411-BS1 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1089985	7.04	1316163	6.96	83	50 - 150		0.0800	+/-2.00	

## LHSMW01-211104 (M1K0338-01 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1134439	6.69	1316163	6.96	86	50 - 150		-0.2700	+/-2.00	

## LHSMW01-211104-FD (M1K0338-02 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1156960	6.71	1316163	6.96	88	50 - 150		-0.2500	+/-2.00	

## 04WW04-211104 (M1K0338-03 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1159347	6.91	1316163	6.96	88	50 - 150		-0.0500	+/-2.00	

## 04WW08-211104 (M1K0338-04 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	768107	6.64	1316163	6.96	58	50 - 150		-0.3200	+/-2.00	

## 04WW02-211104 (M1K0338-05 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1087450	6.89	1316163	6.96	83	50 - 150		-0.0700	+/-2.00	

## 04WW06-211104 (M1K0338-06 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	903426	6.71	1316163	6.96	69	50 - 150		-0.2500	+/-2.00	

## LHSMW02-211104 (M1K0338-07 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1044134	6.81	1316163	6.96	79	50 - 150		-0.1500	+/-2.00	





Laboratory Report Number: M1K0338

INTERNAL STANDARD AREA SUMMARY  
FORM VIIIA

Client Project ID: LHAAP

## 04WW11-211104 (M1K0338-08 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1235458	6.79	1316163	6.96	94	50 - 150		-0.2900	+/-2.00	

## 04WW01-211104 (M1K0338-09 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1020047	6.66	1316163	6.96	78	50 - 150		-0.4200	+/-2.00	

## Calibration Blank (S1K0467-CCB1 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1299178	6.94	1316163	6.96	99	50 - 150		0.0000	+/-2.00	

## Calibration Blank (S1K0467-CCB2 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1244461	7.11	1316163	6.96	95	50 - 150		0.0300	+/-2.00	

## Calibration Blank (S1K0467-CCB3 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1144360	7.19	1316163	6.96	87	50 - 150		0.0300	+/-2.00	

## Calibration Blank (S1K0467-CCB4 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1046354	7.26	1316163	6.96	80	50 - 150		0.0200	+/-2.00	

## Calibration Check (S1K0467-CCV1 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1316163	6.96	1316163	6.96	100	50 - 150		0.0000	+/-2.00	

## Calibration Check (S1K0467-CCV2 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1207068	7.08	1316163	6.96	92	50 - 150		0.0000	+/-2.00	

## Calibration Check (S1K0467-CCV3 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1145001	7.16	1316163	6.96	87	50 - 150		0.0000	+/-2.00	

## Calibration Check (S1K0467-CCV4 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1039826	7.24	1316163	6.96	79	50 - 150		0.0000	+/-2.00	

## Instrument RL Check (S1K0467-CRL1 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1174525	6.96	1316163	6.96	89	50 - 150		0.0000	+/-2.00	

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Laboratory Report Number: M1K0338

INTERNAL STANDARD AREA SUMMARY

Client Project ID: LHAAP

FORM VIIIA

## Instrument RL Check (S1K0467-CRL2 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1264922	7.09	1316163	6.96	96	50 - 150		0.0100	+/-2.00	

## Instrument RL Check (S1K0467-CRL3 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1164709	7.19	1316163	6.96	88	50 - 150		0.0300	+/-2.00	

## Instrument RL Check (S1K0467-CRL4 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1083337	7.24	1316163	6.96	82	50 - 150		0.0000	+/-2.00	

## Initial Cal Blank (S1K0467-ICB1 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1373183	6.86	1316163	6.96	104	50 - 150		-0.0700	+/-2.00	

## Initial Cal Check (S1K0467-ICV1 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1311711	6.94	1316163	6.96	100	50 - 150		0.0000	+/-2.00	

## Interference Check A (S1K0467-IFA1 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1108705	6.61	1316163	6.96	84	50 - 150		-0.3500	+/-2.00	



**Section A:**  
**HPLC Organics**  
**EPA 6850**  
**Batch / Sequence Raw Data**





Filename	Sample Type	Level	Sample ID	Comments	Compound	Type	Area	Ion Ratio (2.31-3.85)
2LM032255	Unknown		S1K0467-ICB1	1:1	Perchlorate	Target Compound	N/F	#VALUE!
2LM032255	Unknown		S1K0467-ICB1	1:1	Perchlorate	Confirming Peak	N/F	
2LM032256	Cal Std	1	S1K0467-CAL1	1:1 0012469	Perchlorate	Target Compound	22361	3.136625053
2LM032256	Cal Std	1	S1K0467-CAL1	1:1 0012469	Perchlorate	Confirming Peak	7129	
2LM032257	Cal Std	2	S1K0467-CAL2	1:1 0012468	Perchlorate	Target Compound	42956	3.099278499
2LM032257	Cal Std	2	S1K0467-CAL2	1:1 0012468	Perchlorate	Confirming Peak	13860	
2LM032258	Cal Std	3	S1K0467-CAL3	1:1 0012467	Perchlorate	Target Compound	150289	3.166178608
2LM032258	Cal Std	3	S1K0467-CAL3	1:1 0012467	Perchlorate	Confirming Peak	47467	
2LM032259	Cal Std	4	S1K0467-CAL4	1:1 0012466	Perchlorate	Target Compound	222769	3.102070656
2LM032259	Cal Std	4	S1K0467-CAL4	1:1 0012466	Perchlorate	Confirming Peak	71813	
2LM032260	Cal Std	5	S1K0467-CAL5	1:1 0012465	Perchlorate	Target Compound	450589	3.166650268
2LM032260	Cal Std	5	S1K0467-CAL5	1:1 0012465	Perchlorate	Confirming Peak	142292	
2LM032261	Cal Std	6	S1K0467-CAL6	1:1 0012464	Perchlorate	Target Compound	960334	3.197787634
2LM032261	Cal Std	6	S1K0467-CAL6	1:1 0012464	Perchlorate	Confirming Peak	300312	
2LM032262	Cal Std	7	S1K0467-CAL7	1:1 0012463	Perchlorate	Target Compound	2224819	3.230804194
2LM032262	Cal Std	7	S1K0467-CAL7	1:1 0012463	Perchlorate	Confirming Peak	688627	
2LM032263	Chk Std	ICV	S1K0467-ICV1	1:1 0012475	Perchlorate	Target Compound	230866	3.103955471
2LM032263	Chk Std	ICV	S1K0467-ICV1	1:1 0012475	Perchlorate	Confirming Peak	74378	
2LM032264	Unknown		S1K0467-CCB1	1:1	Perchlorate	Target Compound	N/F	#VALUE!
2LM032264	Unknown		S1K0467-CCB1	1:1	Perchlorate	Confirming Peak	N/F	
2LM032265	Chk Std	CCV	S1K0467-CCV1	1:1 0012466	Perchlorate	Target Compound	228358	3.133213507
2LM032265	Chk Std	CCV	S1K0467-CCV1	1:1 0012466	Perchlorate	Confirming Peak	72883	
2LM032266	Chk Std	QCMRL	S1K0467-CRL1	1:1 0012468	Perchlorate	Target Compound	40831	2.87137834
2LM032266	Chk Std	QCMRL	S1K0467-CRL1	1:1 0012468	Perchlorate	Confirming Peak	14220	
2LM032267	Unknown		S1K0467-IFA1	1:1 0012477	Perchlorate	Target Compound	49014	3.191223387
2LM032267	Unknown		S1K0467-IFA1	1:1 0012477	Perchlorate	Confirming Peak	15359	
2LM032268	Unknown		B1K1411-BLK1	1:1	Perchlorate	Target Compound	3243	2.875
2LM032268	Unknown		B1K1411-BLK1	1:1	Perchlorate	Confirming Peak	1128	
2LM032269	Unknown		B1K1411-BS1	1:1 0012474	Perchlorate	Target Compound	41165	3.05877545
2LM032269	Unknown		B1K1411-BS1	1:1 0012474	Perchlorate	Confirming Peak	13458	
2LM032270	Unknown		M1K0338-01	1:1	Perchlorate	Target Compound	N/F	#VALUE!
2LM032270	Unknown		M1K0338-01	1:1	Perchlorate	Confirming Peak	N/F	
2LM032271	Unknown		M1K0338-02	1:1	Perchlorate	Target Compound	N/F	#VALUE!
2LM032271	Unknown		M1K0338-02	1:1	Perchlorate	Confirming Peak	N/F	
2LM032272	Unknown		M1K0338-03	1:1	Perchlorate	Target Compound	2732	2.562851782
2LM032272	Unknown		M1K0338-03	1:1	Perchlorate	Confirming Peak	1066	
2LM032273	Unknown		M1K0338-04	1:1	Perchlorate	Target Compound	N/F	#VALUE!
2LM032273	Unknown		M1K0338-04	1:1	Perchlorate	Confirming Peak	N/F	
2LM032274	Unknown		M1K0338-05	1:1	Perchlorate	Target Compound	3973	2.993971364
2LM032274	Unknown		M1K0338-05	1:1	Perchlorate	Confirming Peak	1327	
2LM032275	Unknown		M1K0338-06	1:1	Perchlorate	Target Compound	N/F	#VALUE!
2LM032275	Unknown		M1K0338-06	1:1	Perchlorate	Confirming Peak	N/F	
2LM032276	Unknown		M1K0338-07	1:1	Perchlorate	Target Compound	1472	1.275563258
2LM032276	Unknown		M1K0338-07	1:1	Perchlorate	Confirming Peak	1154	
2LM032277	Chk Std	CCV	S1K0467-CCV2	1:1 0012466	Perchlorate	Target Compound	211917	3.21066905
2LM032277	Chk Std	CCV	S1K0467-CCV2	1:1 0012466	Perchlorate	Confirming Peak	66004	
2LM032278	Chk Std	QCMRL	S1K0467-CRL2	1:1 0012468	Perchlorate	Target Compound	43563	3.327706058
2LM032278	Chk Std	QCMRL	S1K0467-CRL2	1:1 0012468	Perchlorate	Confirming Peak	13091	
2LM032279	Unknown		S1K0467-CCB2	1:1	Perchlorate	Target Compound	N/F	#VALUE!
2LM032279	Unknown		S1K0467-CCB2	1:1	Perchlorate	Confirming Peak	N/F	
2LM032280	Unknown		M1K0338-08	1:1	Perchlorate	Target Compound	N/F	#VALUE!
2LM032280	Unknown		M1K0338-08	1:1	Perchlorate	Confirming Peak	N/F	
2LM032281	Unknown		M1K0338-09	1:1	Perchlorate	Target Compound	N/F	#VALUE!
2LM032281	Unknown		M1K0338-09	1:1	Perchlorate	Confirming Peak	N/F	
2LM032282	Unknown		M1K0586-01	1:1	Perchlorate	Target Compound	6164	3.017131669
2LM032282	Unknown		M1K0586-01	1:1	Perchlorate	Confirming Peak	2043	



2LM032283	Unknown		M1K0586-02	1:1	Perchlorate	Target Compound	3393	4.826458037
2LM032283	Unknown		M1K0586-02	1:1	Perchlorate	Confirming Peak	703	
2LM032284	Unknown		M1K0586-03	1:1	Perchlorate	Target Compound	8837	2.965436242
2LM032284	Unknown		M1K0586-03	1:1	Perchlorate	Confirming Peak	2980	
2LM032285	Unknown		M1K0586-04	1:1	Perchlorate	Target Compound	9007	3.819762511
2LM032285	Unknown		M1K0586-04	1:1	Perchlorate	Confirming Peak	2358	
2LM032286	Unknown		M1K0586-05	1:1	Perchlorate	Target Compound	3022	1.852851012
2LM032286	Unknown		M1K0586-05	1:1	Perchlorate	Confirming Peak	1631	
2LM032287	Unknown		B1K1411-MS1	1:1	Perchlorate	Target Compound	39264	3.17747026
2LM032287	Unknown		B1K1411-MS1	1:1	Perchlorate	Confirming Peak	12357	
2LM032288	Unknown		B1K1411-MSD1	1:1	Perchlorate	Target Compound	44422	2.880243792
2LM032288	Unknown		B1K1411-MSD1	1:1	Perchlorate	Confirming Peak	15423	
2LM032289	Unknown		B1K1414-BLK1	1:1	Perchlorate	Target Compound	3659	#VALUE!
2LM032289	Unknown		B1K1414-BLK1	1:1	Perchlorate	Confirming Peak	N/F	
2LM032290	Chk Std	CCV	S1K0467-CCV3	1:1 0012466	Perchlorate	Target Compound	201734	3.169426551
2LM032290	Chk Std	CCV	S1K0467-CCV3	1:1 0012466	Perchlorate	Confirming Peak	63650	
2LM032291	Chk Std	QCMRL	S1K0467-CRL3	1:1 0012468	Perchlorate	Target Compound	40798	3.289895976
2LM032291	Chk Std	QCMRL	S1K0467-CRL3	1:1 0012468	Perchlorate	Confirming Peak	12401	
2LM032292	Unknown		S1K0467-CCB3	1:1	Perchlorate	Target Compound	N/F	#VALUE!
2LM032292	Unknown		S1K0467-CCB3	1:1	Perchlorate	Confirming Peak	N/F	
2LM032293	Unknown		B1K1414-BS1	1:1	Perchlorate	Target Compound	43893	3.129848831
2LM032293	Unknown		B1K1414-BS1	1:1	Perchlorate	Confirming Peak	14024	
2LM032294	Unknown		M1K0728-01	1:1	Perchlorate	Target Compound	60617	3.282627532
2LM032294	Unknown		M1K0728-01	1:1	Perchlorate	Confirming Peak	18466	
2LM032295	Unknown		B1K1414-MS1	1:1	Perchlorate	Target Compound	90970	2.990663423
2LM032295	Unknown		B1K1414-MS1	1:1	Perchlorate	Confirming Peak	30418	
2LM032296	Unknown		B1K1414-MSD1	1:1	Perchlorate	Target Compound	84146	3.063307729
2LM032296	Unknown		B1K1414-MSD1	1:1	Perchlorate	Confirming Peak	27469	
2LM032297	Unknown		M1K0728-03	1:1	Perchlorate	Target Compound	N/F	#VALUE!
2LM032297	Unknown		M1K0728-03	1:1	Perchlorate	Confirming Peak	N/F	
2LM032298	Unknown		M1K0728-05	1:1	Perchlorate	Target Compound	3883	2.82811362
2LM032298	Unknown		M1K0728-05	1:1	Perchlorate	Confirming Peak	1373	
2LM032299	Unknown		M1K0728-07	1:1	Perchlorate	Target Compound	28938	3.098950525
2LM032299	Unknown		M1K0728-07	1:1	Perchlorate	Confirming Peak	9338	
2LM032300	Unknown		M1K0728-09	1:1	Perchlorate	Target Compound	26161	2.864447608
2LM032300	Unknown		M1K0728-09	1:1	Perchlorate	Confirming Peak	9133	
2LM032301	Unknown		M1K0728-11	1:1	Perchlorate	Target Compound	26433	3.520175789
2LM032301	Unknown		M1K0728-11	1:1	Perchlorate	Confirming Peak	7509	
2LM032302	Unknown		M1K0728-13	1:1	Perchlorate	Target Compound	27710	3.219846619
2LM032302	Unknown		M1K0728-13	1:1	Perchlorate	Confirming Peak	8606	
2LM032303	Chk Std	CCV	S1K0467-CCV4	1:1	Perchlorate	Target Compound	179321	3.125093672
2LM032303	Chk Std	CCV	S1K0467-CCV4	1:1	Perchlorate	Confirming Peak	57381	
2LM032304	Chk Std	QCMRL	S1K0467-CRL4	1:1	Perchlorate	Target Compound	37083	2.929609733
2LM032304	Chk Std	QCMRL	S1K0467-CRL4	1:1	Perchlorate	Confirming Peak	12658	
2LM032305	Unknown		S1K0467-CCB4	1:1	Perchlorate	Target Compound	N/F	#VALUE!
2LM032305	Unknown		S1K0467-CCB4	1:1	Perchlorate	Confirming Peak	N/F	



Filename	Sample Type	Level	Sample ID	Comments	Compound	Type	Area	IS Rec (50-150 Avg. ICAI)
2LM032255	Unknown		S1K0467-ICB1	1:1	O18LP	Internal Standard	1373183	
2LM032256	Cal Std	1	S1K0467-CAL1	1:1 0012469	O18LP	Internal Standard	1303270	
2LM032257	Cal Std	2	S1K0467-CAL2	1:1 0012468	O18LP	Internal Standard	1232995	
2LM032258	Cal Std	3	S1K0467-CAL3	1:1 0012467	O18LP	Internal Standard	1266053	
2LM032259	Cal Std	4	S1K0467-CAL4	1:1 0012466	O18LP	Internal Standard	1280767	1235382.571
2LM032260	Cal Std	5	S1K0467-CAL5	1:1 0012465	O18LP	Internal Standard	1283639	
2LM032261	Cal Std	6	S1K0467-CAL6	1:1 0012464	O18LP	Internal Standard	1099645	
2LM032262	Cal Std	7	S1K0467-CAL7	1:1 0012463	O18LP	Internal Standard	1181309	
2LM032263	Chk Std	ICV	S1K0467-ICV1	1:1 0012475	O18LP	Internal Standard	1311711	106.1785256
2LM032264	Unknown		S1K0467-CCB1	1:1	O18LP	Internal Standard	1299178	105.1640221
2LM032265	Chk Std	CCV	S1K0467-CCV1	1:1 0012466	O18LP	Internal Standard	1316163	106.5388998
2LM032266	Chk Std	QCMRL	S1K0467-CRL1	1:1 0012468	O18LP	Internal Standard	1174525	95.07378744
2LM032267	Unknown		S1K0467-IFA1	1:1 0012477	O18LP	Internal Standard	1108705	89.74588323
2LM032268	Unknown		B1K1411-BLK1	1:1	O18LP	Internal Standard	1094479	88.59433712
2LM032269	Unknown		B1K1411-BS1	1:1 0012474	O18LP	Internal Standard	1089985	88.23056316
2LM032270	Unknown		M1K0338-01	1:1	O18LP	Internal Standard	1134439	91.82896264
2LM032271	Unknown		M1K0338-02	1:1	O18LP	Internal Standard	1156960	93.65196068
2LM032272	Unknown		M1K0338-03	1:1	O18LP	Internal Standard	1159347	93.84518017
2LM032273	Unknown		M1K0338-04	1:1	O18LP	Internal Standard	768107	62.17563836
2LM032274	Unknown		M1K0338-05	1:1	O18LP	Internal Standard	1087450	88.02536357
2LM032275	Unknown		M1K0338-06	1:1	O18LP	Internal Standard	903426	73.12924926
2LM032276	Unknown		M1K0338-07	1:1	O18LP	Internal Standard	1044134	84.51908131
2LM032277	Chk Std	CCV	S1K0467-CCV2	1:1 0012466	O18LP	Internal Standard	1207068	97.70803214
2LM032278	Chk Std	QCMRL	S1K0467-CRL2	1:1 0012468	O18LP	Internal Standard	1264922	102.3911159
2LM032279	Unknown		S1K0467-CCB2	1:1	O18LP	Internal Standard	1244461	100.7348678
2LM032280	Unknown		M1K0338-08	1:1	O18LP	Internal Standard	1235458	100.0061057
2LM032281	Unknown		M1K0338-09	1:1	O18LP	Internal Standard	1020047	82.56932092
2LM032282	Unknown		M1K0586-01	1:1	O18LP	Internal Standard	1004392	81.30210214
2LM032283	Unknown		M1K0586-02	1:1	O18LP	Internal Standard	858816	69.51822212
2LM032284	Unknown		M1K0586-03	1:1	O18LP	Internal Standard	735620	59.54592666
2LM032285	Unknown		M1K0586-04	1:1	O18LP	Internal Standard	743693	60.19940844
2LM032286	Unknown		M1K0586-05	1:1	O18LP	Internal Standard	824510	66.74126858
2LM032287	Unknown		B1K1411-MS1	1:1	O18LP	Internal Standard	974676	78.89669342
2LM032288	Unknown		B1K1411-MSD1	1:1	O18LP	Internal Standard	1105509	89.48717795
2LM032289	Unknown		B1K1414-BLK1	1:1	O18LP	Internal Standard	1257021	101.7515569
2LM032290	Chk Std	CCV	S1K0467-CCV3	1:1 0012466	O18LP	Internal Standard	1145001	92.68392047
2LM032291	Chk Std	QCMRL	S1K0467-CRL3	1:1 0012468	O18LP	Internal Standard	1164709	94.27921576
2LM032292	Unknown		S1K0467-CCB3	1:1	O18LP	Internal Standard	1144360	92.63203371
2LM032293	Unknown		B1K1414-BS1	1:1	O18LP	Internal Standard	1196028	96.81438185
2LM032294	Unknown		M1K0728-01	1:1	O18LP	Internal Standard	1144110	92.61179706
2LM032295	Unknown		B1K1414-MS1	1:1	O18LP	Internal Standard	1066511	86.33042303
2LM032296	Unknown		B1K1414-MSD1	1:1	O18LP	Internal Standard	1001025	81.02955499
2LM032297	Unknown		M1K0728-03	1:1	O18LP	Internal Standard	1115350	90.28377329
2LM032298	Unknown		M1K0728-05	1:1	O18LP	Internal Standard	934686	75.6596395
2LM032299	Unknown		M1K0728-07	1:1	O18LP	Internal Standard	817524	66.17577574
2LM032300	Unknown		M1K0728-09	1:1	O18LP	Internal Standard	808478	65.44353293
2LM032301	Unknown		M1K0728-11	1:1	O18LP	Internal Standard	797112	64.52349405
2LM032302	Unknown		M1K0728-13	1:1	O18LP	Internal Standard	817946	66.2099352
2LM032303	Chk Std	CCV	S1K0467-CCV4	1:1	O18LP	Internal Standard	1039826	84.17036342
2LM032304	Chk Std	QCMRL	S1K0467-CRL4	1:1	O18LP	Internal Standard	1083337	87.69243027
2LM032305	Unknown		S1K0467-CCB4	1:1	O18LP	Internal Standard	1046354	84.69878273



Laboratory Report Number: M1K0338

Client Project ID: LHAAP

BATCH LOG SUMMARY  
SECTION A1

Batch: B1K1411

Prepared: 11/23/2021 9:23:00AM

Matrix: Aqueous

Prepared By: CAS

Method: EPA 6850

Laboratory ID	Client / Source ID	Initial	Final						Spike(s)
B1K1411-BLK1		10.0 mL	10.0 mL						
B1K1411-BS1		10.0 mL	10.0 mL						1006965 200µL
M1K0338-01	LHSMW01-211104	10.0 mL	10.0 mL						
M1K0338-02	LHSMW01-211104-F D	10.0 mL	10.0 mL						
M1K0338-03	04WW04-211104	10.0 mL	10.0 mL						
M1K0338-04	04WW08-211104	10.0 mL	10.0 mL						
M1K0338-05	04WW02-211104	10.0 mL	10.0 mL						
M1K0338-06	04WW06-211104	10.0 mL	10.0 mL						
M1K0338-07	LHSMW02-211104	10.0 mL	10.0 mL						
M1K0338-08	04WW11-211104	10.0 mL	10.0 mL						
M1K0338-09	04WW01-211104	10.0 mL	10.0 mL						

## Standards used in the batch:

Standard ID	Description	Date Prepared	Prepared By
1006965	6850/331 Perchlorate Alternate Solution (10 ppb)	8/11/2021 5:13:38PM	John Richards

## Reagents used in the batch:

Reagent ID	Description	Prepared	Prepared By
1000181	6850/331 Column	1/8/2021 2:36:22PM	** Vendor **
1008665	0.45 um PTFE Syringe Filter	10/11/2021 10:46:38AM	Asa Timmons
1009215	0.1% Acetic Acid in Water	10/26/2021 8:46:45AM	Craig Smith
1009216	0.1% Acetic Acid in Acetonitrile	10/26/2021 8:48:32AM	Craig Smith





Laboratory Report Number: M1K0338

Client Project ID: LHAAP

**SEQUENCE LOG SUMMARY**  
**SECTION A2**
**Sequence:** S1K0467**Instrument:** LCMS2**Calibration:** 21K0035**Analyst 1:** CAS**Method:** EPA 6850**SOP:** HPLC06

#	File ID	Laboratory ID	Client ID	Analyzed	Reference	Standard
1	2LM032255	S1K0467-ICB1	Initial Cal Blank	11/23/21 16:30		
2	2LM032256	S1K0467-CAL1	Cal Standard	11/23/21 16:43		1007584
3	2LM032257	S1K0467-CAL2	Cal Standard	11/23/21 16:56		1007583
4	2LM032258	S1K0467-CAL3	Cal Standard	11/23/21 17:09		1007582
5	2LM032259	S1K0467-CAL4	Cal Standard	11/23/21 17:23		1007581
6	2LM032260	S1K0467-CAL5	Cal Standard	11/23/21 17:36		1007580
7	2LM032261	S1K0467-CAL6	Cal Standard	11/23/21 17:49		1007579
8	2LM032262	S1K0467-CAL7	Cal Standard	11/23/21 18:02		1007578
9	2LM032263	S1K0467-ICV1	Initial Cal Check	11/23/21 18:16		1006966
10	2LM032264	S1K0467-CCB1	Calibration Blank	11/23/21 18:29		
11	2LM032265	S1K0467-CCV1	Calibration Check	11/23/21 18:42		1007581
12	2LM032266	S1K0467-CRL1	Instrument RL Check	11/23/21 18:55		1007583
13	2LM032267	S1K0467-IFA1	Interference Check A	11/23/21 19:09		1006967
14	2LM032268	B1K1411-BLK1	Blank	11/23/21 19:22		
15	2LM032269	B1K1411-BS1	LCS	11/23/21 19:35		
16	2LM032270	M1K0338-01	LHSMW01-211104	11/23/21 19:48		
17	2LM032271	M1K0338-02	LHSMW01-211104-FD	11/23/21 20:02		
18	2LM032272	M1K0338-03	04WW04-211104	11/23/21 20:15		
19	2LM032273	M1K0338-04	04WW08-211104	11/23/21 20:28		
20	2LM032274	M1K0338-05	04WW02-211104	11/23/21 20:41		
21	2LM032275	M1K0338-06	04WW06-211104	11/23/21 20:55		
22	2LM032276	M1K0338-07	LHSMW02-211104	11/23/21 21:08		
23	2LM032277	S1K0467-CCV2	Calibration Check	11/23/21 21:21		1007581
24	2LM032278	S1K0467-CRL2	Instrument RL Check	11/23/21 21:34		1007583
25	2LM032279	S1K0467-CCB2	Calibration Blank	11/23/21 21:48		
26	2LM032280	M1K0338-08	04WW11-211104	11/23/21 22:01		
27	2LM032281	M1K0338-09	04WW01-211104	11/23/21 22:14		
36	2LM032290	S1K0467-CCV3	Calibration Check	11/24/21 00:13		1007581
37	2LM032291	S1K0467-CRL3	Instrument RL Check	11/24/21 00:27		1007583
38	2LM032292	S1K0467-CCB3	Calibration Blank	11/24/21 00:40		
49	2LM032303	S1K0467-CCV4	Calibration Check	11/24/21 03:06		1007581
50	2LM032304	S1K0467-CRL4	Instrument RL Check	11/24/21 03:19		1007583
51	2LM032305	S1K0467-CCB4	Calibration Blank	11/24/21 03:32		

Microbac Laboratories, Inc.

158 Starlite Drive | Marietta, OH 45750 | 800.373.4071 | www.microbac.com



Laboratory Report Number: M1K0338

Client Project ID: LHAAP

**SEQUENCE LOG SUMMARY  
SECTION A2**
**Sequence Standards**

Standard ID	Description	Prepared	PreparedBy	Expires
1006966	6850/331 Perchlorate ICV (1 ppb)	08/11/2021	John Richards	08/11/2022
1006967	6850 Perchlorate Alternate 0.2 ppb MCT	08/11/2021	John Richards	08/11/2022
1007578	6850/331 ICAL STD @ 10 ppb	09/07/2021	Craig Smith	09/07/2022
1007579	6850/331 ICAL STD @ 5 ppb	09/07/2021	Craig Smith	09/07/2022
1007580	6850/331 ICAL STD @ 2 ppb	09/07/2021	Craig Smith	09/07/2022
1007581	6850/331 ICAL STD-CCV @ 1 ppb	09/07/2021	Craig Smith	09/07/2022
1007582	6850/331 ICAL STD @ 0.5 ppb	09/07/2021	Craig Smith	09/07/2022
1007583	6850/331 ICAL STD-MRL @ 0.2 ppb	09/07/2021	Craig Smith	09/07/2022
1007584	6850/331 ICAL STD @ 0.1 ppb	09/07/2021	Craig Smith	09/07/2022

**Sequence Internal Standard**

Standard ID	Description	Prepared	PreparedBy	Expires
1000597	6850/331 IS Working (5.0 ppb)	01/20/2021	Craig Smith	01/20/2022



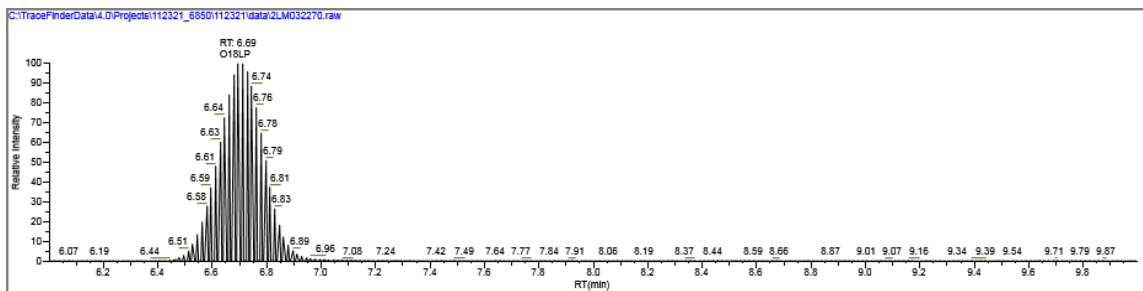
# **Section B: HPLC Organics EPA 6850 Sample Raw Data**

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R-B4	M1K0338-01	2LM032270	N/A	M1K0338-01	11/23/2021 7:48:54 PM	1:01



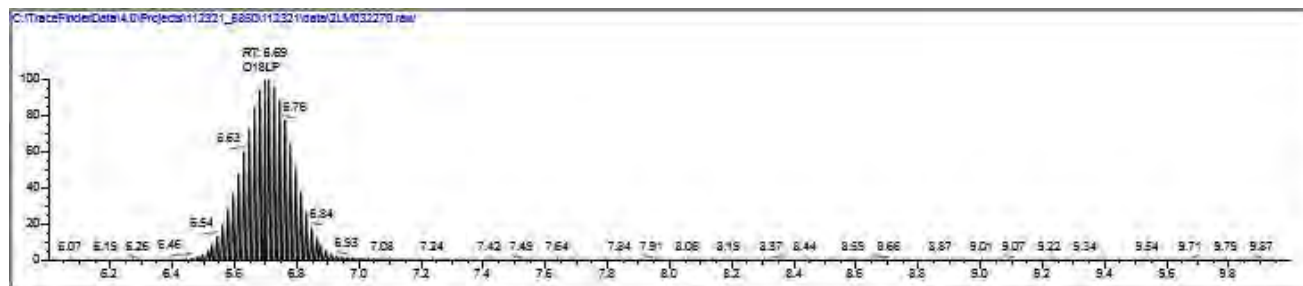
Internal Standards	RT	Quan Peak	Response			Injected	Calculated	Flags
	O18LP	6.69	89	1134439			Conc Units	
						5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected	Calculated	Flags
						Conc Units	Conc Units	
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected	Calculated	Flags
Perchlorate	N/F	N/F	N/F	Linear	0.000	Conc Units	Conc Units	
						N/F ug/L	N/F ug/L	

# Sample Report

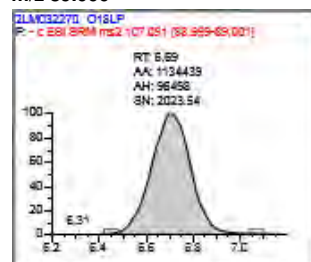
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 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: M1K0338-01  
 Diln Factor: 1.00  
 Comments: 1:01

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

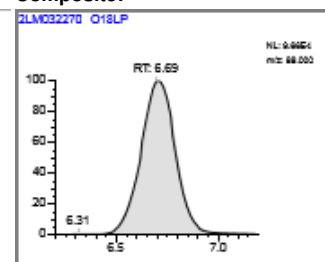
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 11/23/2021 7:48:54 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:B4



m/z 89.000



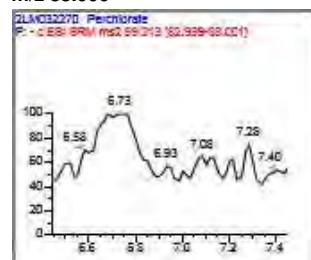
Composite:



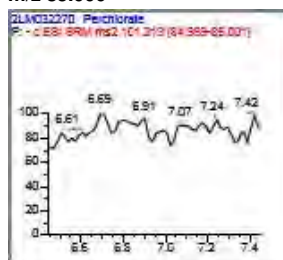
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.69	m/z 89.000	1134439	5.000		N/A

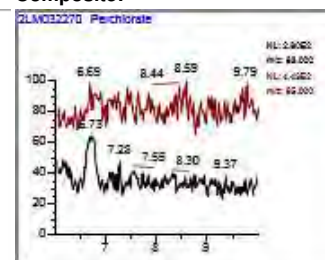
m/z 83.000



m/z 85.000



Composite:



Perchlorate

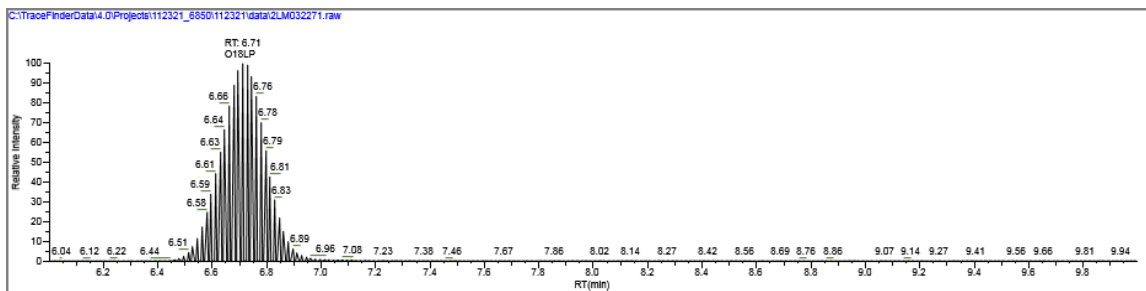
RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
0.00	m/z 83.000	Compound Not Found	N/A		
	m/z 85.000				

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:B5	M1K0338-02	2LM032271	N/A	M1K0338-02	11/23/2021 8:02:09 PM	1:01



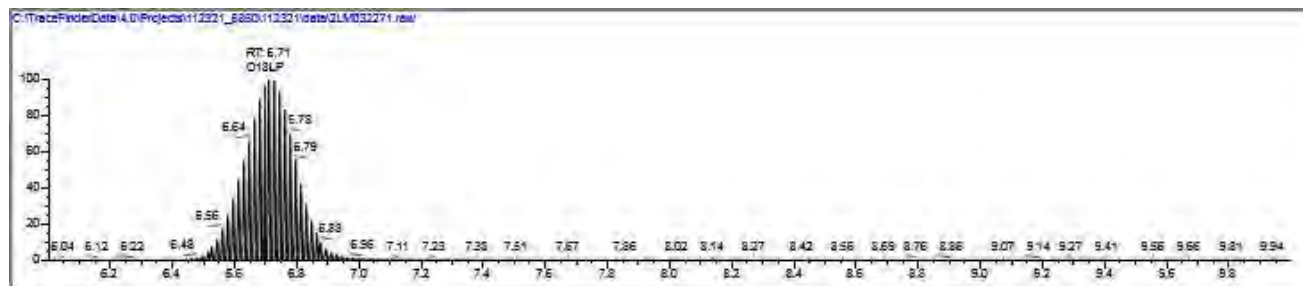
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	6.71	89	1156960			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	N/F	N/F	N/F	Linear	0.000	N/F ug/L	N/F ug/L	

# Sample Report

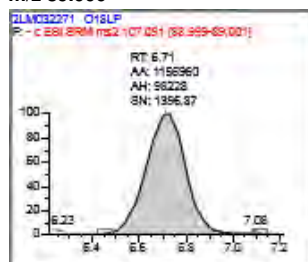
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 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx  
 Sample ID: M1K0338-02  
 Diln Factor: 1.00  
 Comments: 1:01

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

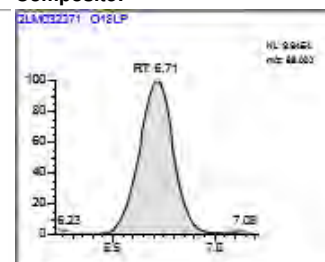
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 11/23/2021 8:02:09 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:B5



m/z 89.000



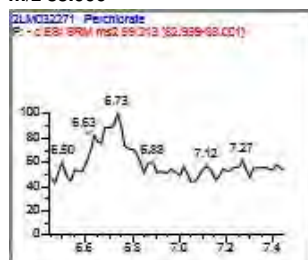
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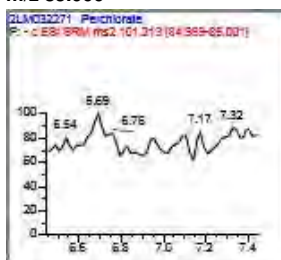
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.71	m/z 89.000	1156960	5.000		N/A

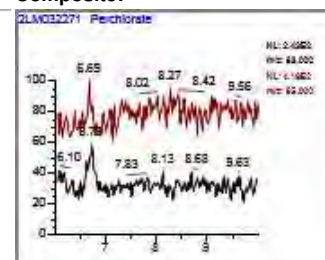
m/z 83.000



m/z 85.000



Composite:



Perchlorate

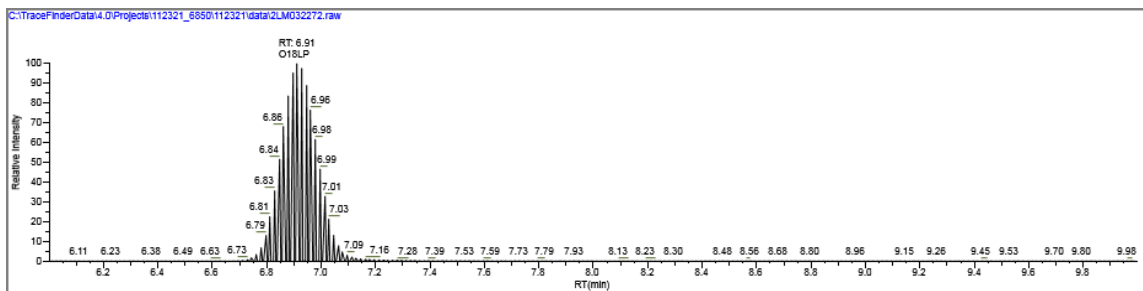
RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
0.00	m/z 83.000	Compound Not Found	N/A		
	m/z 85.000				

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:B6	M1K0338-03	2LM032272	N/A	M1K0338-03	11/23/2021 8:15:24 PM	1:01



Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	6.91	89	1159347			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	6.92	83	2732	Linear	0.002	0.009 ug/L	0.009 ug/L	I

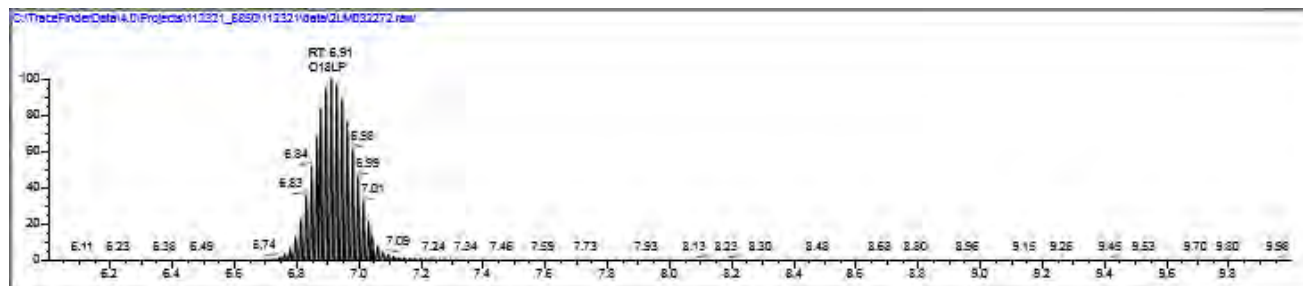


# Sample Report

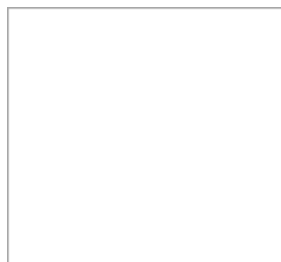
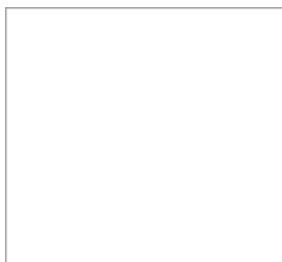
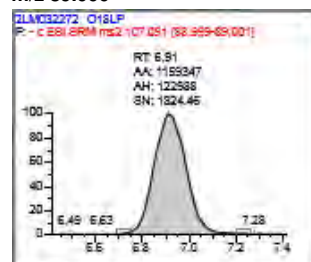
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 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx  
 Sample ID: M1K0338-03  
 Diln Factor: 1.00  
 Comments: 1:01

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

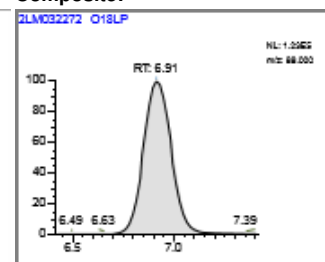
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 11/23/2021 8:15:24 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:B6



m/z 89.000



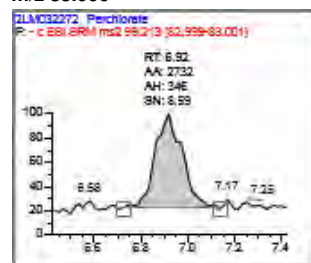
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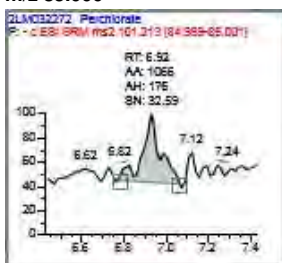
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.91	m/z 89.000	1159347	5.000		N/A

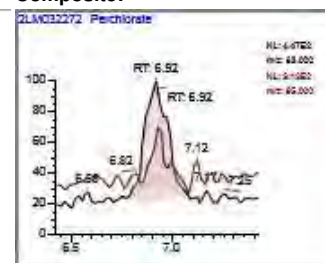
m/z 83.000



m/z 85.000



Composite:



Perchlorate

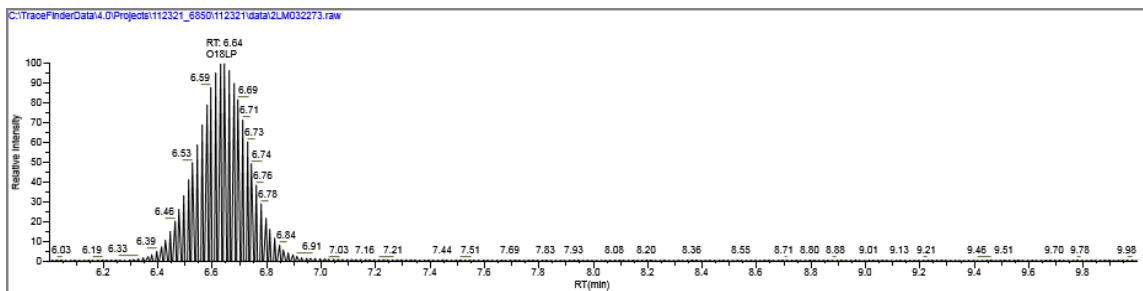
RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.92	m/z 83.000	2732	0.009		N/A
6.92	m/z 85.000	1066		25.81 - 38.71	39.04 *

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:B7	M1K0338-04	2LM032273	N/A	M1K0338-04	11/23/2021 8:28:39 PM	1:01



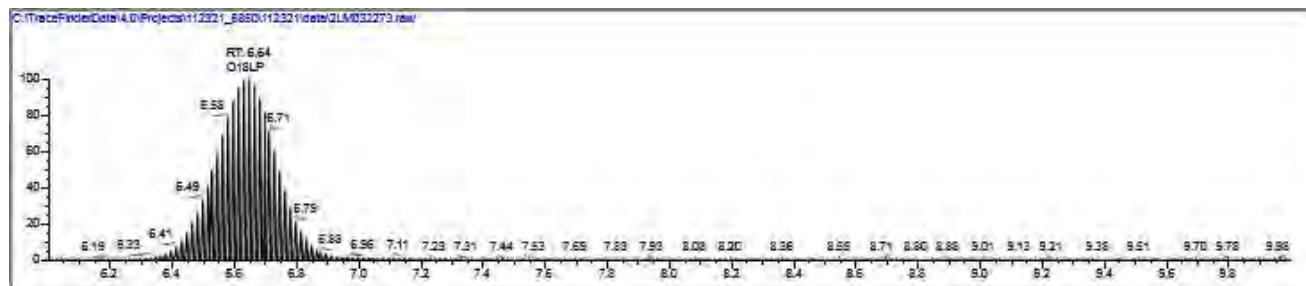
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	6.64	89	768107			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	N/F	N/F	N/F	Linear	0.000	N/F ug/L	N/F ug/L	

# Sample Report

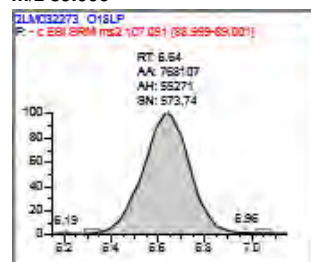
Data File: 2LM032273  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: M1K0338-04  
 Diln Factor: 1.00  
 Comments: 1:01

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

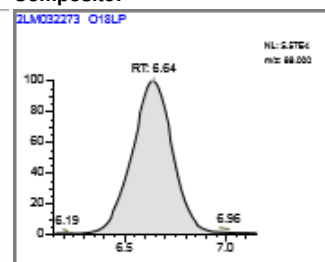
Tune report not found  
 11/23/2021 8:28:39 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:B7



m/z 89.000



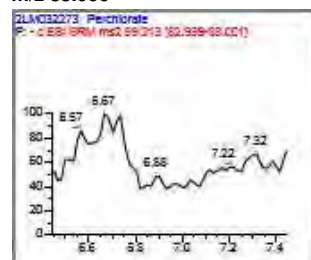
Composite:



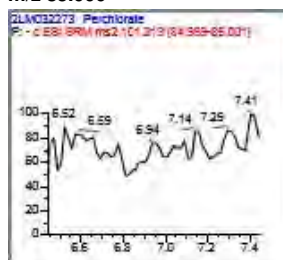
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.64	m/z 89.000	768107	5.000		N/A

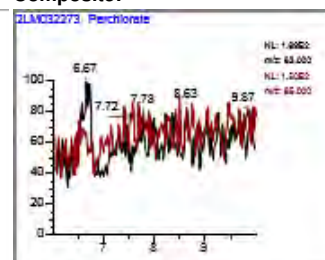
m/z 83.000



m/z 85.000



Composite:



Perchlorate

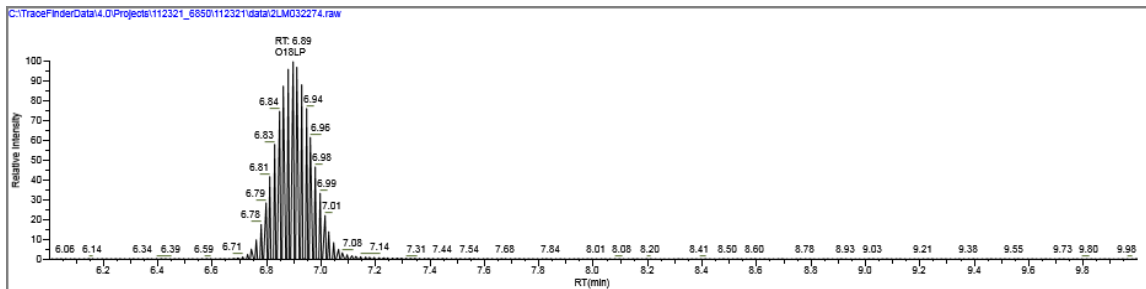
RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
0.00	m/z 83.000	Compound Not Found	N/A		
	m/z 85.000				

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:B8	M1K0338-05	2LM032274	N/A	M1K0338-05	11/23/2021 8:41:54 PM	1:01



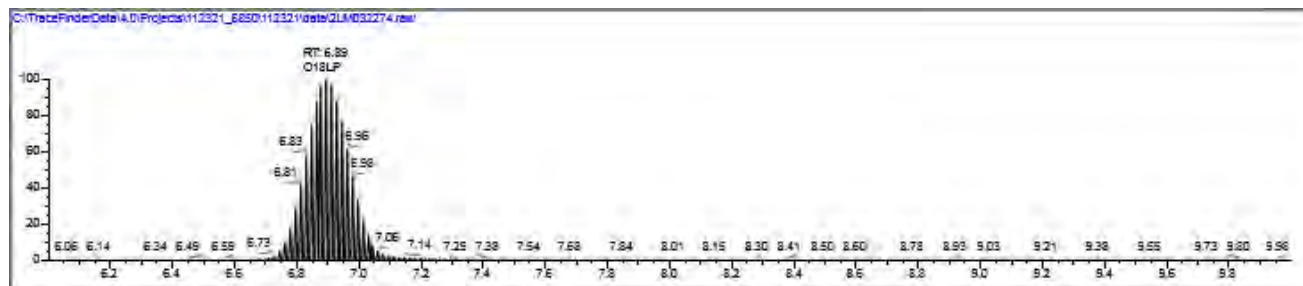
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	O18LP 6.89	89	1087450			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
	Perchlorate 6.88	83	3973	Linear	0.004	0.016 ug/L	0.016 ug/L	

# Sample Report

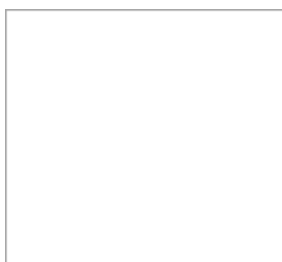
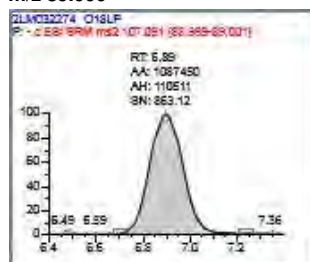
Data File: 2LM032274  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx  
 Sample ID: M1K0338-05  
 Diln Factor: 1.00  
 Comments: 1:01

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

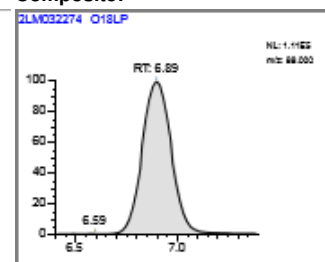
Tune report not found  
 11/23/2021 8:41:54 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:B8



## m/z 89.000



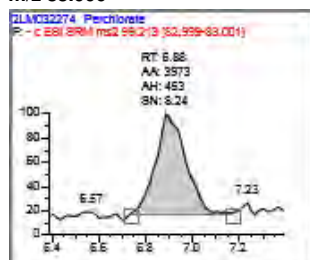
## Composite:



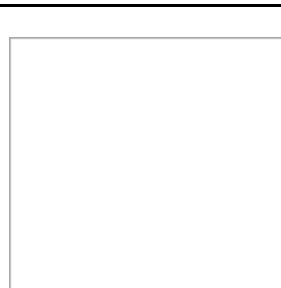
## O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.89	m/z 89.000	1087450	5.000		N/A

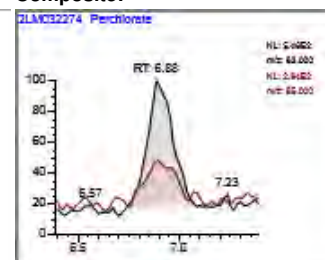
## m/z 83.000



## m/z 85.000



## Composite:



## Perchlorate

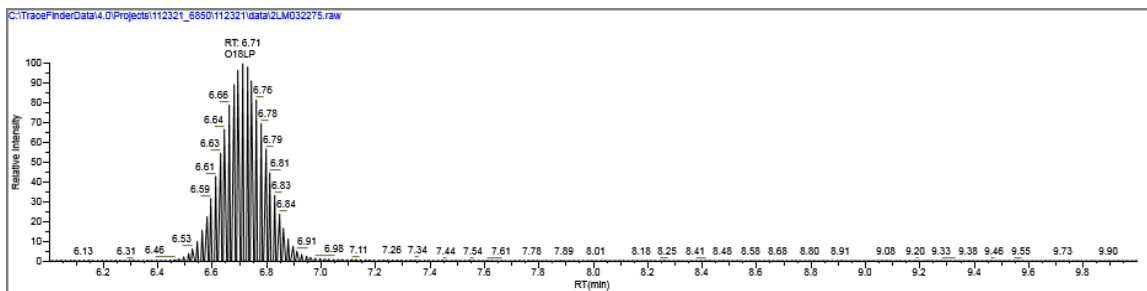
RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.88	m/z 83.000	3973	0.016		N/A
6.89	m/z 85.000	1327		25.81 - 38.71	33.4

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:B9	M1K0338-06	2LM032275	N/A	M1K0338-06	11/23/2021 8:55:09 PM	1:01



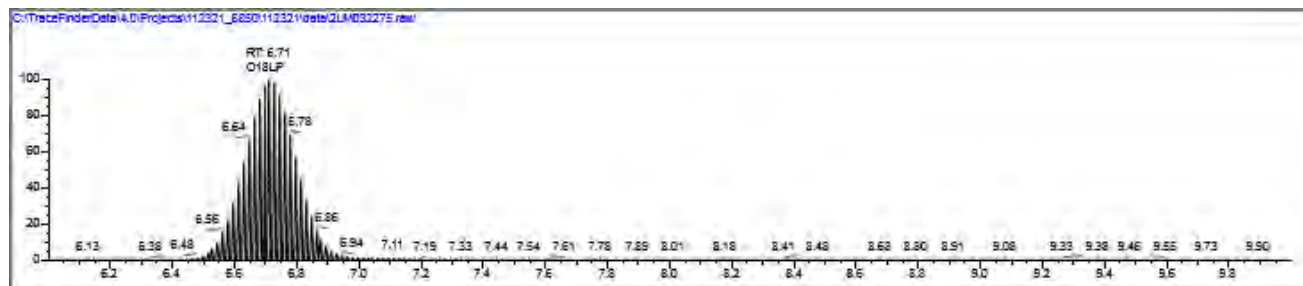
Internal Standards	RT	Quan Peak	Response			Injected	Calculated	Flags
	O18LP 6.71	89	903426			Conc Units 5.000 ug/L	Conc Units 5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	N/F	N/F	N/F	Linear	0.000	N/F ug/L	N/F ug/L	

# Sample Report

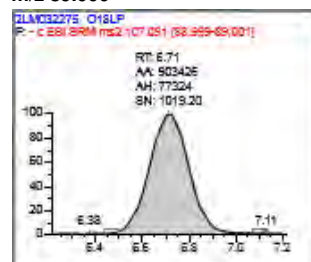
Data File: 2LM032275  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: M1K0338-06  
 Diln Factor: 1.00  
 Comments: 1:01

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

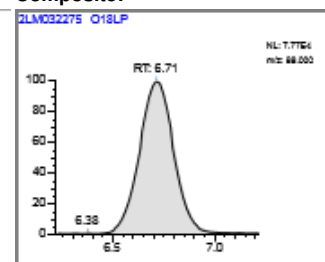
Tune report not found  
 11/23/2021 8:55:09 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:B9



m/z 89.000



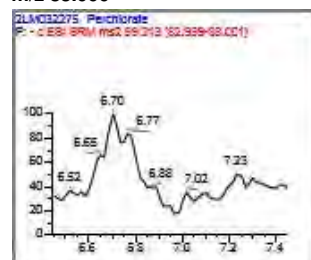
Composite:



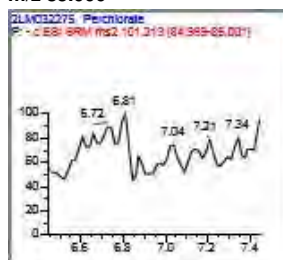
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.71	m/z 89.000	903426	5.000		N/A

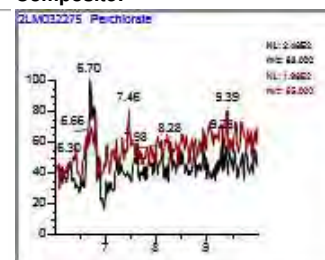
m/z 83.000



m/z 85.000



Composite:



Perchlorate

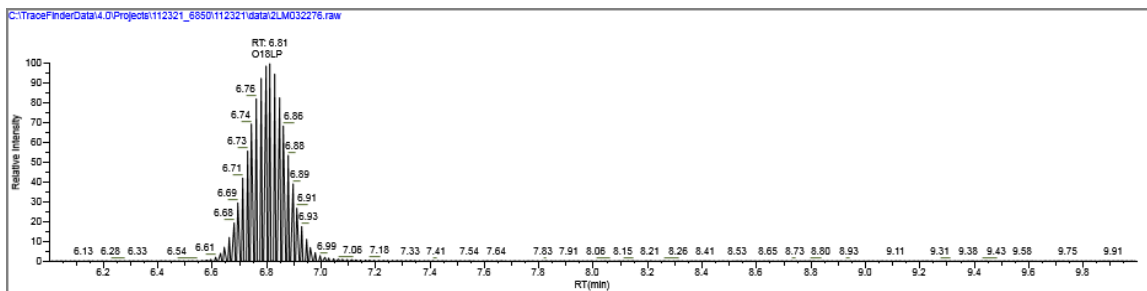
RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
0.00	m/z 83.000	Compound Not Found	N/A		
	m/z 85.000				

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:C1	M1K0338-07	2LM032276	N/A	M1K0338-07	11/23/2021 9:08:24 PM	1:01



Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	6.81	89	1044134			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	6.82	83	1472	Linear	0.001	0.004 ug/L	0.004 ug/L	I

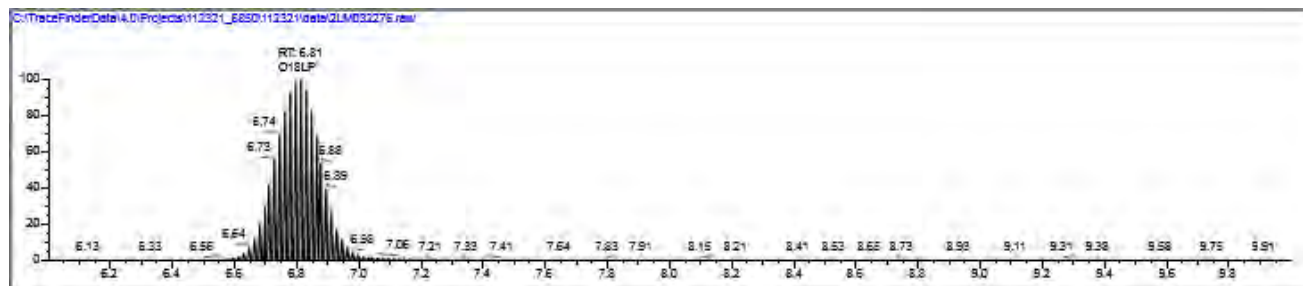


# Sample Report

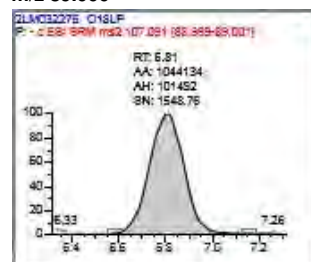
Data File: 2LM032276  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: M1K0338-07  
 Diln Factor: 1.00  
 Comments: 1:01

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

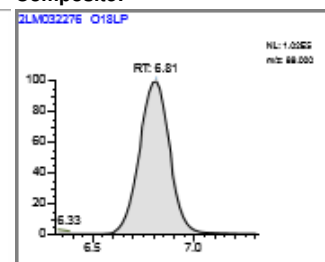
Tune report not found  
 11/23/2021 9:08:24 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:C1



m/z 89.000



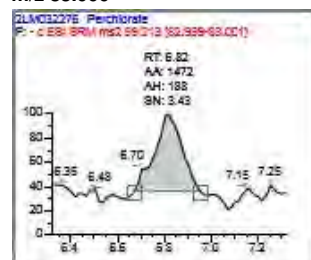
Composite:



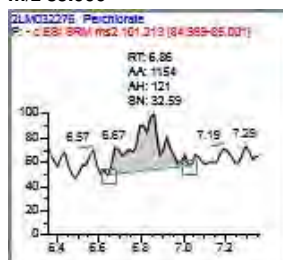
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.81	m/z 89.000	1044134	5.000		N/A

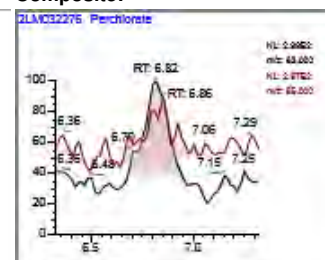
m/z 83.000



m/z 85.000



Composite:



Perchlorate

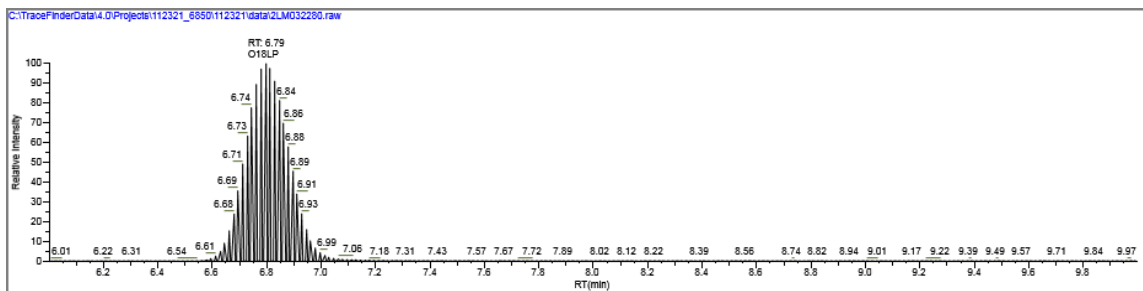
RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.82	m/z 83.000	1472	0.004		N/A
6.86	m/z 85.000	1154		25.81 - 38.71	78.37 *

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:02	M1K0338-08	2LM032280	N/A	M1K0338-08	11/23/2021 10:01:24 PM	1:01



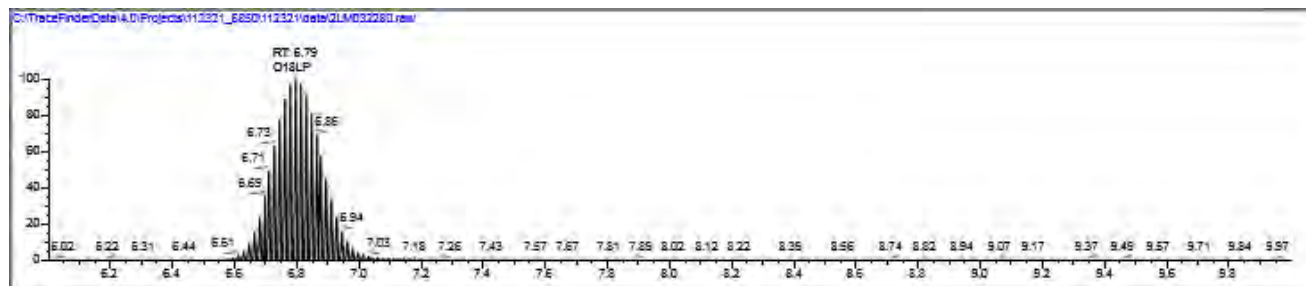
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	6.79	89	1235458			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	N/F	N/F	N/F	Linear	0.000	N/F ug/L	N/F ug/L	

# Sample Report

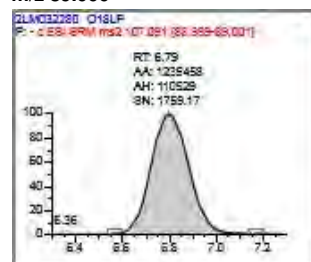
Data File: 2LM032280  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx  
 Sample ID: M1K0338-08  
 Diln Factor: 1.00  
 Comments: 1:01

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

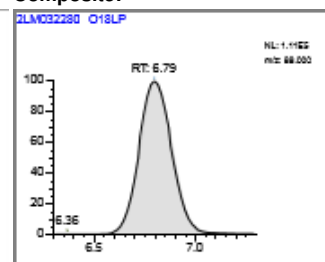
Tune report not found  
 11/23/2021 10:01:24 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:C2



m/z 89.000



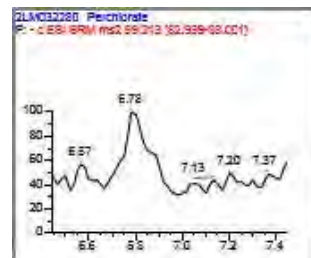
Composite:



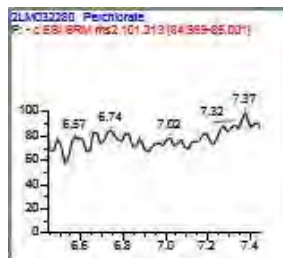
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.79	m/z 89.000	1235458	5.000		N/A

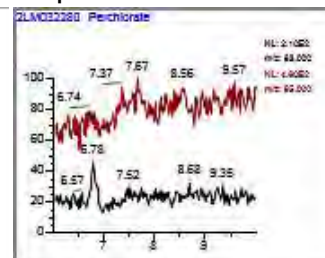
m/z 83.000



m/z 85.000



Composite:



Perchlorate

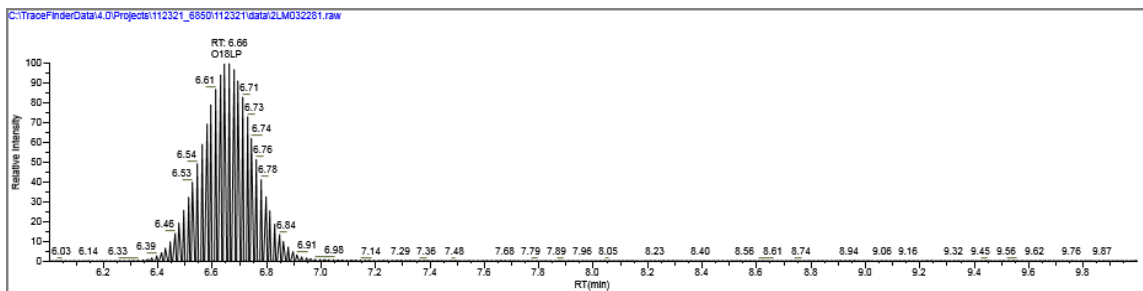
RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
0.00	m/z 83.000	Compound Not Found	N/A		
	m/z 85.000				

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:C3	M1K0338-09	2LM032281	N/A	M1K0338-09	11/23/2021 10:14:38 PM	1:01



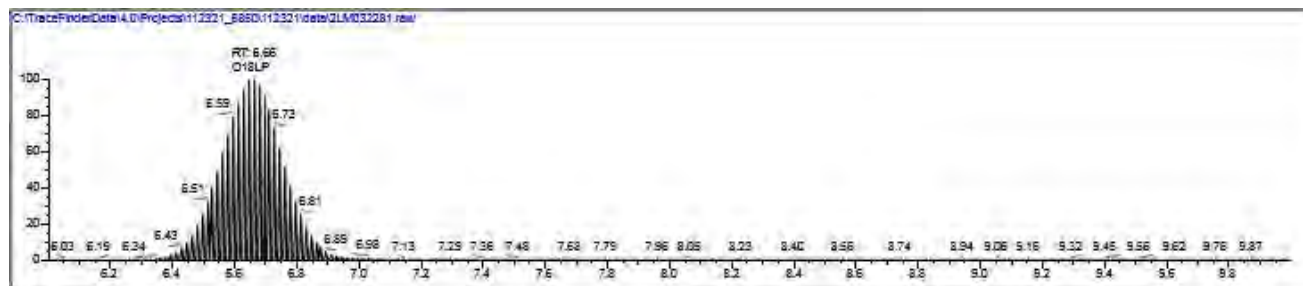
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	6.66	89	1020047			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	N/F	N/F	N/F	Linear	0.000	N/F ug/L	N/F ug/L	

# Sample Report

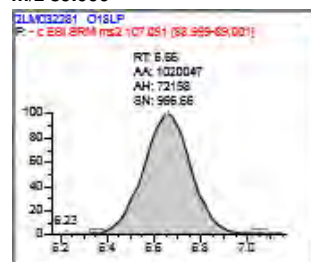
Data File: 2LM032281  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: M1K0338-09  
 Diln Factor: 1.00  
 Comments: 1:01

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

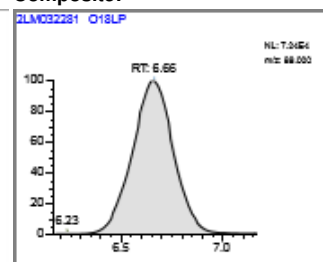
Tune report not found  
 11/23/2021 10:14:38 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:C3



m/z 89.000



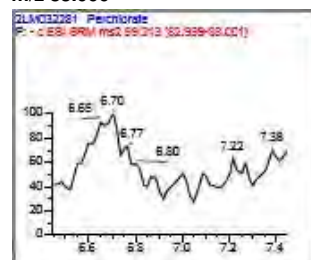
Composite:



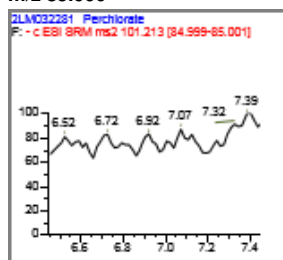
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.66	m/z 89.000	1020047	5.000		N/A

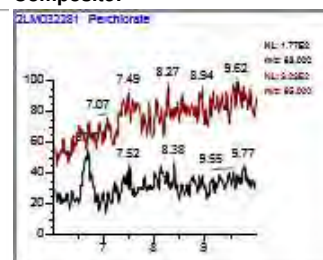
m/z 83.000



m/z 85.000



Composite:



Perchlorate

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
0.00	m/z 83.000	Compound Not Found	N/A		
	m/z 85.000				



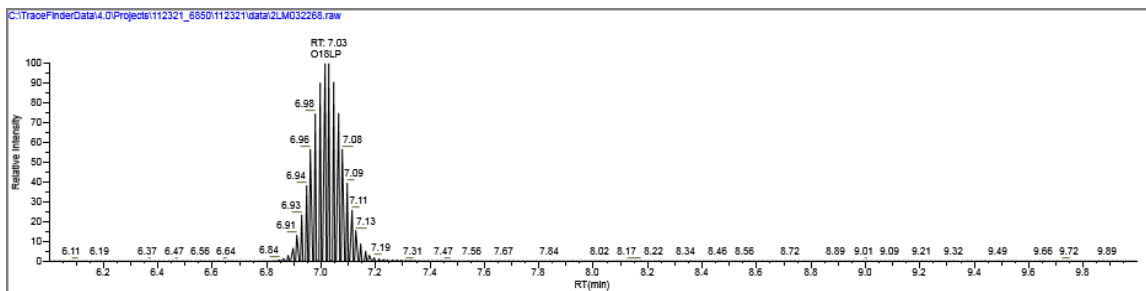
# **Section C: HPLC Organics EPA 6850 QC Sample Raw Data**

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:B2	B1K1411-BLK1	2LM032268	N/A	BLANK	11/23/2021 7:22:25 PM	1:01



Internal Standards	RT	Quan Peak	Response	Injected Conc Units	Calculated Conc Units	Flags
O18LP	7.03	89	1094479	5.000 ug/L	5.000 ug/L	

Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
------------	----	-----------	----------	------------	-------------------------------	---------------------	-----------------------	-------

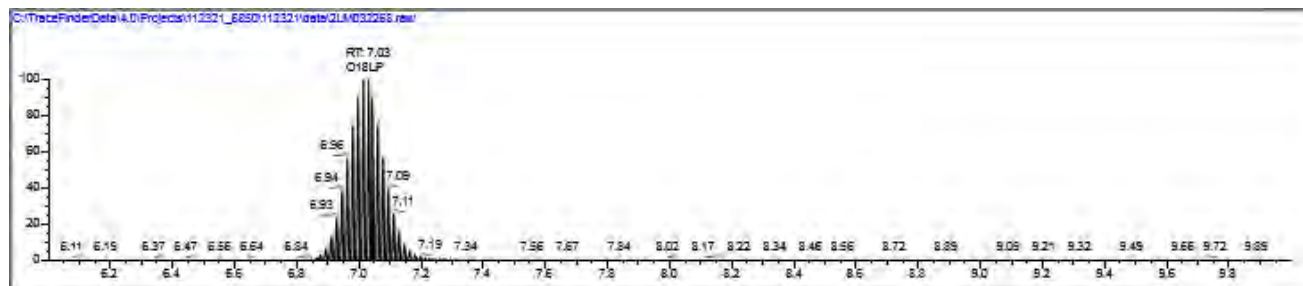
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	7.03	83	3243	Linear	0.003	0.013 ug/L	0.013 ug/L	

# Sample Report

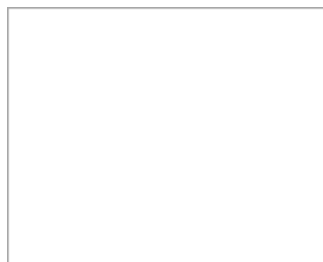
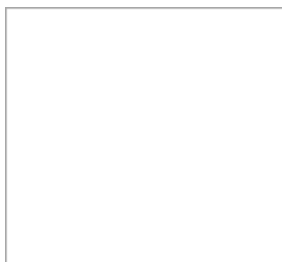
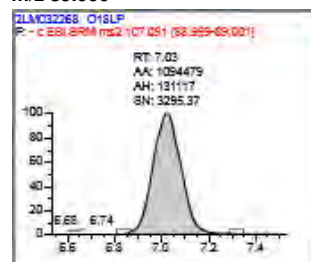
Data File: 2LM032268  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx  
 Sample ID: B1K1411-BLK1  
 Diln Factor: 1.00  
 Comments: 1:01

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

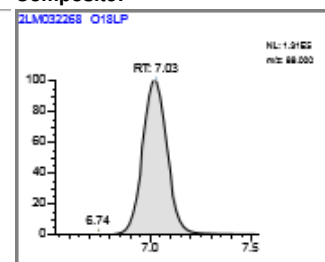
Tune report not found  
 11/23/2021 7:22:25 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:B2



m/z 89.000



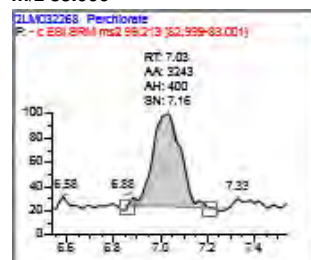
Composite:



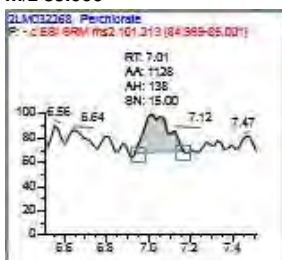
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
7.03	m/z 89.000	1094479	5.000		N/A

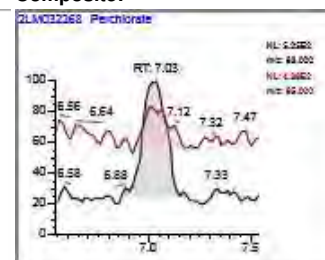
m/z 83.000



m/z 85.000



Composite:



Perchlorate

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
7.03	m/z 83.000	3243	0.013		N/A
7.01	m/z 85.000	1128		25.81 - 38.71	34.79

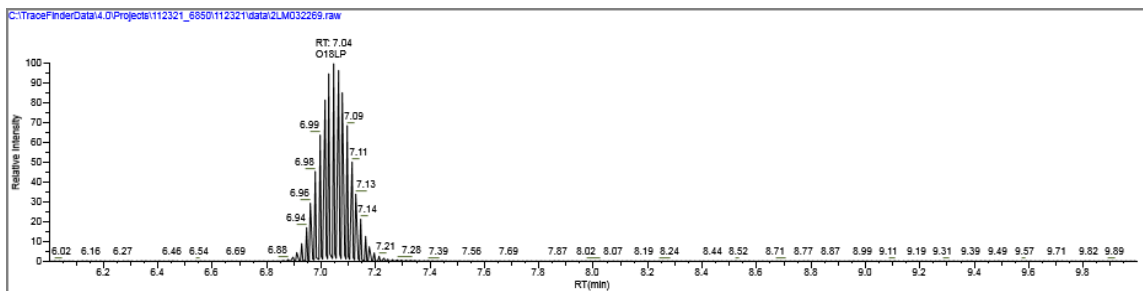


## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:B3	B1K1411-BS1	2LM032269	N/A	LCS (0.2ug/L)	11/23/2021 7:35:39 PM	1:1 0012474



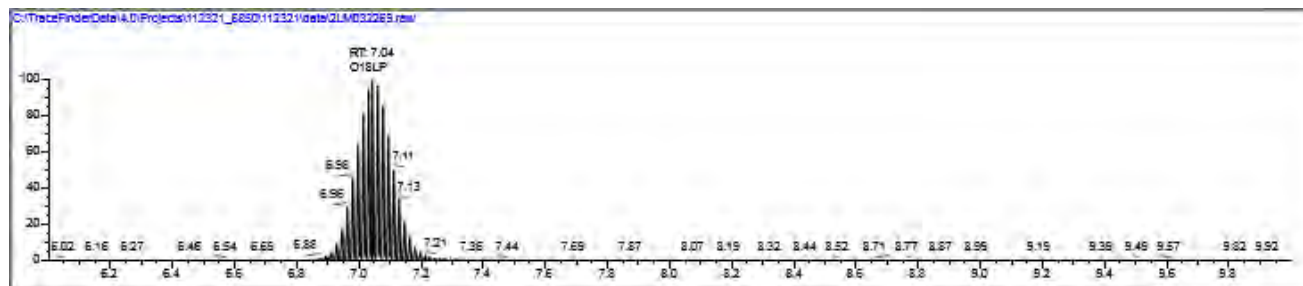
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	7.04	89	1089985			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	7.05	83	41165	Linear	0.038	0.202 ug/L	0.202 ug/L	

## Sample Report

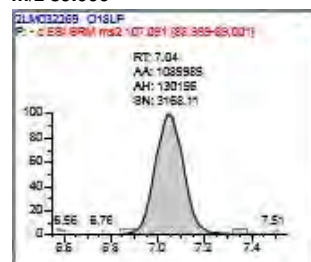
Data File: 2LM032269  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx  
 Sample ID: B1K1411-BS1  
 Diln Factor: 1.00  
 Comments: 1:1 0012474

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

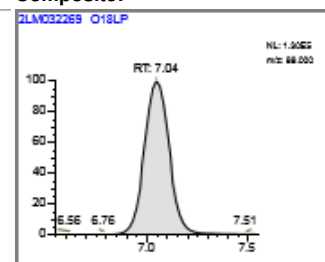
Tune report not found  
 11/23/2021 7:35:39 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:B3



m/z 89.000



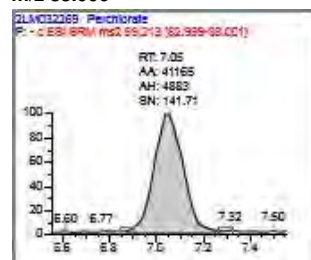
Composite:



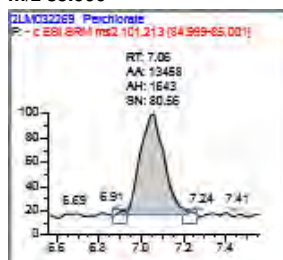
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
7.04	m/z 89.000	1089985	5.000		N/A

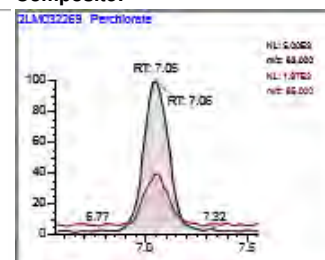
m/z 83.000



m/z 85.000



Composite:



Perchlorate

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
7.05	m/z 83.000	41165	0.202		N/A
7.06	m/z 85.000	13458		25.81 - 38.71	32.69



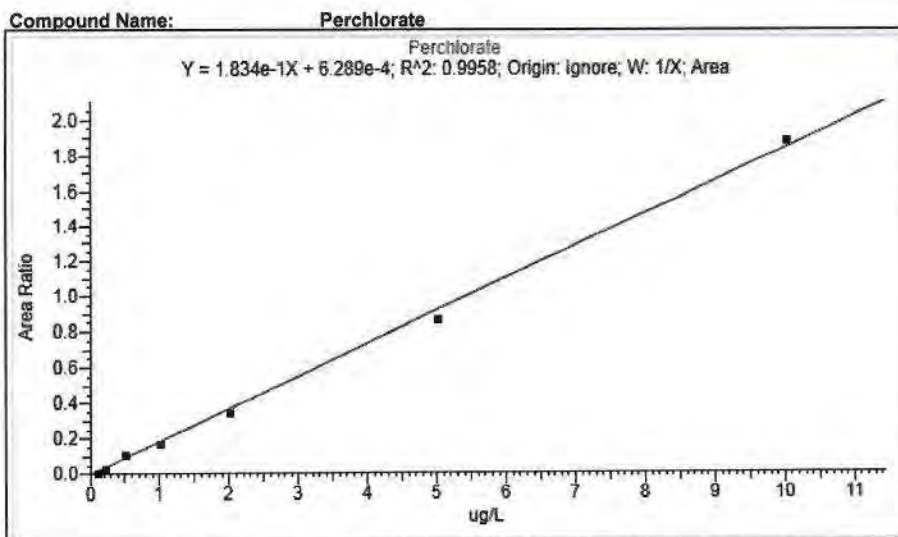
# **Section D: HPLC Organics EPA 6850 Calibration Raw Data**

## Compound Calibration Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch:

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cal File: 112321.calx

112321.00



Linear  
 Fail A

Level	Std Amount	Std Area	IS Amount	IS Area	Resp factor/ ratio	Calc Amount	Units	% CV	% RSD
1	0.1	22361	5	1303270	0.017	0.09	ug/L	N/A	N/A
2	0.2	42956	5	1232995	0.035	0.187	ug/L	N/A	N/A
3	0.5	150289	5	1266053	0.119	0.644	ug/L	N/A	N/A A
4	1	222769	5	1280767	0.174	0.945	ug/L	N/A	N/A
5	2	450589	5	1283639	0.351	1.911	ug/L	N/A	N/A
6	5	960334	5	1099645	0.873	4.758	ug/L	N/A	N/A
7	10	2224819	5	1181309	1.883	10.266	ug/L	N/A	N/A

## Compound Calibration Report

Lab Name: Microbac OVD  
Instrument: LCMS2  
User: CAS  
Batch: 112321.00

Method: 112321\_Perchlorate 6850  
Perchlorate 6850  
Cali File: 112321.cali

<u>Vial Pos</u>	<u>Sample ID</u>	<u>File Name</u>	<u>Level</u>	<u>Sample Name</u>	<u>File Date</u>	<u>Comment</u>
R:A2	S1K0467-CAL1	2LM032256	1	CAL STD 1	11/23/2021 4:43:26 PM	1:1 0012469
R:A3	S1K0467-CAL2	2LM032257	2	CAL STD 2	11/23/2021 4:56:40 PM	1:1 0012468
R:A4	S1K0467-CAL3	2LM032258	3	CAL STD 3	11/23/2021 5:09:55 PM	1:1 0012467
R:A5	S1K0467-CAL4	2LM032259	4	CAL STD 4	11/23/2021 5:23:10 PM	1:1 0012466
R:A6	S1K0467-CAL5	2LM032260	5	CAL STD 5	11/23/2021 5:36:25 PM	1:1 0012465
R:A7	S1K0467-CAL6	2LM032261	6	CAL STD 6	11/23/2021 5:49:40 PM	1:1 0012464
R:A8	S1K0467-CAL7	2LM032262	7	CAL STD 7	11/23/2021 6:02:55 PM	1:1 0012463

# Data Review Report

Printed: 11/24/2021 11:28 am

Analysis	Analyte	CalResult	True Value	% D	% Rec
<b>Lab ID:</b> S1K0467-CAL1	Cal Standard				
6850 Perchlorate DOD	Perchlorate	0.09	0.10000	-9.88	90.12
<b>Lab ID:</b> S1K0467-CAL2	Cal Standard				
6850 Perchlorate DOD	Perchlorate	0.19	0.20000	-6.74	93.27
<b>Lab ID:</b> S1K0467-CAL3	Cal Standard				
6850 Perchlorate DOD	Perchlorate	0.64	0.50000	28.77	128.77
<b>Lab ID:</b> S1K0467-CAL4	Cal Standard				
6850 Perchlorate DOD	Perchlorate	0.94	1.0000	-5.50	94.50
<b>Lab ID:</b> S1K0467-CAL5	Cal Standard				
6850 Perchlorate DOD	Perchlorate	1.91	2.0000	-4.47	95.53
<b>Lab ID:</b> S1K0467-CAL6	Cal Standard				
6850 Perchlorate DOD	Perchlorate	4.76	5.0000	-4.83	95.17
<b>Lab ID:</b> S1K0467-CAL7	Cal Standard				
6850 Perchlorate DOD	Perchlorate	10.27	10.000	2.66	102.66



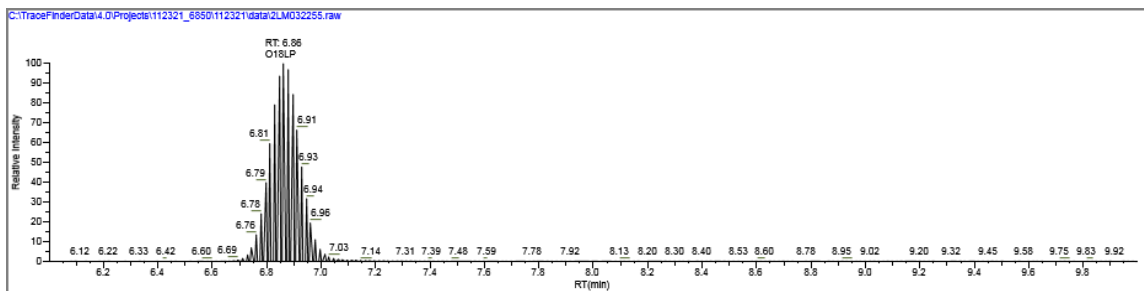
# **Section E: HPLC Organics EPA 6850 Sequence QC Sample Raw Data**

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R-A1	S1K0467-ICB1	2LM032255	N/A	CCB	11/23/2021 4:30:11 PM	1:01



Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	6.86	89	1373183			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	N/F	N/F	N/F	Linear	0.000	N/F ug/L	N/F ug/L	

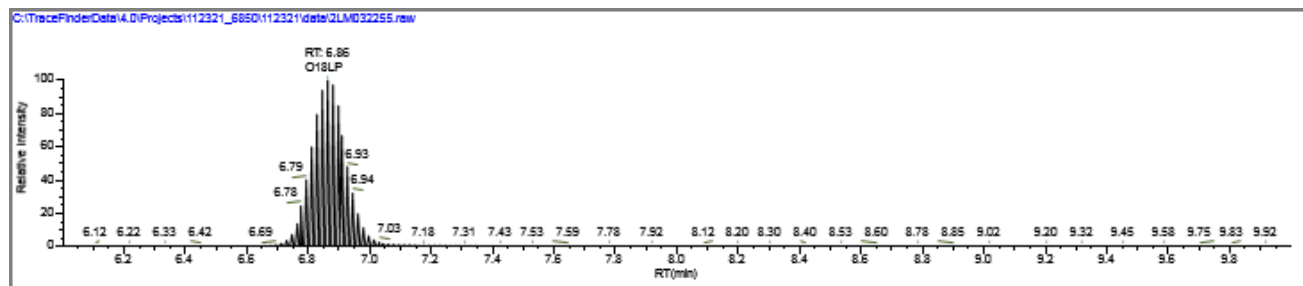


## Sample Report

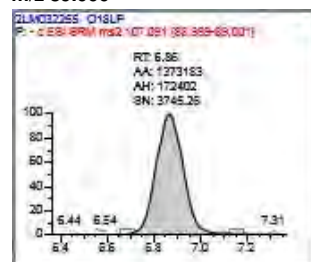
Data File: 2LM032255  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx  
 Sample ID: S1K0467-ICB1  
 Diln Factor: 1.00  
 Comments: 1:01

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

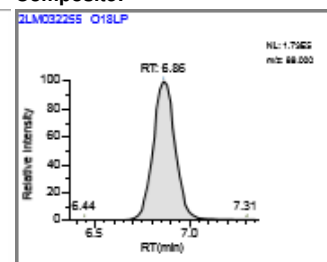
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 11/23/2021 4:30:11 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:A1



m/z 89.000



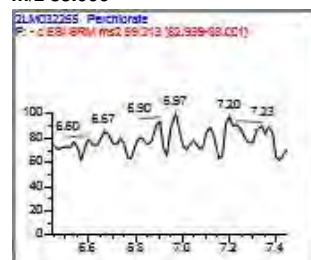
Composite:



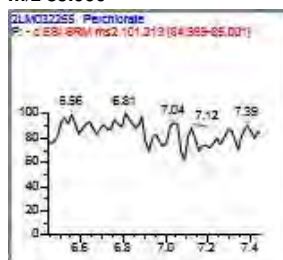
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.86	m/z 89.000	1373183	5.000		N/A

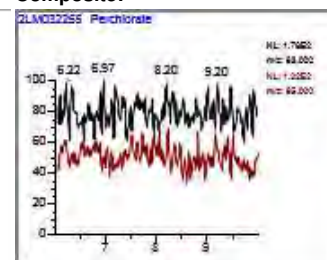
m/z 83.000



m/z 85.000



Composite:



Perchlorate

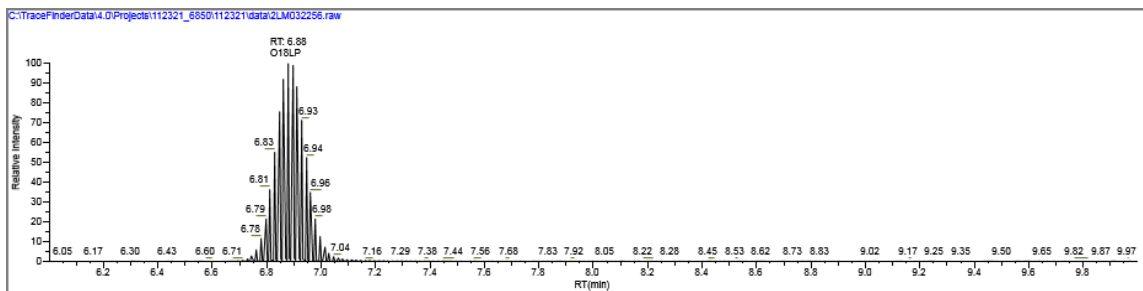
RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
0.00	m/z 83.000	Compound Not Found	N/A		
	m/z 85.000				

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:A2	S1K0467-CAL1	2LM032256	1	CAL STD 1	11/23/2021 4:43:26 PM	1:1 0012469



Internal Standards	RT	Quan Peak	Response	Injected Conc Units	Calculated Conc Units	Flags
O18LP	6.88	89	1303270	5.000 ug/L	5.000 ug/L	

Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
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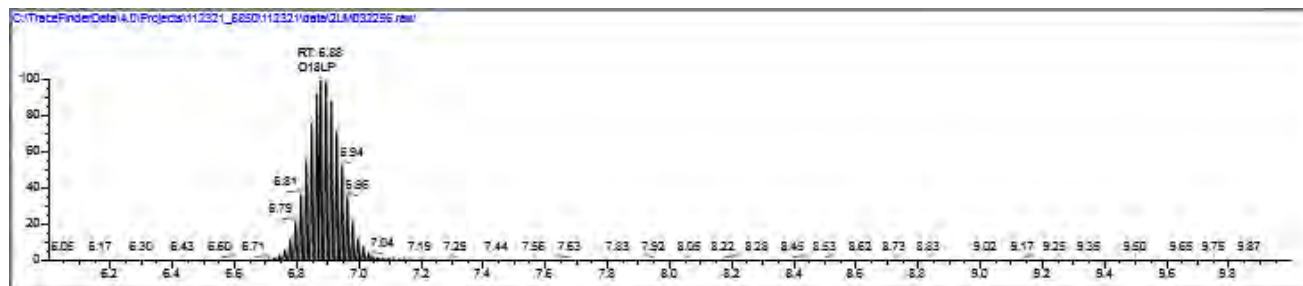
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	6.9	83	22361	Linear	0.017	0.09 ug/L	0.09 ug/L	

# Sample Report

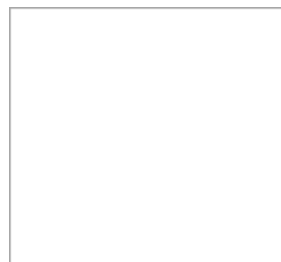
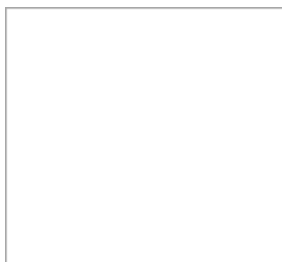
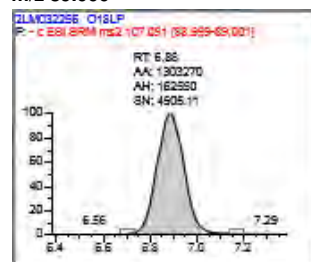
Data File: 2LM032256  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: S1K0467-CAL1  
 Diln Factor: 1.00  
 Comments: 1:1 0012469

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

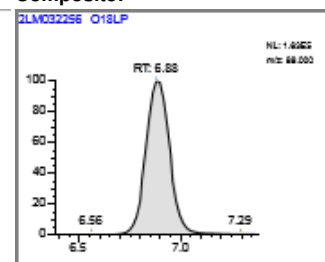
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 11/23/2021 4:43:26 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:A2



m/z 89.000



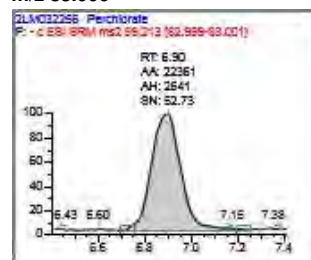
Composite:



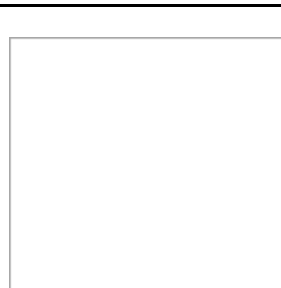
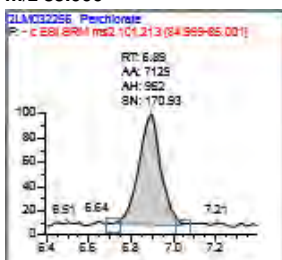
O18LP

RT (min)	Ion	Response	Amount N/A	Target Range	Ratio
6.88	m/z 89.000	1303270	5.000		N/A

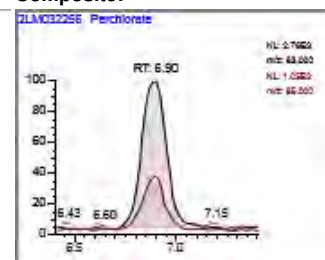
m/z 83.000



m/z 85.000



Composite:



Perchlorate

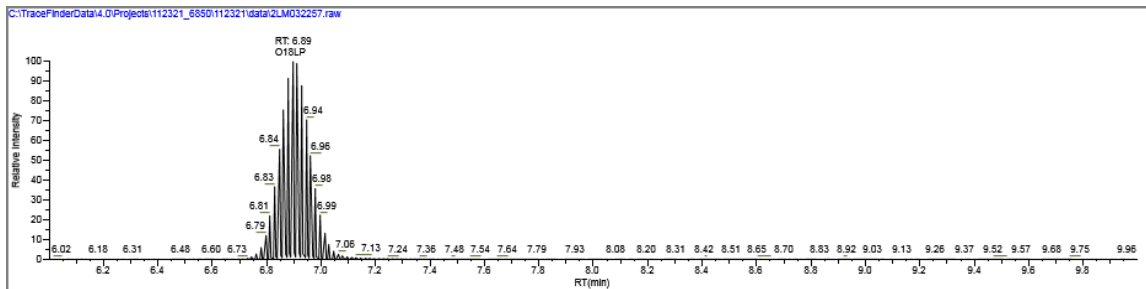
RT (min)	Ion	Response	Amount Cal: 0.100	Target Range 0.080 - 2.100	Ratio
6.90	m/z 83.000	22361	0.090		N/A
6.89	m/z 85.000	7129		25.81 - 38.71	31.88

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:A3	S1K0467-CAL2	2LM032257	2	CAL STD 2	11/23/2021 4:56:40 PM	1:1 0012468



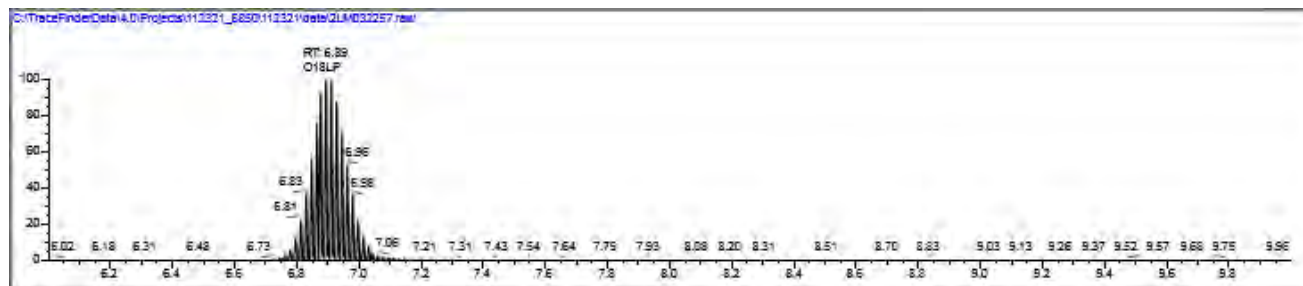
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	O18LP 6.89	89	1232995			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	6.9	83	42956	Linear	0.035	0.187 ug/L	0.187 ug/L	

# Sample Report

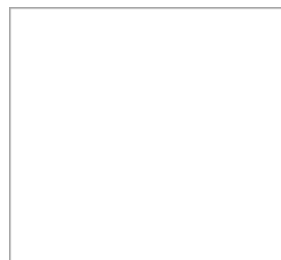
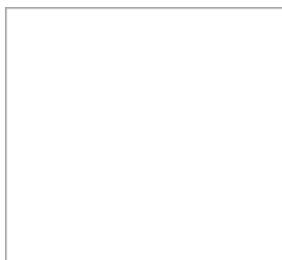
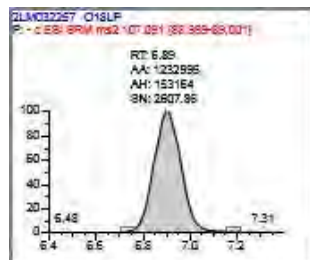
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 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx  
 Sample ID: S1K0467-CAL2  
 Diln Factor: 1.00  
 Comments: 1:1 0012468

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

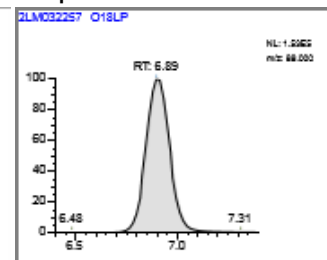
Tune report not found  
 11/23/2021 4:56:40 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:A3



## m/z 89.000



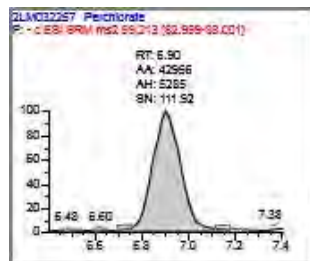
## Composite:



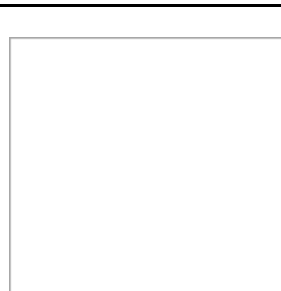
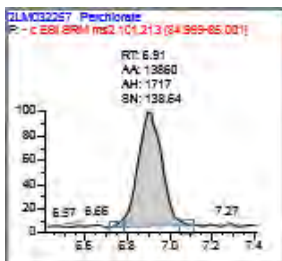
## O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.89	m/z 89.000	1232995	5.000		N/A

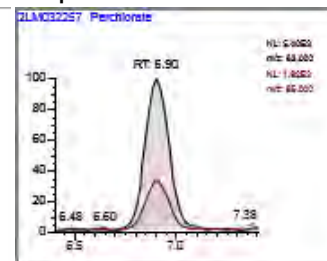
## m/z 83.000



## m/z 85.000



## Composite:



## Perchlorate

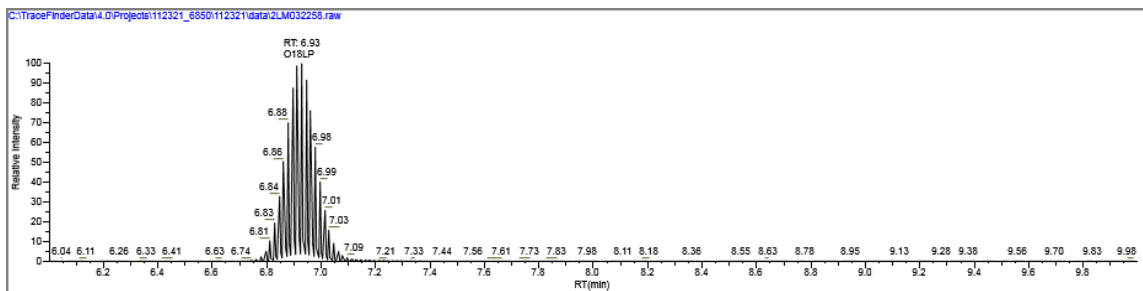
RT (min)	Ion	Response	Amount	Target Range	Ratio
			Cal: 0.200		
6.90	m/z 83.000	42956	0.187	0.160 - 4.200	N/A
6.91	m/z 85.000	13860		25.81 - 38.71	32.27

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:44	S1K0467-CAL3	2LM032258	3	CAL STD 3	11/23/2021 5:09:55 PM	1:1 0012467



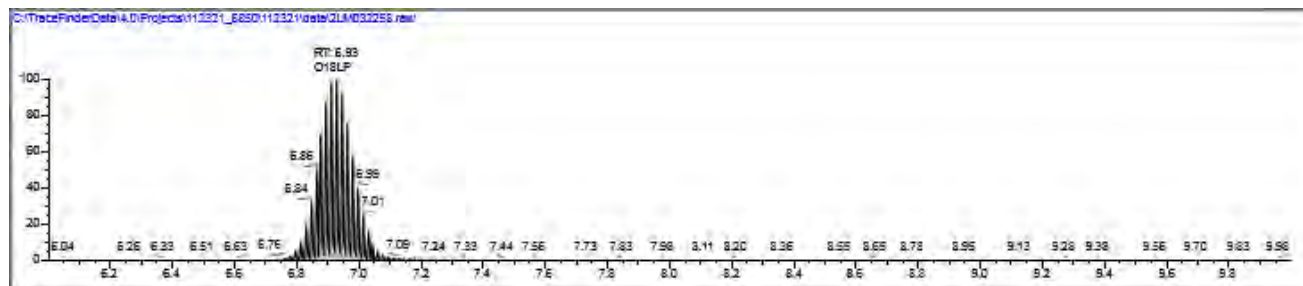
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	O18LP 6.93	89	1266053			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	6.92	83	150289	Linear	0.119	0.644 ug/L	0.644 ug/L	

# Sample Report

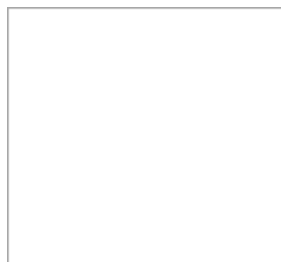
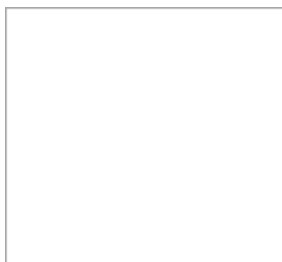
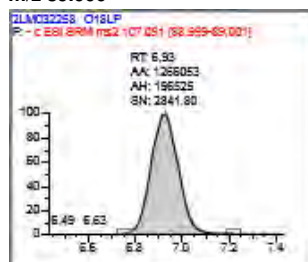
Data File: 2LM032258  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: S1K0467-CAL3  
 Diln Factor: 1.00  
 Comments: 1:1 0012467

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

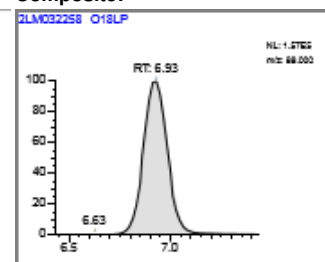
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 11/23/2021 5:09:55 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:A4



## m/z 89.000



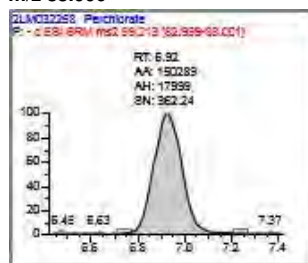
## Composite:



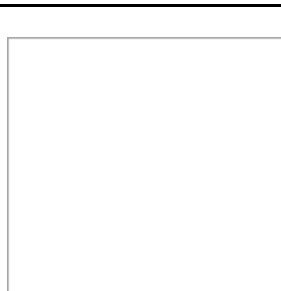
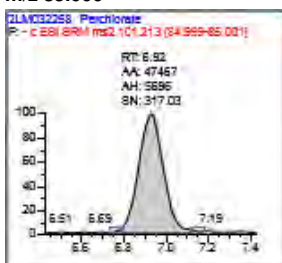
## O18LP

RT (min)	Ion	Response	Amount N/A	Target Range	Ratio
6.93	m/z 89.000	1266053	5.000		N/A

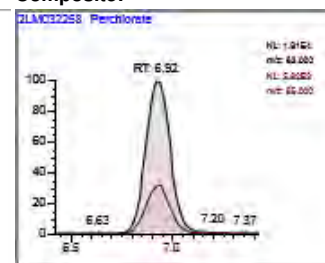
## m/z 83.000



## m/z 85.000



## Composite:



## Perchlorate

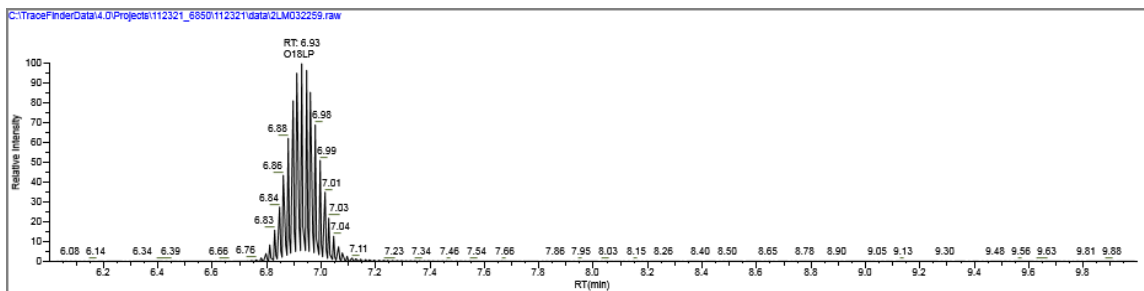
RT (min)	Ion	Response	Amount Cal: 0.500	Target Range 0.400 - 10.500	Ratio
6.92	m/z 83.000	150289	0.644		N/A
6.92	m/z 85.000	47467		25.81 - 38.71	31.58

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:A5	S1K0467-CAL4	2LM032259	4	CAL STD 4	11/23/2021 5:23:10 PM	1:1 0012466



Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	6.93	89	1280767			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	6.93	83	222769	Linear	0.174	0.945 ug/L	0.945 ug/L	

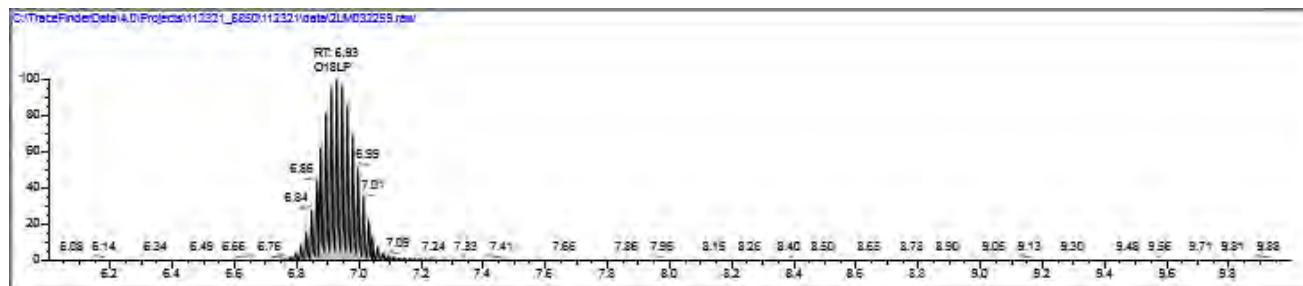


# Sample Report

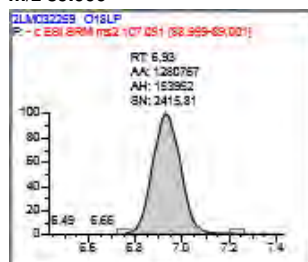
Data File: 2LM032259  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: S1K0467-CAL4  
 Diln Factor: 1.00  
 Comments: 1:1 0012466

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

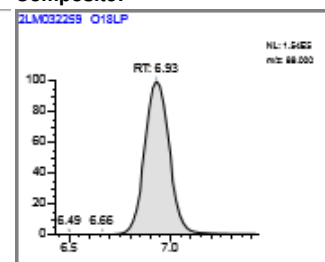
Tune report not found  
 11/23/2021 5:23:10 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:A5



m/z 89.000



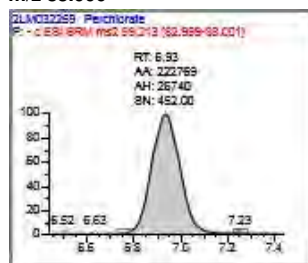
Composite:



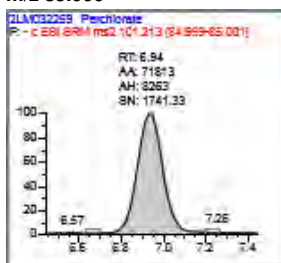
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.93	m/z 89.000	1280767	5.000		N/A

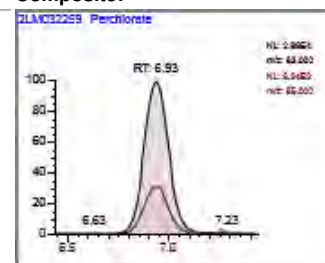
m/z 83.000



m/z 85.000



Composite:



Perchlorate

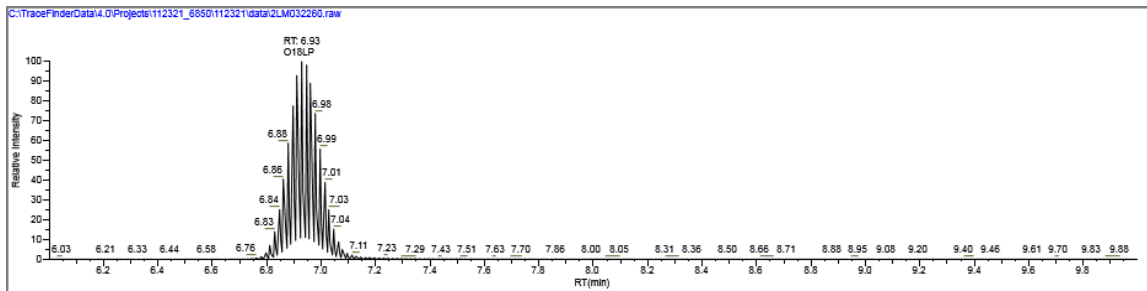
RT (min)	Ion	Response	Amount	Target Range	Ratio
			Cal: 1.000		
6.93	m/z 83.000	222769	0.945	0.800 - 21.000	N/A
6.94	m/z 85.000	71813		25.81 - 38.71	32.24

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R: A6	S1K0467-CAL5	2LM032260	5	CAL STD 5	11/23/2021 5:36:25 PM	1:1 0012465

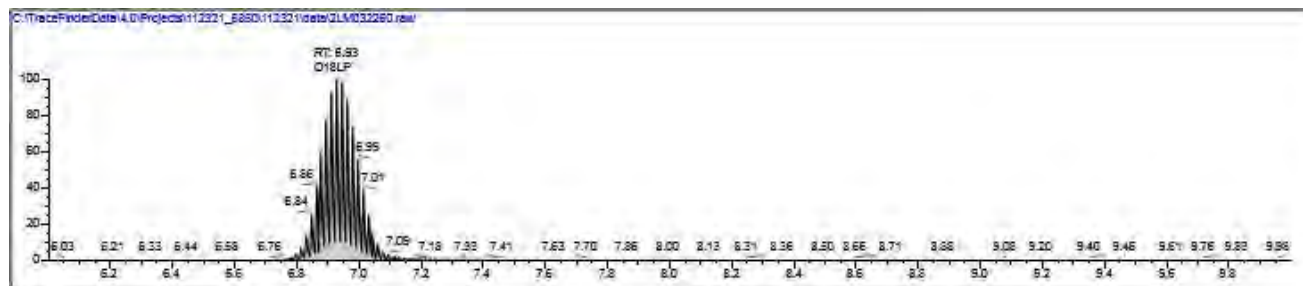


Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	O18LP 6.93	89	1283639			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
	Perchlorate 6.93	83	450589	Linear	0.351	1.911 ug/L	1.911 ug/L	

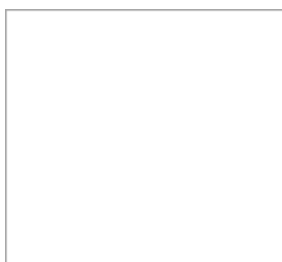
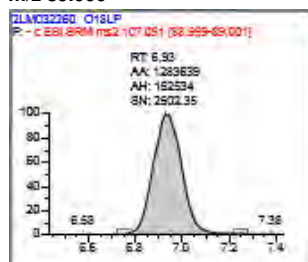
## Sample Report

Data File: 2LM032260  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: S1K0467-CAL5  
 Diln Factor: 1.00  
 Comments: 1:1 0012465

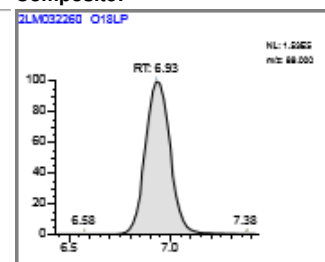
Tune Report Date: Tune report not found  
 Acquisition Date: 11/23/2021 5:36:25 PM  
 Cali File Date: 11/24/2021 9:36:24 AM  
 Operator ID: CAS  
 Instrument ID: LCMS2  
 Vial Number: R:A6



## m/z 89.000



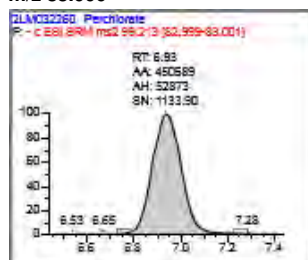
## Composite:



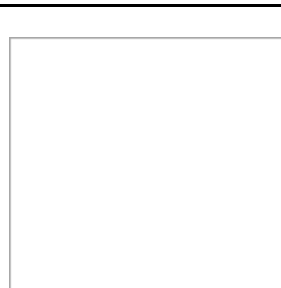
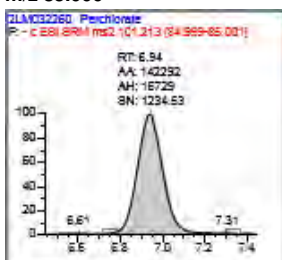
## O18LP

RT (min)	Ion	Response	Amount N/A	Target Range	Ratio
6.93	m/z 89.000	1283639	5.000		N/A

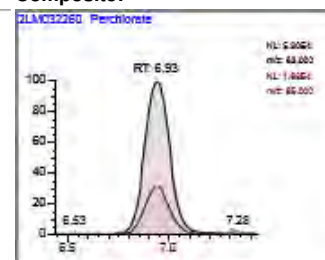
## m/z 83.000



## m/z 85.000



## Composite:



## Perchlorate

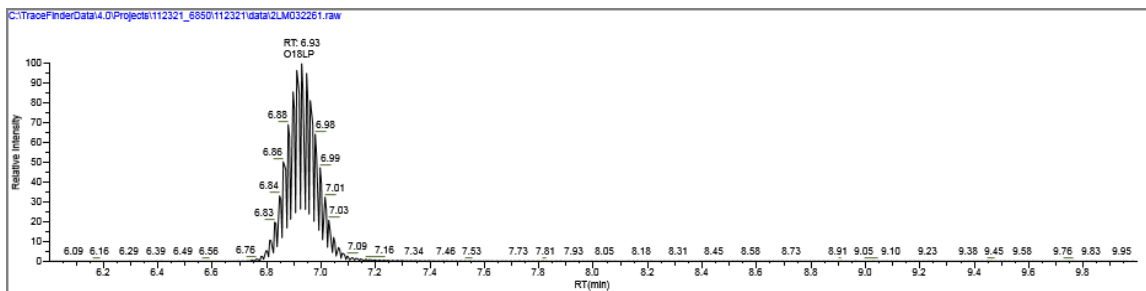
RT (min)	Ion	Response	Amount Cal: 2.000	Target Range 1.600 - 42.000	Ratio
6.93	m/z 83.000	450589	1.911		N/A
6.94	m/z 85.000	142292		25.81 - 38.71	31.58

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R: A7	S1K0467-CAL6	2LM032261	6	CAL STD 6	11/23/2021 5:49:40 PM	1:1 0012464



Internal Standards	RT	Quan Peak	Response	Injected Conc Units	Calculated Conc Units	Flags
O18LP	6.93	89	1099645	5.000 ug/L	5.000 ug/L	

Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
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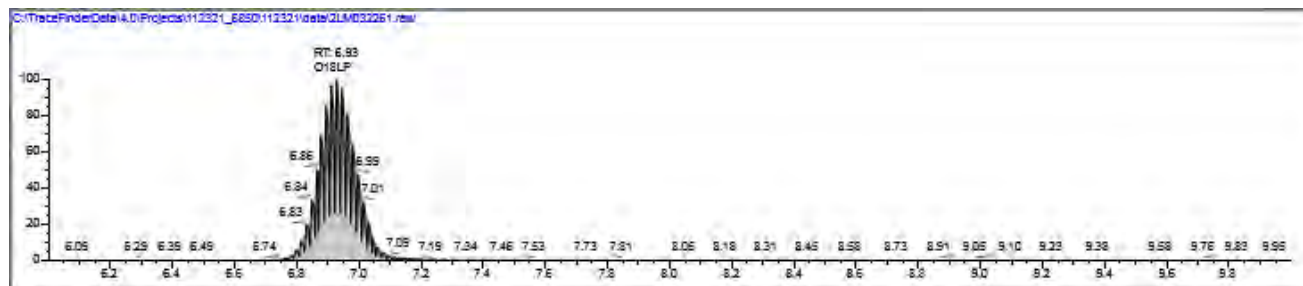
  

Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	6.93	83	960334	Linear	0.873	4.758 ug/L	4.758 ug/L	

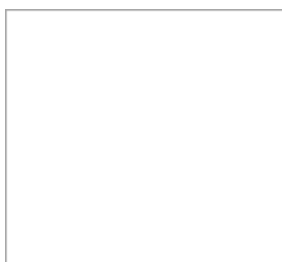
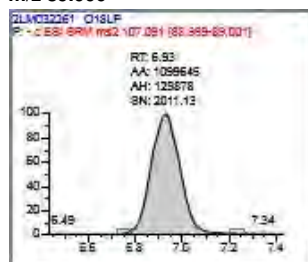
# Sample Report

Data File: 2LM032261  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: S1K0467-CAL6  
 Diln Factor: 1.00  
 Comments: 1:1 0012464

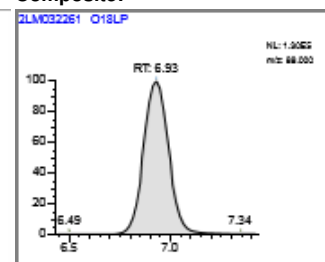
Tune Report Date: Tune report not found  
 Acquisition Date: 11/23/2021 5:49:40 PM  
 Cali File Date: 11/24/2021 9:36:24 AM  
 Operator ID: CAS  
 Instrument ID: LCMS2  
 Vial Number: R:A7



## m/z 89.000



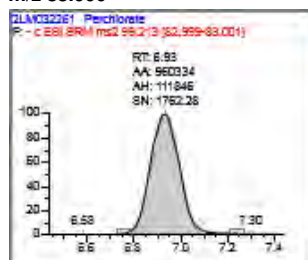
## Composite:



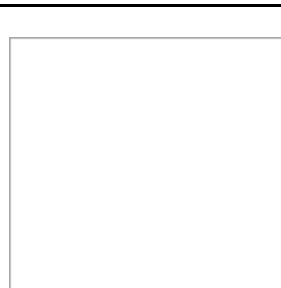
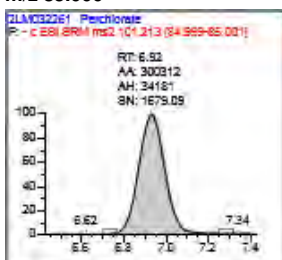
## O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.93	m/z 89.000	1099645	5.000		N/A

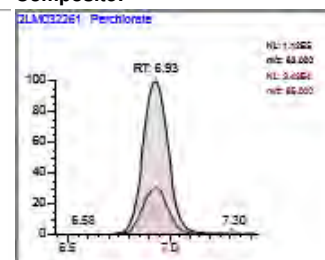
## m/z 83.000



## m/z 85.000



## Composite:



## Perchlorate

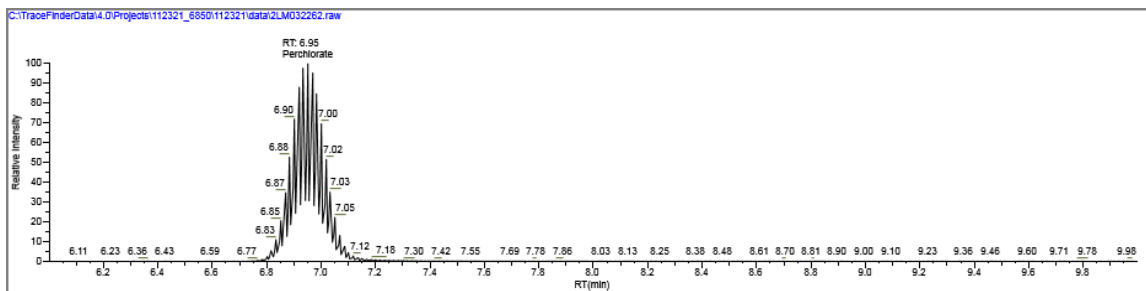
RT (min)	Ion	Response	Amount	Target Range	Ratio
			Cal: 5.000		
6.93	m/z 83.000	960334	4.758	4.000 - 105.000	N/A
6.92	m/z 85.000	300312		25.81 - 38.71	31.27

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:A8	S1K0467-CAL7	2LM032262	7	CAL STD 7	11/23/2021 6:02:55 PM	1:1 0012463



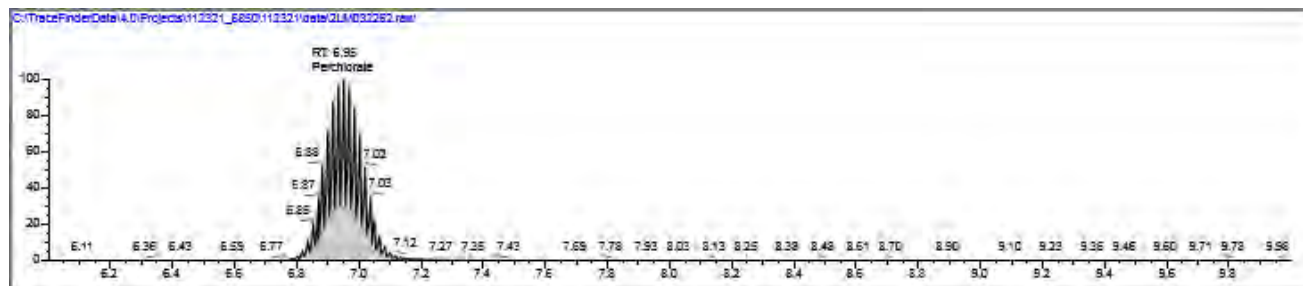
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	6.94	89	1181309			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	6.95	83	2224819	Linear	1.883	10.266 ug/L	10.266 ug/L	

## Sample Report

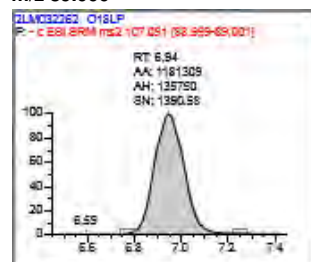
Data File: 2LM032262  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx  
 Sample ID: S1K0467-CAL7  
 Diln Factor: 1.00  
 Comments: 1:1 0012463

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

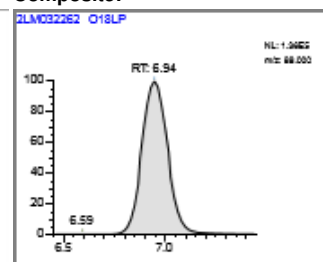
Tune report not found  
 11/23/2021 6:02:55 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:A8



m/z 89.000



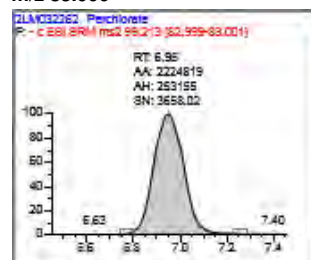
Composite:



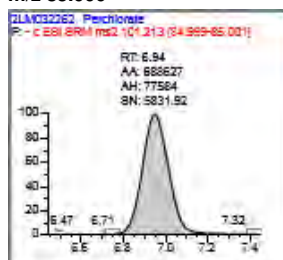
O18LP

RT (min)	Ion	Response	Amount N/A	Target Range	Ratio
6.94	m/z 89.000	1181309	5.000		N/A

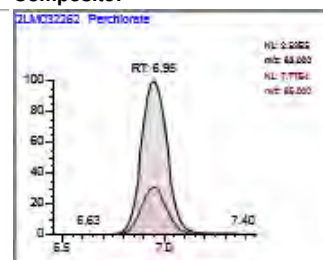
m/z 83.000



m/z 85.000



Composite:



Perchlorate

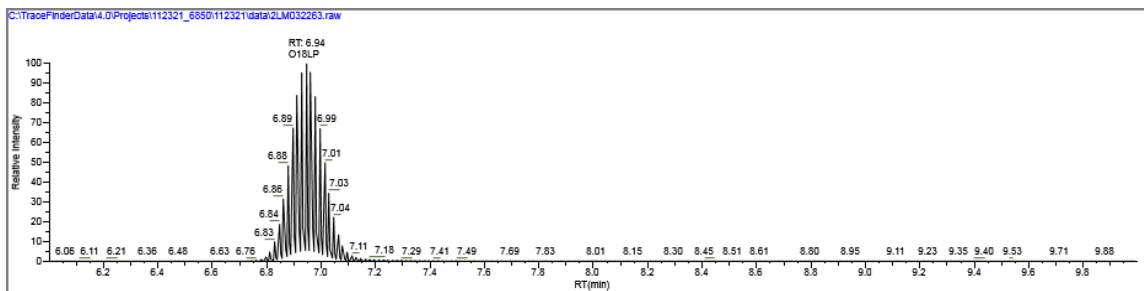
RT (min)	Ion	Response	Amount Cal: 10.000	Target Range 8.000 - 210.000	Ratio
6.95	m/z 83.000	2224819	10.266		N/A
6.94	m/z 85.000	688627		25.81 - 38.71	30.95

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:A9	S1K0467-ICV1	2LM032263	ICV	ICV	11/23/2021 6:16:10 PM	1:1 0012475



Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	6.94	89	1311711			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	6.95	83	230866	Linear	0.176	0.956 ug/L	0.956 ug/L	

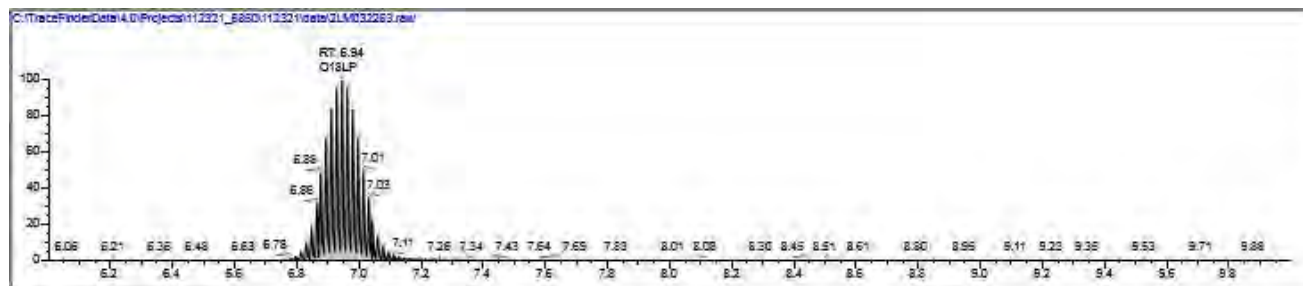


## Sample Report

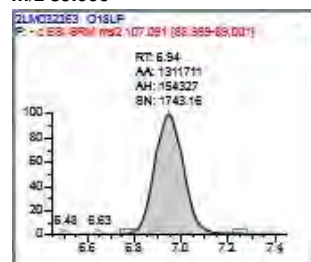
Data File: 2LM032263  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: S1K0467-ICV1  
 Diln Factor: 1.00  
 Comments: 1:1 0012475

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

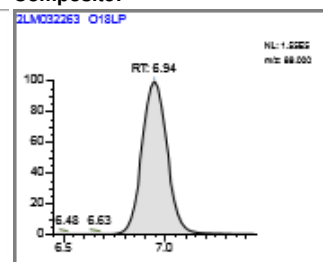
Tune report not found  
 11/23/2021 6:16:10 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:A9



m/z 89.000



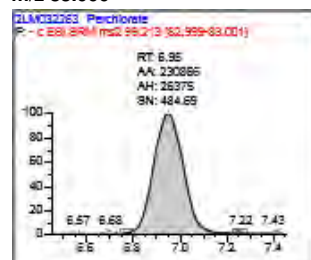
Composite:



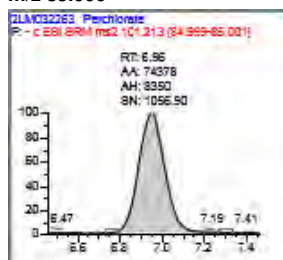
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.94	m/z 89.000	1311711	5.000		N/A

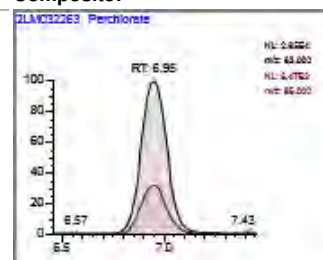
m/z 83.000



m/z 85.000



Composite:



Perchlorate

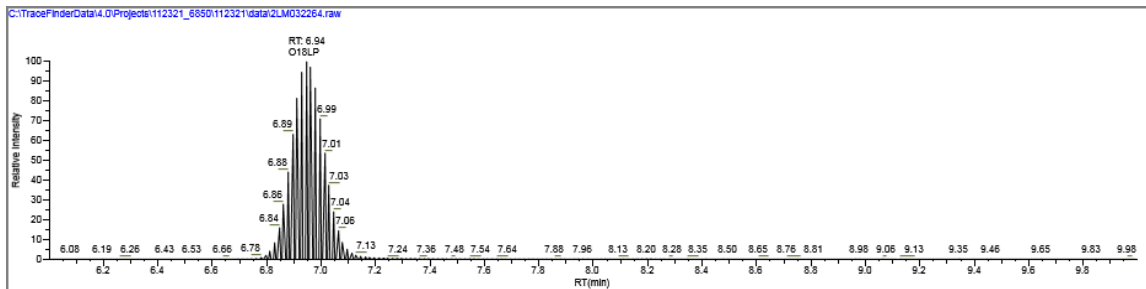
RT (min)	Ion	Response	Amount	Target Range	Ratio
			QC: 1.000		
6.95	m/z 83.000	230866	0.956	0.850 - 1.150	N/A
6.96	m/z 85.000	74378		25.81 - 38.71	32.22

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R-A1	S1K0467-CCB1	2LM032264	N/A	CCB	11/23/2021 6:29:24 PM	1:01



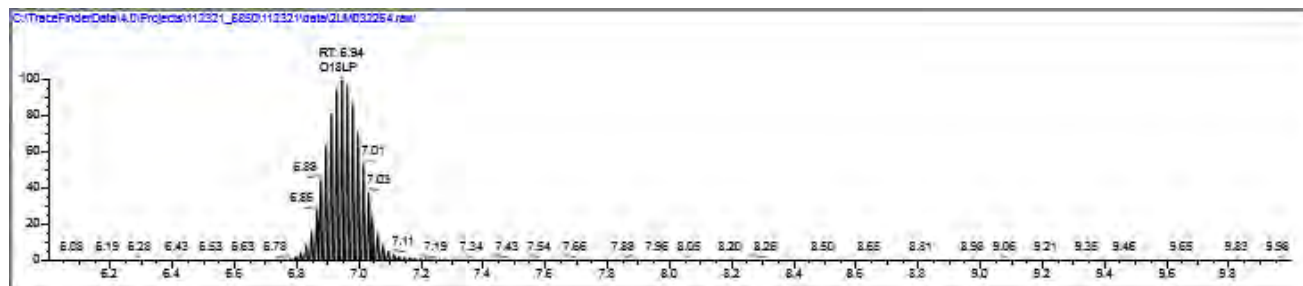
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	O18LP 6.94	89	1299178			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
	Perchlorate N/F	N/F	N/F	Linear	0.000	N/F ug/L	N/F ug/L	

# Sample Report

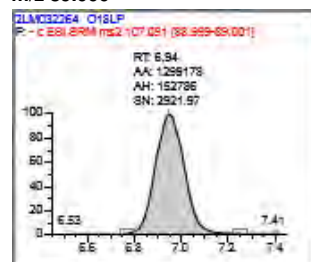
Data File: 2LM032264  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: S1K0467-CCB1  
 Diln Factor: 1.00  
 Comments: 1:01

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

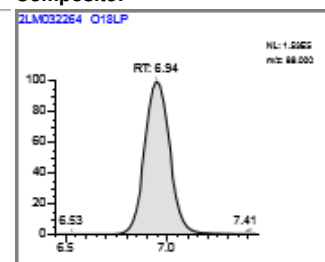
Tune report not found  
 11/23/2021 6:29:24 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:A1



m/z 89.000



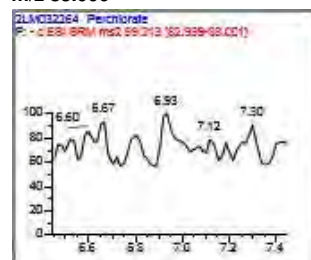
Composite:



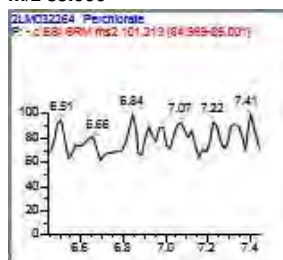
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.94	m/z 89.000	1299178	5.000		N/A

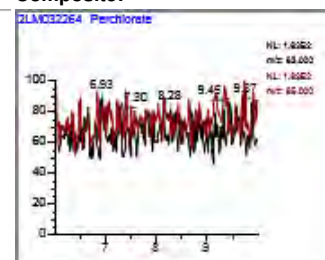
m/z 83.000



m/z 85.000



Composite:



Perchlorate

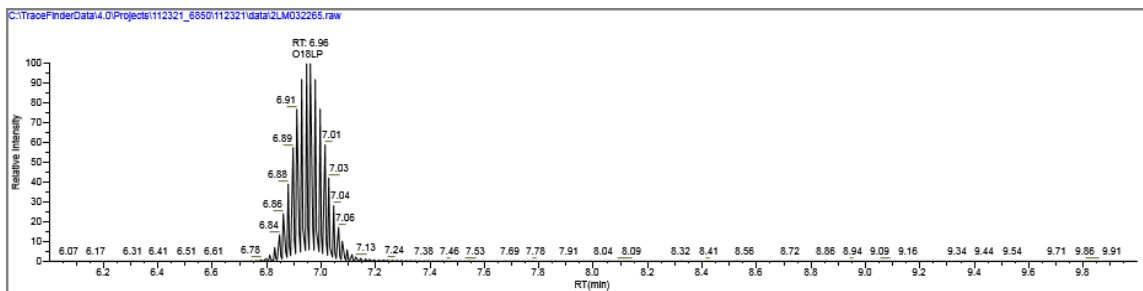
RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
0.00	m/z 83.000	Compound Not Found	N/A		
	m/z 85.000				

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:A5	S1K0467-CCV1	2LM032265	CCV	CCV 1.0 ug/L	11/23/2021 6:42:40 PM	1:1 0012466



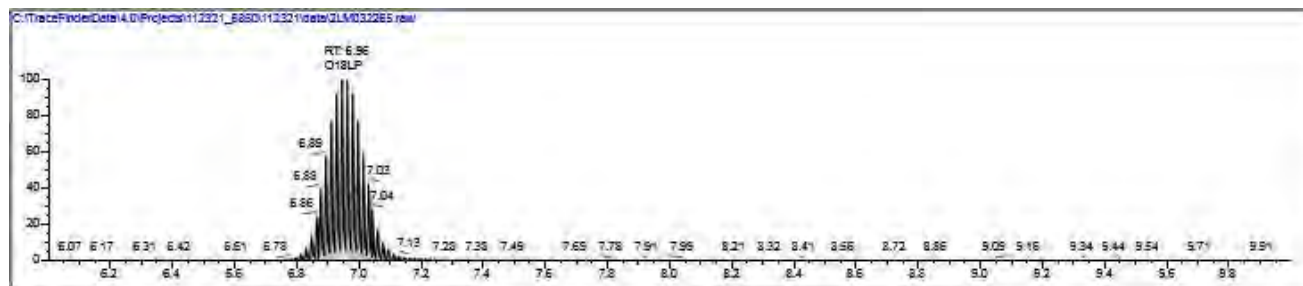
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
O18LP	6.96	89	1316163			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	6.95	83	228358	Linear	0.174	0.943 ug/L	0.943 ug/L	

# Sample Report

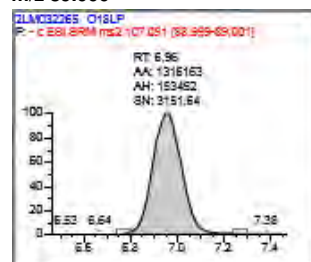
Data File: 2LM032265  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx  
 Sample ID: S1K0467-CCV1  
 Diln Factor: 1.00  
 Comments: 1:1 0012466

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

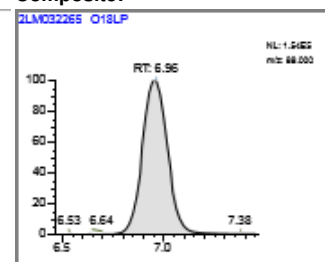
Tune report not found  
 11/23/2021 6:42:40 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:A5



m/z 89.000



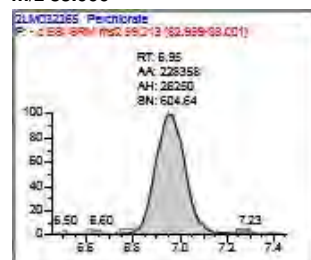
Composite:



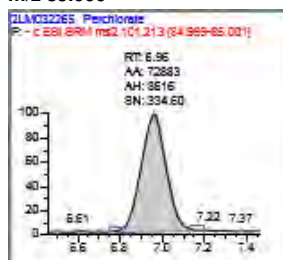
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.96	m/z 89.000	1316163	5.000		N/A

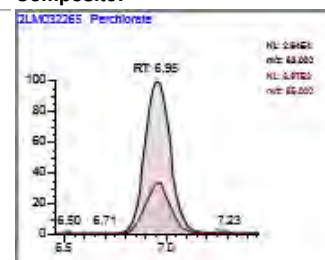
m/z 83.000



m/z 85.000



Composite:



Perchlorate

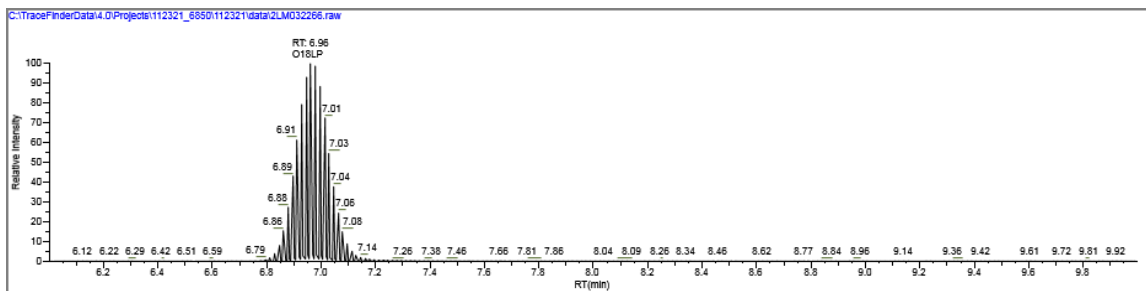
RT (min)	Ion	Response	Amount	Target Range	Ratio
			QC: 1.000		
6.95	m/z 83.000	228358	0.943	0.850 - 1.150	N/A
6.96	m/z 85.000	72883		25.81 - 38.71	31.92

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:A3	S1K0467-CRL1	2LM032266	QCMRL	QCMRL 0.2 ug/L	11/23/2021 6:55:54 PM	1:1 0012468



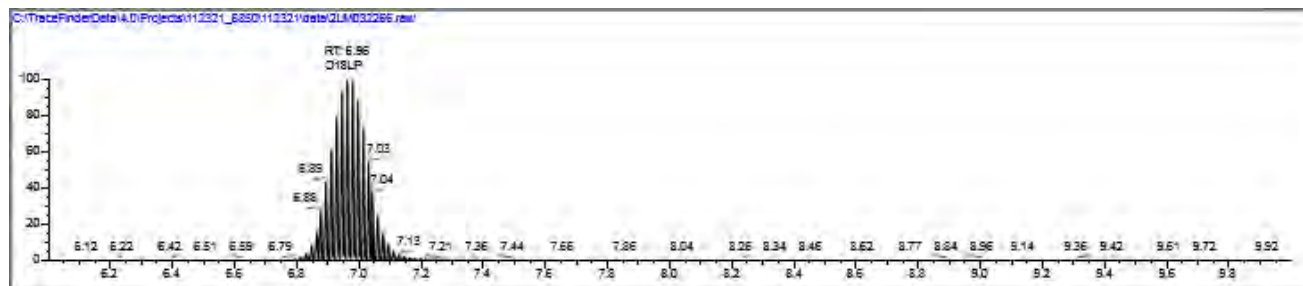
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	6.96	89	1174525			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	6.97	83	40831	Linear	0.035	0.186 ug/L	0.186 ug/L	

# Sample Report

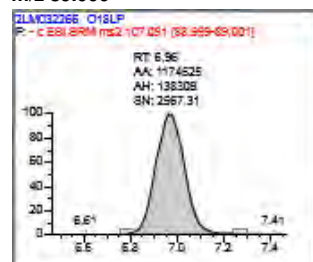
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 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx  
 Sample ID: S1K0467-CRL1  
 Diln Factor: 1.00  
 Comments: 1:1 0012468

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

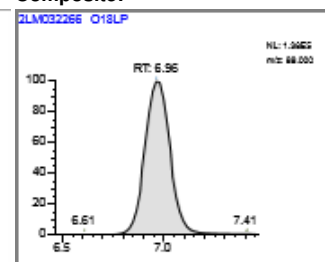
Tune report not found  
 11/23/2021 6:55:54 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:A3



m/z 89.000



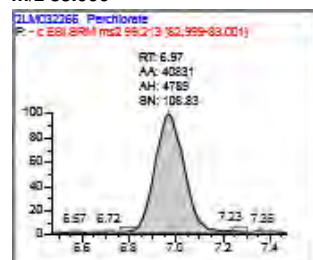
Composite:



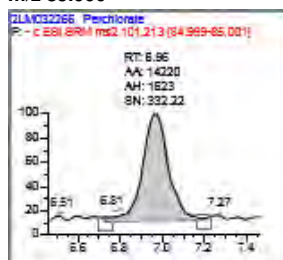
O18LP

RT (min)	Ion	Response	Amount N/A	Target Range	Ratio
6.96	m/z 89.000	1174525	5.000		N/A

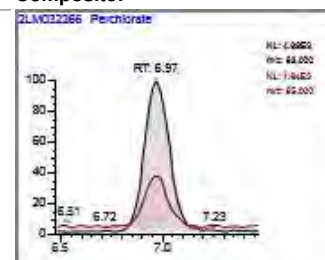
m/z 83.000



m/z 85.000



Composite:



Perchlorate

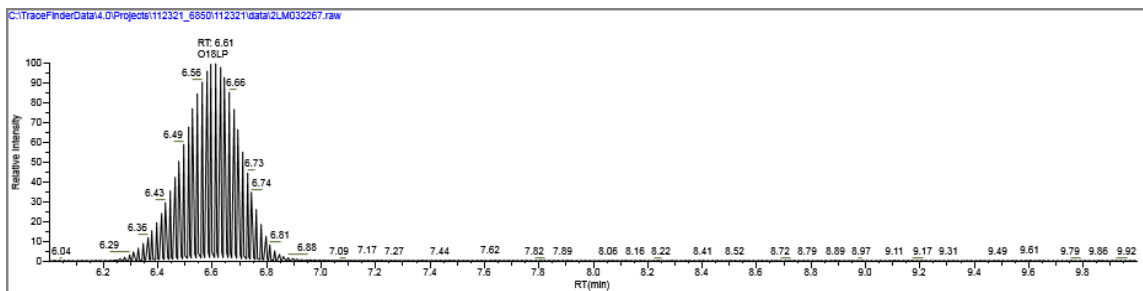
RT (min)	Ion	Response	Amount QC: 0.200	Target Range 0.140 - 0.260	Ratio
6.97	m/z 83.000	40831	0.186		N/A
6.96	m/z 85.000	14220		25.81 - 38.71	34.83

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:B1	S1K0467-IFA1	2LM032267	N/A	MCT 0.2 ug/L	11/23/2021 7:09:09 PM	1:1 0012477



Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	6.61	89	1108705			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	6.62	83	49014	Linear	0.044	0.238 ug/L	0.238 ug/L	

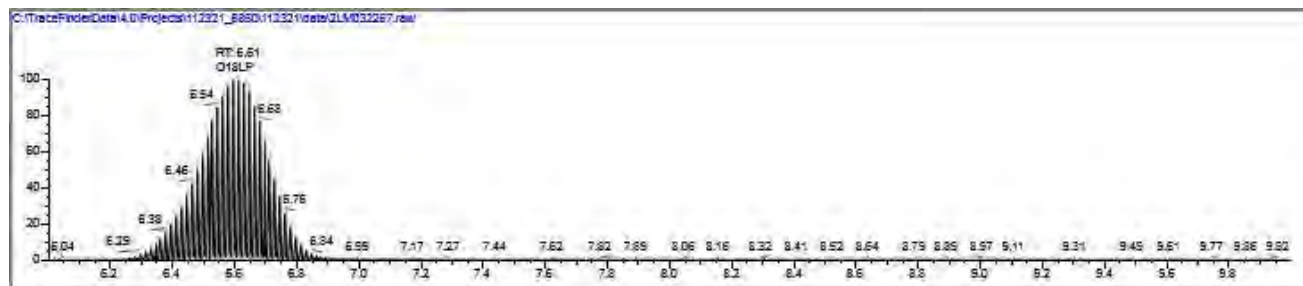


# Sample Report

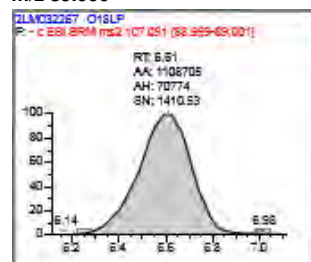
Data File: 2LM032267  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: S1K0467-IFA1  
 Diln Factor: 1.00  
 Comments: 1:1 0012477

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

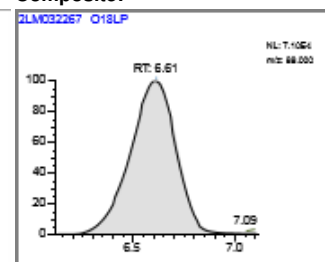
Tune report not found  
 11/23/2021 7:09:09 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:B1



m/z 89.000



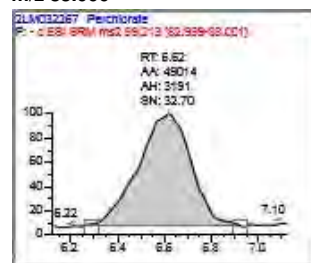
Composite:



O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.61	m/z 89.000	1108705	5.000		N/A

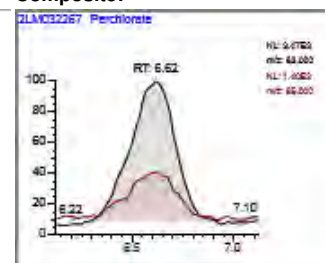
m/z 83.000



m/z 85.000



Composite:



Perchlorate

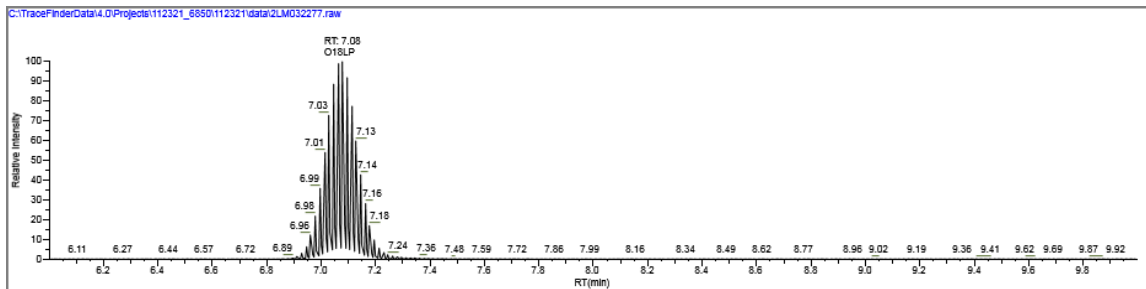
RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.62	m/z 83.000	49014	0.238		N/A
6.61	m/z 85.000	15359		25.81 - 38.71	31.34

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:A5	S1K0467-CCV2	2LM032277	CCV	CCV 1.0 ug/L	11/23/2021 9:21:38 PM	1:1 0012466

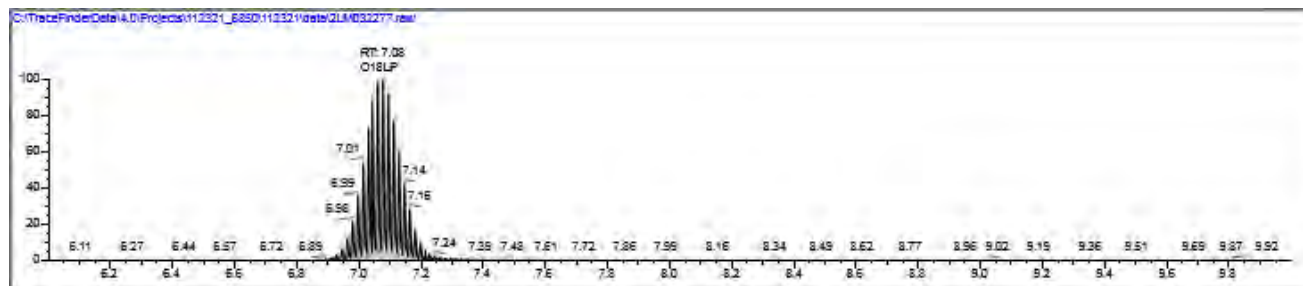


Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	O18LP 7.08	89	1207068			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
	Perchlorate 7.08	83	211917	Linear	0.176	0.954 ug/L	0.954 ug/L	

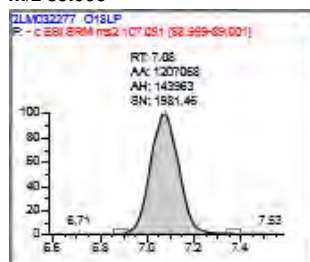
## Sample Report

Data File: 2LM032277  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx  
 Sample ID: S1K0467-CCV2  
 Diln Factor: 1.00  
 Comments: 1:1 0012466

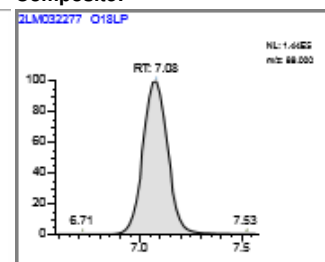
Tune Report Date: Tune report not found  
 Acquisition Date: 11/23/2021 9:21:38 PM  
 Cali File Date: 11/24/2021 9:36:24 AM  
 Operator ID: CAS  
 Instrument ID: LCMS2  
 Vial Number: R:A5



## m/z 89.000



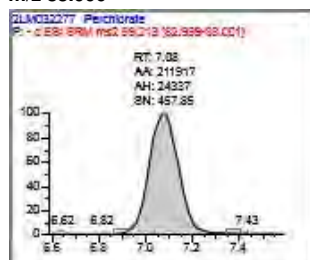
## Composite:



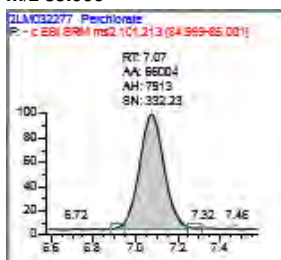
## O18LP

RT (min)	Ion	Response	Amount N/A	Target Range	Ratio
7.08	m/z 89.000	1207068	5.000		N/A

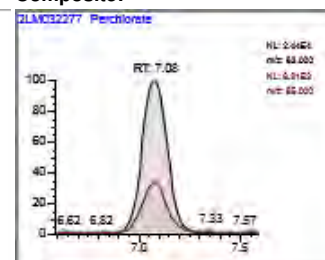
## m/z 83.000



## m/z 85.000



## Composite:



## Perchlorate

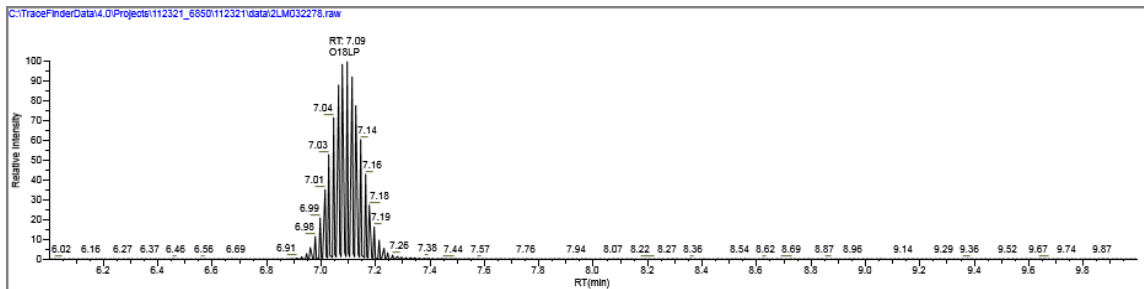
RT (min)	Ion	Response	Amount QC: 1.000	Target Range 0.850 - 1.150	Ratio
7.08	m/z 83.000	211917	0.954		N/A
7.07	m/z 85.000	66004		25.81 - 38.71	31.15

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:A3	S1K0467-CRL2	2LM032278	QCMRL	QCMRL 0.2 ug/L	11/23/2021 9:34:53 PM	1:1 0012468



Internal Standards	RT	Quan Peak	Response	Injected Conc Units	Calculated Conc Units	Flags
O18LP	7.09	89	1264922	5.000 ug/L	5.000 ug/L	

Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
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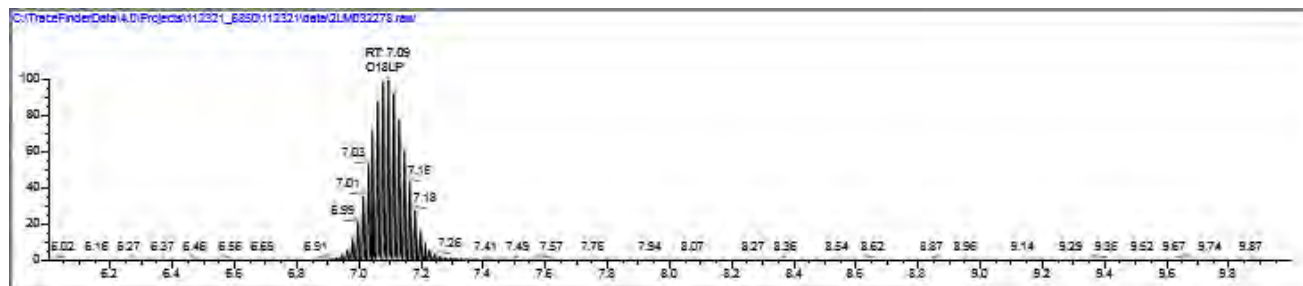
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	7.08	83	43563	Linear	0.034	0.184 ug/L	0.184 ug/L	

# Sample Report

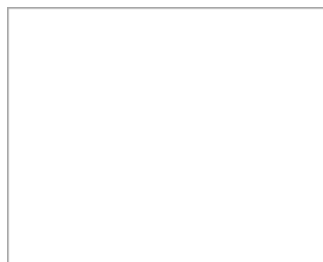
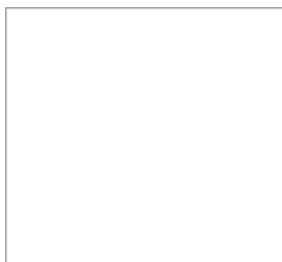
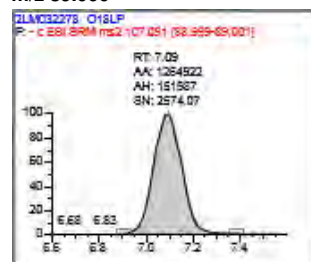
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 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: S1K0467-CRL2  
 Diln Factor: 1.00  
 Comments: 1:1 0012468

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

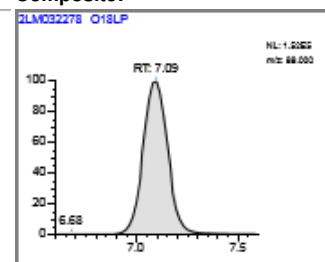
Tune report not found  
 11/23/2021 9:34:53 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:A3



m/z 89.000



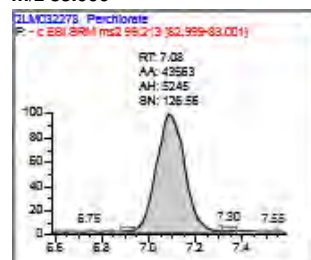
Composite:



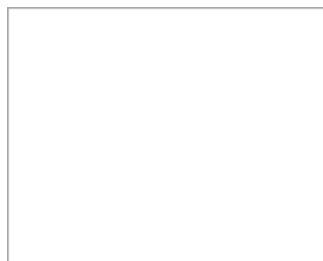
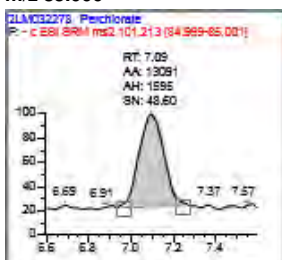
O18LP

RT (min)	Ion	Response	Amount N/A	Target Range	Ratio
7.09	m/z 89.000	1264922	5.000		N/A

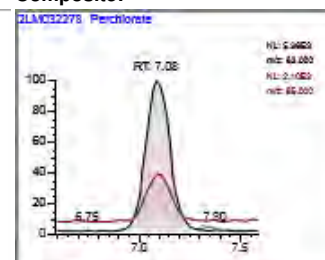
m/z 83.000



m/z 85.000



Composite:



Perchlorate

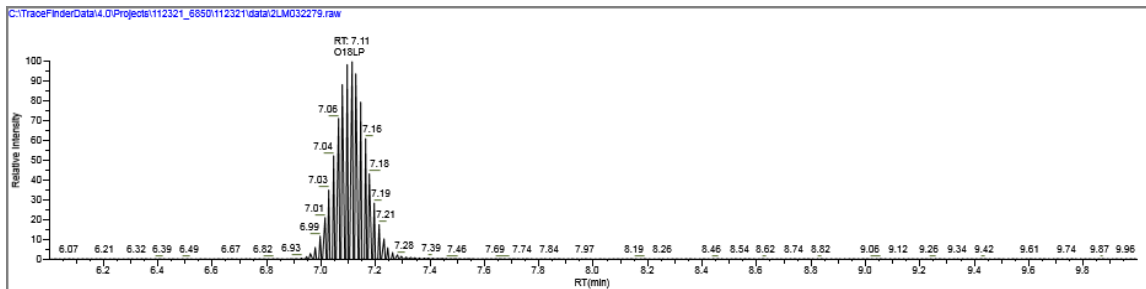
RT (min)	Ion	Response	Amount QC: 0.200	Target Range 0.140 - 0.260	Ratio
7.08	m/z 83.000	43563	0.184		N/A
7.09	m/z 85.000	13091		25.81 - 38.71	30.05

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R-A1	S1K0467-CCB2	2LM032279	N/A	CCB	11/23/2021 9:48:08 PM	1:01



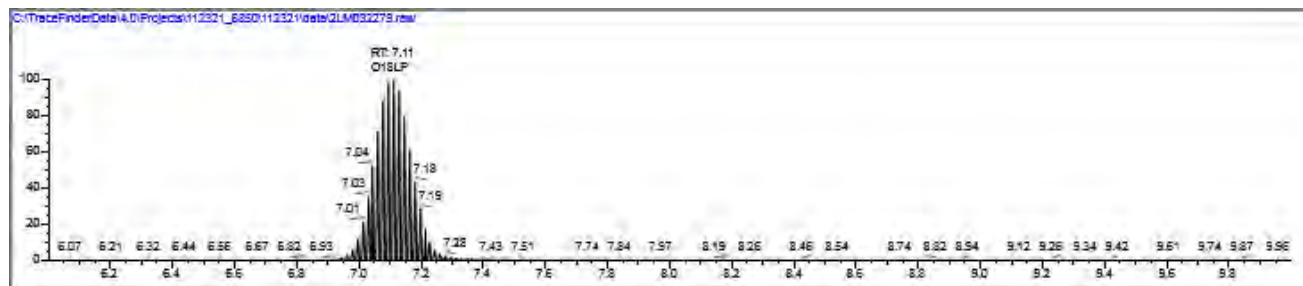
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	O18LP 7.11	89	1244461			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	N/F	N/F	N/F	Linear	0.000	N/F ug/L	N/F ug/L	

# Sample Report

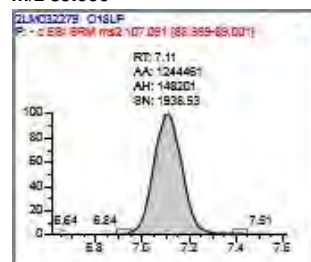
Data File: 2LM032279  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: S1K0467-CCB2  
 Diln Factor: 1.00  
 Comments: 1:01

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

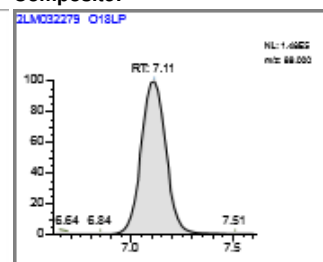
Tune report not found  
 11/23/2021 9:48:08 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:A1



m/z 89.000



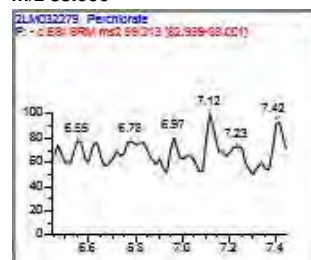
Composite:



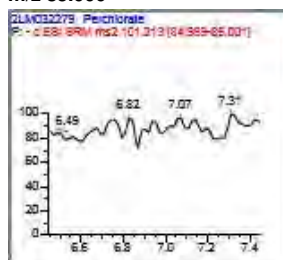
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
7.11	m/z 89.000	1244461	5.000		N/A

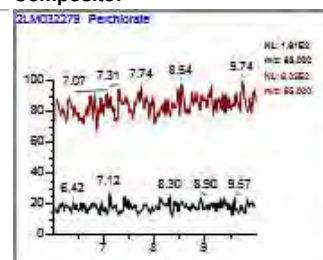
m/z 83.000



m/z 85.000



Composite:



Perchlorate

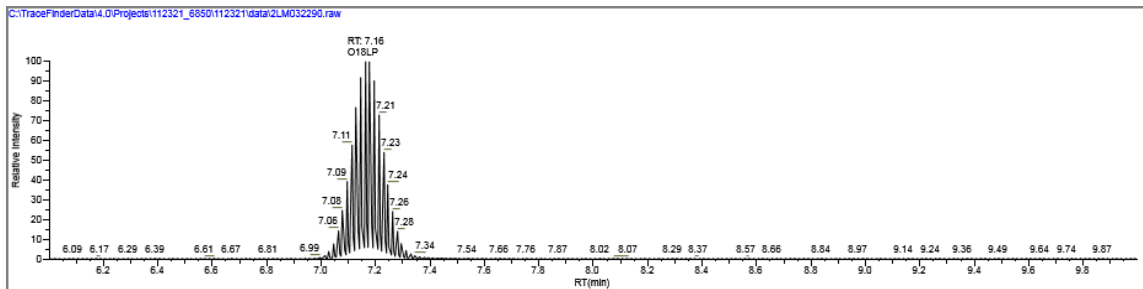
RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
0.00	m/z 83.000	Compound Not Found	N/A		
	m/z 85.000				

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:A5	S1K0467-CCV3	2LM032290	CCV	CCV 1.0 ug/L	11/24/2021 12:13:50 AM	1:1 0012466



Internal Standards	RT	Quan Peak	Response	Injected Conc Units	Calculated Conc Units	Flags
O18LP	7.16	89	1145001	5.000 ug/L	5.000 ug/L	

Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
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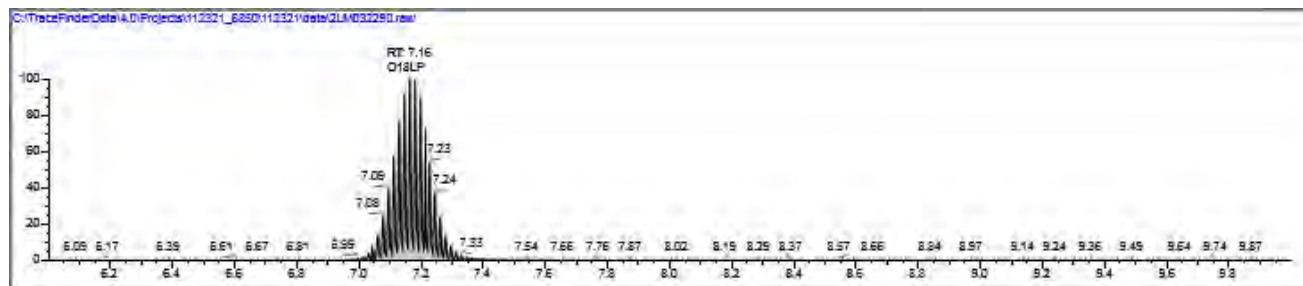
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	7.17	83	201734	Linear	0.176	0.957 ug/L	0.957 ug/L	



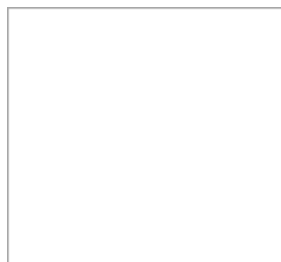
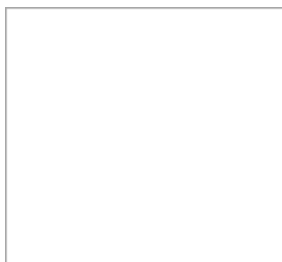
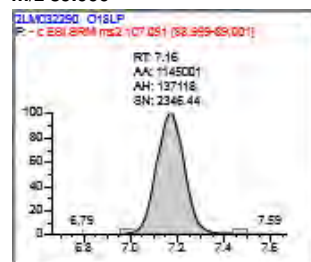
# Sample Report

Data File: 2LM032290  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx  
 Sample ID: S1K0467-CCV3  
 Diln Factor: 1.00  
 Comments: 1:1 0012466

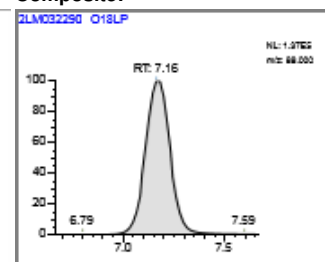
Tune Report Date: Tune report not found  
 Acquisition Date: 11/24/2021 12:13:50 AM  
 Cali File Date: 11/24/2021 9:36:24 AM  
 Operator ID: CAS  
 Instrument ID: LCMS2  
 Vial Number: R:A5



m/z 89.000



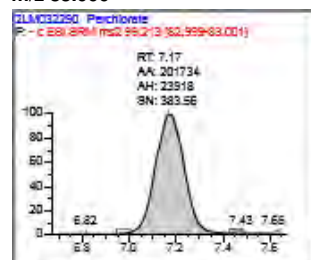
Composite:



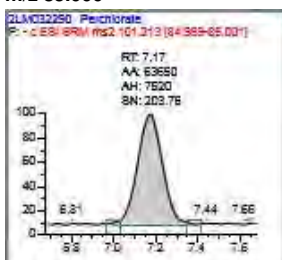
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
7.16	m/z 89.000	1145001	5.000		N/A

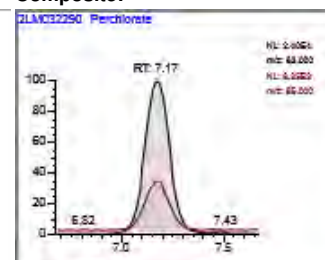
m/z 83.000



m/z 85.000



Composite:



Perchlorate

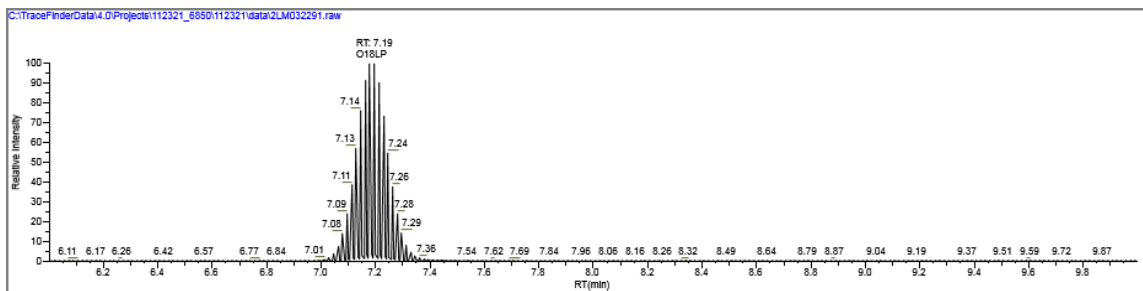
RT (min)	Ion	Response	Amount	Target Range	Ratio
			QC: 1.000		
7.17	m/z 83.000	201734	0.957	0.850 - 1.150	N/A
7.17	m/z 85.000	63650		25.81 - 38.71	31.55

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:A3	S1K0467-CRL3	2LM032291	QCMRL	QCMRL 0.2 ug/L	11/24/2021 12:27:05 AM	1:1 0012468



Internal Standards	RT	Quan Peak	Response	Injected Conc Units	Calculated Conc Units	Flags
O18LP	7.19	89	1164709	5.000 ug/L	5.000 ug/L	

Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
------------	----	-----------	----------	------------	-------------------------------	---------------------	-----------------------	-------

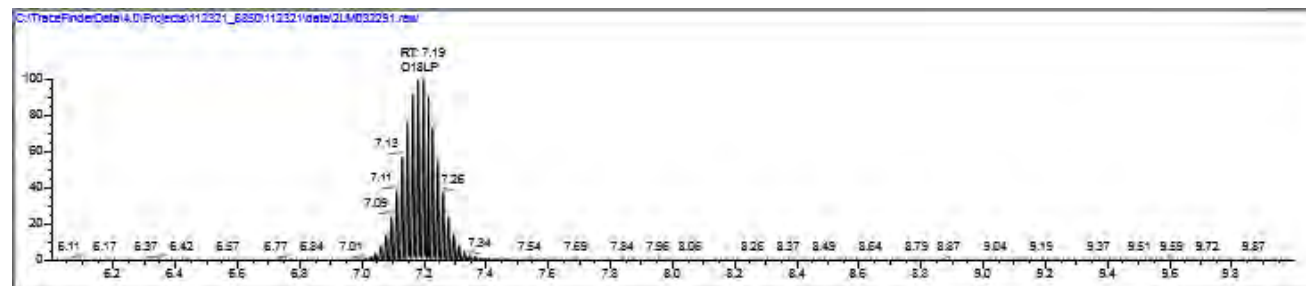
  

Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	7.18	83	40798	Linear	0.035	0.188 ug/L	0.188 ug/L	

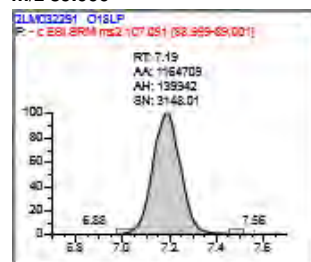
## Sample Report

Data File: 2LM032291  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx  
 Sample ID: S1K0467-CRL3  
 Diln Factor: 1.00  
 Comments: 1:1 0012468

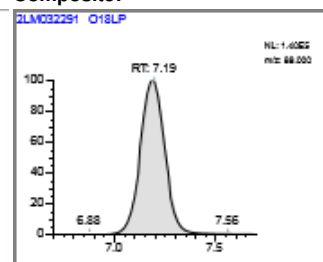
Tune Report Date:  
 Acquisition Date: 11/24/2021 12:27:05 AM  
 Cali File Date: 11/24/2021 9:36:24 AM  
 Operator ID: CAS  
 Instrument ID: LCMS2  
 Vial Number: R:A3



m/z 89.000



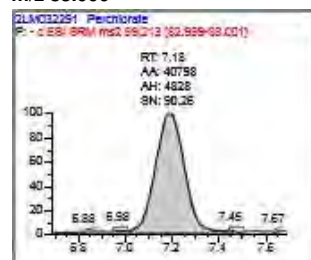
Composite:



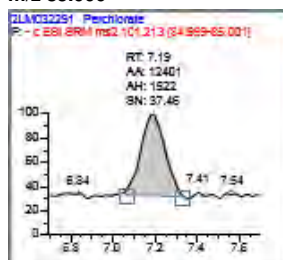
O18LP

RT (min)	Ion	Response	Amount N/A	Target Range	Ratio
7.19	m/z 89.000	1164709	5.000		N/A

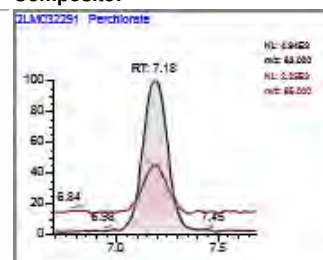
m/z 83.000



m/z 85.000



Composite:



Perchlorate

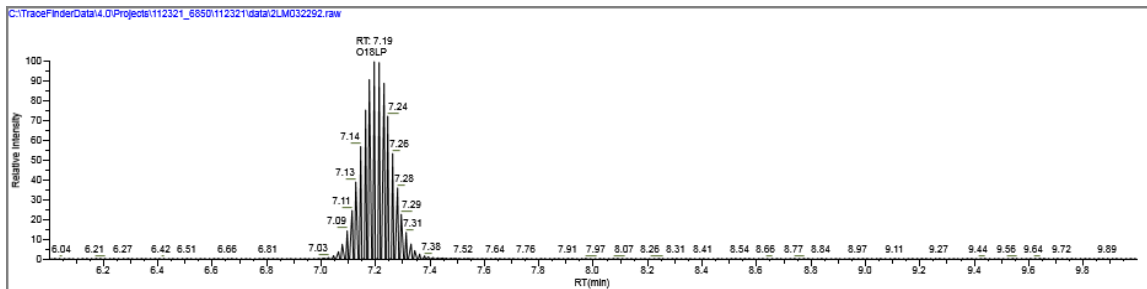
RT (min)	Ion	Response	Amount QC: 0.200	Target Range 0.140 - 0.260	Ratio
7.18	m/z 83.000	40798	0.188		N/A
7.19	m/z 85.000	12401		25.81 - 38.71	30.4

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R-A1	S1K0467-CCB3	2LM032292	N/A	CCB	11/24/2021 12:40:20 AM	1:01



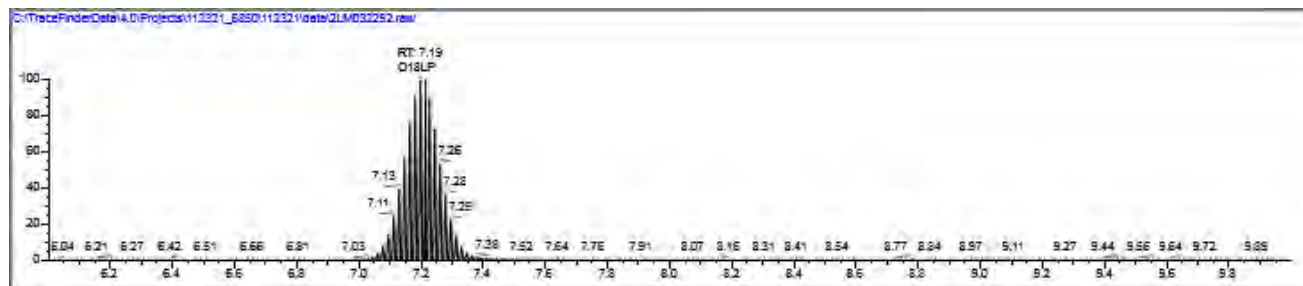
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	7.19	89	1144360			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	N/F	N/F	N/F	Linear	0.000	N/F ug/L	N/F ug/L	

# Sample Report

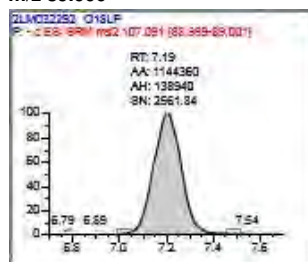
Data File: 2LM032292  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: S1K0467-CCB3  
 Diln Factor: 1.00  
 Comments: 1:01

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

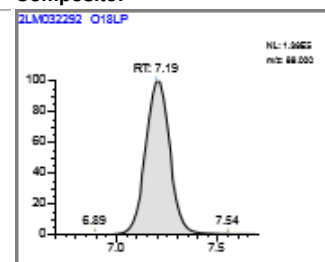
Tune report not found  
 11/24/2021 12:40:20 AM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:A1



m/z 89.000



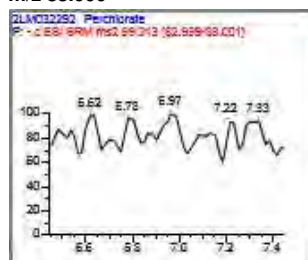
Composite:



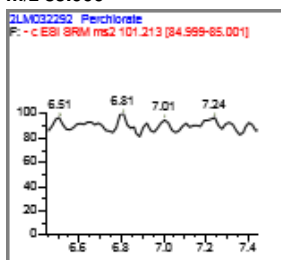
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
7.19	m/z 89.000	1144360	5.000		N/A

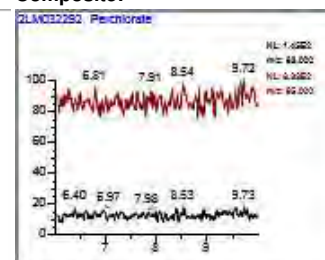
m/z 83.000



m/z 85.000



Composite:



Perchlorate

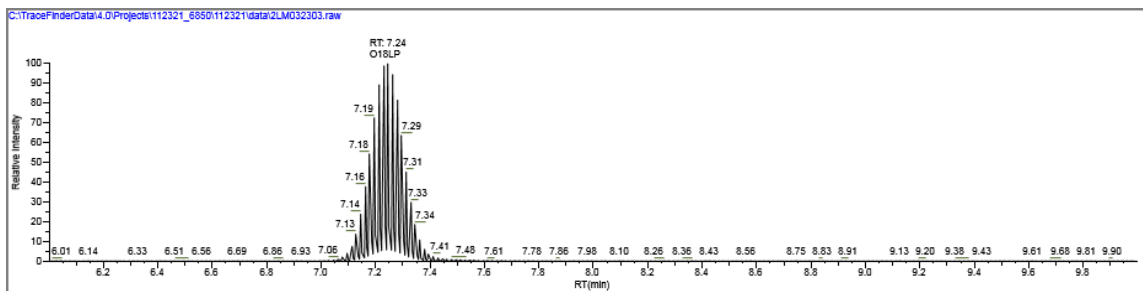
RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
		Compound Not Found			
0.00	m/z 83.000		N/A		
	m/z 85.000				

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:A5	S1K0467-CCV4	2LM032303	CCV	CCV 1.0 ug/L	11/24/2021 3:06:02 AM	1:01

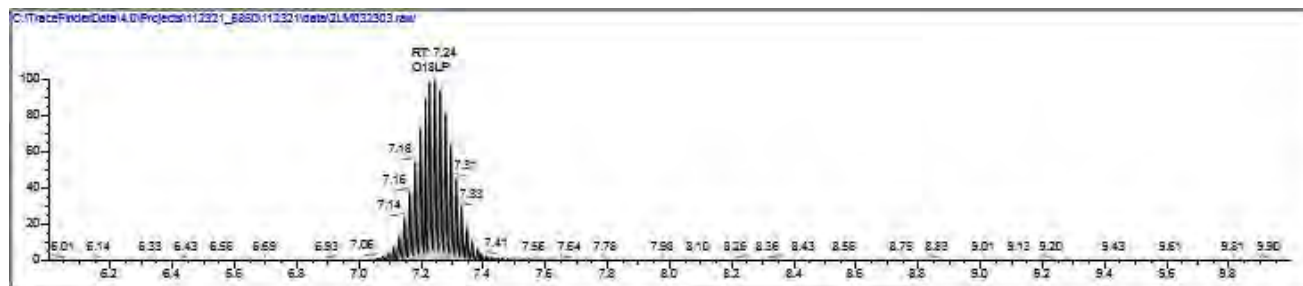


Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	7.24	89	1039826			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	7.25	83	179321	Linear	0.172	0.937 ug/L	0.937 ug/L	

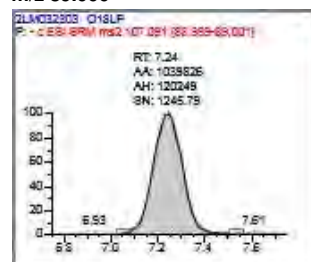
## Sample Report

Data File: 2LM032303  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx  
 Sample ID: S1K0467-CCV4  
 Diln Factor: 1.00  
 Comments: 1:01

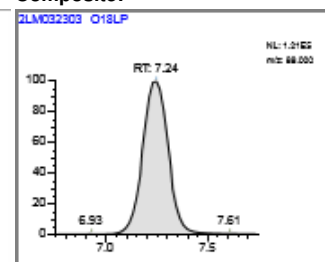
Tune Report Date: Tune report not found  
 Acquisition Date: 11/24/2021 3:06:02 AM  
 Cali File Date: 11/24/2021 9:36:24 AM  
 Operator ID: CAS  
 Instrument ID: LCMS2  
 Vial Number: R:A5



m/z 89.000



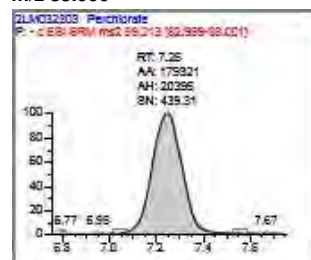
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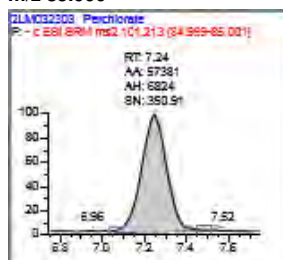
O18LP

RT (min)	Ion	Response	Amount N/A	Target Range	Ratio
7.24	m/z 89.000	1039826	5.000		N/A

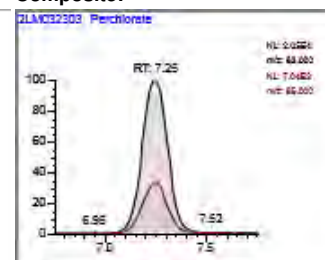
m/z 83.000



m/z 85.000



Composite:



Perchlorate

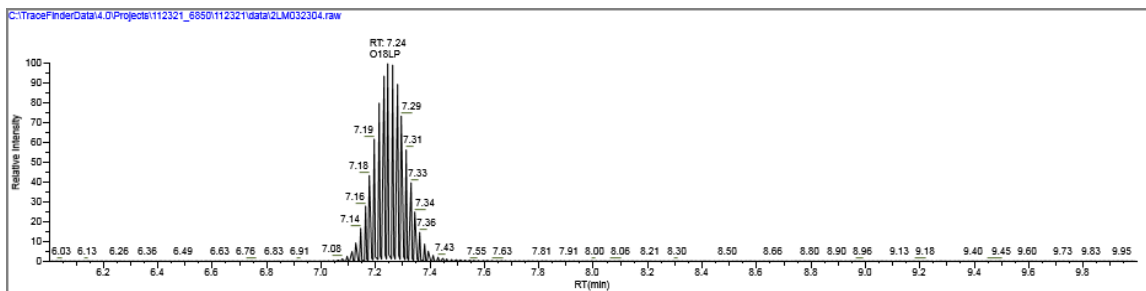
RT (min)	Ion	Response	Amount QC: 1.000	Target Range 0.850 - 1.150	Ratio
7.25	m/z 83.000	179321	0.937		N/A
7.24	m/z 85.000	57381		25.81 - 38.71	32

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:A3	S1K0467-CRL4	2LM032304	QCMRL	QCMRL 0.2 ug/L	11/24/2021 3:19:17 AM	1:01



Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	7.24	89	1083337			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	7.25	83	37083	Linear	0.034	0.183 ug/L	0.183 ug/L	

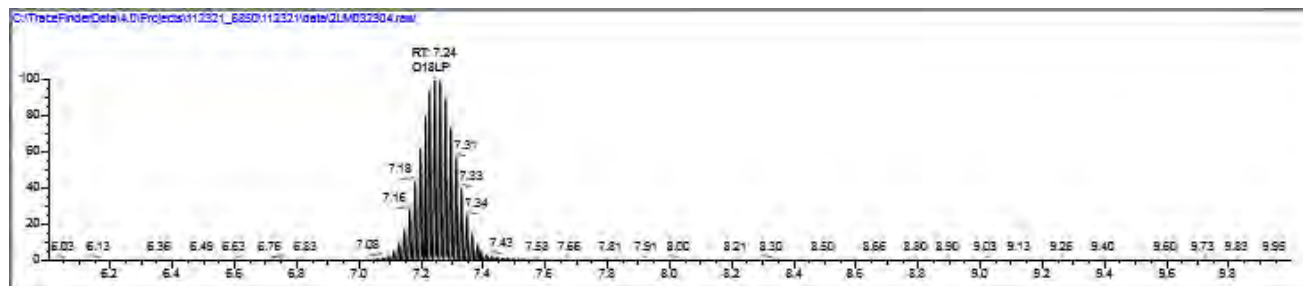


# Sample Report

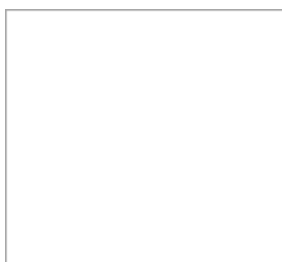
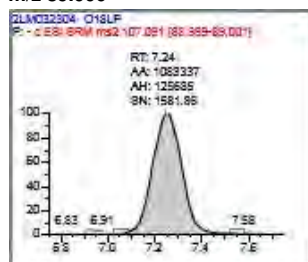
Data File: 2LM032304  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx  
 Sample ID: S1K0467-CRL4  
 Diln Factor: 1.00  
 Comments: 1:01

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

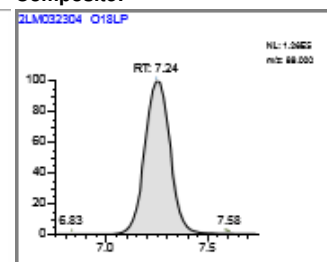
Tune report not found  
 11/24/2021 3:19:17 AM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:A3



## m/z 89.000



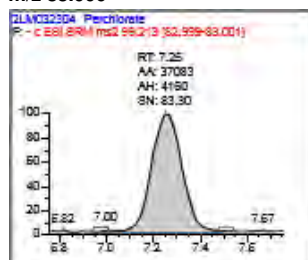
## Composite:



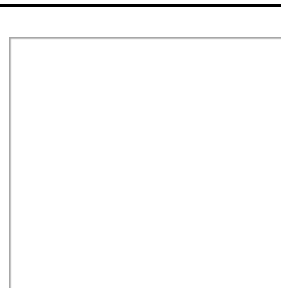
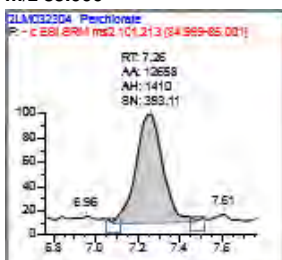
## O18LP

RT (min)	Ion	Response	Amount N/A	Target Range	Ratio
7.24	m/z 89.000	1083337	5.000		N/A

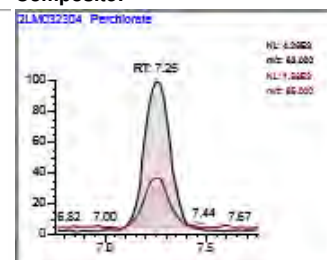
## m/z 83.000



## m/z 85.000



## Composite:



## Perchlorate

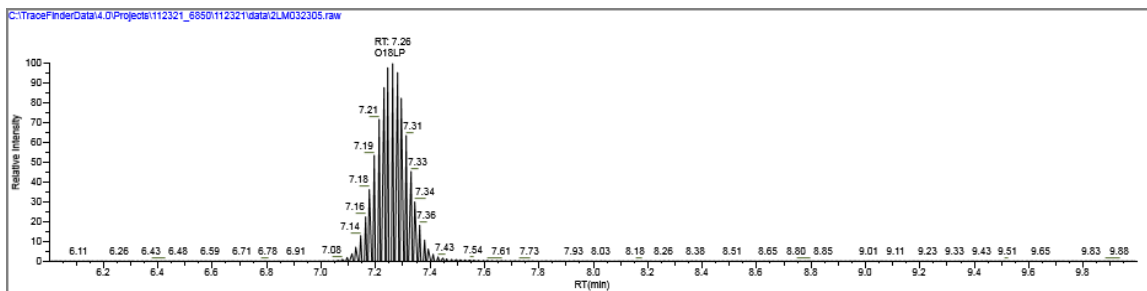
RT (min)	Ion	Response	Amount QC: 0.200	Target Range 0.140 - 0.260	Ratio
7.25	m/z 83.000	37083	0.183		N/A
7.26	m/z 85.000	12658		25.81 - 38.71	34.13

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R-A1	S1K0467-CCB4	2LM032305	N/A	CCB	11/24/2021 3:32:31 AM	1:01



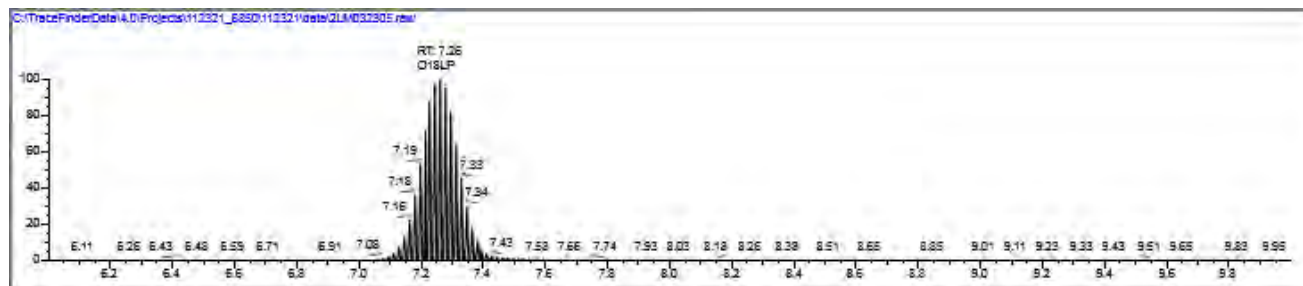
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	7.26	89	1046354			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	N/F	N/F	N/F	Linear	0.000	N/F ug/L	N/F ug/L	

# Sample Report

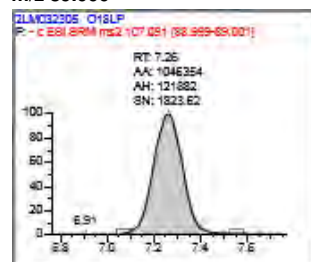
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 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: S1K0467-CCB4  
 Diln Factor: 1.00  
 Comments: 1:01

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

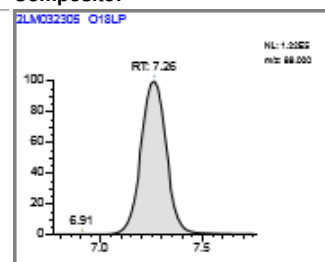
Tune report not found  
 11/24/2021 3:32:31 AM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:A1



m/z 89.000



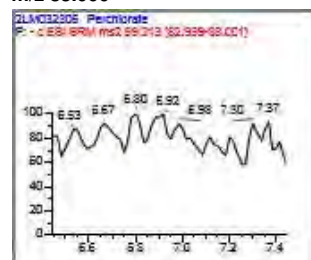
Composite:



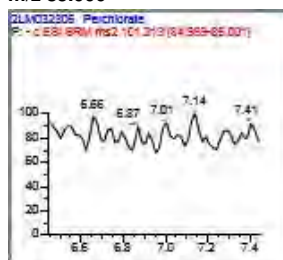
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
7.26	m/z 89.000	1046354	5.000		N/A

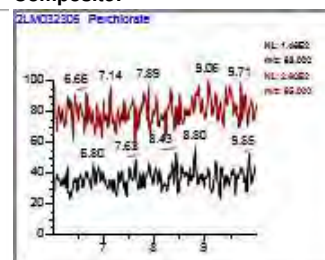
m/z 83.000



m/z 85.000



Composite:



Perchlorate


RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
		Compound Not Found			
0.00	m/z 83.000		N/A		
	m/z 85.000				

## CHAIN OF CUSTODY

Name Of Lab Shipping To: Microbac 158 Starlite Drive Marietta, OH, 45750 (304) 299-4976 Cell (740)-373-4071 Office ATTN: Stephanie Mossburg  
1 of 1

Page

<b>Project:</b> APTIM LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS			<b>Project No.</b> 501032		<b>Analyses</b>										<b>Remarks</b> (Preservatives, etc.)	<b>Lab I.D.#</b>				
<b>Job:</b> LHAAP 04 November 2021																				
<b>Prepared By:</b> Scott Beesinger			<b>P.O. Number</b>		MS / MSD No. OF CONTAINERS Perchlorate by SW6850															
<b>Field Sample I.D.</b> Time															<b>Sample Matrix</b>		<b>Date /</b>			
LH5mw01-21104			wg		11/4/21/0755		1		X											
LH5mw01-21104-FD			wg		11/4/21/0755		1		X											
04ww04-21104			wg		11/4/21/0845		1		X											
04ww08-21104			wg		11/4/21/0930		1		X											
04ww02-21104			wg		11/4/21/1015		1		X											
04ww06-21104			wg		11/4/21/1055		1		X											
LH5mw02-21104			wg		11/4/21/1135		1		X											
04ww11-21104			wg		11/4/21/1215		1		X											

  
 M 1 K 0 3 3 8

APTIM Tennessee  
 Rec'd: 11/05/2021 09:30  
 By: Stephanie Murphy Temp: 3.2 (Signature)

**Additional Remarks:** Standard TAT on all parameters. Please email results to [Vicki.Graves@aptim.com](mailto:Vicki.Graves@aptim.com) and invoices to [fedinvoices@aptim.com](mailto:fedinvoices@aptim.com)

Relinquished By:	Date	Time	Received By:	Date	Time	Relinquished By:	Date	Time	Received By:	Date	Time
Scott Beesinger	11/4/21	1430	Stephanie Murphy	11/5/21	0930						

## For Lab Use Only

Received At Lab By:	Date	Time	Airbill No.	Opened By:	Date	Time	Temp of Container	Seal No.	Condition
<b>Remarks:</b>									

## CHAIN OF CUSTODY

Name Of Lab Shipping To: Microbac 158 Starlite Drive Marietta, OH, 45750 (304) 299-4976 Cell (740)-373-4071 Office ATTN: Stephanie Mossburg  
1 of 1

Page

<b>Project:</b> APTIM LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS			<b>Project No.</b> 501032			<b>Analyses</b>										<b>Remarks</b> (Preservatives, etc.)	<b>Lab I.D.#</b>
<b>Job:</b> LHAAP 04 November 2021																	
<b>Prepared By:</b> Scott Beesinger			<b>P.O. Number</b>														
<b>Field Sample I.D.</b> Time	<b>Sample Matrix</b>	<b>Date /</b>	<b>MS / MSD</b>	<b>No. OF CONTAINERS</b>	<b>Perchlorate by SW6850</b>												
04ww01-211104	WG	11/4/21/1300		1	X												

**Additional Remarks:** Standard TAT on all parameters. Please email results to [Vicki.Graves@aptim.com](mailto:Vicki.Graves@aptim.com) and invoices to [fedinvoices@aptim.com](mailto:fedinvoices@aptim.com)

<b>Relinquished By:</b>	<b>Date</b>	<b>Time</b>	<b>Received By:</b>	<b>Date</b>	<b>Time</b>	<b>Relinquished By:</b>	<b>Date</b>	<b>Time</b>	<b>Received By:</b>	<b>Date</b>	<b>Time</b>
Scott Beesinger	11/4/21	1430	Stephanie Murphy	11-5-21	0930						

<b>Received At Lab By:</b>					<b>Date</b>	<b>Time</b>	<b>Airbill No.</b>	<b>For Lab Use Only</b>					
								<b>Opened By:</b>	<b>Date</b>	<b>Time</b>	<b>Temp of Container</b>	<b>Seal No.</b>	<b>Condition</b>
<b>Remarks:</b>													



Work Order # MR0338

COOLER TEMP >6° C LOG

[illegible]

pH Lot # 4257843

pH

## Exceptions

[illegible]

PRESERVATIVE  
EXCEPTIONS

✓ NONE

AS NOTED

Document Control # 1957  
Last 04-10-2019

Issued to: Document Master File



Microbac Laboratories Inc., - Marietta, OH

Level IV QA/QC Data Package

Laboratory Report Number:

**M1K0586**

Client Project ID:

**LHAAP**

For:

Vicki Graves

**APTIM Tennessee**

2410 Cherahala BLVD

Knoxville, TN 37932

**Project Requested Certification:**

Microbac Laboratories Inc., - Marietta, OH

2936.01

American Association for Laboratory Accreditation

**Project State of Origin: Texas**

*All test results meet the requirements of the QAPP and other applicable contract terms and conditions. Any exceptions are attached to this cover page or addressed in the method narratives presented in the report. I certify that all test results meet all of the requirements of the accrediting authority listed within this report. Analytical results are reported on a 'as received' basis unless specified otherwise. Analytical results for solids with units ending in (dry) are reported on a dry weight basis. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories. The reported results are related only to the samples analyzed as received. The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.*

**Laboratory Project Manager:**

Stephanie Mossburg  
Customer Relations Manager  
Stephanie.Mossburg@microbac.com

**Authorized By:**

Stephanie Mossburg  
Customer Relations Manager  
Issued: 12/06/2021

**Microbac Laboratories, Inc.**

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**Laboratory Report Number: M1K0586**

**Client Project ID: LHAAP**

**Microbac Laboratories Inc., - Marietta, OH**

### Cooler Receipt Log

**Cooler ID:** Default Cooler

**Temp:** 1.7°C

### Cooler Inspection Checklist

Ice Present or not required?	Yes	Shipping containers sealed or not required?	Yes
Custody seals intact or not required?	Yes	Chain of Custody (COC) Present?	Yes
COC includes customer information?	Yes	Relinquished and received signature on COC?	Yes
Sample collector identified on COC?	Yes	Sample type identified on COC?	Yes
Correct type of Containers Received	Yes	Correct number of containers listed on COC?	Yes
Containers Intact?	Yes	COC includes requested analyses?	Yes
Enough sample volume for indicated tests received?	Yes	Sample labels match COC (Name, Date & Time?)	Yes
Samples arrived within hold time?	Yes	Correct preservatives on COC or not required?	Yes
Chemical preservations checked or not required?	Yes	Preservation checks meet method requirements?	Yes
VOA vials have zero headspace, or not recd.?	Yes		



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# Sample Summary

## Sample Summary

Laboratory Report Number: M1K0586

Client Project ID: LHAAP

Microbac Laboratories Inc., - Marietta, OH

Client Sample ID:	Lab Sample ID:	Sampled:
04WW07-211109	M1K0586-01	11/09/21 07:45
04WW07-211109-FD	M1K0586-02	11/09/21 07:45
04WW05-211109	M1K0586-03	11/09/21 08:30
04WW09-211109	M1K0586-04	11/09/21 09:15
04WW10-211109	M1K0586-05	11/09/21 10:00

# Holding Time Summary

**Specific Method: EPA 6850****Hold Time****Laboratory Report Number: M1K0586****Matrix: Aqueous****Client Project ID: LHAAP****Microbac Laboratories Inc., - Marietta, OH**

Laboratory ID	Date Collected	Date Received	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
04WW07-211109	11/09/21 07:45	11/10/21 09:30	11/23/21 22:27	14.61	28.00	
04WW07-211109-FD	11/09/21 07:45	11/10/21 09:30	11/23/21 22:41	14.62	28.00	
04WW05-211109	11/09/21 08:30	11/10/21 09:30	11/23/21 22:54	14.60	28.00	
04WW09-211109	11/09/21 09:15	11/10/21 09:30	11/23/21 23:07	14.58	28.00	
04WW10-211109	11/09/21 10:00	11/10/21 09:30	11/23/21 23:20	14.56	28.00	

\* - Holding time exceeded.



Analysis Class

# HPLC Organics



### HPLC Organics - Class Narrative and Notes

All test results meet the requirements of the QAPP and other applicable contract terms and conditions. Any exceptions are listed below in the sample and qc notes sections. Analytical results are reported on a 'as received' basis unless specified otherwise. Analytical results for solids with units ending in (dry) are reported on a dry weight basis. A statement of uncertainty for each analysis is available upon request.

### QC Sample Notes



The analyte was analyzed for but was not detected above the reported quantitation limit. The quantitation limit has been adjusted for any dilution or concentration of the sample.

### EPA 6850

#### Perchlorate

S1K0467-CCB1	Calibration Blank	S1K0467-CCB2	Calibration Blank
S1K0467-CCB3	Calibration Blank	S1K0467-CCB4	Calibration Blank
S1K0467-ICB1	Initial Cal Blank		



# HPLC Organics

## EPA 6850





# **FORM I: HPLC Organics EPA 6850 RESULTS SUMMARY**

**Laboratory Report Number: M1K0586****CERTIFICATE OF ANALYSIS****Client Project ID: LHAAP****FORM I****Microbac Laboratories Inc., - Marietta, OH****Perchlorate by LCMS**

<b>Client ID:</b> 04WW07-211109		<b>Collection Date:</b> 11/09/2021 07:45						
<b>Laboratory ID:</b> M1K0586-01		<b>Prep Date:</b> 11/23/2021 09:23						
<b>Matrix:</b> Aqueous		<b>Analyzed:</b> 11/23/2021 22:27						
<b>Batch / Sequence:</b> B1K1411 / S1K0467		<b>Analytical Method:</b> EPA 6850		<b>Calibration:</b> 21K0035				
<b>Instrument:</b> LCMS2		<b>Units:</b> ug/L		<b>File ID:</b> 2LM032282				
<b>Analyst:</b> CAS		<b>Dilution:</b> 1						
<b>Analyte</b>		<b>CAS Number</b>	<b>Result</b>	<b>DL</b>	<b>LOD</b>	<b>LOQ</b>	<b>Flag</b>	<b>Qual</b>
Perchlorate		14797-73-0	0.200	0.100	0.200	0.400	U	

**Notes and Definitions**

DL: Detection Limit

LOD: Limit of Detection

LOQ: Limit of Quantitation

U: The analyte was analyzed for but was not detected above the reported quantitation limit. The quantitation limit has been adjusted for any dilution or concentration of the sample.

ug/L: Micrograms per Liter

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Laboratory Report Number: M1K0586

CERTIFICATE OF ANALYSIS

Client Project ID: LHAAP

FORM I

Microbac Laboratories Inc., - Marietta, OH

Perchlorate by LCMS

<b>Client ID:</b> 04WW07-211109-FD			<b>Collection Date:</b> 11/09/2021 07:45					
<b>Laboratory ID:</b> M1K0586-02			<b>Prep Date:</b> 11/23/2021 09:23					
<b>Matrix:</b> Aqueous			<b>Analyzed:</b> 11/23/2021 22:41					
<b>Batch / Sequence:</b> B1K1411 / S1K0467		<b>Analytical Method:</b> EPA 6850		<b>Calibration:</b> 21K0035				
<b>Instrument:</b> LCMS2		<b>Units:</b> ug/L		<b>File ID:</b> 2LM032283				
<b>Analyst:</b> CAS		<b>Dilution:</b> 1						
<b>Analyte</b>		<b>CAS Number</b>	<b>Result</b>	<b>DL</b>	<b>LOD</b>	<b>LOQ</b>	<b>Flag</b>	<b>Qual</b>
Perchlorate		14797-73-0	0.200	0.100	0.200	0.400	U	

**Notes and Definitions**

DL: Detection Limit

LOD: Limit of Detection

LOQ: Limit of Quantitation

U: The analyte was analyzed for but was not detected above the reported quantitation limit. The quantitation limit has been adjusted for any dilution or concentration of the sample.

ug/L: Micrograms per Liter

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Laboratory Report Number: M1K0586

CERTIFICATE OF ANALYSIS

Client Project ID: LHAAP

FORM I

Microbac Laboratories Inc., - Marietta, OH

Perchlorate by LCMS

<b>Client ID:</b> 04WW05-211109		<b>Collection Date:</b> 11/09/2021 08:30					
<b>Laboratory ID:</b> M1K0586-03		<b>Prep Date:</b> 11/23/2021 09:23					
<b>Matrix:</b> Aqueous		<b>Analyzed:</b> 11/23/2021 22:54					
<b>Batch / Sequence:</b> B1K1411 / S1K0467	<b>Analytical Method:</b> EPA 6850	<b>Calibration:</b> 21K0035					
<b>Instrument:</b> LCMS2	<b>Units:</b> ug/L	<b>File ID:</b> 2LM032284					
<b>Analyst:</b> CAS	<b>Dilution:</b> 1						
Analyte	CAS Number	Result	DL	LOD	LOQ	Flag	Qual
Perchlorate	14797-73-0	0.200	0.100	0.200	0.400	U	

**Notes and Definitions**

DL: Detection Limit

LOD: Limit of Detection

LOQ: Limit of Quantitation

U: The analyte was analyzed for but was not detected above the reported quantitation limit. The quantitation limit has been adjusted for any dilution or concentration of the sample.

ug/L: Micrograms per Liter

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Laboratory Report Number: M1K0586

CERTIFICATE OF ANALYSIS

Client Project ID: LHAAP

FORM I

Microbac Laboratories Inc., - Marietta, OH

Perchlorate by LCMS

<b>Client ID:</b> 04WW09-211109		<b>Collection Date:</b> 11/09/2021 09:15					
<b>Laboratory ID:</b> M1K0586-04		<b>Prep Date:</b> 11/23/2021 09:23					
<b>Matrix:</b> Aqueous		<b>Analyzed:</b> 11/23/2021 23:07					
<b>Batch / Sequence:</b> B1K1411 / S1K0467	<b>Analytical Method:</b> EPA 6850	<b>Calibration:</b> 21K0035					
<b>Instrument:</b> LCMS2	<b>Units:</b> ug/L	<b>File ID:</b> 2LM032285					
<b>Analyst:</b> CAS	<b>Dilution:</b> 1						
Analyte	CAS Number	Result	DL	LOD	LOQ	Flag	Qual
Perchlorate	14797-73-0	0.200	0.100	0.200	0.400	U	

**Notes and Definitions**

DL: Detection Limit

LOD: Limit of Detection

LOQ: Limit of Quantitation

U: The analyte was analyzed for but was not detected above the reported quantitation limit. The quantitation limit has been adjusted for any dilution or concentration of the sample.

ug/L: Micrograms per Liter

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Laboratory Report Number: M1K0586

CERTIFICATE OF ANALYSIS

Client Project ID: LHAAP

FORM I

Microbac Laboratories Inc., - Marietta, OH

Perchlorate by LCMS

<b>Client ID:</b> 04WW10-211109			<b>Collection Date:</b> 11/09/2021 10:00				
<b>Laboratory ID:</b> M1K0586-05			<b>Prep Date:</b> 11/23/2021 09:23				
<b>Matrix:</b> Aqueous			<b>Analyzed:</b> 11/23/2021 23:20				
<b>Batch / Sequence:</b> B1K1411 / S1K0467		<b>Analytical Method:</b> EPA 6850		<b>Calibration:</b> 21K0035			
<b>Instrument:</b> LCMS2		<b>Units:</b> ug/L		<b>File ID:</b> 2LM032286			
<b>Analyst:</b> CAS		<b>Dilution:</b> 1					

Analyte	CAS Number	Result	DL	LOD	LOQ	Flag	Qual
Perchlorate	14797-73-0	0.200	0.100	0.200	0.400	U	

**Notes and Definitions**

DL: Detection Limit

LOD: Limit of Detection

LOQ: Limit of Quantitation

U: The analyte was analyzed for but was not detected above the reported quantitation limit. The quantitation limit has been adjusted for any dilution or concentration of the sample.

ug/L: Micrograms per Liter

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**FORM III:  
HPLC Organics  
EPA 6850  
BS/BSD, MS/MSD, DUP**



Laboratory Report Number: M1K0586

Matrix Spike/Duplicate (MS/MSD)

Client Project ID: LHAAP

FORM IIIA

<b>Method:</b> EPA 6850		<b>Parent</b>				<b>Spike</b>		<b>Duplicate</b>			
<b>Batch:</b> B1K1411		<b>Sample ID:</b> M1K0586-05				B1K1411-MS1		B1K1411-MSD1			
<b>Matrix:</b> Aqueous		<b>Prepared:</b> 11/23/2021 09:23				11/23/21 09:23		11/23/21 09:23			
<b>Units:</b> ug/L		<b>Analyzed:</b> 11/23/2021 23:20				11/23/21 23:34		11/23/21 23:47			
<b>Instrument:</b> LCMS2		<b>File ID:</b> 2LM032286				2LM032287		2LM032288			
<b>Calibration:</b> 21K0035		<b>Dilution:</b> 1				1		1			
<b>Analyst:</b> CAS											

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limts	RPD Limit	Q
Perchlorate	ND	0.200	0.216	108	0.200	0.216	108	0.00	84 - 119	15	

\* - Exceeds %Rec Limit

# - Exceeds RPD Limit





Laboratory Report Number: M1K0586

BLANK SPIKE (BS)

Client Project ID: LHAAP

FORM IIIB

<b>Method:</b> EPA 6850		<b>Blank Spike</b>			
<b>Batch:</b> B1K1411		<b>Spike ID:</b> B1K1411-BS1			
<b>Analyst:</b> CAS		<b>Prepared:</b> 11/23/21 09:23			
<b>Matrix:</b> Aqueous		<b>Analyzed:</b> 11/23/21 19:35			
<b>Units:</b> ug/L		<b>File ID:</b> 2LM032269			
<b>Instrument:</b> LCMS2		<b>Initial/Final:</b> 10mL/10mL			
<b>Calibration:</b> 21K0035					
Analyte	BS Spiked	BS Found	BS %Rec	%Rec Limts	Q
Perchlorate	0.200	0.202	101	84 - 119	

\* - Does not meet %Rec acceptance criteria.

# - Does not meet RPD acceptance criteria.

NS - Analyte Not Spiked

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# **FORM IV: HPLC Organics EPA 6850 METHOD BLANK SUMMARY**



Laboratory Report Number: M1K0586

Client Project ID: LHAAP

**METHOD BLANK SUMMARY  
FORM IVA**

**Blank ID:** B1K1411-BLK1  
**Blank File ID:** 2LM032268  
**Prepared:** 11/23/2021 9:23  
**Analyzed:** 11/23/2021 19:22

**Batch:** B1K1411  
**Instrument:** LCMS2  
**Method:** EPA 6850  
**Analyst:** CAS

**This Method Blank Applies To The Following Samples:**

Client Sample ID	Laboratory Sample ID	Lab File ID	Time Analyzed
Blank	B1K1411-BLK1	2LM032268	11/23/2021 19:22
LCS	B1K1411-BS1	2LM032269	11/23/2021 19:35
04WW07-211109	M1K0586-01	2LM032282	11/23/2021 22:27
04WW07-211109-FD	M1K0586-02	2LM032283	11/23/2021 22:41
04WW05-211109	M1K0586-03	2LM032284	11/23/2021 22:54
04WW09-211109	M1K0586-04	2LM032285	11/23/2021 23:07
04WW10-211109	M1K0586-05	2LM032286	11/23/2021 23:20
Matrix Spike	B1K1411-MS1	2LM032287	11/23/2021 23:34
Matrix Spike Dup	B1K1411-MSD1	2LM032288	11/23/2021 23:47



Laboratory Report Number: M1K0586

METHOD BLANK

Client Project ID: LHAAP

FORM IVB

<b>Sample ID:</b> B1K1411-BLK1		<b>Prep Date:</b> 11/23/21 09:23		<b>Matrix:</b> Aqueous				
<b>Instrument:</b> LCMS2		<b>Analyzed:</b> 11/23/21 19:22		<b>Method:</b> EPA 6850				
<b>File ID:</b> 2LM032268		<b>Sequence:</b> S1K0467		<b>Analyst:</b> CAS				
<b>Batch:</b> B1K1411		<b>Units:</b> ug/L		<b>Calibration:</b> 21K0035				
<b>Analyte</b>		<b>Result</b>	<b>DL</b>	<b>LOD</b>	<b>LOQ</b>	<b>Dilution</b>	<b>Flag</b>	<b>Q</b>
Perchlorate		0.200	0.100	0.200	0.400	1	U	

**Notes and Definitions**

\* - Detected in the associated method Blank at a concentration  $\geq 1/2 \times \text{RL}$

U: The analyte was analyzed for but was not detected above the reported quantitation limit. The quantitation limit has been adjusted for any dilution or concentration of the sample.



# **FORM VII: HPLC Organics EPA 6850 ICV/CCV**



Laboratory Report Number: M1K0586

Initial Calibration Verification (ICV)

Client Project ID: LHAAP

FORM VIIA

Sample ID: S1K0467-ICV1			Analyzed: 11/23/21 18:16			Method: EPA 6850		
Instrument: LCMS2			Calibration: 21K0035			Sequence: S1K0467		
File ID: 2LM032263			Units: ug/L			Analyst: CAS		
Analyte	Response	Limit	Q	Expected	Found	% Drift / % Diff	UCL	Q
Perchlorate	0.8800185			1.00	0.956	-4.4	15	

\* - Does not meet acceptance criteria.

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Laboratory Report Number: M1K0586

Client Project ID: LHAAP

Continuing Calibration Verification (CCV)

FORM VIIB

<b>Laboratory ID:</b> S1K0467-CCV1		<b>Analyzed:</b> 11/23/21 18:42			<b>Method:</b> EPA 6850			
<b>Instrument:</b> LCMS2		<b>Calibration:</b> 21K0035			<b>Sequence:</b> S1K0467			
<b>File ID:</b> 2LM032265		<b>Units:</b> ug/L			<b>Analyst:</b> CAS			
<b>Analyte</b>	<b>Response</b>	<b>Limit</b>	<b>Q</b>	<b>Expected</b>	<b>Found</b>	<b>% Drift / % Diff</b>	<b>UCL</b>	<b>Q</b>
Perchlorate	0.8675141			1.00	0.943	-5.7	15	

\* - Does not meet acceptance criteria.

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Laboratory Report Number: M1K0586

Client Project ID: LHAAP

Continuing Calibration Verification (CCV)

FORM VIIB

<b>Laboratory ID:</b> S1K0467-CCV2		<b>Analyzed:</b> 11/23/21 21:21			<b>Method:</b> EPA 6850			
<b>Instrument:</b> LCMS2		<b>Calibration:</b> 21K0035			<b>Sequence:</b> S1K0467			
<b>File ID:</b> 2LM032277		<b>Units:</b> ug/L			<b>Analyst:</b> CAS			
<b>Analyte</b>	<b>Response</b>	<b>Limit</b>	<b>Q</b>	<b>Expected</b>	<b>Found</b>	<b>% Drift / % Diff</b>	<b>UCL</b>	<b>Q</b>
Perchlorate	0.8778172			1.00	0.954	-4.6	15	

\* - Does not meet acceptance criteria.

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Laboratory Report Number: M1K0586

Client Project ID: LHAAP

Continuing Calibration Verification (CCV)

FORM VIIB

Laboratory ID: S1K0467-CCV3		Analyzed: 11/24/21 00:13			Method: EPA 6850			
Instrument: LCMS2		Calibration: 21K0035			Sequence: S1K0467			
File ID: 2LM032290		Units: ug/L			Analyst: CAS			
Analyte	Response	Limit	Q	Expected	Found	% Drift / % Diff	UCL	Q
Perchlorate	0.8809337			1.00	0.957	-4.3	15	

\* - Does not meet acceptance criteria.

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Laboratory Report Number: M1K0586

Client Project ID: LHAAP

Continuing Calibration Verification (CCV)

FORM VIIB

Laboratory ID: S1K0467-CCV4		Analyzed: 11/24/21 03:06			Method: EPA 6850			
Instrument: LCMS2		Calibration: 21K0035			Sequence: S1K0467			
File ID: 2LM032303		Units: ug/L			Analyst: CAS			
Analyte	Response	Limit	Q	Expected	Found	% Drift / % Diff	UCL	Q
Perchlorate	0.8622645			1.00	0.937	-6.3	15	

\* - Does not meet acceptance criteria.

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Laboratory Report Number: M1K0586

Client Project ID: LHAAP

Instrument Reporting Limit Check (CRL)

FORM VIIB

<b>Laboratory ID:</b> S1K0467-CRL1		<b>Analyzed:</b> 11/23/21 18:55		<b>Method:</b> EPA 6850		
<b>Instrument:</b> LCMS2		<b>Calibration:</b> 21K0035		<b>Sequence:</b> S1K0467		
<b>File ID:</b> 2LM032266		<b>Units:</b> ug/L				
Analyte	Expected	Found	Recovery	LCL	UCL	Q
Perchlorate	0.200	0.186	93.0	70	130	

\* - Does not meet acceptance criteria.

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Laboratory Report Number: M1K0586

Client Project ID: LHAAP

Instrument Reporting Limit Check (CRL)

FORM VIIB

<b>Laboratory ID:</b> S1K0467-CRL2		<b>Analyzed:</b> 11/23/21 21:34		<b>Method:</b> EPA 6850		
<b>Instrument:</b> LCMS2		<b>Calibration:</b> 21K0035		<b>Sequence:</b> S1K0467		
<b>File ID:</b> 2LM032278		<b>Units:</b> ug/L				
Analyte	Expected	Found	Recovery	LCL	UCL	Q
Perchlorate	0.200	0.184	92.0	70	130	

\* - Does not meet acceptance criteria.

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Laboratory Report Number: M1K0586

Client Project ID: LHAAP

Instrument Reporting Limit Check (CRL)  
FORM VIIB

<b>Laboratory ID:</b> S1K0467-CRL3		<b>Analyzed:</b> 11/24/21 00:27		<b>Method:</b> EPA 6850		
<b>Instrument:</b> LCMS2		<b>Calibration:</b> 21K0035		<b>Sequence:</b> S1K0467		
<b>File ID:</b> 2LM032291		<b>Units:</b> ug/L				
Analyte	Expected	Found	Recovery	LCL	UCL	Q
Perchlorate	0.200	0.188	94.0	70	130	

\* - Does not meet acceptance criteria.

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Laboratory Report Number: M1K0586

Client Project ID: LHAAP

Instrument Reporting Limit Check (CRL)  
FORM VIIB

<b>Laboratory ID:</b> S1K0467-CRL4		<b>Analyzed:</b> 11/24/21 03:19		<b>Method:</b> EPA 6850		
<b>Instrument:</b> LCMS2		<b>Calibration:</b> 21K0035		<b>Sequence:</b> S1K0467		
<b>File ID:</b> 2LM032304		<b>Units:</b> ug/L				
Analyte	Expected	Found	Recovery	LCL	UCL	Q
Perchlorate	0.200	0.183	91.5	70	130	

\* - Does not meet acceptance criteria.

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Laboratory Report Number: M1K0586

Client Project ID: LHAAP

MATRIX CONDUCTIVITY TEST

FORM VII

<b>Laboratory ID:</b> S1K0467-IFA1		<b>Run Date:</b> 11/23/21 19:09		<b>Matrix:</b> Aqueous			
<b>Instrument:</b> LCMS2		<b>Calibration:</b> 21K0035		<b>Method:</b> EPA 6850			
<b>File ID:</b> 2LM032267		<b>Analyst:</b> CAS		<b>Batch ID:</b> S1K0467			
Analyte	Known (ug/L)	Result (ug/L)	Recovery	LCL	UCL	MRL (ug/L)	Flags
Perchlorate	0.20000	0.238	119	80	120	0.4000	



# **FORM VIII: HPLC Organics EPA 6850 Internal Standard Area and RT**





Laboratory Report Number: M1K0586

INTERNAL STANDARD AREA SUMMARY

Client Project ID: LHAAP

FORM VIIIA

<b>Laboratory:</b>	Microbac Laboratories Inc., - Marietta, OH	<b>SDG:</b>	M1K0586
<b>Client:</b>	APTIM Tennessee	<b>Project:</b>	Longhorn AAP
<b>Sequence:</b>	S1K0467	<b>Instrument:</b>	LCMS2
		<b>Calibration:</b>	21K0035

## Blank (B1K1411-BLK1 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1094479	7.03	1316163	6.96	83	50 - 150		0.0700	+/-2.00	

## LCS (B1K1411-BS1 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1089985	7.04	1316163	6.96	83	50 - 150		0.0800	+/-2.00	

## Matrix Spike (B1K1411-MS1 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	974676	6.76	1316163	6.96	74	50 - 150		-0.3200	+/-2.00	

## Matrix Spike Dup (B1K1411-MSD1 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1105509	6.78	1316163	6.96	84	50 - 150		-0.3000	+/-2.00	

## 04WW07-211109 (M1K0586-01 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1004392	6.74	1316163	6.96	76	50 - 150		-0.3400	+/-2.00	

## 04WW07-211109-FD (M1K0586-02 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	858816	6.74	1316163	6.96	65	50 - 150		-0.3400	+/-2.00	

## 04WW05-211109 (M1K0586-03 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	735620	6.74	1316163	6.96	56	50 - 150		-0.3400	+/-2.00	

## 04WW09-211109 (M1K0586-04 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	743693	6.73	1316163	6.96	57	50 - 150		-0.3500	+/-2.00	

## 04WW10-211109 (M1K0586-05 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	824510	6.76	1316163	6.96	63	50 - 150		-0.3200	+/-2.00	



Laboratory Report Number: M1K0586

INTERNAL STANDARD AREA SUMMARY  
FORM VIIIA

Client Project ID: LHAAP

## Calibration Blank (S1K0467-CCB1 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1299178	6.94	1316163	6.96	99	50 - 150		0.0000	+/-2.00	

## Calibration Blank (S1K0467-CCB2 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1244461	7.11	1316163	6.96	95	50 - 150		0.0300	+/-2.00	

## Calibration Blank (S1K0467-CCB3 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1144360	7.19	1316163	6.96	87	50 - 150		0.0300	+/-2.00	

## Calibration Blank (S1K0467-CCB4 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1046354	7.26	1316163	6.96	80	50 - 150		0.0200	+/-2.00	

## Calibration Check (S1K0467-CCV1 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1316163	6.96	1316163	6.96	100	50 - 150		0.0000	+/-2.00	

## Calibration Check (S1K0467-CCV2 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1207068	7.08	1316163	6.96	92	50 - 150		0.0000	+/-2.00	

## Calibration Check (S1K0467-CCV3 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1145001	7.16	1316163	6.96	87	50 - 150		0.0000	+/-2.00	

## Calibration Check (S1K0467-CCV4 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1039826	7.24	1316163	6.96	79	50 - 150		0.0000	+/-2.00	

## Instrument RL Check (S1K0467-CRL1 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1174525	6.96	1316163	6.96	89	50 - 150		0.0000	+/-2.00	

## Instrument RL Check (S1K0467-CRL2 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1264922	7.09	1316163	6.96	96	50 - 150		0.0100	+/-2.00	

## Instrument RL Check (S1K0467-CRL3 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1164709	7.19	1316163	6.96	88	50 - 150		0.0300	+/-2.00	

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Laboratory Report Number: M1K0586

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INTERNAL STANDARD AREA SUMMARY  
FORM VIIIA

## Instrument RL Check (S1K0467-CRL4 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1083337	7.24	1316163	6.96	82	50 - 150		0.0000	+/-2.00	

## Initial Cal Blank (S1K0467-ICB1 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1373183	6.86	1316163	6.96	104	50 - 150		-0.0700	+/-2.00	

## Initial Cal Check (S1K0467-ICV1 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1311711	6.94	1316163	6.96	100	50 - 150		0.0000	+/-2.00	

## Interference Check A (S1K0467-IFA1 )

Analyte	Resp	RT	RefResp	RefRT	Area%	ISAreaLimit	Flg	RTDiff	RTDiffLimit	Flg
O18LP	1108705	6.61	1316163	6.96	84	50 - 150		-0.3500	+/-2.00	



**Section A:**  
**HPLC Organics**  
**EPA 6850**  
**Batch / Sequence Raw Data**





Filename	Sample Type	Level	Sample ID	Comments	Compound	Type	Area	Ion Ratio (2.31-3.85)
2LM032255	Unknown		S1K0467-ICB1	1:1	Perchlorate	Target Compound	N/F	#VALUE!
2LM032255	Unknown		S1K0467-ICB1	1:1	Perchlorate	Confirming Peak	N/F	
2LM032256	Cal Std	1	S1K0467-CAL1	1:1 0012469	Perchlorate	Target Compound	22361	3.136625053
2LM032256	Cal Std	1	S1K0467-CAL1	1:1 0012469	Perchlorate	Confirming Peak	7129	
2LM032257	Cal Std	2	S1K0467-CAL2	1:1 0012468	Perchlorate	Target Compound	42956	3.099278499
2LM032257	Cal Std	2	S1K0467-CAL2	1:1 0012468	Perchlorate	Confirming Peak	13860	
2LM032258	Cal Std	3	S1K0467-CAL3	1:1 0012467	Perchlorate	Target Compound	150289	3.166178608
2LM032258	Cal Std	3	S1K0467-CAL3	1:1 0012467	Perchlorate	Confirming Peak	47467	
2LM032259	Cal Std	4	S1K0467-CAL4	1:1 0012466	Perchlorate	Target Compound	222769	3.102070656
2LM032259	Cal Std	4	S1K0467-CAL4	1:1 0012466	Perchlorate	Confirming Peak	71813	
2LM032260	Cal Std	5	S1K0467-CAL5	1:1 0012465	Perchlorate	Target Compound	450589	3.166650268
2LM032260	Cal Std	5	S1K0467-CAL5	1:1 0012465	Perchlorate	Confirming Peak	142292	
2LM032261	Cal Std	6	S1K0467-CAL6	1:1 0012464	Perchlorate	Target Compound	960334	3.197787634
2LM032261	Cal Std	6	S1K0467-CAL6	1:1 0012464	Perchlorate	Confirming Peak	300312	
2LM032262	Cal Std	7	S1K0467-CAL7	1:1 0012463	Perchlorate	Target Compound	2224819	3.230804194
2LM032262	Cal Std	7	S1K0467-CAL7	1:1 0012463	Perchlorate	Confirming Peak	688627	
2LM032263	Chk Std	ICV	S1K0467-ICV1	1:1 0012475	Perchlorate	Target Compound	230866	3.103955471
2LM032263	Chk Std	ICV	S1K0467-ICV1	1:1 0012475	Perchlorate	Confirming Peak	74378	
2LM032264	Unknown		S1K0467-CCB1	1:1	Perchlorate	Target Compound	N/F	#VALUE!
2LM032264	Unknown		S1K0467-CCB1	1:1	Perchlorate	Confirming Peak	N/F	
2LM032265	Chk Std	CCV	S1K0467-CCV1	1:1 0012466	Perchlorate	Target Compound	228358	3.133213507
2LM032265	Chk Std	CCV	S1K0467-CCV1	1:1 0012466	Perchlorate	Confirming Peak	72883	
2LM032266	Chk Std	QCMRL	S1K0467-CRL1	1:1 0012468	Perchlorate	Target Compound	40831	2.87137834
2LM032266	Chk Std	QCMRL	S1K0467-CRL1	1:1 0012468	Perchlorate	Confirming Peak	14220	
2LM032267	Unknown		S1K0467-IFA1	1:1 0012477	Perchlorate	Target Compound	49014	3.191223387
2LM032267	Unknown		S1K0467-IFA1	1:1 0012477	Perchlorate	Confirming Peak	15359	
2LM032268	Unknown		B1K1411-BLK1	1:1	Perchlorate	Target Compound	3243	2.875
2LM032268	Unknown		B1K1411-BLK1	1:1	Perchlorate	Confirming Peak	1128	
2LM032269	Unknown		B1K1411-BS1	1:1 0012474	Perchlorate	Target Compound	41165	3.05877545
2LM032269	Unknown		B1K1411-BS1	1:1 0012474	Perchlorate	Confirming Peak	13458	
2LM032270	Unknown		M1K0338-01	1:1	Perchlorate	Target Compound	N/F	#VALUE!
2LM032270	Unknown		M1K0338-01	1:1	Perchlorate	Confirming Peak	N/F	
2LM032271	Unknown		M1K0338-02	1:1	Perchlorate	Target Compound	N/F	#VALUE!
2LM032271	Unknown		M1K0338-02	1:1	Perchlorate	Confirming Peak	N/F	
2LM032272	Unknown		M1K0338-03	1:1	Perchlorate	Target Compound	2732	2.562851782
2LM032272	Unknown		M1K0338-03	1:1	Perchlorate	Confirming Peak	1066	
2LM032273	Unknown		M1K0338-04	1:1	Perchlorate	Target Compound	N/F	#VALUE!
2LM032273	Unknown		M1K0338-04	1:1	Perchlorate	Confirming Peak	N/F	
2LM032274	Unknown		M1K0338-05	1:1	Perchlorate	Target Compound	3973	2.993971364
2LM032274	Unknown		M1K0338-05	1:1	Perchlorate	Confirming Peak	1327	
2LM032275	Unknown		M1K0338-06	1:1	Perchlorate	Target Compound	N/F	#VALUE!
2LM032275	Unknown		M1K0338-06	1:1	Perchlorate	Confirming Peak	N/F	
2LM032276	Unknown		M1K0338-07	1:1	Perchlorate	Target Compound	1472	1.275563258
2LM032276	Unknown		M1K0338-07	1:1	Perchlorate	Confirming Peak	1154	
2LM032277	Chk Std	CCV	S1K0467-CCV2	1:1 0012466	Perchlorate	Target Compound	211917	3.21066905
2LM032277	Chk Std	CCV	S1K0467-CCV2	1:1 0012466	Perchlorate	Confirming Peak	66004	
2LM032278	Chk Std	QCMRL	S1K0467-CRL2	1:1 0012468	Perchlorate	Target Compound	43563	3.327706058
2LM032278	Chk Std	QCMRL	S1K0467-CRL2	1:1 0012468	Perchlorate	Confirming Peak	13091	
2LM032279	Unknown		S1K0467-CCB2	1:1	Perchlorate	Target Compound	N/F	#VALUE!
2LM032279	Unknown		S1K0467-CCB2	1:1	Perchlorate	Confirming Peak	N/F	
2LM032280	Unknown		M1K0338-08	1:1	Perchlorate	Target Compound	N/F	#VALUE!
2LM032280	Unknown		M1K0338-08	1:1	Perchlorate	Confirming Peak	N/F	
2LM032281	Unknown		M1K0338-09	1:1	Perchlorate	Target Compound	N/F	#VALUE!
2LM032281	Unknown		M1K0338-09	1:1	Perchlorate	Confirming Peak	N/F	
2LM032282	Unknown		M1K0586-01	1:1	Perchlorate	Target Compound	6164	3.017131669
2LM032282	Unknown		M1K0586-01	1:1	Perchlorate	Confirming Peak	2043	



2LM032283	Unknown		M1K0586-02	1:1	Perchlorate	Target Compound	3393	4.826458037
2LM032283	Unknown		M1K0586-02	1:1	Perchlorate	Confirming Peak	703	
2LM032284	Unknown		M1K0586-03	1:1	Perchlorate	Target Compound	8837	2.965436242
2LM032284	Unknown		M1K0586-03	1:1	Perchlorate	Confirming Peak	2980	
2LM032285	Unknown		M1K0586-04	1:1	Perchlorate	Target Compound	9007	3.819762511
2LM032285	Unknown		M1K0586-04	1:1	Perchlorate	Confirming Peak	2358	
2LM032286	Unknown		M1K0586-05	1:1	Perchlorate	Target Compound	3022	1.852851012
2LM032286	Unknown		M1K0586-05	1:1	Perchlorate	Confirming Peak	1631	
2LM032287	Unknown		B1K1411-MS1	1:1	Perchlorate	Target Compound	39264	3.17747026
2LM032287	Unknown		B1K1411-MS1	1:1	Perchlorate	Confirming Peak	12357	
2LM032288	Unknown		B1K1411-MSD1	1:1	Perchlorate	Target Compound	44422	2.880243792
2LM032288	Unknown		B1K1411-MSD1	1:1	Perchlorate	Confirming Peak	15423	
2LM032289	Unknown		B1K1414-BLK1	1:1	Perchlorate	Target Compound	3659	#VALUE!
2LM032289	Unknown		B1K1414-BLK1	1:1	Perchlorate	Confirming Peak	N/F	
2LM032290	Chk Std	CCV	S1K0467-CCV3	1:1 0012466	Perchlorate	Target Compound	201734	3.169426551
2LM032290	Chk Std	CCV	S1K0467-CCV3	1:1 0012466	Perchlorate	Confirming Peak	63650	
2LM032291	Chk Std	QCMRL	S1K0467-CRL3	1:1 0012468	Perchlorate	Target Compound	40798	3.289895976
2LM032291	Chk Std	QCMRL	S1K0467-CRL3	1:1 0012468	Perchlorate	Confirming Peak	12401	
2LM032292	Unknown		S1K0467-CCB3	1:1	Perchlorate	Target Compound	N/F	#VALUE!
2LM032292	Unknown		S1K0467-CCB3	1:1	Perchlorate	Confirming Peak	N/F	
2LM032293	Unknown		B1K1414-BS1	1:1	Perchlorate	Target Compound	43893	3.129848831
2LM032293	Unknown		B1K1414-BS1	1:1	Perchlorate	Confirming Peak	14024	
2LM032294	Unknown		M1K0728-01	1:1	Perchlorate	Target Compound	60617	3.282627532
2LM032294	Unknown		M1K0728-01	1:1	Perchlorate	Confirming Peak	18466	
2LM032295	Unknown		B1K1414-MS1	1:1	Perchlorate	Target Compound	90970	2.990663423
2LM032295	Unknown		B1K1414-MS1	1:1	Perchlorate	Confirming Peak	30418	
2LM032296	Unknown		B1K1414-MSD1	1:1	Perchlorate	Target Compound	84146	3.063307729
2LM032296	Unknown		B1K1414-MSD1	1:1	Perchlorate	Confirming Peak	27469	
2LM032297	Unknown		M1K0728-03	1:1	Perchlorate	Target Compound	N/F	#VALUE!
2LM032297	Unknown		M1K0728-03	1:1	Perchlorate	Confirming Peak	N/F	
2LM032298	Unknown		M1K0728-05	1:1	Perchlorate	Target Compound	3883	2.82811362
2LM032298	Unknown		M1K0728-05	1:1	Perchlorate	Confirming Peak	1373	
2LM032299	Unknown		M1K0728-07	1:1	Perchlorate	Target Compound	28938	3.098950525
2LM032299	Unknown		M1K0728-07	1:1	Perchlorate	Confirming Peak	9338	
2LM032300	Unknown		M1K0728-09	1:1	Perchlorate	Target Compound	26161	2.864447608
2LM032300	Unknown		M1K0728-09	1:1	Perchlorate	Confirming Peak	9133	
2LM032301	Unknown		M1K0728-11	1:1	Perchlorate	Target Compound	26433	3.520175789
2LM032301	Unknown		M1K0728-11	1:1	Perchlorate	Confirming Peak	7509	
2LM032302	Unknown		M1K0728-13	1:1	Perchlorate	Target Compound	27710	3.219846619
2LM032302	Unknown		M1K0728-13	1:1	Perchlorate	Confirming Peak	8606	
2LM032303	Chk Std	CCV	S1K0467-CCV4	1:1	Perchlorate	Target Compound	179321	3.125093672
2LM032303	Chk Std	CCV	S1K0467-CCV4	1:1	Perchlorate	Confirming Peak	57381	
2LM032304	Chk Std	QCMRL	S1K0467-CRL4	1:1	Perchlorate	Target Compound	37083	2.929609733
2LM032304	Chk Std	QCMRL	S1K0467-CRL4	1:1	Perchlorate	Confirming Peak	12658	
2LM032305	Unknown		S1K0467-CCB4	1:1	Perchlorate	Target Compound	N/F	#VALUE!
2LM032305	Unknown		S1K0467-CCB4	1:1	Perchlorate	Confirming Peak	N/F	



Filename	Sample Type	Level	Sample ID	Comments	Compound	Type	Area	IS Rec (50-150 Avg. ICAL)
2LM032255	Unknown		S1K0467-ICB1	1:1	O18LP	Internal Standard	1373183	
2LM032256	Cal Std	1	S1K0467-CAL1	1:1 0012469	O18LP	Internal Standard	1303270	
2LM032257	Cal Std	2	S1K0467-CAL2	1:1 0012468	O18LP	Internal Standard	1232995	
2LM032258	Cal Std	3	S1K0467-CAL3	1:1 0012467	O18LP	Internal Standard	1266053	
2LM032259	Cal Std	4	S1K0467-CAL4	1:1 0012466	O18LP	Internal Standard	1280767	1235382.571
2LM032260	Cal Std	5	S1K0467-CAL5	1:1 0012465	O18LP	Internal Standard	1283639	
2LM032261	Cal Std	6	S1K0467-CAL6	1:1 0012464	O18LP	Internal Standard	1099645	
2LM032262	Cal Std	7	S1K0467-CAL7	1:1 0012463	O18LP	Internal Standard	1181309	
2LM032263	Chk Std	ICV	S1K0467-ICV1	1:1 0012475	O18LP	Internal Standard	1311711	106.1785256
2LM032264	Unknown		S1K0467-CCB1	1:1	O18LP	Internal Standard	1299178	105.1640221
2LM032265	Chk Std	CCV	S1K0467-CCV1	1:1 0012466	O18LP	Internal Standard	1316163	106.5388998
2LM032266	Chk Std	QCMRL	S1K0467-CRL1	1:1 0012468	O18LP	Internal Standard	1174525	95.07378744
2LM032267	Unknown		S1K0467-IFA1	1:1 0012477	O18LP	Internal Standard	1108705	89.74588323
2LM032268	Unknown		B1K1411-BLK1	1:1	O18LP	Internal Standard	1094479	88.59433712
2LM032269	Unknown		B1K1411-BS1	1:1 0012474	O18LP	Internal Standard	1089985	88.23056316
2LM032270	Unknown		M1K0338-01	1:1	O18LP	Internal Standard	1134439	91.82896264
2LM032271	Unknown		M1K0338-02	1:1	O18LP	Internal Standard	1156960	93.65196068
2LM032272	Unknown		M1K0338-03	1:1	O18LP	Internal Standard	1159347	93.84518017
2LM032273	Unknown		M1K0338-04	1:1	O18LP	Internal Standard	768107	62.17563836
2LM032274	Unknown		M1K0338-05	1:1	O18LP	Internal Standard	1087450	88.02536357
2LM032275	Unknown		M1K0338-06	1:1	O18LP	Internal Standard	903426	73.12924926
2LM032276	Unknown		M1K0338-07	1:1	O18LP	Internal Standard	1044134	84.51908131
2LM032277	Chk Std	CCV	S1K0467-CCV2	1:1 0012466	O18LP	Internal Standard	1207068	97.70803214
2LM032278	Chk Std	QCMRL	S1K0467-CRL2	1:1 0012468	O18LP	Internal Standard	1264922	102.3911159
2LM032279	Unknown		S1K0467-CCB2	1:1	O18LP	Internal Standard	1244461	100.7348678
2LM032280	Unknown		M1K0338-08	1:1	O18LP	Internal Standard	1235458	100.0061057
2LM032281	Unknown		M1K0338-09	1:1	O18LP	Internal Standard	1020047	82.56932092
2LM032282	Unknown		M1K0586-01	1:1	O18LP	Internal Standard	1004392	81.30210214
2LM032283	Unknown		M1K0586-02	1:1	O18LP	Internal Standard	858816	69.51822212
2LM032284	Unknown		M1K0586-03	1:1	O18LP	Internal Standard	735620	59.54592666
2LM032285	Unknown		M1K0586-04	1:1	O18LP	Internal Standard	743693	60.19940844
2LM032286	Unknown		M1K0586-05	1:1	O18LP	Internal Standard	824510	66.74126858
2LM032287	Unknown		B1K1411-MS1	1:1	O18LP	Internal Standard	974676	78.89669342
2LM032288	Unknown		B1K1411-MSD1	1:1	O18LP	Internal Standard	1105509	89.48717795
2LM032289	Unknown		B1K1414-BLK1	1:1	O18LP	Internal Standard	1257021	101.7515569
2LM032290	Chk Std	CCV	S1K0467-CCV3	1:1 0012466	O18LP	Internal Standard	1145001	92.68392047
2LM032291	Chk Std	QCMRL	S1K0467-CRL3	1:1 0012468	O18LP	Internal Standard	1164709	94.27921576
2LM032292	Unknown		S1K0467-CCB3	1:1	O18LP	Internal Standard	1144360	92.63203371
2LM032293	Unknown		B1K1414-BS1	1:1	O18LP	Internal Standard	1196028	96.81438185
2LM032294	Unknown		M1K0728-01	1:1	O18LP	Internal Standard	1144110	92.61179706
2LM032295	Unknown		B1K1414-MS1	1:1	O18LP	Internal Standard	1066511	86.33042303
2LM032296	Unknown		B1K1414-MSD1	1:1	O18LP	Internal Standard	1001025	81.02955499
2LM032297	Unknown		M1K0728-03	1:1	O18LP	Internal Standard	1115350	90.28377329
2LM032298	Unknown		M1K0728-05	1:1	O18LP	Internal Standard	934686	75.6596395
2LM032299	Unknown		M1K0728-07	1:1	O18LP	Internal Standard	817524	66.17577574
2LM032300	Unknown		M1K0728-09	1:1	O18LP	Internal Standard	808478	65.44353293
2LM032301	Unknown		M1K0728-11	1:1	O18LP	Internal Standard	797112	64.52349405
2LM032302	Unknown		M1K0728-13	1:1	O18LP	Internal Standard	817946	66.2099352
2LM032303	Chk Std	CCV	S1K0467-CCV4	1:1	O18LP	Internal Standard	1039826	84.17036342
2LM032304	Chk Std	QCMRL	S1K0467-CRL4	1:1	O18LP	Internal Standard	1083337	87.69243027
2LM032305	Unknown		S1K0467-CCB4	1:1	O18LP	Internal Standard	1046354	84.69878273





Laboratory Report Number: M1K0586

Client Project ID: LHAAP

BATCH LOG SUMMARY  
SECTION A1

Batch: B1K1411

Prepared: 11/23/2021 9:23:00AM

Matrix: Aqueous

Prepared By: CAS

Method: EPA 6850

Laboratory ID	Client / Source ID	Initial	Final						Spike(s)
B1K1411-BLK1		10.0 mL	10.0 mL						
B1K1411-BS1		10.0 mL	10.0 mL						1006965 200µL
M1K0586-01	04WW07-211109	10.0 mL	10.0 mL						
M1K0586-02	04WW07-211109-FD	10.0 mL	10.0 mL						
M1K0586-03	04WW05-211109	10.0 mL	10.0 mL						
M1K0586-04	04WW09-211109	10.0 mL	10.0 mL						
M1K0586-05	04WW10-211109	10.0 mL	10.0 mL						
B1K1411-MS1	M1K0586-05	10.0 mL	10.0 mL						1006965 200µL
B1K1411-MSD1	M1K0586-05	10.0 mL	10.0 mL						1006965 200µL

## Standards used in the batch:

Standard ID	Description	Date Prepared	Prepared By
1006965	6850/331 Perchlorate Alternate Solution (10 ppb)	8/11/2021 5:13:38PM	John Richards

## Reagents used in the batch:

Reagent ID	Description	Prepared	Prepared By
1000181	6850/331 Column	1/8/2021 2:36:22PM	** Vendor **
1008665	0.45 um PTFE Syringe Filter	10/11/2021 10:46:38AM	Asa Timmons
1009215	0.1% Acetic Acid in Water	10/26/2021 8:46:45AM	Craig Smith
1009216	0.1% Acetic Acid in Acetonitrile	10/26/2021 8:48:32AM	Craig Smith



Laboratory Report Number: M1K0586

Client Project ID: LHAAP

SEQUENCE LOG SUMMARY  
SECTION A2

Sequence: S1K0467

Instrument: LCMS2

Calibration: 21K0035

Analyst 1: CAS

Method: EPA 6850

SOP: HPLC06

#	File ID	Laboratory ID	Client ID	Analyzed	Reference	Standard
1	2LM032255	S1K0467-ICB1	Initial Cal Blank	11/23/21 16:30		
2	2LM032256	S1K0467-CAL1	Cal Standard	11/23/21 16:43		1007584
3	2LM032257	S1K0467-CAL2	Cal Standard	11/23/21 16:56		1007583
4	2LM032258	S1K0467-CAL3	Cal Standard	11/23/21 17:09		1007582
5	2LM032259	S1K0467-CAL4	Cal Standard	11/23/21 17:23		1007581
6	2LM032260	S1K0467-CAL5	Cal Standard	11/23/21 17:36		1007580
7	2LM032261	S1K0467-CAL6	Cal Standard	11/23/21 17:49		1007579
8	2LM032262	S1K0467-CAL7	Cal Standard	11/23/21 18:02		1007578
9	2LM032263	S1K0467-ICV1	Initial Cal Check	11/23/21 18:16		1006966
10	2LM032264	S1K0467-CCB1	Calibration Blank	11/23/21 18:29		
11	2LM032265	S1K0467-CCV1	Calibration Check	11/23/21 18:42		1007581
12	2LM032266	S1K0467-CRL1	Instrument RL Check	11/23/21 18:55		1007583
13	2LM032267	S1K0467-IFA1	Interference Check A	11/23/21 19:09		1006967
14	2LM032268	B1K1411-BLK1	Blank	11/23/21 19:22		
15	2LM032269	B1K1411-BS1	LCS	11/23/21 19:35		
23	2LM032277	S1K0467-CCV2	Calibration Check	11/23/21 21:21		1007581
24	2LM032278	S1K0467-CRL2	Instrument RL Check	11/23/21 21:34		1007583
25	2LM032279	S1K0467-CCB2	Calibration Blank	11/23/21 21:48		
28	2LM032282	M1K0586-01	04WW07-211109	11/23/21 22:27		
29	2LM032283	M1K0586-02	04WW07-211109-FD	11/23/21 22:41		
30	2LM032284	M1K0586-03	04WW05-211109	11/23/21 22:54		
31	2LM032285	M1K0586-04	04WW09-211109	11/23/21 23:07		
32	2LM032286	M1K0586-05	04WW10-211109	11/23/21 23:20		
33	2LM032287	B1K1411-MS1	04WW10-211109	11/23/21 23:34	M1K0586-05	
34	2LM032288	B1K1411-MSD1	04WW10-211109	11/23/21 23:47	M1K0586-05	
36	2LM032290	S1K0467-CCV3	Calibration Check	11/24/21 00:13		1007581
37	2LM032291	S1K0467-CRL3	Instrument RL Check	11/24/21 00:27		1007583
38	2LM032292	S1K0467-CCB3	Calibration Blank	11/24/21 00:40		
49	2LM032303	S1K0467-CCV4	Calibration Check	11/24/21 03:06		1007581
50	2LM032304	S1K0467-CRL4	Instrument RL Check	11/24/21 03:19		1007583
51	2LM032305	S1K0467-CCB4	Calibration Blank	11/24/21 03:32		



Laboratory Report Number: M1K0586

Client Project ID: LHAAP

**SEQUENCE LOG SUMMARY  
SECTION A2**
**Sequence Standards**

Standard ID	Description	Prepared	PreparedBy	Expires
1006966	6850/331 Perchlorate ICV (1 ppb)	08/11/2021	John Richards	08/11/2022
1006967	6850 Perchlorate Alternate 0.2 ppb MCT	08/11/2021	John Richards	08/11/2022
1007578	6850/331 ICAL STD @ 10 ppb	09/07/2021	Craig Smith	09/07/2022
1007579	6850/331 ICAL STD @ 5 ppb	09/07/2021	Craig Smith	09/07/2022
1007580	6850/331 ICAL STD @ 2 ppb	09/07/2021	Craig Smith	09/07/2022
1007581	6850/331 ICAL STD-CCV @ 1 ppb	09/07/2021	Craig Smith	09/07/2022
1007582	6850/331 ICAL STD @ 0.5 ppb	09/07/2021	Craig Smith	09/07/2022
1007583	6850/331 ICAL STD-MRL @ 0.2 ppb	09/07/2021	Craig Smith	09/07/2022
1007584	6850/331 ICAL STD @ 0.1 ppb	09/07/2021	Craig Smith	09/07/2022

**Sequence Internal Standard**

Standard ID	Description	Prepared	PreparedBy	Expires
1000597	6850/331 IS Working (5.0 ppb)	01/20/2021	Craig Smith	01/20/2022



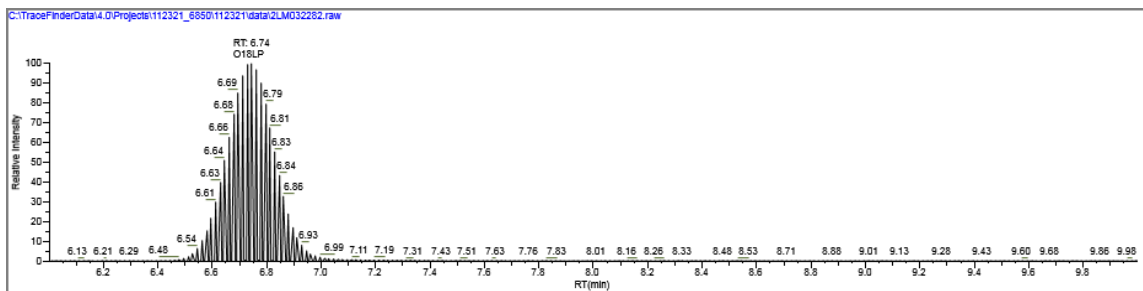
# **Section B: HPLC Organics EPA 6850 Sample Raw Data**

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:C4	M1K0586-01	2LM032282	N/A	M1K0586-01	11/23/2021 10:27:53 PM	1:01



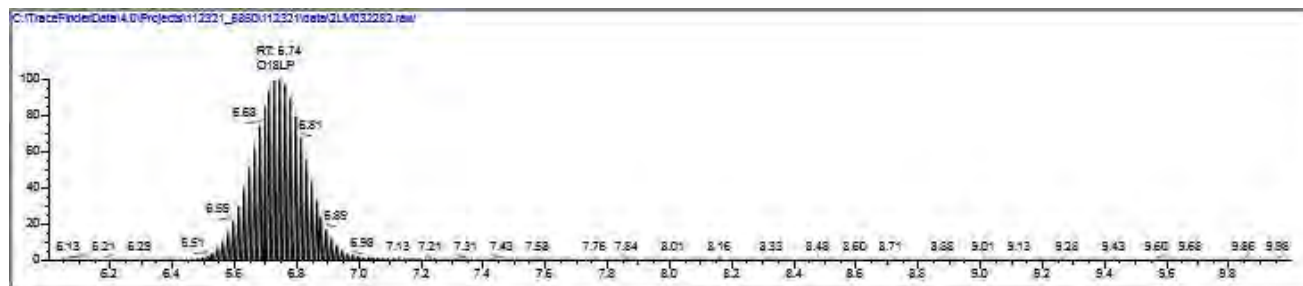
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	6.74	89	1004392			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	6.72	83	6164	Linear	0.006	0.03 ug/L	0.03 ug/L	

## Sample Report

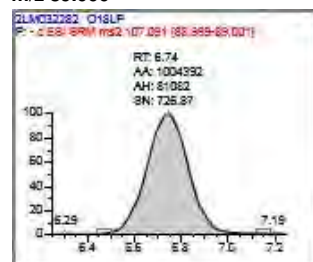
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 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: M1K0586-01  
 Diln Factor: 1.00  
 Comments: 1:01

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

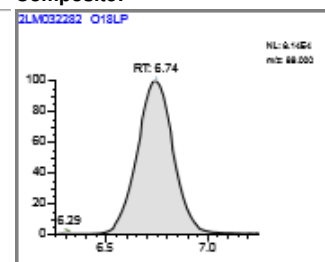
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 11/23/2021 10:27:53 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:C4



m/z 89.000



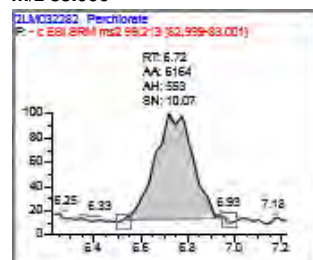
Composite:



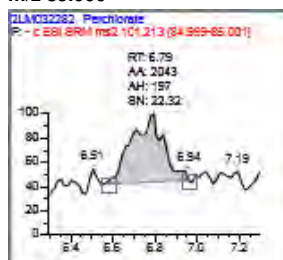
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.74	m/z 89.000	1004392	5.000		N/A

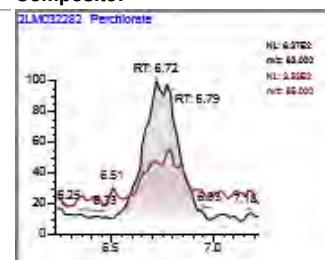
m/z 83.000



m/z 85.000



Composite:



Perchlorate

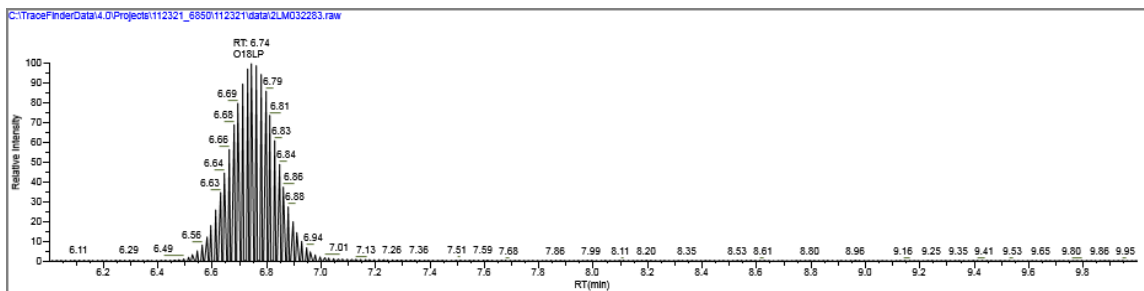
RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.72	m/z 83.000	6164	0.030		N/A
6.79	m/z 85.000	2043		25.81 - 38.71	33.14

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:05	M1K0586-02	2LM032283	N/A	M1K0586-02	11/23/2021 10:41:08 PM	1:01



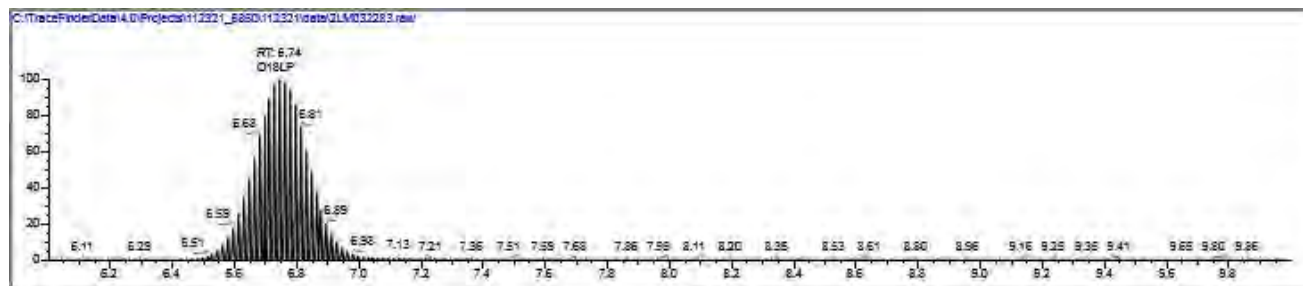
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	6.74	89	858816			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	6.73	83	3393	Linear	0.004	0.018 ug/L	0.018 ug/L	I

# Sample Report

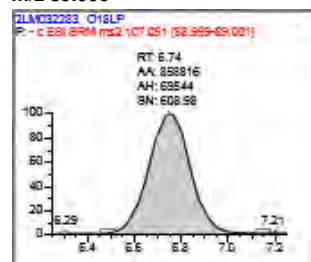
Data File: 2LM032283  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: M1K0586-02  
 Diln Factor: 1.00  
 Comments: 1:01

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

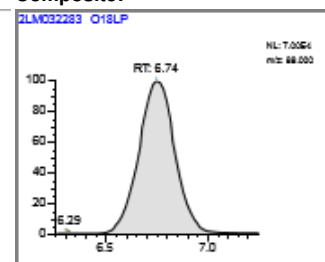
Tune report not found  
 11/23/2021 10:41:08 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:C5



m/z 89.000



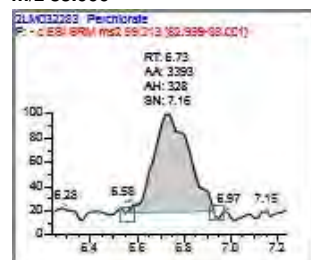
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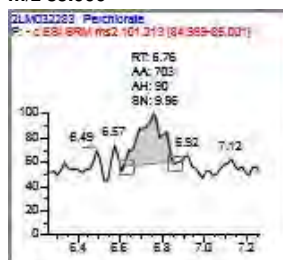
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.74	m/z 89.000	858816	5.000		N/A

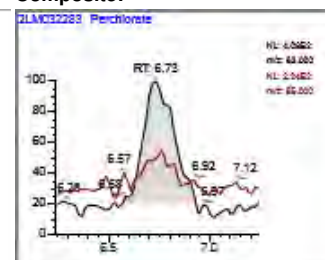
m/z 83.000



m/z 85.000



Composite:



Perchlorate

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.73	m/z 83.000	3393	0.018		N/A
6.76	m/z 85.000	703		25.81 - 38.71	20.72 *

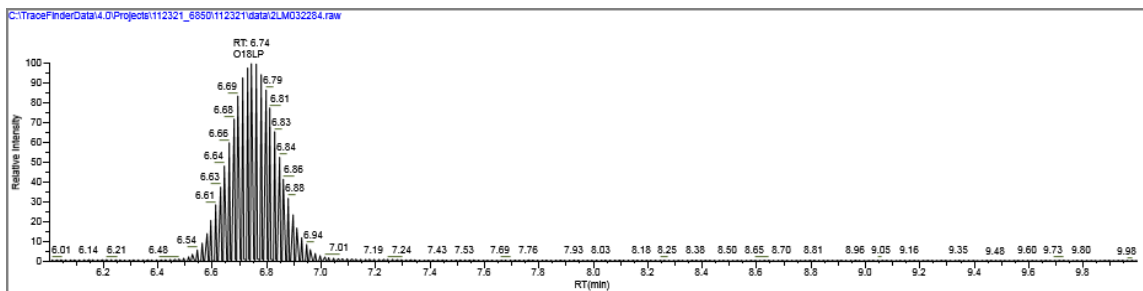


## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:06	M1K0586-03	2LM032284	N/A	M1K0586-03	11/23/2021 10:54:21 PM	1:01



Internal Standards	RT	Quan Peak	Response	Injected Conc Units	Calculated Conc Units	Flags
O18LP	6.74	89	735620	5.000 ug/L	5.000 ug/L	

Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
------------	----	-----------	----------	------------	-------------------------------	---------------------	-----------------------	-------

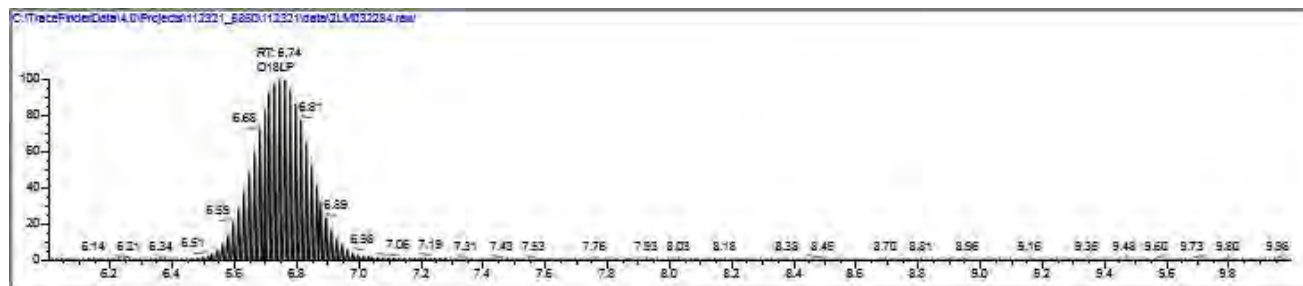
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	6.77	83	8837	Linear	0.012	0.062 ug/L	0.062 ug/L	

# Sample Report

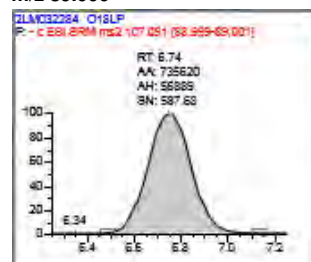
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 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: M1K0586-03  
 Diln Factor: 1.00  
 Comments: 1:01

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

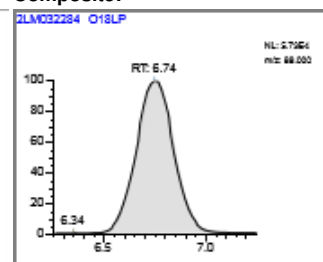
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 11/23/2021 10:54:21 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:C6



m/z 89.000



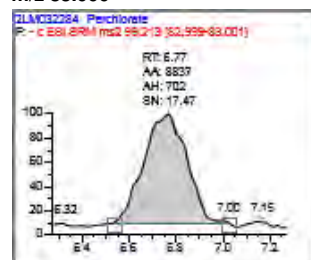
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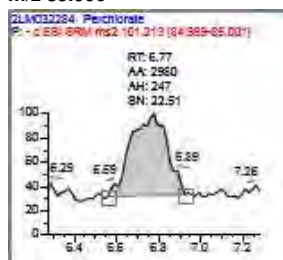
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.74	m/z 89.000	735620	5.000		N/A

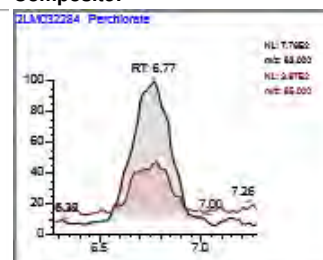
m/z 83.000



m/z 85.000



Composite:



Perchlorate

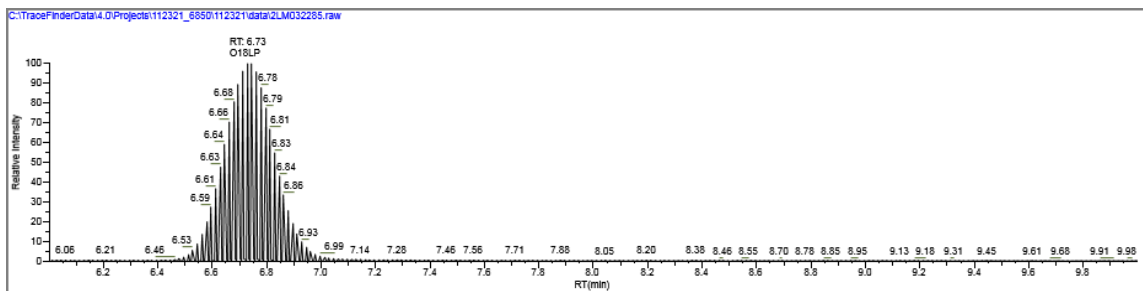
RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.77	m/z 83.000	8837	0.062		N/A
6.77	m/z 85.000	2980		25.81 - 38.71	33.72

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:C7	M1K0586-04	2LM032285	N/A	M1K0586-04	11/23/2021 11:07:36 PM	1:01



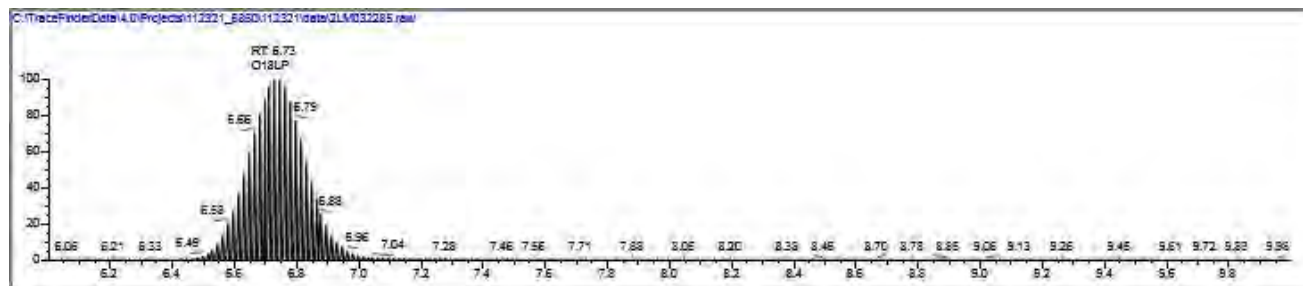
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	6.73	89	743693			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	6.73	83	9007	Linear	0.012	0.063 ug/L	0.063 ug/L	

## Sample Report

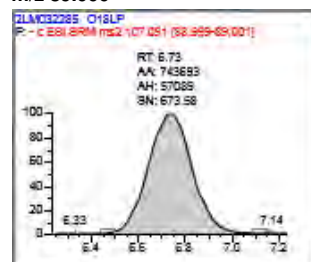
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 Perchlorate 6850  
 Cali File: 112321.calx  
 Sample ID: M1K0586-04  
 Diln Factor: 1.00  
 Comments: 1:01

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

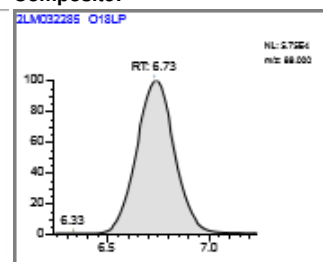
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 CAS  
 LCMS2  
 R:C7



m/z 89.000



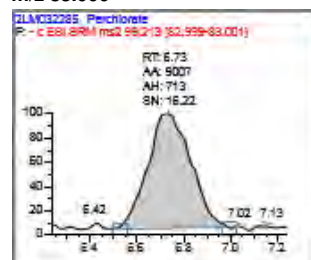
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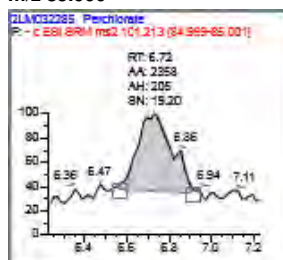
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.73	m/z 89.000	743693	5.000		N/A

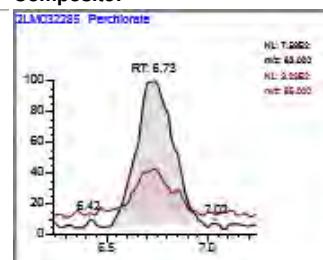
m/z 83.000



m/z 85.000



Composite:



Perchlorate

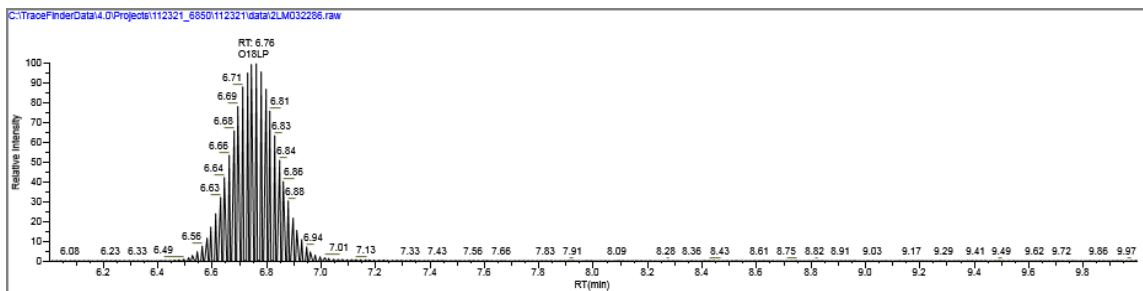
RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.73	m/z 83.000	9007	0.063		N/A
6.72	m/z 85.000	2358		25.81 - 38.71	26.18

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:C8	M1K0586-05	2LM032286	N/A	M1K0586-05	11/23/2021 11:20:51 PM	1:01



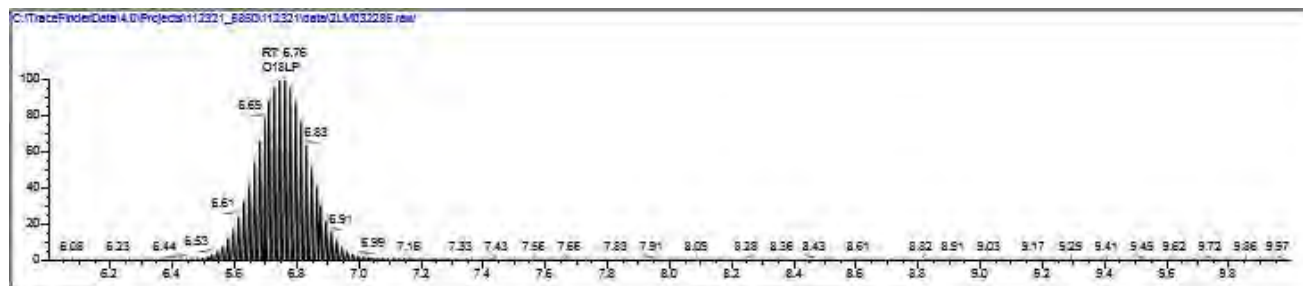
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	6.76	89	824510			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	6.75	83	3022	Linear	0.004	0.017 ug/L	0.017 ug/L	I

# Sample Report

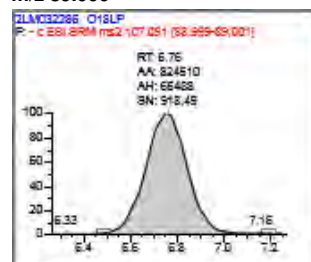
Data File: 2LM032286  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: M1K0586-05  
 Diln Factor: 1.00  
 Comments: 1:01

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

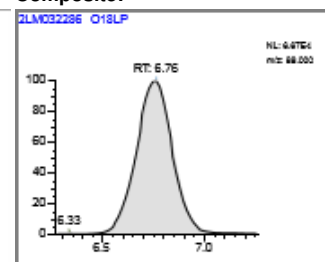
Tune report not found  
 11/23/2021 11:20:51 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:C8



m/z 89.000



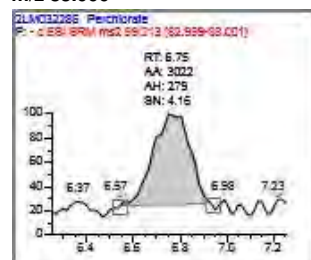
Composite:



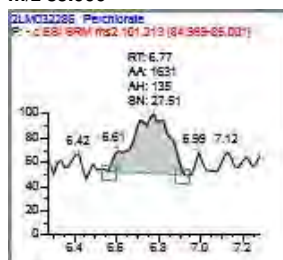
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.76	m/z 89.000	824510	5.000		N/A

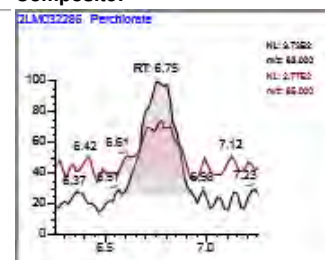
m/z 83.000



m/z 85.000



Composite:



Perchlorate

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.75	m/z 83.000	3022	0.017		N/A
6.77	m/z 85.000	1631		25.81 - 38.71	53.97 *



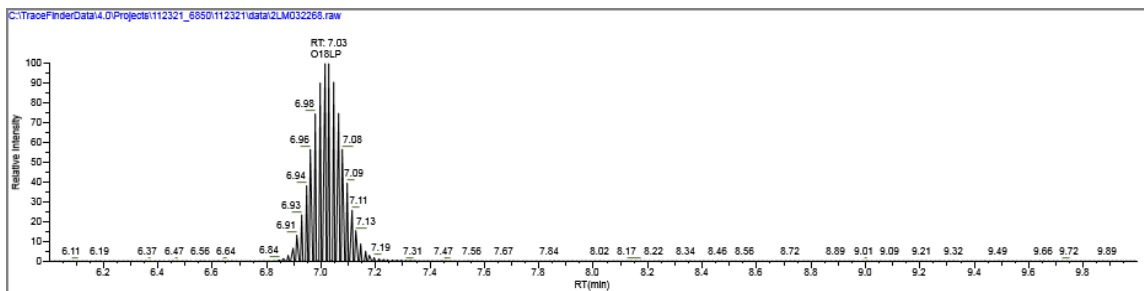
# **Section C: HPLC Organics EPA 6850 QC Sample Raw Data**

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:B2	B1K1411-BLK1	2LM032268	N/A	BLANK	11/23/2021 7:22:25 PM	1:01



Internal Standards	RT	Quan Peak	Response	Injected Conc Units	Calculated Conc Units	Flags
O18LP	7.03	89	1094479	5.000 ug/L	5.000 ug/L	

Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
------------	----	-----------	----------	------------	-------------------------------	---------------------	-----------------------	-------

Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	7.03	83	3243	Linear	0.003	0.013 ug/L	0.013 ug/L	

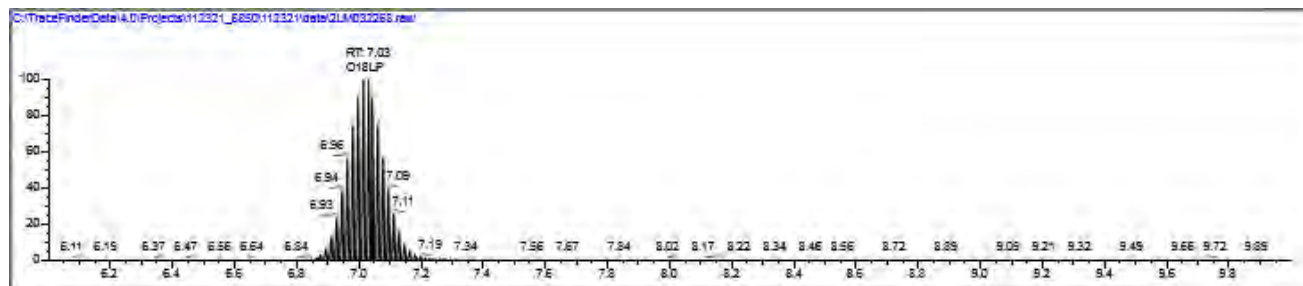


## Sample Report

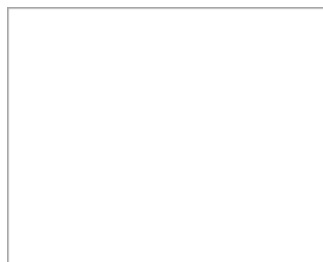
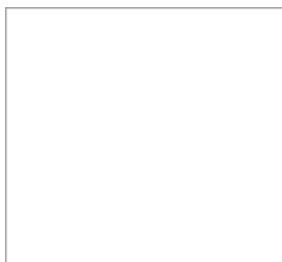
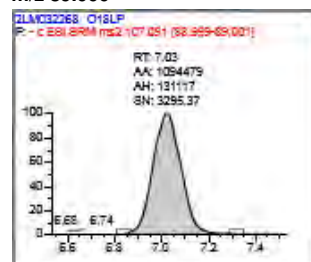
Data File: 2LM032268  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: B1K1411-BLK1  
 Diln Factor: 1.00  
 Comments: 1:01

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

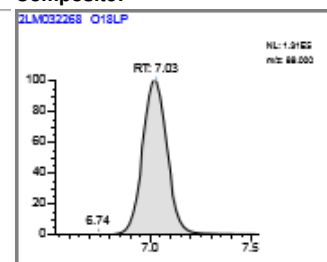
Tune report not found  
 11/23/2021 7:22:25 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:B2



m/z 89.000



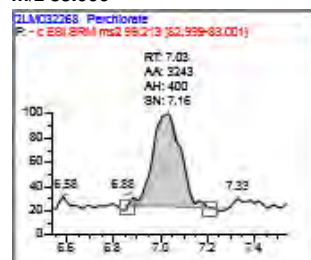
Composite:



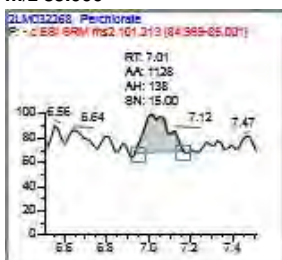
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
7.03	m/z 89.000	1094479	5.000		N/A

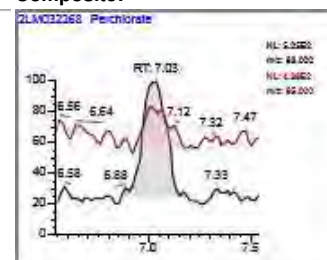
m/z 83.000



m/z 85.000



Composite:



Perchlorate

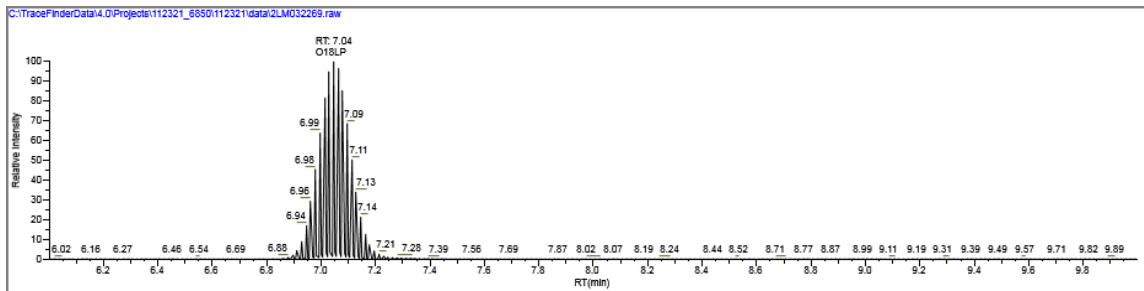
RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
7.03	m/z 83.000	3243	0.013		N/A
7.01	m/z 85.000	1128		25.81 - 38.71	34.79

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:B3	B1K1411-BS1	2LM032269	N/A	LCS (0.2ug/L)	11/23/2021 7:35:39 PM	1:1 0012474



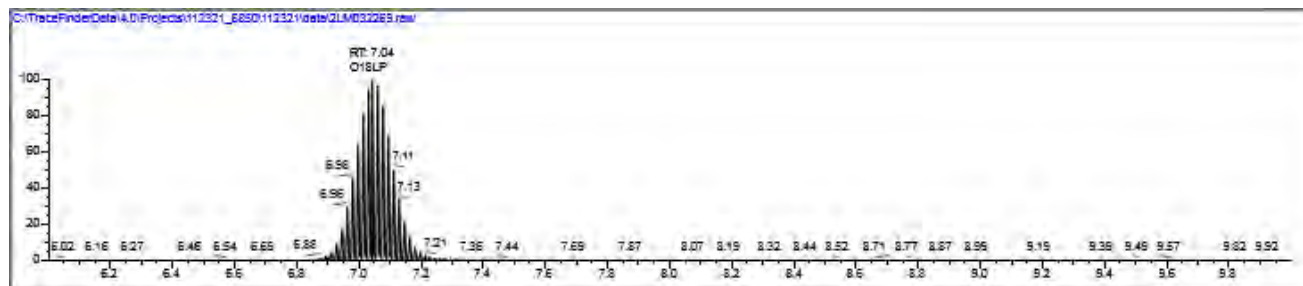
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	O18LP 7.04	89	1089985			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	7.05	83	41165	Linear	0.038	0.202 ug/L	0.202 ug/L	

# Sample Report

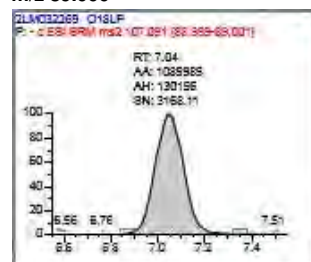
Data File: 2LM032269  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx  
 Sample ID: B1K1411-BS1  
 Diln Factor: 1.00  
 Comments: 1:1 0012474

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

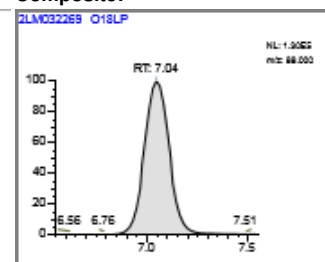
Tune report not found  
 11/23/2021 7:35:39 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:B3



m/z 89.000



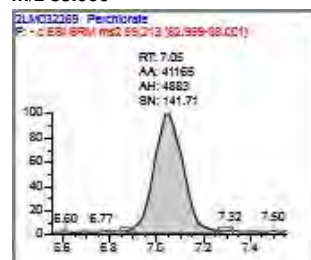
Composite:



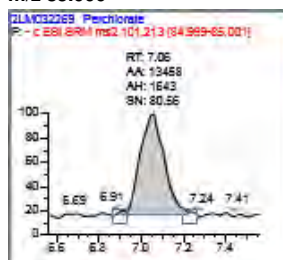
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
7.04	m/z 89.000	1089985	5.000		N/A

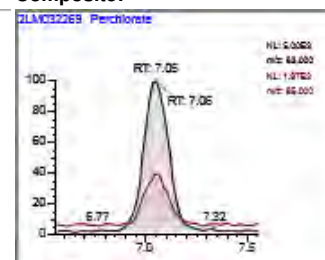
m/z 83.000



m/z 85.000



Composite:



Perchlorate

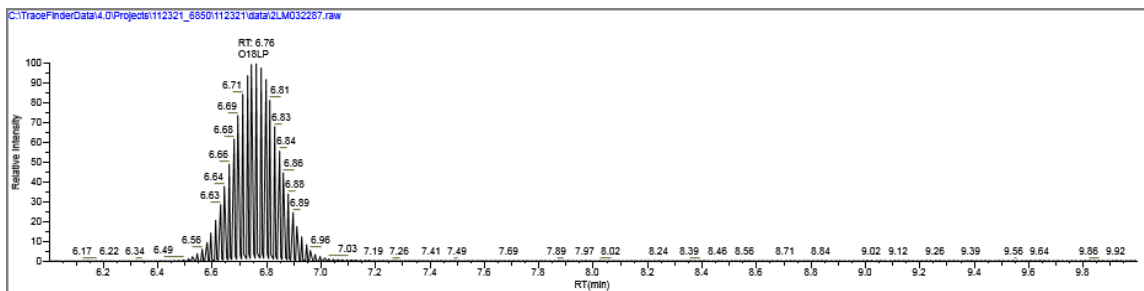
RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
7.05	m/z 83.000	41165	0.202		N/A
7.06	m/z 85.000	13458		25.81 - 38.71	32.69

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:C9	B1K1411-MS1	2LM032287	N/A	MATRIX SPIKE	11/23/2021 11:34:06 PM	1:01



Internal Standards	RT	Quan Peak	Response	Injected Conc Units	Calculated Conc Units	Flags
O18LP	6.76	89	974676	5.000 ug/L	5.000 ug/L	

Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
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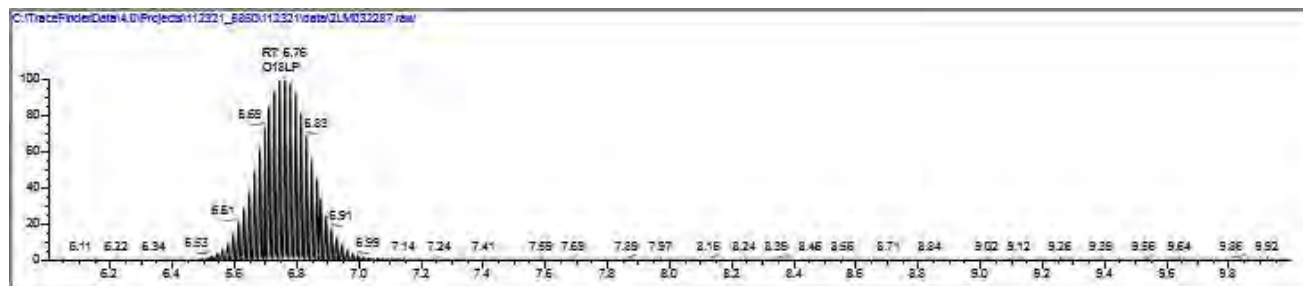
  

Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	6.77	83	39264	Linear	0.040	0.216 ug/L	0.216 ug/L	

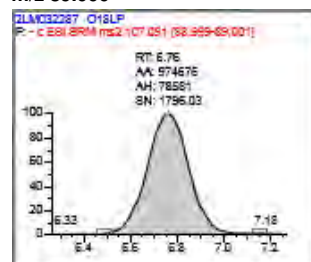
## Sample Report

Data File: 2LM032287  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: B1K1411-MS1  
 Diln Factor: 1.00  
 Comments: 1:01

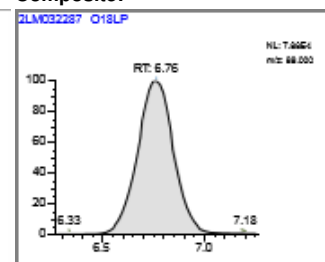
Tune Report Date: Tune report not found  
 Acquisition Date: 11/23/2021 11:34:06 PM  
 Cali File Date: 11/24/2021 9:36:24 AM  
 Operator ID: CAS  
 Instrument ID: LCMS2  
 Vial Number: R:C9



m/z 89.000



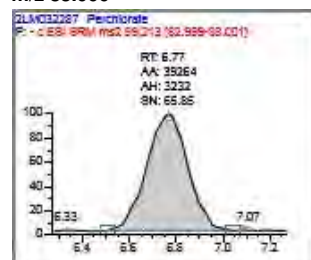
Composite:



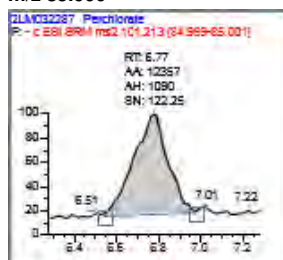
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.76	m/z 89.000	974676	5.000		N/A

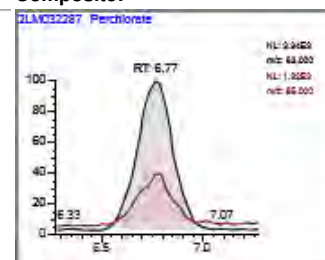
m/z 83.000



m/z 85.000



Composite:



Perchlorate

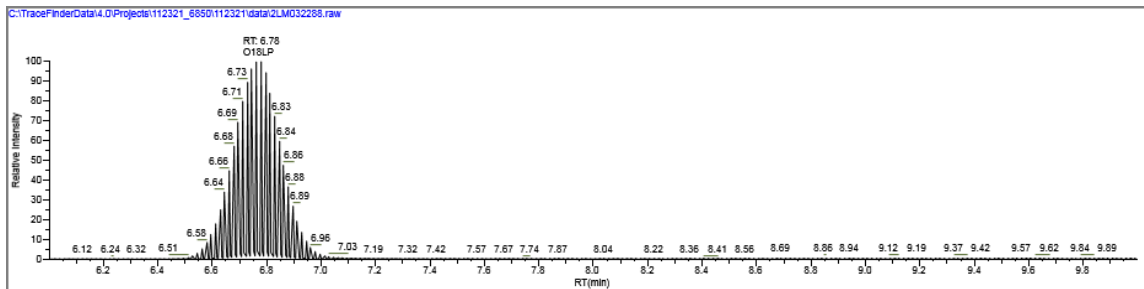
RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.77	m/z 83.000	39264	0.216		N/A
6.77	m/z 85.000	12357		25.81 - 38.71	31.47

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R.D1	B1K1411-MSD1	2LM032288	N/A	MATRIX SPIKE DUP	11/23/2021 11:47:21 PM	1:01



Internal Standards	RT	Quan Peak	Response	Injected Conc Units	Calculated Conc Units	Flags
O18LP	6.78	89	1105509	5.000 ug/L	5.000 ug/L	

Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
------------	----	-----------	----------	------------	-------------------------------	---------------------	-----------------------	-------

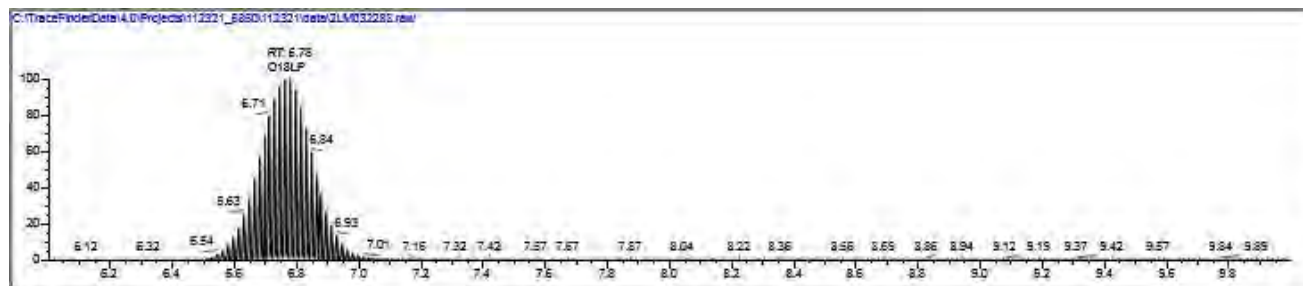
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	6.77	83	44422	Linear	0.040	0.216 ug/L	0.216 ug/L	

## Sample Report

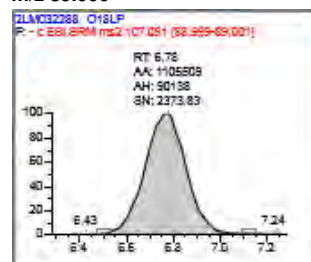
Data File: 2LM032288  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: B1K1411-MSD1  
 Diln Factor: 1.00  
 Comments: 1:01

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

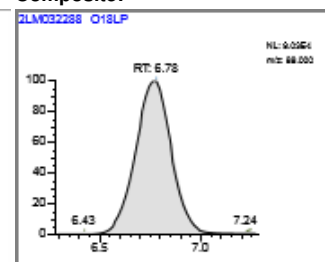
Tune report not found  
 11/23/2021 11:47:21 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:D1



m/z 89.000



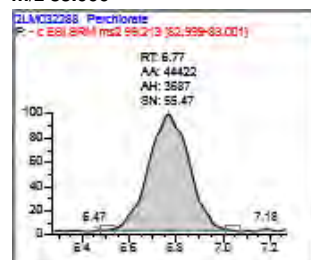
Composite:



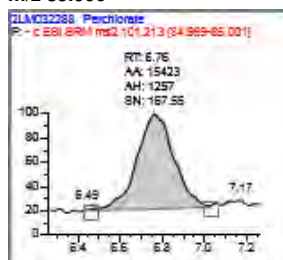
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.78	m/z 89.000	1105509	5.000		N/A

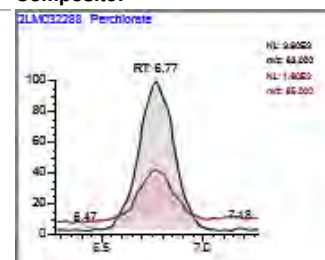
m/z 83.000



m/z 85.000



Composite:



Perchlorate

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.77	m/z 83.000	44422	0.216		N/A
6.76	m/z 85.000	15423		25.81 - 38.71	34.72



# **Section D: HPLC Organics EPA 6850 Calibration Raw Data**

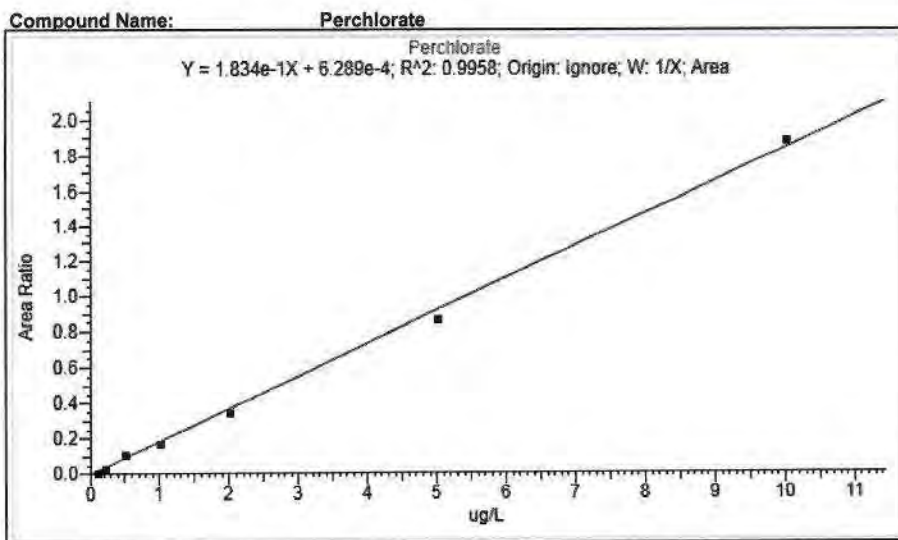


## Compound Calibration Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch:

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Call File: 112321.calx

112321.00



Linear  
 Fail A

Level	Std Amount	Std Area	IS Amount	IS Area	Resp factor/ ratio	Calc Amount	Units	% CV	% RSD
1	0.1	22361	5	1303270	0.017	0.09	ug/L	N/A	N/A
2	0.2	42956	5	1232995	0.035	0.187	ug/L	N/A	N/A
3	0.5	150289	5	1266053	0.119	0.644	ug/L	N/A	N/A A
4	1	222769	5	1280767	0.174	0.945	ug/L	N/A	N/A
5	2	450589	5	1283639	0.351	1.911	ug/L	N/A	N/A
6	5	960334	5	1099645	0.873	4.758	ug/L	N/A	N/A
7	10	2224819	5	1181309	1.883	10.266	ug/L	N/A	N/A

## Compound Calibration Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321.00

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Call File: 112321.calx

<u>Vial Pos</u>	<u>Sample ID</u>	<u>File Name</u>	<u>Level</u>	<u>Sample Name</u>	<u>File Date</u>	<u>Comment</u>
R:A2	S1K0467-CAL1	2LM032256	1	CAL STD 1	11/23/2021 4:43:26 PM	1:1 0012469
R:A3	S1K0467-CAL2	2LM032257	2	CAL STD 2	11/23/2021 4:56:40 PM	1:1 0012468
R:A4	S1K0467-CAL3	2LM032258	3	CAL STD 3	11/23/2021 5:09:55 PM	1:1 0012467
R:A5	S1K0467-CAL4	2LM032259	4	CAL STD 4	11/23/2021 5:23:10 PM	1:1 0012466
R:A6	S1K0467-CAL5	2LM032260	5	CAL STD 5	11/23/2021 5:36:25 PM	1:1 0012465
R:A7	S1K0467-CAL6	2LM032261	6	CAL STD 6	11/23/2021 5:49:40 PM	1:1 0012464
R:A8	S1K0467-CAL7	2LM032262	7	CAL STD 7	11/23/2021 6:02:55 PM	1:1 0012463

Bordered cell = Manually Integrated; Calibration flags: D=RSD; F=Response factor; R=R Squared; A=Amount.

# Data Review Report

Printed: 11/24/2021 11:28 am

Analysis	Analyte	CalResult	True Value	% D	% Rec
<b>Lab ID: S1K0467-CAL1</b> 6850 Perchlorate DOD	Cal Standard Perchlorate	0.09	0.10000	-9.88	90.12
<b>Lab ID: S1K0467-CAL2</b> 6850 Perchlorate DOD	Cal Standard Perchlorate	0.19	0.20000	-6.74	93.27
<b>Lab ID: S1K0467-CAL3</b> 6850 Perchlorate DOD	Cal Standard Perchlorate	0.64	0.50000	28.77	128.77
<b>Lab ID: S1K0467-CAL4</b> 6850 Perchlorate DOD	Cal Standard Perchlorate	0.94	1.0000	-5.50	94.50
<b>Lab ID: S1K0467-CAL5</b> 6850 Perchlorate DOD	Cal Standard Perchlorate	1.91	2.0000	-4.47	95.53
<b>Lab ID: S1K0467-CAL6</b> 6850 Perchlorate DOD	Cal Standard Perchlorate	4.76	5.0000	-4.83	95.17
<b>Lab ID: S1K0467-CAL7</b> 6850 Perchlorate DOD	Cal Standard Perchlorate	10.27	10.000	2.66	102.66



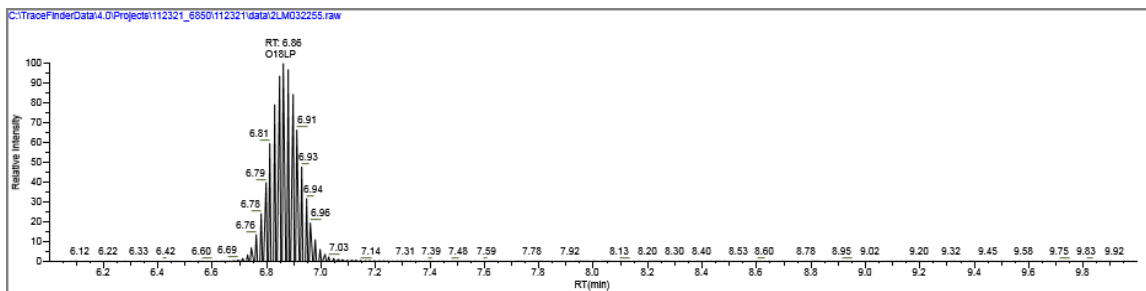
# **Section E: HPLC Organics EPA 6850 Sequence QC Sample Raw Data**

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R-A1	S1K0467-ICB1	2LM032255	N/A	CCB	11/23/2021 4:30:11 PM	1:01



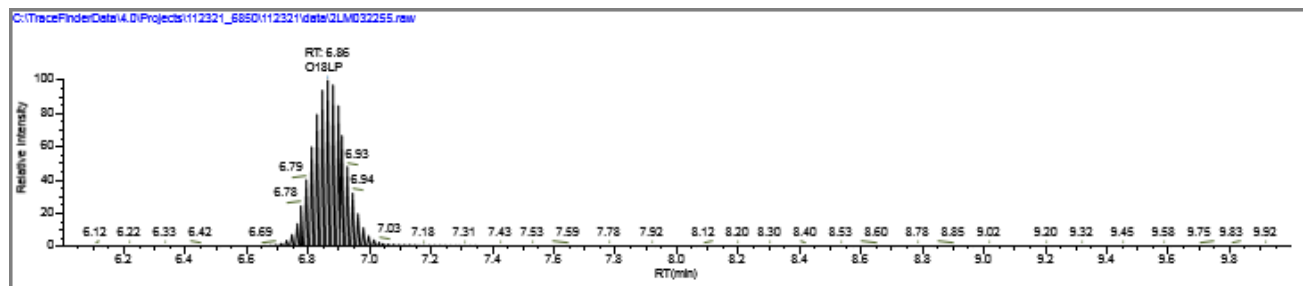
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	6.86	89	1373183			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	N/F	N/F	N/F	Linear	0.000	N/F ug/L	N/F ug/L	

## Sample Report

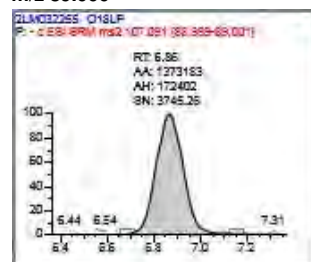
Data File: 2LM032255  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx  
 Sample ID: S1K0467-ICB1  
 Diln Factor: 1.00  
 Comments: 1:01

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

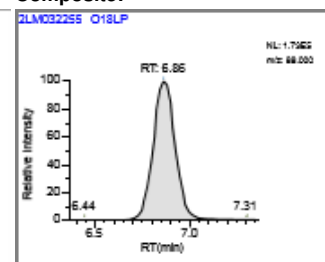
Tune report not found  
 11/23/2021 4:30:11 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:A1



m/z 89.000



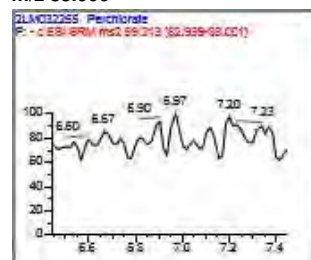
Composite:



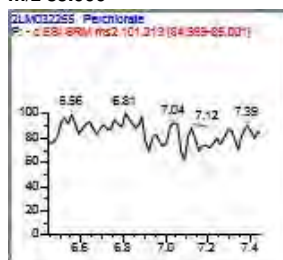
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.86	m/z 89.000	1373183	5.000		N/A

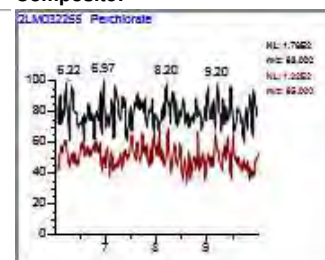
m/z 83.000



m/z 85.000



Composite:



Perchlorate

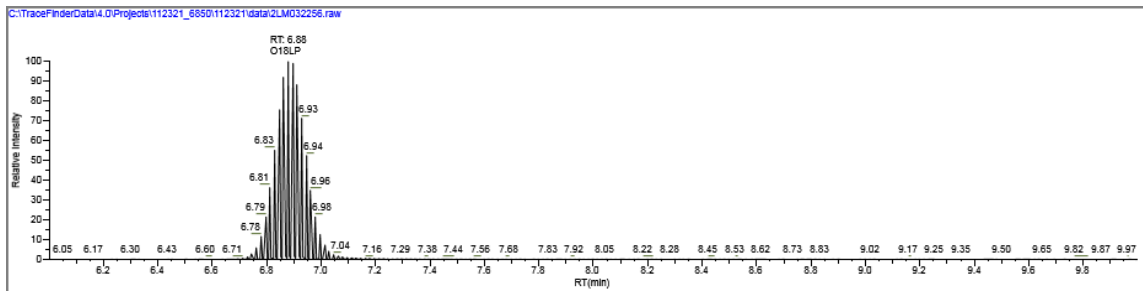
RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
0.00	m/z 83.000	Compound Not Found	N/A		
	m/z 85.000				

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:A2	S1K0467-CAL1	2LM032256	1	CAL STD 1	11/23/2021 4:43:26 PM	1:1 0012469



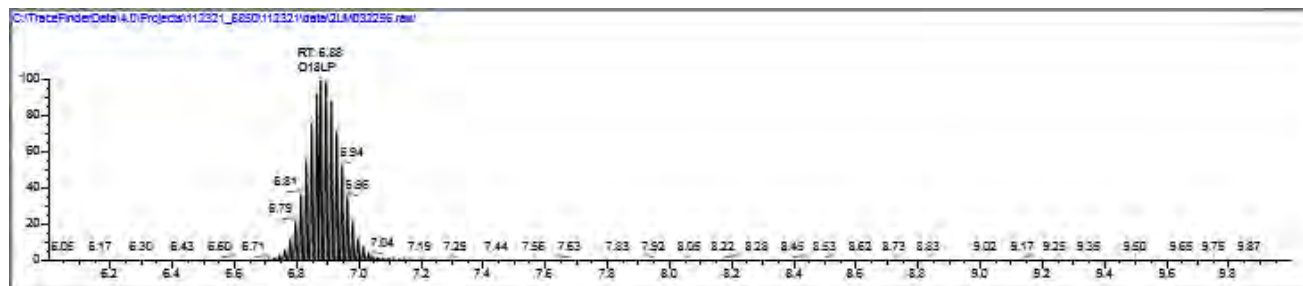
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	O18LP 6.88	89	1303270			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
	Perchlorate 6.9	83	22361	Linear	0.017	0.09 ug/L	0.09 ug/L	

## Sample Report

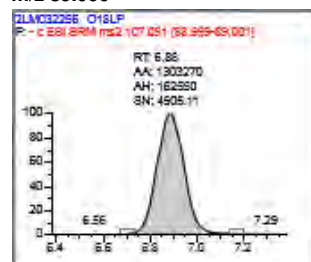
Data File: 2LM032256  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx  
 Sample ID: S1K0467-CAL1  
 Diln Factor: 1.00  
 Comments: 1:1 0012469

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

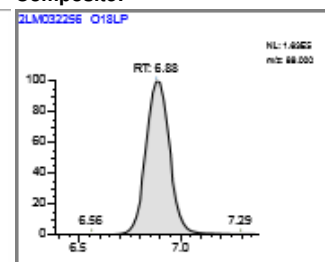
Tune report not found  
 11/23/2021 4:43:26 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:A2



## m/z 89.000



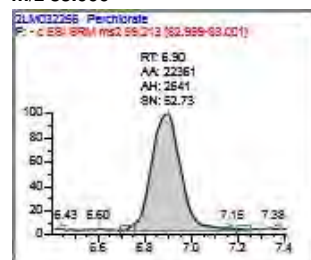
## Composite:



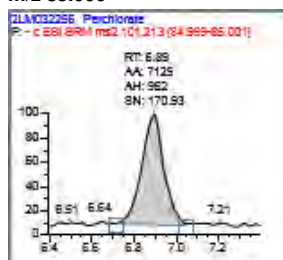
## O18LP

RT (min)	Ion	Response	Amount N/A	Target Range	Ratio
6.88	m/z 89.000	1303270	5.000		N/A

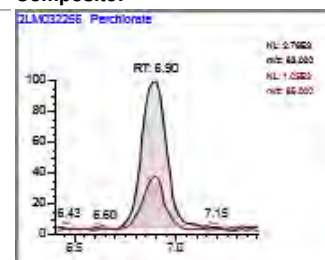
## m/z 83.000



## m/z 85.000



## Composite:



## Perchlorate

RT (min)	Ion	Response	Amount Cal: 0.100	Target Range 0.080 - 2.100	Ratio
6.90	m/z 83.000	22361	0.090		N/A
6.89	m/z 85.000	7129		25.81 - 38.71	31.88

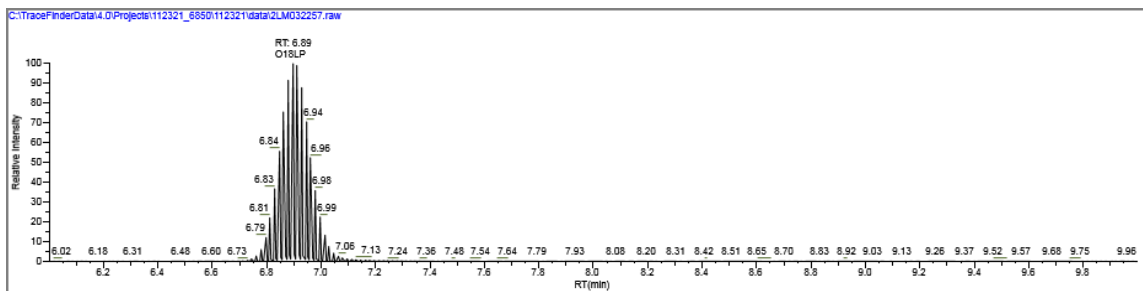


## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:A3	S1K0467-CAL2	2LM032257	2	CAL STD 2	11/23/2021 4:56:40 PM	1:1 0012468



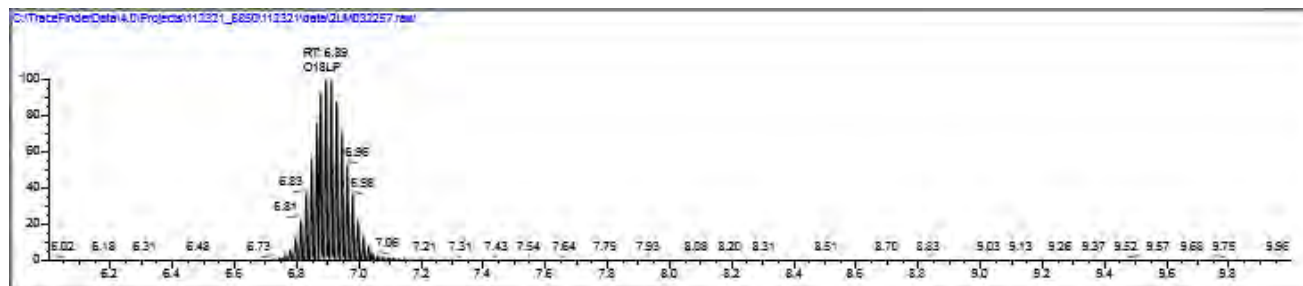
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	6.89	89	1232995			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	6.9	83	42956	Linear	0.035	0.187 ug/L	0.187 ug/L	

# Sample Report

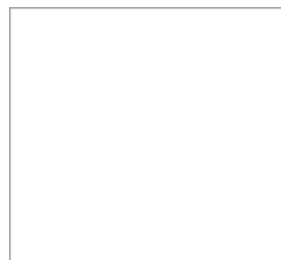
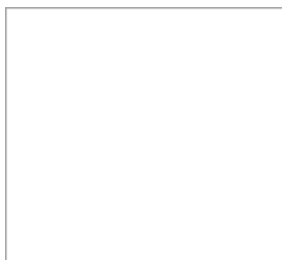
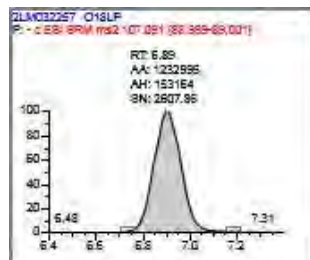
Data File: 2LM032257  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx  
 Sample ID: S1K0467-CAL2  
 Diln Factor: 1.00  
 Comments: 1:1 0012468

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

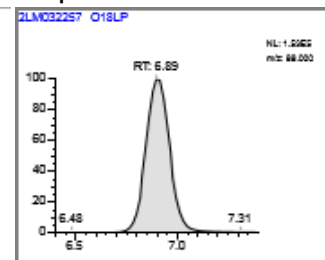
Tune report not found  
 11/23/2021 4:56:40 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:A3



## m/z 89.000



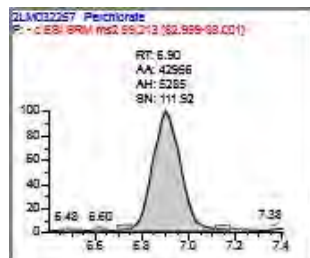
## Composite:



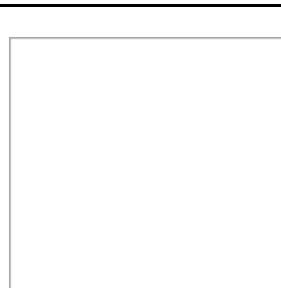
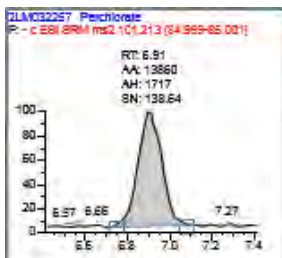
## O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.89	m/z 89.000	1232995	5.000		N/A

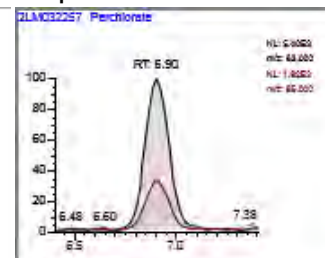
## m/z 83.000



## m/z 85.000



## Composite:



## Perchlorate

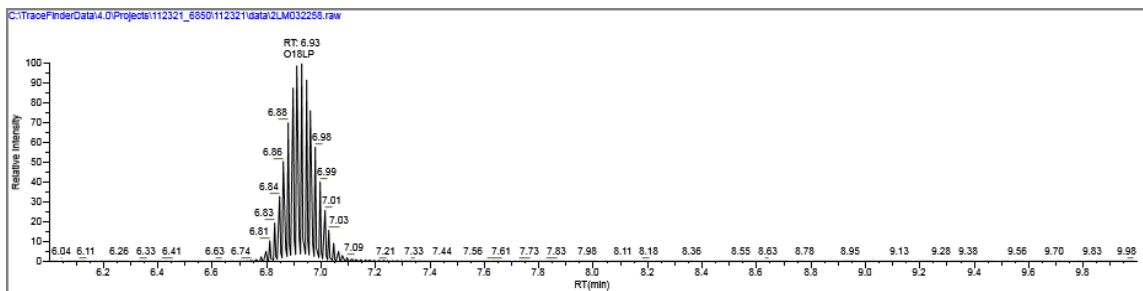
RT (min)	Ion	Response	Amount	Target Range	Ratio
			Cal: 0.200		
6.90	m/z 83.000	42956	0.187	0.160 - 4.200	N/A
6.91	m/z 85.000	13860		25.81 - 38.71	32.27

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:44	S1K0467-CAL3	2LM032258	3	CAL STD 3	11/23/2021 5:09:55 PM	1:1 0012467



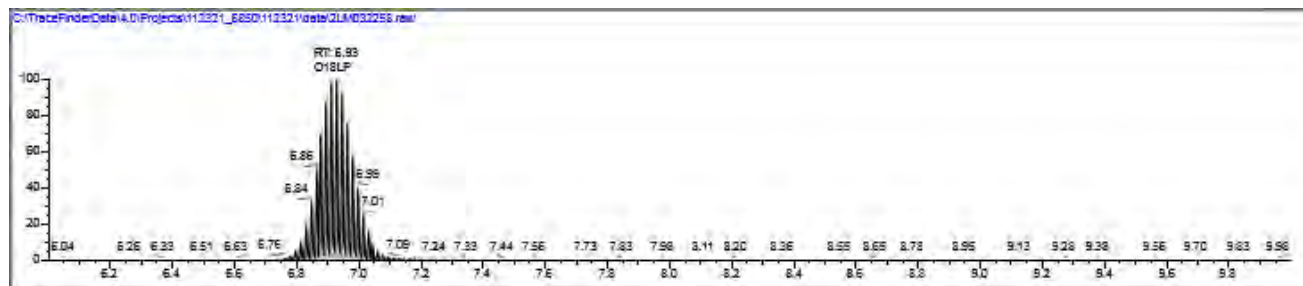
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	O18LP 6.93	89	1266053			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	6.92	83	150289	Linear	0.119	0.644 ug/L	0.644 ug/L	

# Sample Report

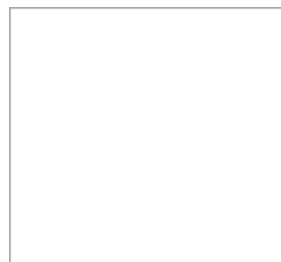
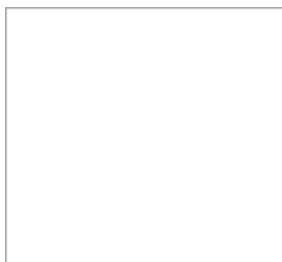
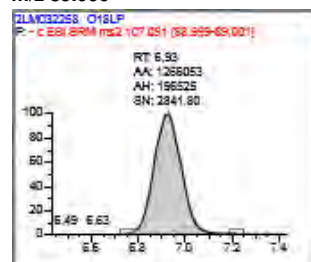
Data File: 2LM032258  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: S1K0467-CAL3  
 Diln Factor: 1.00  
 Comments: 1:1 0012467

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

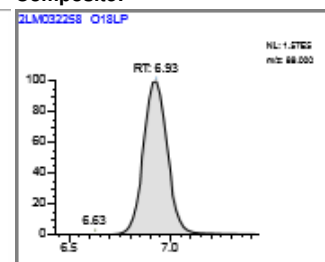
Tune report not found  
 11/23/2021 5:09:55 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:A4



m/z 89.000



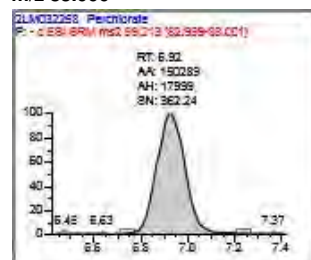
Composite:



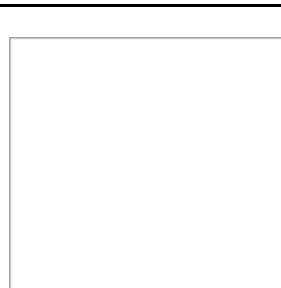
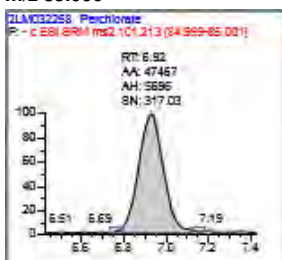
O18LP

RT (min)	Ion	Response	Amount N/A	Target Range	Ratio
6.93	m/z 89.000	1266053	5.000		N/A

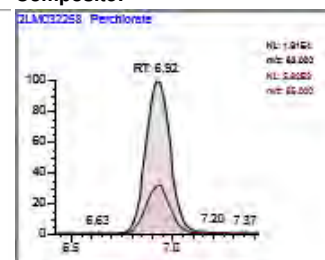
m/z 83.000



m/z 85.000



Composite:



Perchlorate

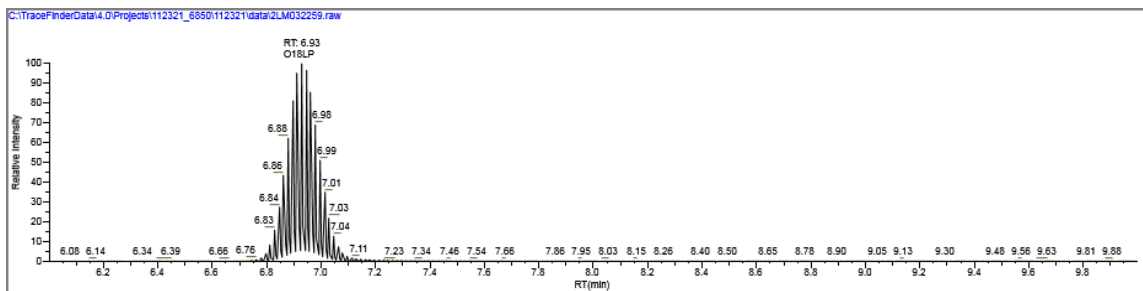
RT (min)	Ion	Response	Amount Cal: 0.500	Target Range 0.400 - 10.500	Ratio
6.92	m/z 83.000	150289	0.644		N/A
6.92	m/z 85.000	47467		25.81 - 38.71	31.58

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:A5	S1K0467-CAL4	2LM032259	4	CAL STD 4	11/23/2021 5:23:10 PM	1:1 0012466



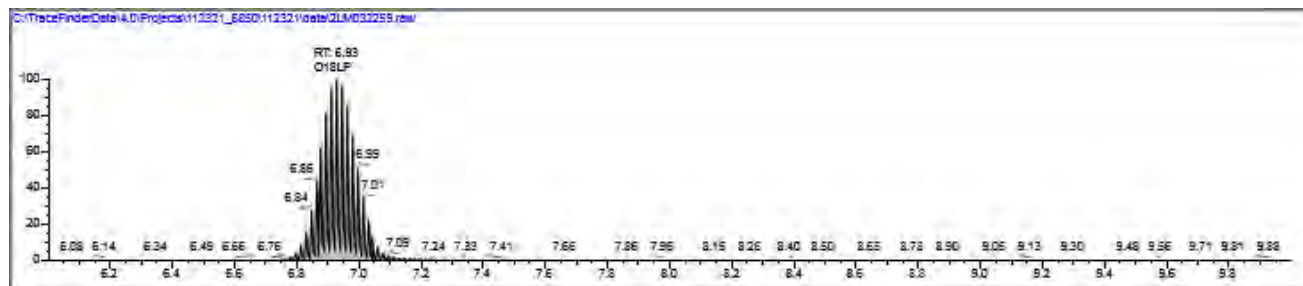
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	6.93	89	1280767			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	6.93	83	222769	Linear	0.174	0.945 ug/L	0.945 ug/L	

# Sample Report

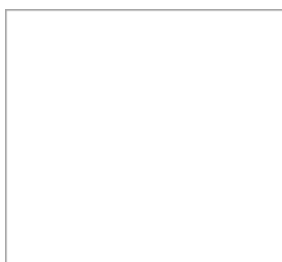
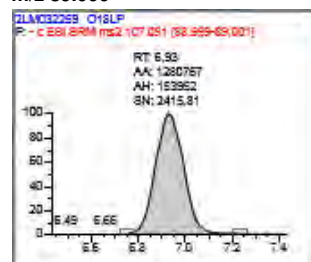
Data File: 2LM032259  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: S1K0467-CAL4  
 Diln Factor: 1.00  
 Comments: 1:1 0012466

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

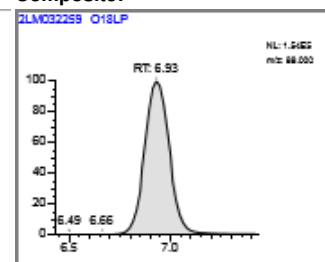
Tune report not found  
 11/23/2021 5:23:10 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:A5



m/z 89.000



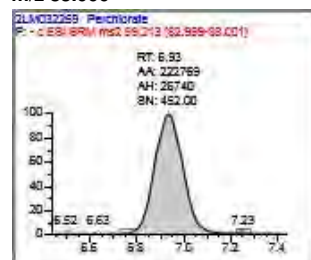
Composite:



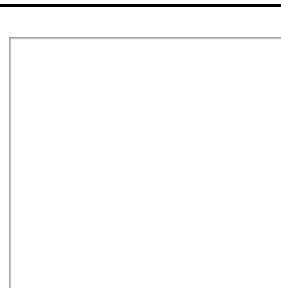
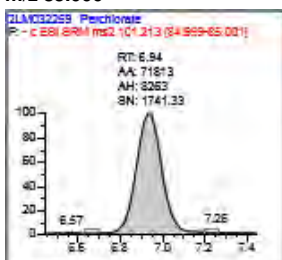
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.93	m/z 89.000	1280767	5.000		N/A

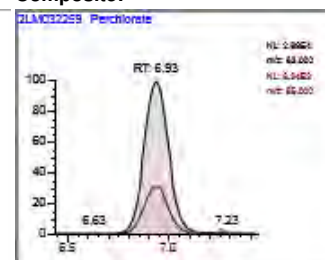
m/z 83.000



m/z 85.000



Composite:



Perchlorate

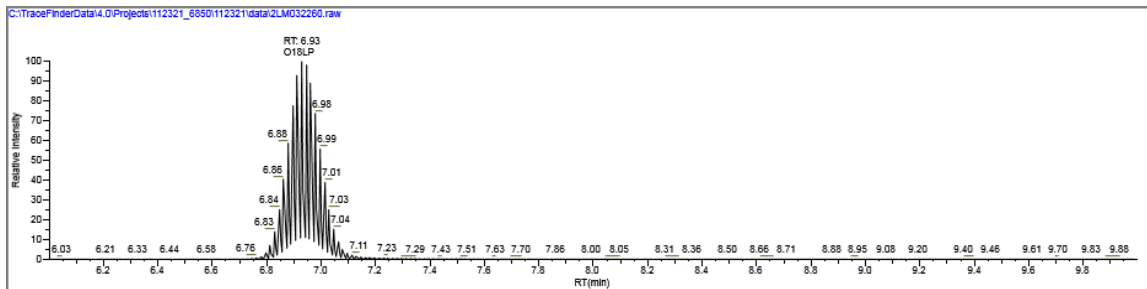
RT (min)	Ion	Response	Amount	Target Range	Ratio
			Cal: 1.000		
6.93	m/z 83.000	222769	0.945	0.800 - 21.000	N/A
6.94	m/z 85.000	71813		25.81 - 38.71	32.24

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R: A6	S1K0467-CAL5	2LM032260	5	CAL STD 5	11/23/2021 5:36:25 PM	1:1 0012465



Internal Standards	RT	Quan Peak	Response	Injected Conc Units	Calculated Conc Units	Flags
O18LP	6.93	89	1283639	5.000 ug/L	5.000 ug/L	

Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
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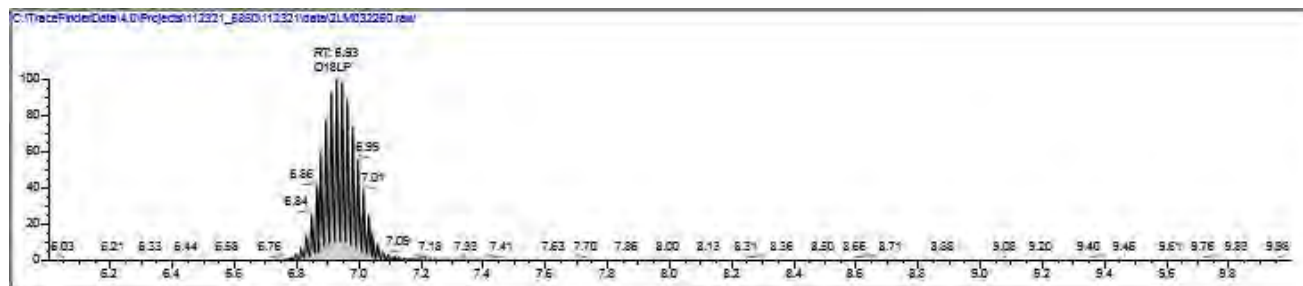
  

Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	6.93	83	450589	Linear	0.351	1.911 ug/L	1.911 ug/L	

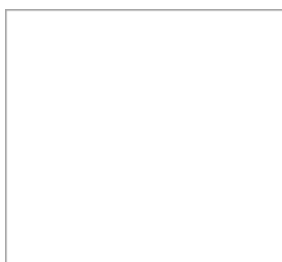
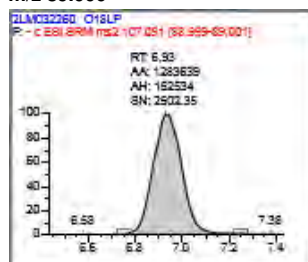
# Sample Report

Data File: 2LM032260  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: S1K0467-CAL5  
 Diln Factor: 1.00  
 Comments: 1:1 0012465

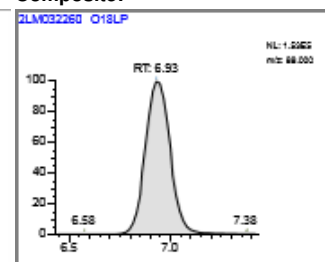
Tune Report Date: Tune report not found  
 Acquisition Date: 11/23/2021 5:36:25 PM  
 Cali File Date: 11/24/2021 9:36:24 AM  
 Operator ID: CAS  
 Instrument ID: LCMS2  
 Vial Number: R:A6



## m/z 89.000



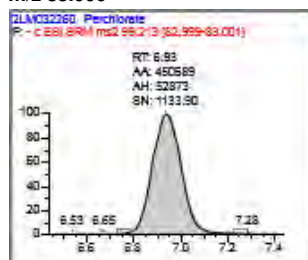
## Composite:



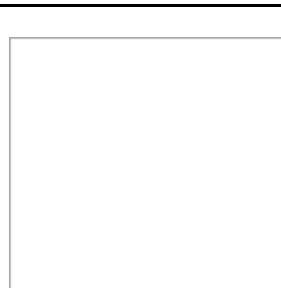
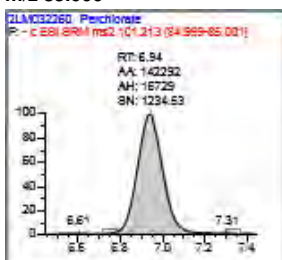
## O18LP

RT (min)	Ion	Response	Amount N/A	Target Range	Ratio
6.93	m/z 89.000	1283639	5.000		N/A

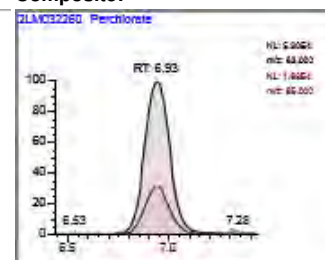
## m/z 83.000



## m/z 85.000



## Composite:



## Perchlorate

RT (min)	Ion	Response	Amount Cal: 2.000	Target Range 1.600 - 42.000	Ratio
6.93	m/z 83.000	450589	1.911		N/A
6.94	m/z 85.000	142292		25.81 - 38.71	31.58

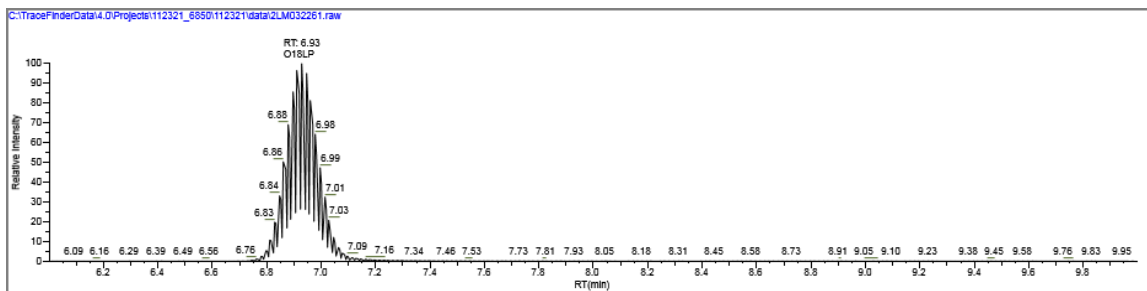


## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R: A7	S1K0467-CAL6	2LM032261	6	CAL STD 6	11/23/2021 5:49:40 PM	1:1 0012464

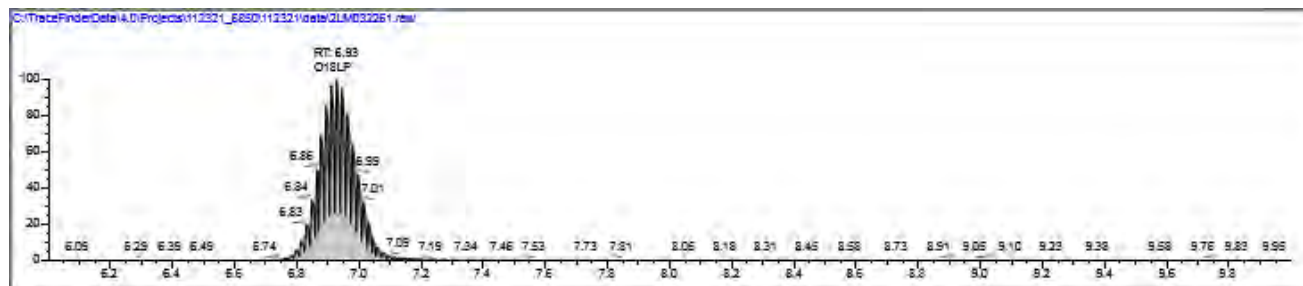


Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	O18LP 6.93	89	1099645			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	6.93	83	960334	Linear	0.873	4.758 ug/L	4.758 ug/L	

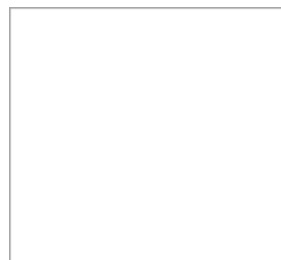
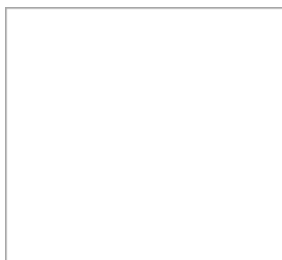
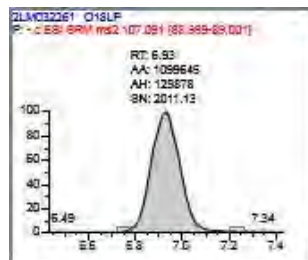
# Sample Report

Data File: 2LM032261  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: S1K0467-CAL6  
 Diln Factor: 1.00  
 Comments: 1:1 0012464

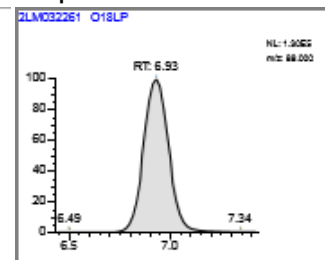
Tune Report Date: Tune report not found  
 Acquisition Date: 11/23/2021 5:49:40 PM  
 Cali File Date: 11/24/2021 9:36:24 AM  
 Operator ID: CAS  
 Instrument ID: LCMS2  
 Vial Number: R:A7



## m/z 89.000



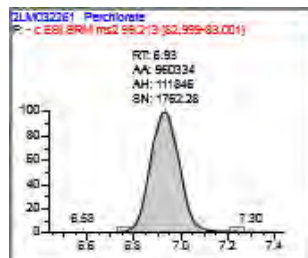
## Composite:



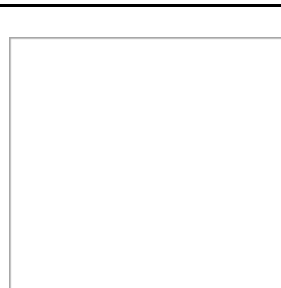
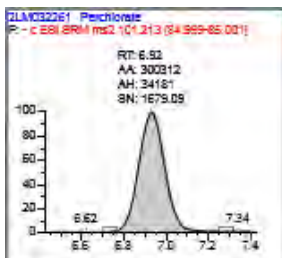
## O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.93	m/z 89.000	1099645	5.000		N/A

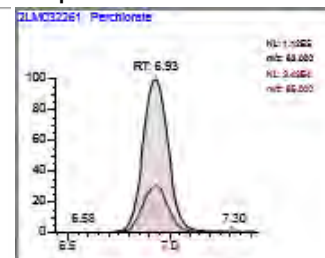
## m/z 83.000



## m/z 85.000



## Composite:



## Perchlorate

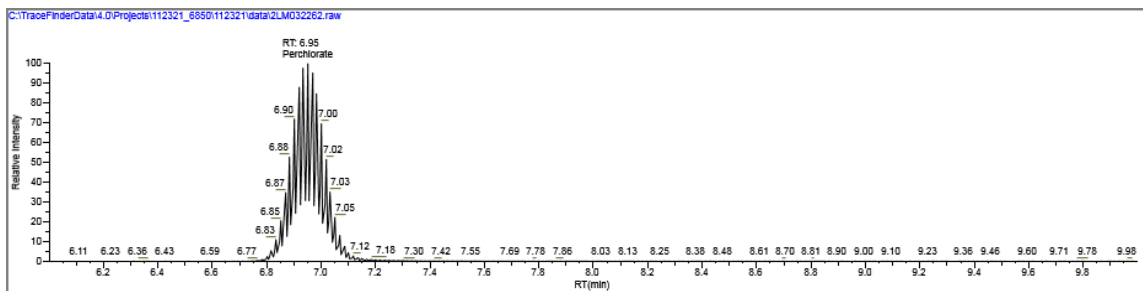
RT (min)	Ion	Response	Amount	Target Range	Ratio
			Cal: 5.000		
6.93	m/z 83.000	960334	4.758	4.000 - 105.000	N/A
6.92	m/z 85.000	300312		25.81 - 38.71	31.27

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:A8	S1K0467-CAL7	2LM032262	7	CAL STD 7	11/23/2021 6:02:55 PM	1:1 0012463



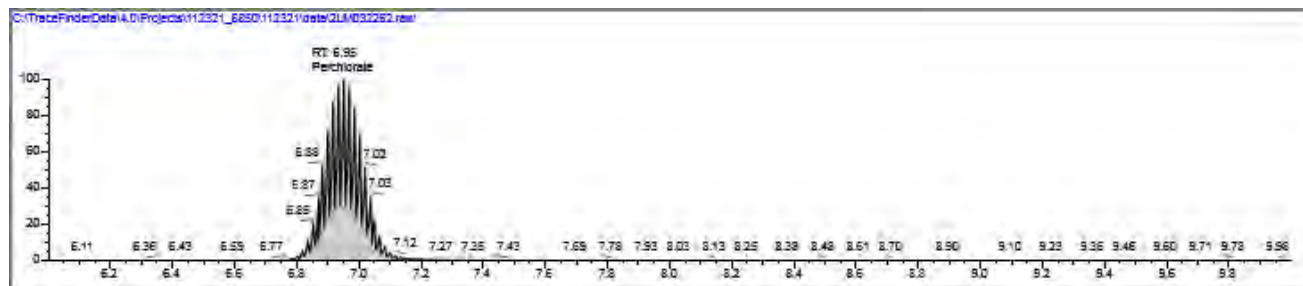
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	6.94	89	1181309			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	6.95	83	2224819	Linear	1.883	10.266 ug/L	10.266 ug/L	

## Sample Report

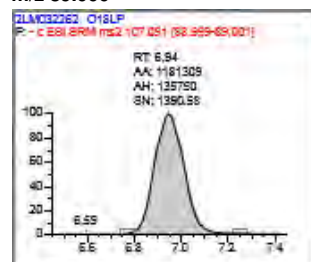
Data File: 2LM032262  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx  
 Sample ID: S1K0467-CAL7  
 Diln Factor: 1.00  
 Comments: 1:1 0012463

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

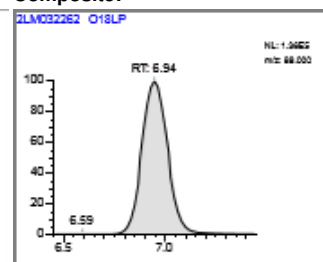
Tune report not found  
 11/23/2021 6:02:55 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:A8



m/z 89.000



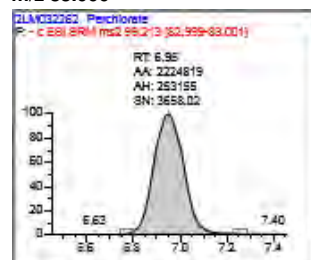
Composite:



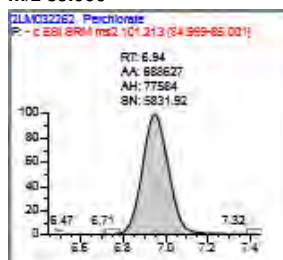
O18LP

RT (min)	Ion	Response	Amount N/A	Target Range	Ratio
6.94	m/z 89.000	1181309	5.000		N/A

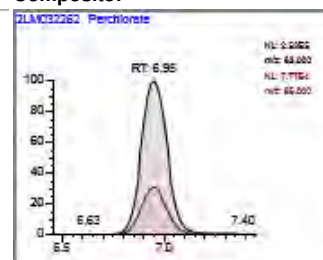
m/z 83.000



m/z 85.000



Composite:



Perchlorate

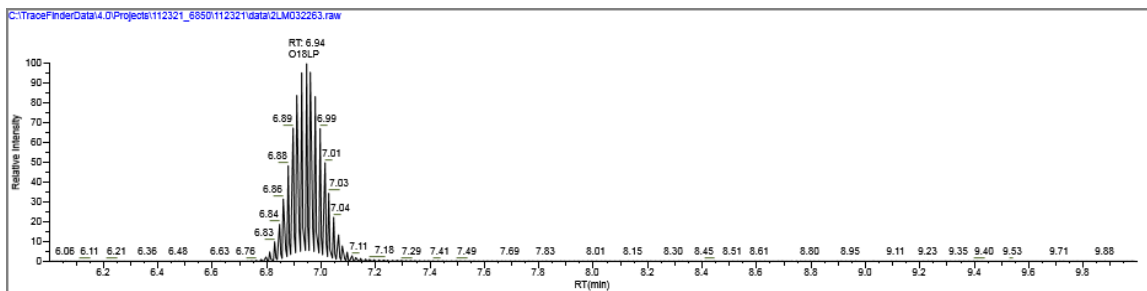
RT (min)	Ion	Response	Amount Cal: 10.000	Target Range 8.000 - 210.000	Ratio
6.95	m/z 83.000	2224819	10.266		N/A
6.94	m/z 85.000	688627		25.81 - 38.71	30.95

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:A9	S1K0467-ICV1	2LM032263	ICV	ICV	11/23/2021 6:16:10 PM	1:1 0012475



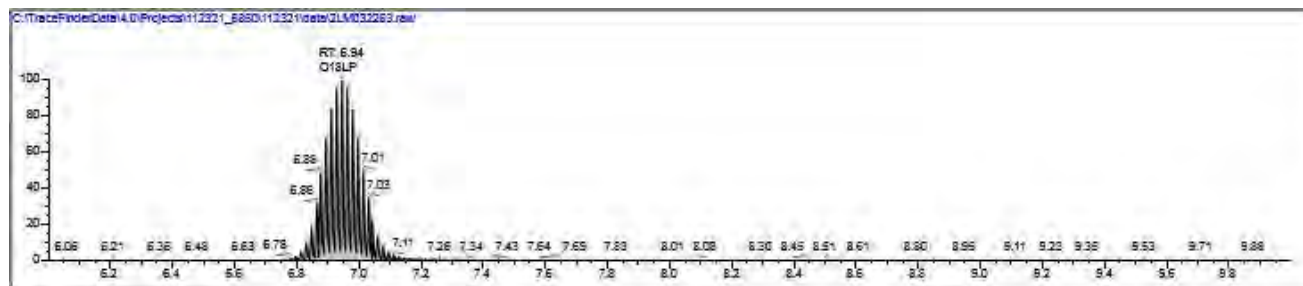
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	6.94	89	1311711			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	6.95	83	230866	Linear	0.176	0.956 ug/L	0.956 ug/L	

# Sample Report

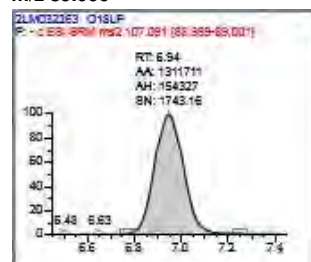
Data File: 2LM032263  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: S1K0467-ICV1  
 Diln Factor: 1.00  
 Comments: 1:1 0012475

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

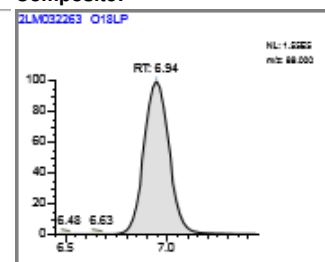
Tune report not found  
 11/23/2021 6:16:10 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:A9



m/z 89.000



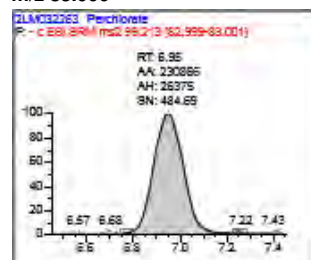
Composite:



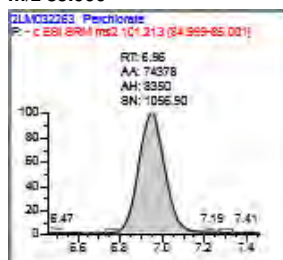
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.94	m/z 89.000	1311711	5.000		N/A

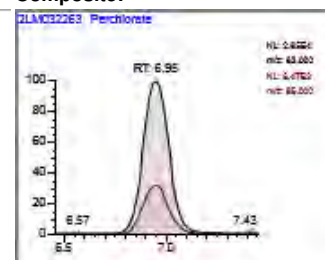
m/z 83.000



m/z 85.000



Composite:



Perchlorate

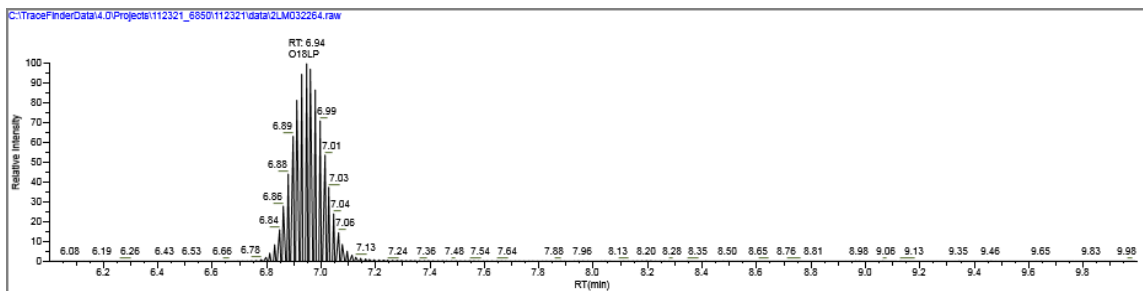
RT (min)	Ion	Response	Amount	Target Range	Ratio
			QC: 1.000		
6.95	m/z 83.000	230866	0.956	0.850 - 1.150	N/A
6.96	m/z 85.000	74378		25.81 - 38.71	32.22

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R-A1	S1K0467-CCB1	2LM032264	N/A	CCB	11/23/2021 6:29:24 PM	1:01



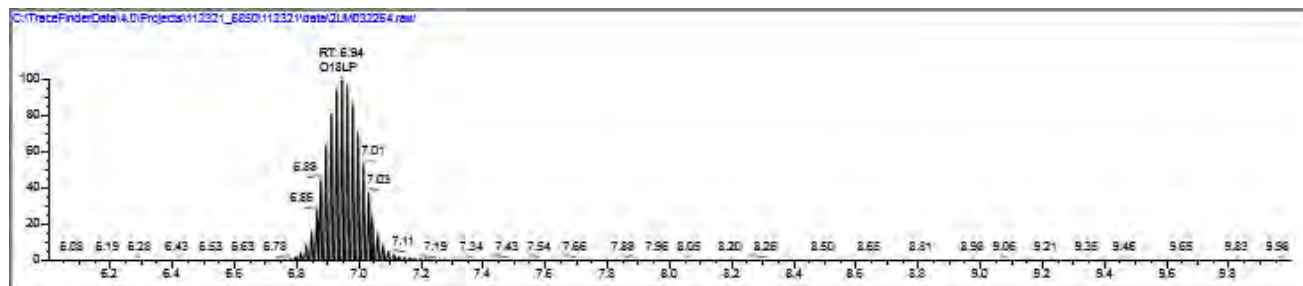
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	O18LP 6.94	89	1299178			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	N/F	N/F	N/F	Linear	0.000	N/F ug/L	N/F ug/L	

# Sample Report

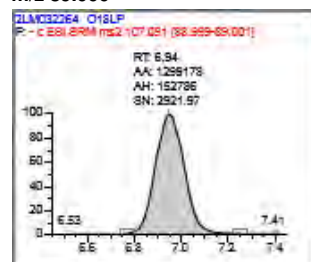
Data File: 2LM032264  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: S1K0467-CCB1  
 Diln Factor: 1.00  
 Comments: 1:01

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

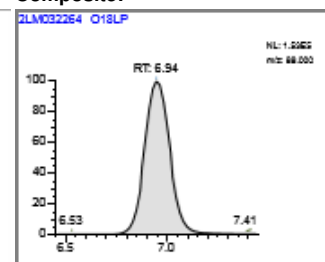
Tune report not found  
 11/23/2021 6:29:24 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:A1



m/z 89.000



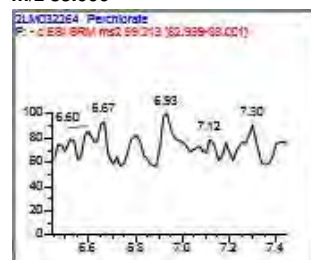
Composite:



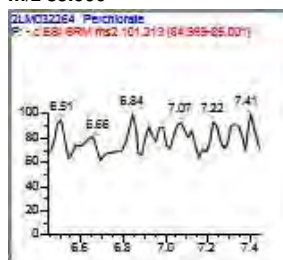
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.94	m/z 89.000	1299178	5.000		N/A

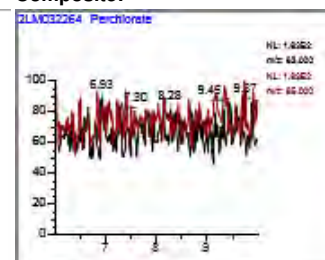
m/z 83.000



m/z 85.000



Composite:



Perchlorate

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
0.00	m/z 83.000	Compound Not Found	N/A		
	m/z 85.000				

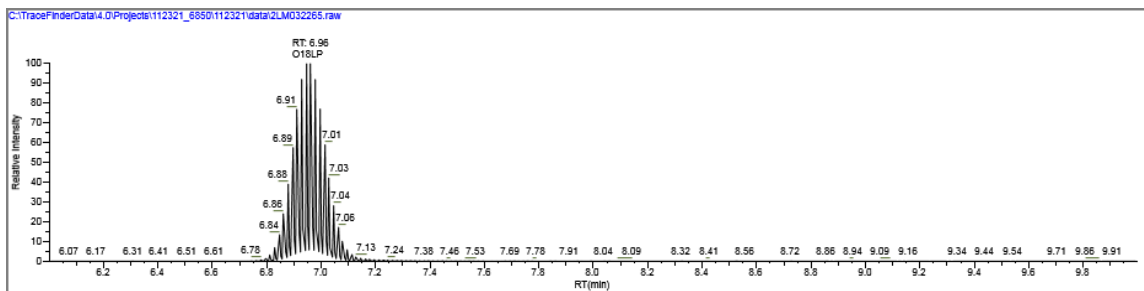


## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:A5	S1K0467-CCV1	2LM032265	CCV	CCV 1.0 ug/L	11/23/2021 6:42:40 PM	1:1 0012466



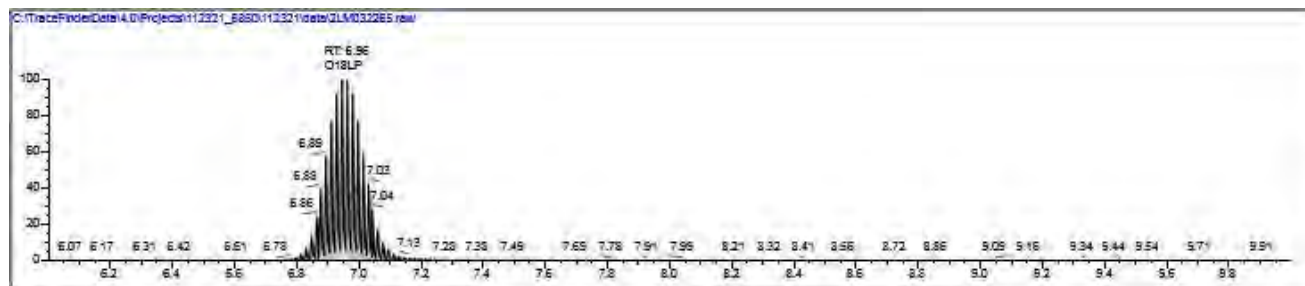
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	6.96	89	1316163			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	6.95	83	228358	Linear	0.174	0.943 ug/L	0.943 ug/L	

# Sample Report

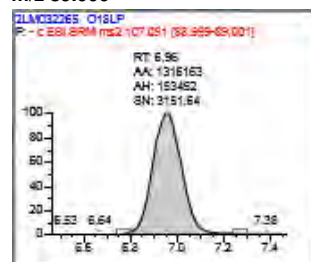
Data File: 2LM032265  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx  
 Sample ID: S1K0467-CCV1  
 Diln Factor: 1.00  
 Comments: 1:1 0012466

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

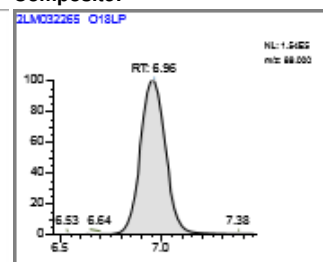
Tune report not found  
 11/23/2021 6:42:40 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:A5



m/z 89.000



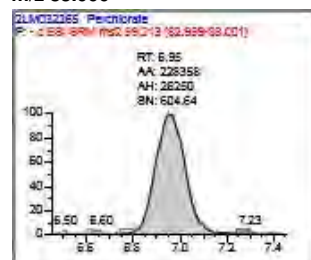
Composite:



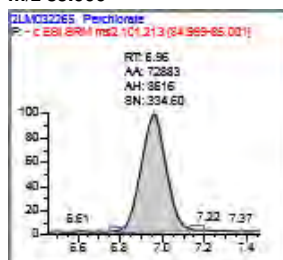
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.96	m/z 89.000	1316163	5.000		N/A

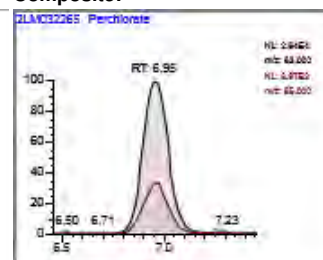
m/z 83.000



m/z 85.000



Composite:



Perchlorate

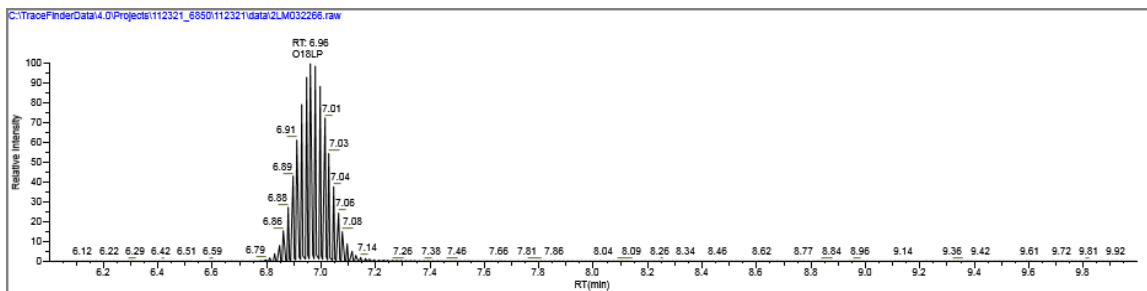
RT (min)	Ion	Response	Amount	Target Range	Ratio
			QC: 1.000		
6.95	m/z 83.000	228358	0.943	0.850 - 1.150	N/A
6.96	m/z 85.000	72883		25.81 - 38.71	31.92

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:A3	S1K0467-CRL1	2LM032266	QCMRL	QCMRL 0.2 ug/L	11/23/2021 6:55:54 PM	1:1 0012468

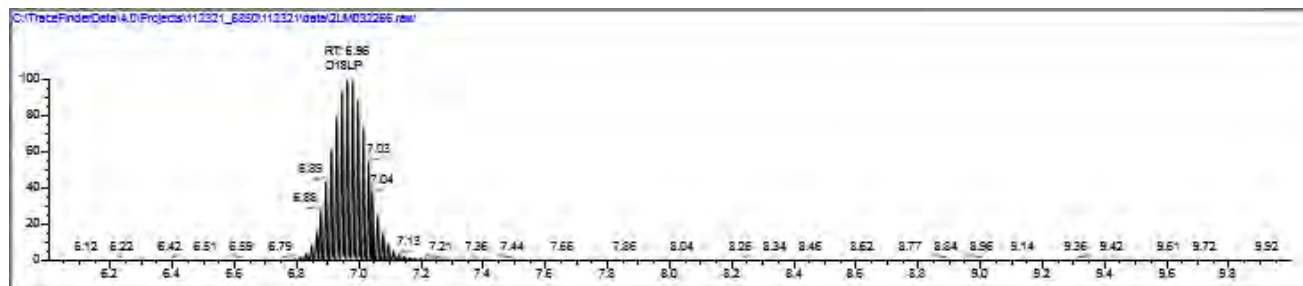


Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	6.96	89	1174525			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	6.97	83	40831	Linear	0.035	0.186 ug/L	0.186 ug/L	

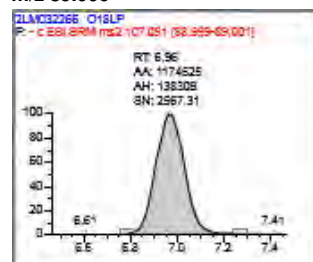
## Sample Report

Data File: 2LM032266  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx  
 Sample ID: S1K0467-CRL1  
 Diln Factor: 1.00  
 Comments: 1:1 0012468

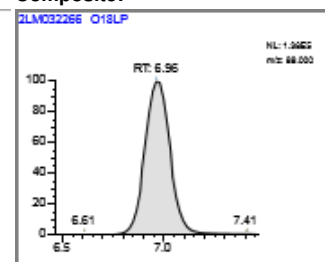
Tune Report Date: Tune report not found  
 Acquisition Date: 11/23/2021 6:55:54 PM  
 Cali File Date: 11/24/2021 9:36:24 AM  
 Operator ID: CAS  
 Instrument ID: LCMS2  
 Vial Number: R:A3



## m/z 89.000



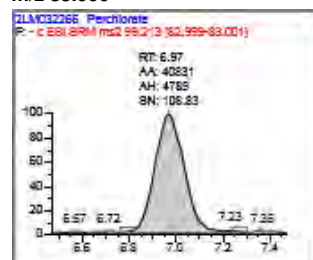
## Composite:



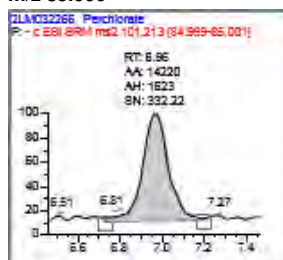
## O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.96	m/z 89.000	1174525	5.000		N/A

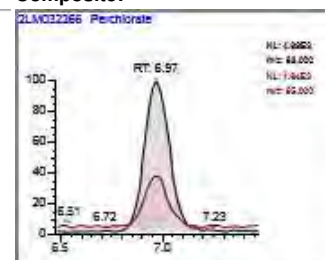
## m/z 83.000



## m/z 85.000



## Composite:



## Perchlorate

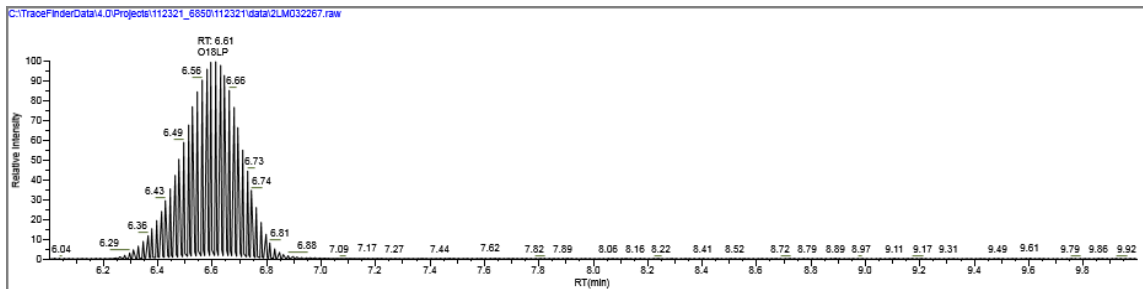
RT (min)	Ion	Response	Amount	Target Range	Ratio
			QC: 0.200		
6.97	m/z 83.000	40831	0.186	0.140 - 0.260	N/A
6.96	m/z 85.000	14220		25.81 - 38.71	34.83

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:B1	S1K0467-IFA1	2LM032267	N/A	MCT 0.2 ug/L	11/23/2021 7:09:09 PM	1:1 0012477



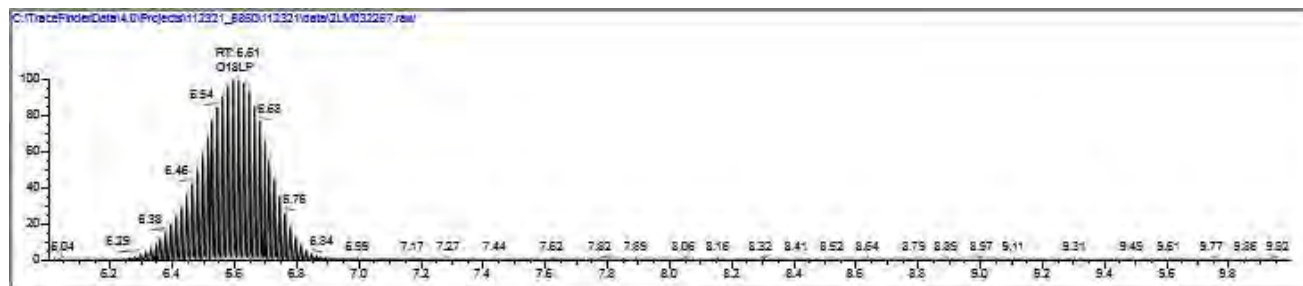
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	6.61	89	1108705			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	6.62	83	49014	Linear	0.044	0.238 ug/L	0.238 ug/L	

# Sample Report

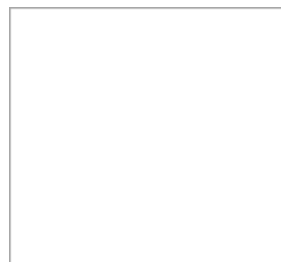
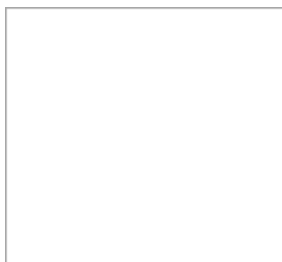
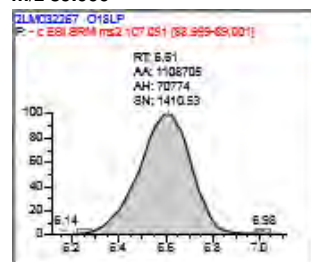
Data File: 2LM032267  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: S1K0467-IFA1  
 Diln Factor: 1.00  
 Comments: 1:1 0012477

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

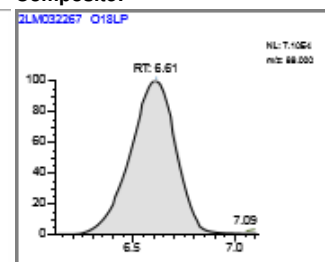
Tune report not found  
 11/23/2021 7:09:09 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:B1



m/z 89.000



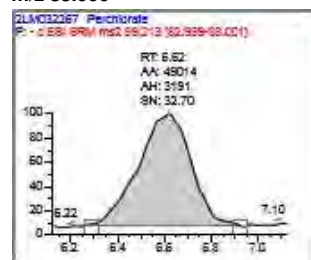
Composite:



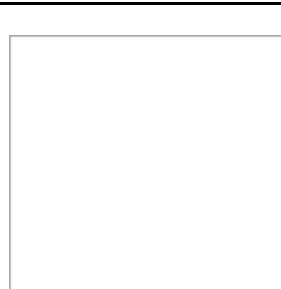
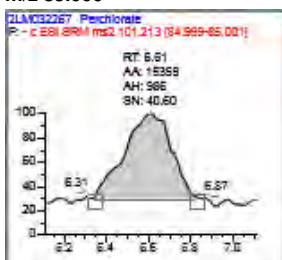
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.61	m/z 89.000	1108705	5.000		N/A

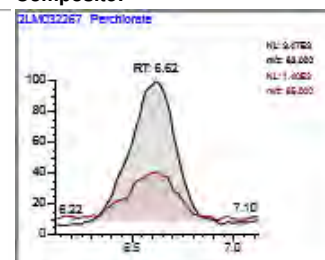
m/z 83.000



m/z 85.000



Composite:



Perchlorate

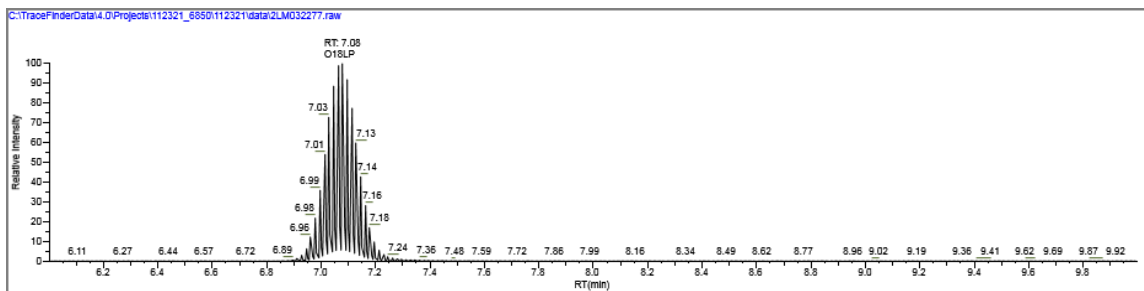
RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
6.62	m/z 83.000	49014	0.238		N/A
6.61	m/z 85.000	15359		25.81 - 38.71	31.34

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:A5	S1K0467-CCV2	2LM032277	CCV	CCV 1.0 ug/L	11/23/2021 9:21:38 PM	1:1 0012466

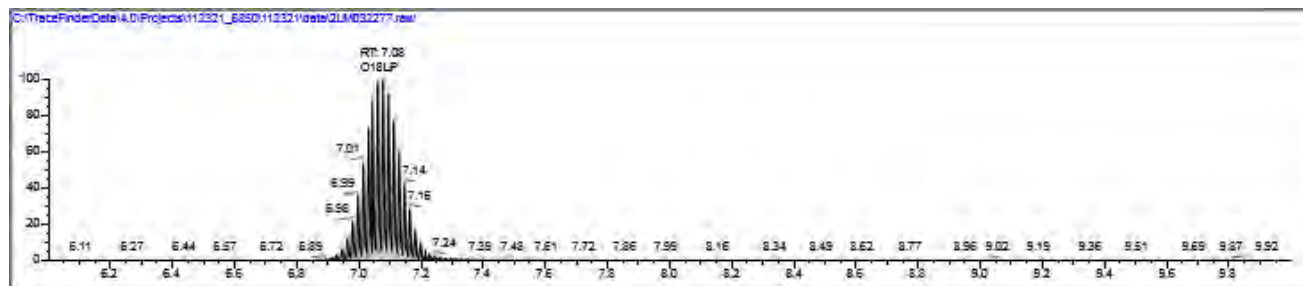


Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	7.08	89	1207068			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	7.08	83	211917	Linear	0.176	0.954 ug/L	0.954 ug/L	

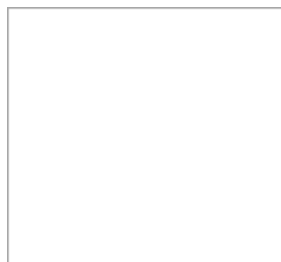
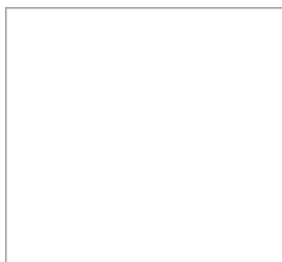
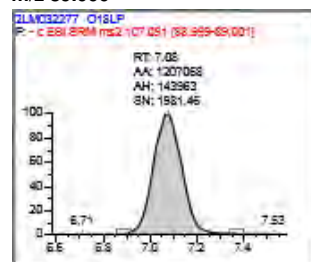
# Sample Report

Data File: 2LM032277  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx  
 Sample ID: S1K0467-CCV2  
 Diln Factor: 1.00  
 Comments: 1:1 0012466

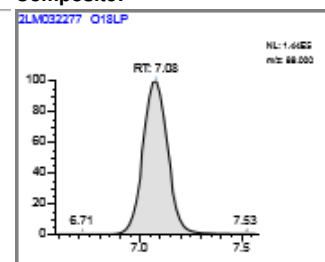
Tune Report Date: Tune report not found  
 Acquisition Date: 11/23/2021 9:21:38 PM  
 Cali File Date: 11/24/2021 9:36:24 AM  
 Operator ID: CAS  
 Instrument ID: LCMS2  
 Vial Number: R:A5



m/z 89.000



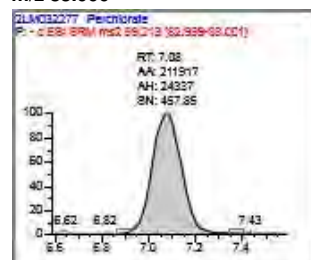
Composite:



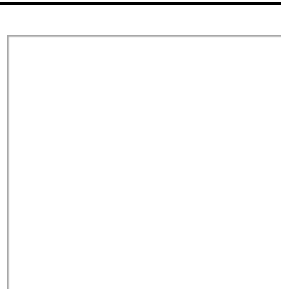
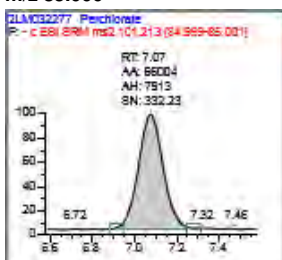
O18LP

RT (min)	Ion	Response	Amount N/A	Target Range	Ratio
7.08	m/z 89.000	1207068	5.000		N/A

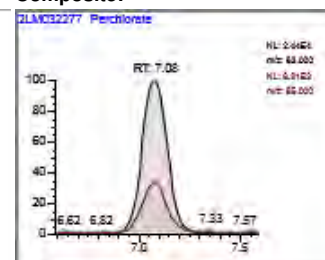
m/z 83.000



m/z 85.000



Composite:



Perchlorate

RT (min)	Ion	Response	Amount QC: 1.000	Target Range 0.850 - 1.150	Ratio
7.08	m/z 83.000	211917	0.954		N/A
7.07	m/z 85.000	66004		25.81 - 38.71	31.15

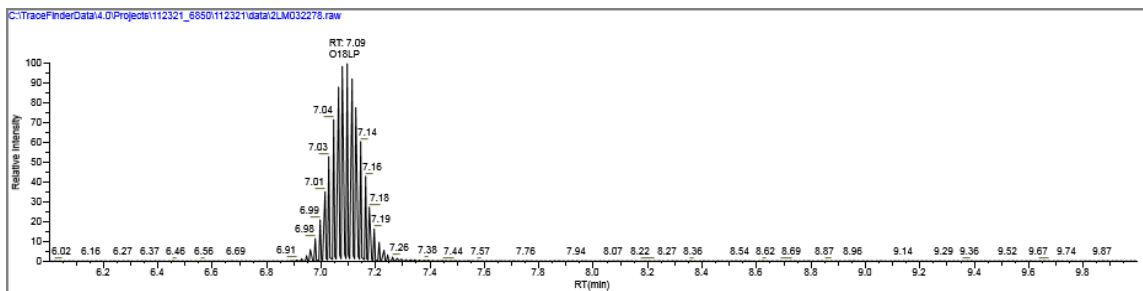


## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:A3	S1K0467-CRL2	2LM032278	QCMRL	QCMRL 0.2 ug/L	11/23/2021 9:34:53 PM	1:1 0012468



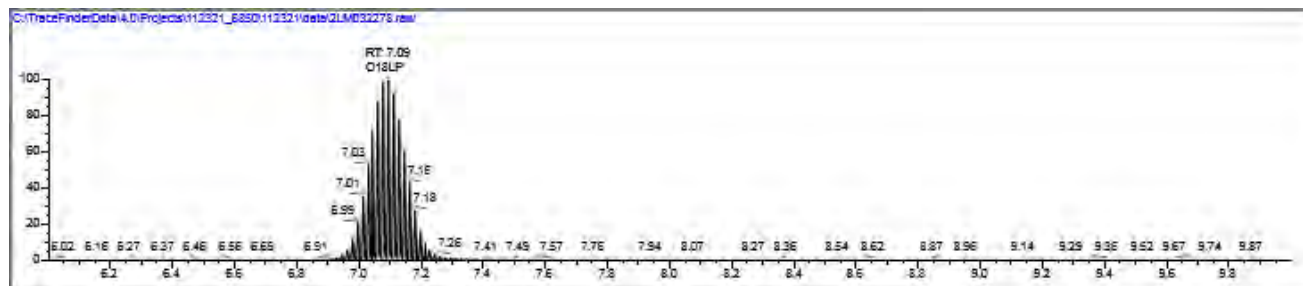
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	7.09	89	1264922			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	7.08	83	43563	Linear	0.034	0.184 ug/L	0.184 ug/L	

# Sample Report

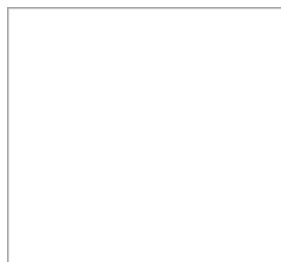
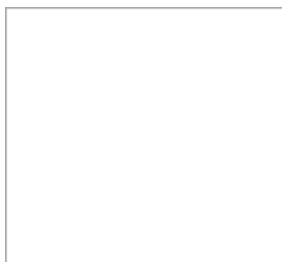
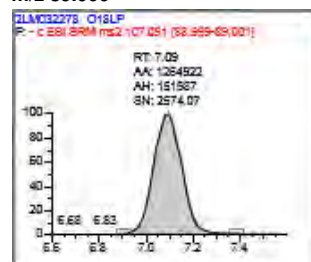
Data File: 2LM032278  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: S1K0467-CRL2  
 Diln Factor: 1.00  
 Comments: 1:1 0012468

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

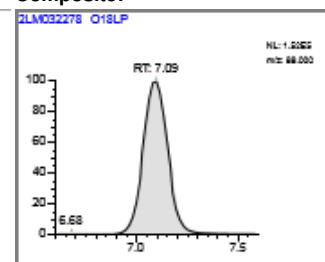
Tune report not found  
 11/23/2021 9:34:53 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:A3



m/z 89.000



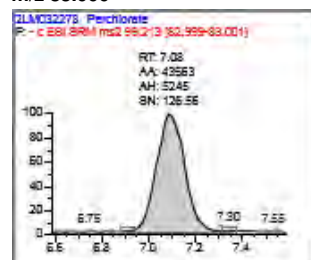
Composite:



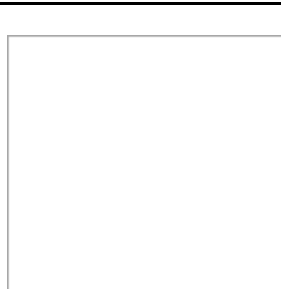
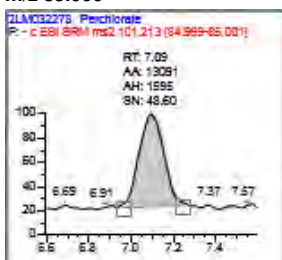
O18LP

RT (min)	Ion	Response	Amount N/A	Target Range	Ratio
7.09	m/z 89.000	1264922	5.000		N/A

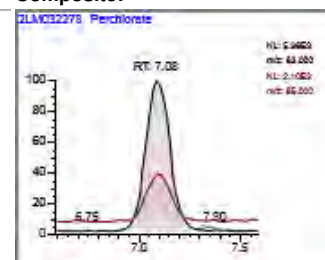
m/z 83.000



m/z 85.000



Composite:



Perchlorate

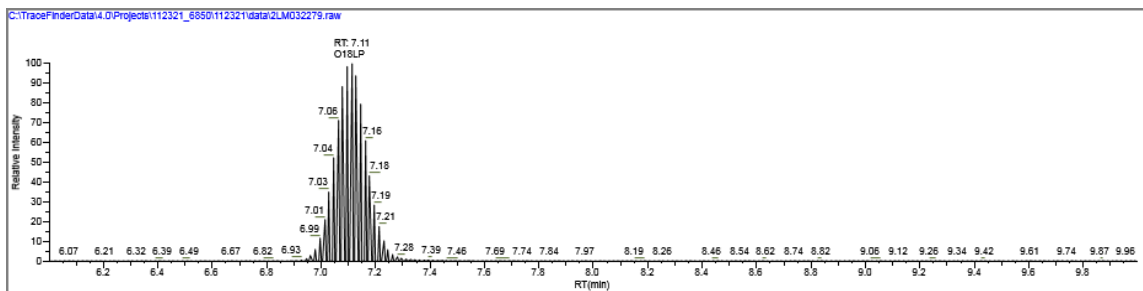
RT (min)	Ion	Response	Amount QC: 0.200	Target Range 0.140 - 0.260	Ratio
7.08	m/z 83.000	43563	0.184		N/A
7.09	m/z 85.000	13091		25.81 - 38.71	30.05

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R-A1	S1K0467-CCB2	2LM032279	N/A	CCB	11/23/2021 9:48:08 PM	1:01



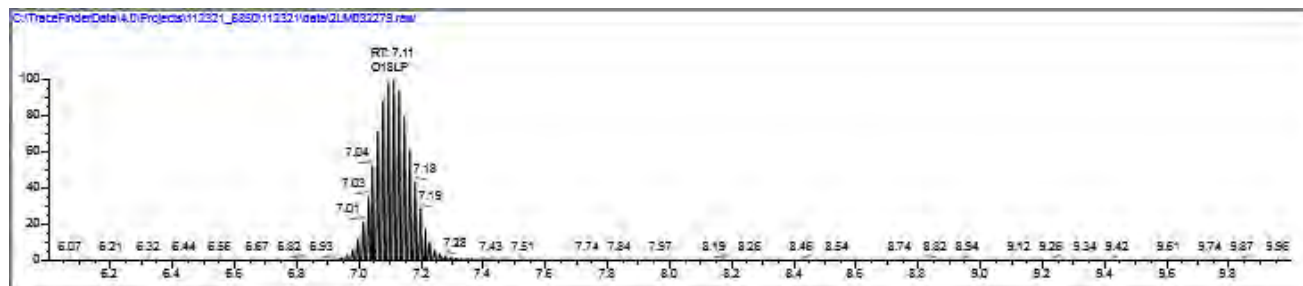
Internal Standards	RT	Quan Peak	Response			Injected	Calculated	Flags
	O18LP	7.11	89	1244461			Conc Units	
						5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected	Calculated	Flags
						Conc Units	Conc Units	
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected	Calculated	Flags
Perchlorate	N/F	N/F	N/F	Linear	0.000	Conc Units	Conc Units	
						N/F ug/L	N/F ug/L	

# Sample Report

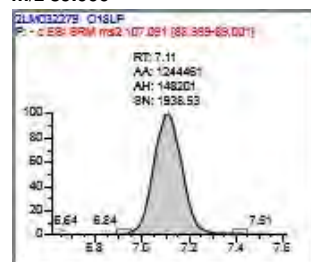
Data File: 2LM032279  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: S1K0467-CCB2  
 Diln Factor: 1.00  
 Comments: 1:01

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

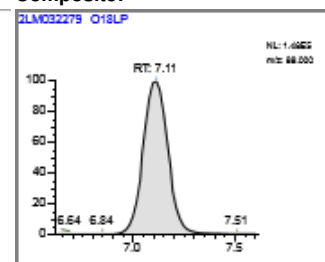
Tune report not found  
 11/23/2021 9:48:08 PM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:A1



m/z 89.000



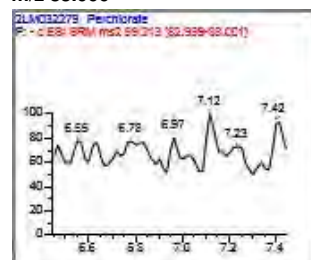
Composite:



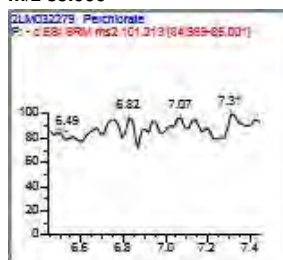
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
7.11	m/z 89.000	1244461	5.000		N/A

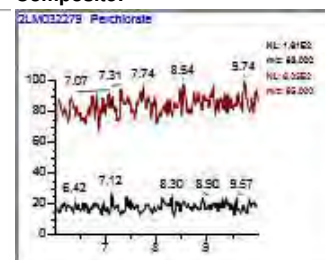
m/z 83.000



m/z 85.000



Composite:



Perchlorate

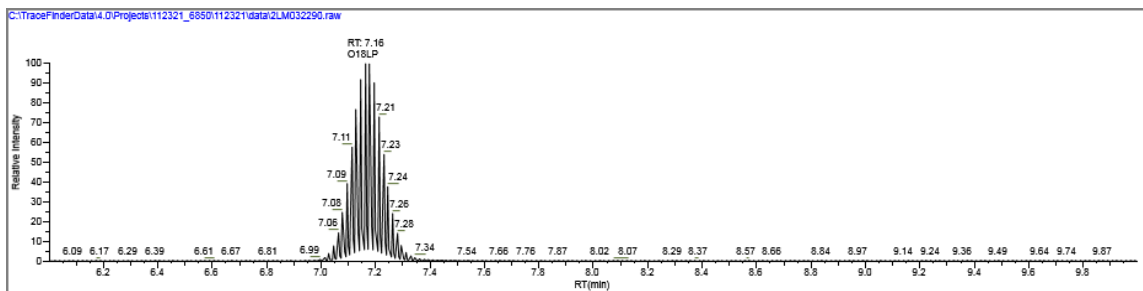
RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
0.00	m/z 83.000	Compound Not Found	N/A		
	m/z 85.000				

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:A5	S1K0467-CCV3	2LM032290	CCV	CCV 1.0 ug/L	11/24/2021 12:13:50 AM	1:1 0012466



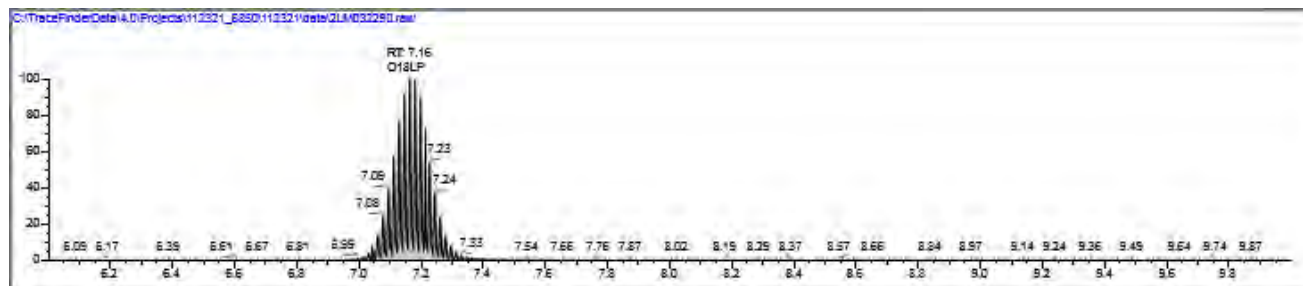
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
O18LP	7.16	89	1145001			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	7.17	83	201734	Linear	0.176	0.957 ug/L	0.957 ug/L	

# Sample Report

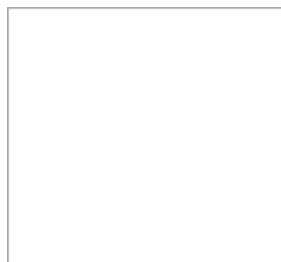
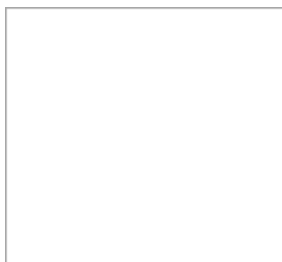
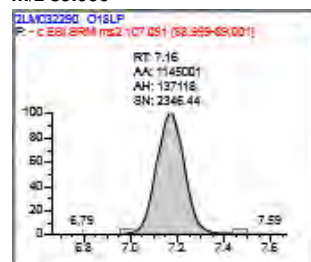
Data File: 2LM032290  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: S1K0467-CCV3  
 Diln Factor: 1.00  
 Comments: 1:1 0012466

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

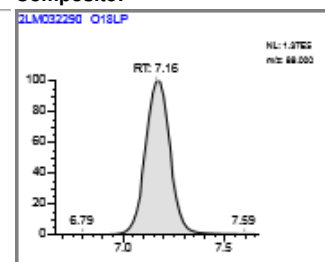
Tune report not found  
 11/24/2021 12:13:50 AM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:A5



m/z 89.000



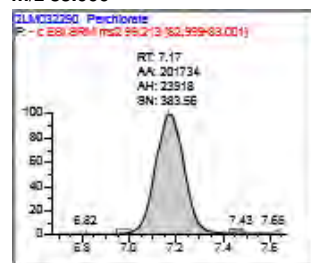
Composite:



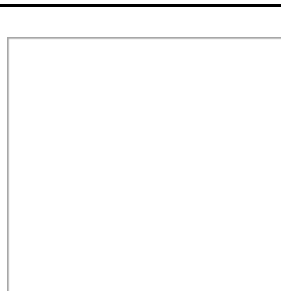
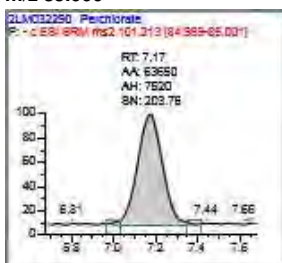
O18LP

RT (min)	Ion	Response	Amount N/A	Target Range	Ratio
7.16	m/z 89.000	1145001	5.000		N/A

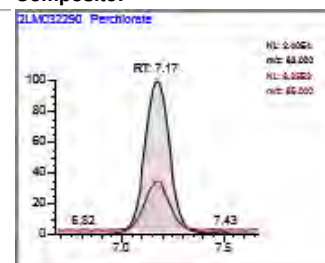
m/z 83.000



m/z 85.000



Composite:



Perchlorate

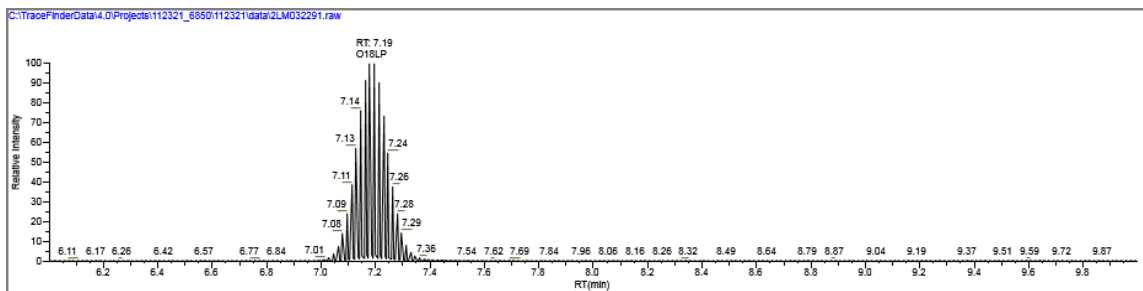
RT (min)	Ion	Response	Amount QC: 1.000	Target Range 0.850 - 1.150	Ratio
7.17	m/z 83.000	201734	0.957		N/A
7.17	m/z 85.000	63650		25.81 - 38.71	31.55

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:A3	S1K0467-CRL3	2LM032291	QCMRL	QCMRL 0.2 ug/L	11/24/2021 12:27:05 AM	1:1 0012468



Internal Standards	RT	Quan Peak	Response	Injected Conc Units	Calculated Conc Units	Flags
O18LP	7.19	89	1164709	5.000 ug/L	5.000 ug/L	

Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
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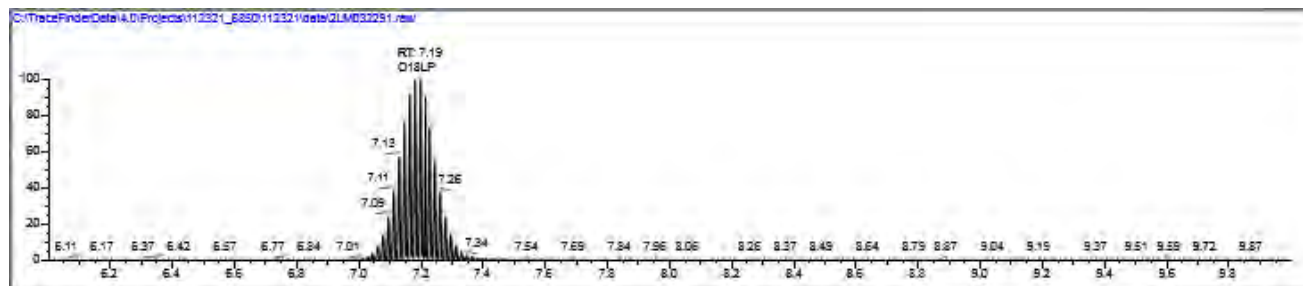
  

Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	7.18	83	40798	Linear	0.035	0.188 ug/L	0.188 ug/L	

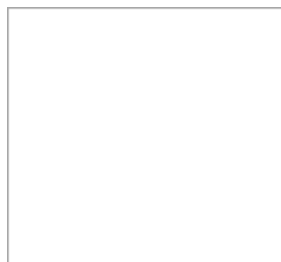
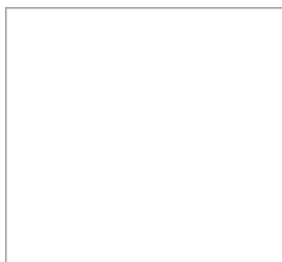
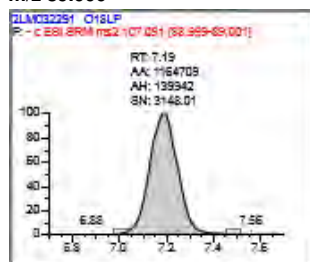
# Sample Report

Data File: 2LM032291  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx  
 Sample ID: S1K0467-CRL3  
 Diln Factor: 1.00  
 Comments: 1:1 0012468

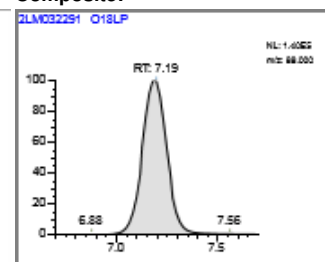
Tune Report Date: Tune report not found  
 Acquisition Date: 11/24/2021 12:27:05 AM  
 Cali File Date: 11/24/2021 9:36:24 AM  
 Operator ID: CAS  
 Instrument ID: LCMS2  
 Vial Number: R:A3



## m/z 89.000



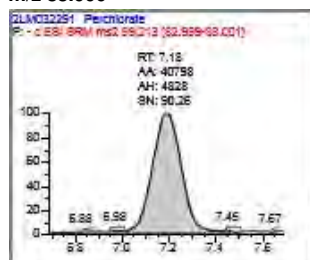
## Composite:



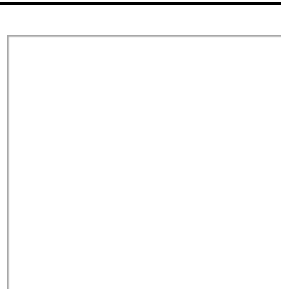
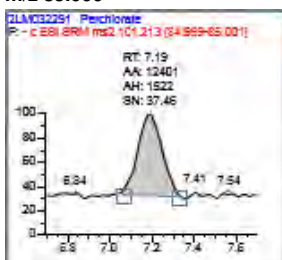
## O18LP

RT (min)	Ion	Response	Amount N/A	Target Range	Ratio
7.19	m/z 89.000	1164709	5.000		N/A

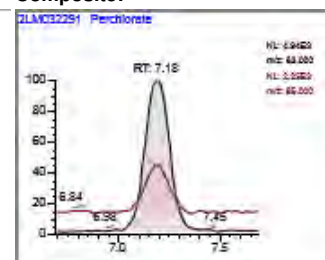
## m/z 83.000



## m/z 85.000



## Composite:



## Perchlorate

RT (min)	Ion	Response	Amount QC: 0.200	Target Range 0.140 - 0.260	Ratio
7.18	m/z 83.000	40798	0.188		N/A
7.19	m/z 85.000	12401		25.81 - 38.71	30.4

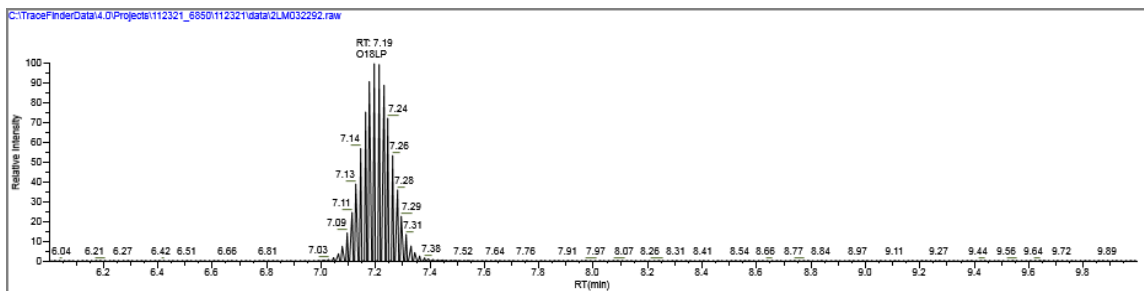


## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R-A1	S1K0467-CCB3	2LM032292	N/A	CCB	11/24/2021 12:40:20 AM	1:01



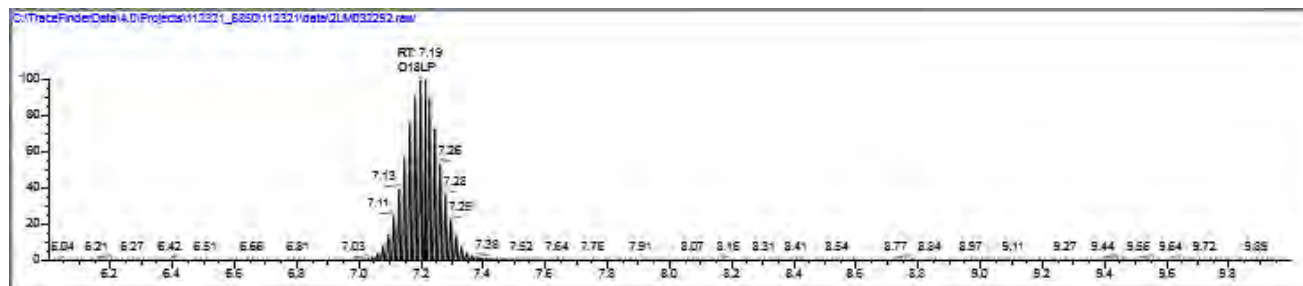
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
O18LP	7.19	89	1144360			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	N/F	N/F	N/F	Linear	0.000	N/F ug/L	N/F ug/L	

# Sample Report

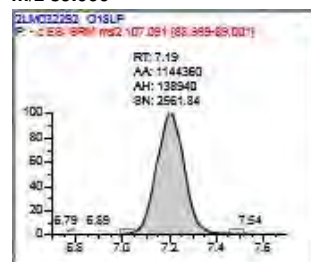
Data File: 2LM032292  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: S1K0467-CCB3  
 Diln Factor: 1.00  
 Comments: 1:01

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

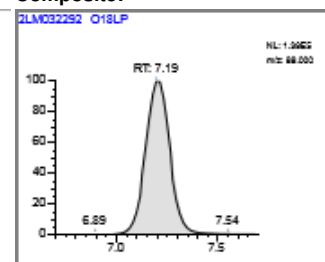
Tune report not found  
 11/24/2021 12:40:20 AM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:A1



m/z 89.000



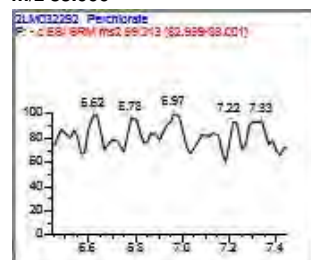
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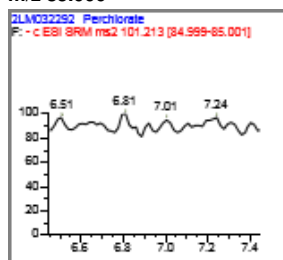
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
7.19	m/z 89.000	1144360	5.000		N/A

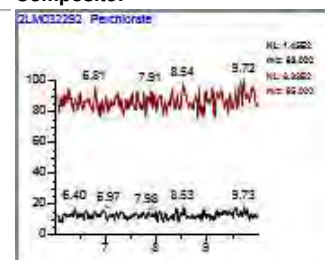
m/z 83.000



m/z 85.000



Composite:



Perchlorate

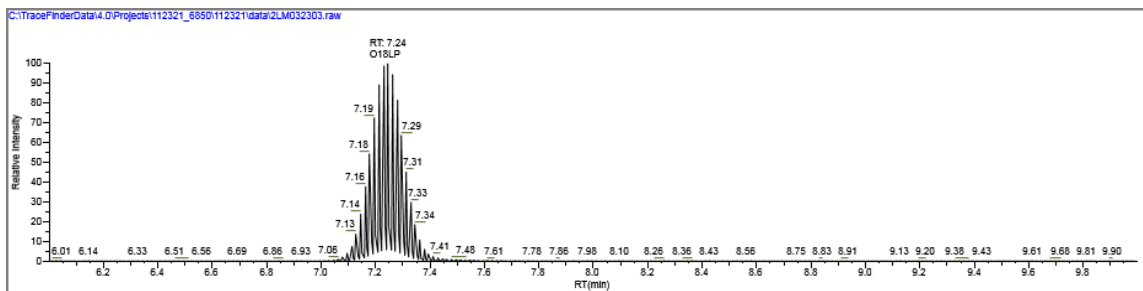
RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
0.00	m/z 83.000	Compound Not Found	N/A		
	m/z 85.000				

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:A5	S1K0467-CCV4	2LM032303	CCV	CCV 1.0 ug/L	11/24/2021 3:06:02 AM	1:01



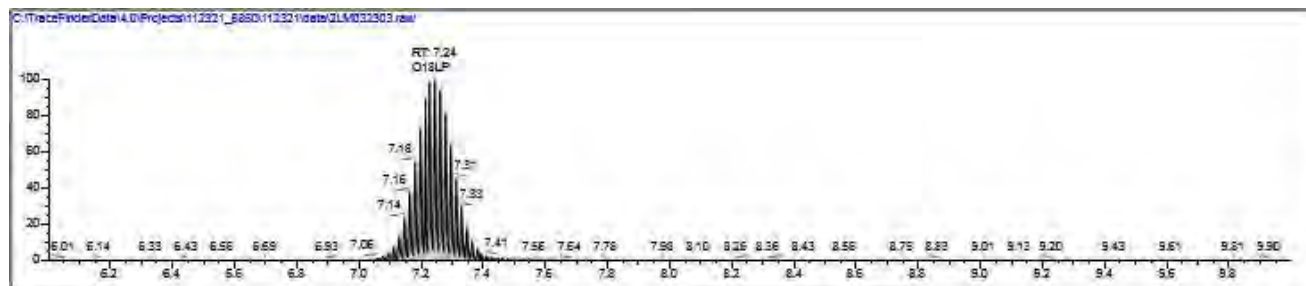
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	7.24	89	1039826			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	7.25	83	179321	Linear	0.172	0.937 ug/L	0.937 ug/L	

# Sample Report

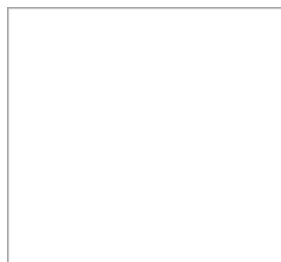
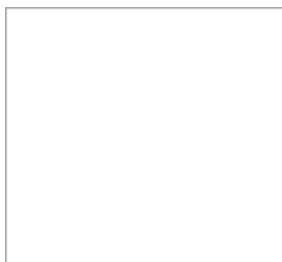
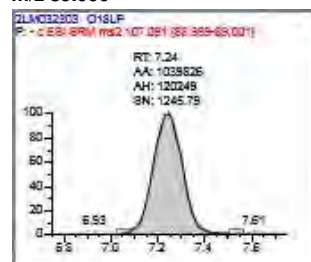
Data File: 2LM032303  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx  
 Sample ID: S1K0467-CCV4  
 Diln Factor: 1.00  
 Comments: 1:01

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

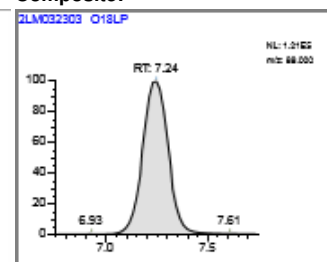
Tune report not found  
 11/24/2021 3:06:02 AM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:A5



m/z 89.000



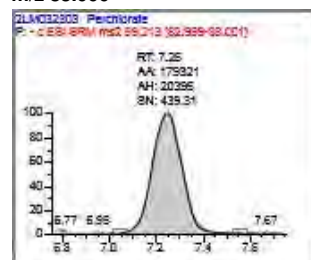
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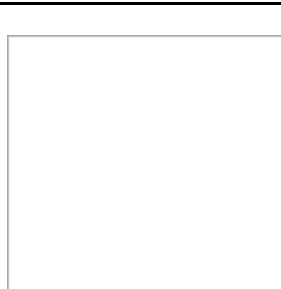
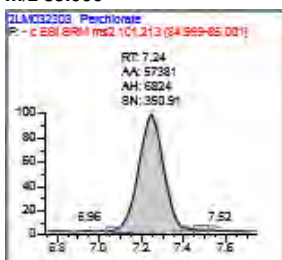
O18LP

RT (min)	Ion	Response	Amount N/A	Target Range	Ratio
7.24	m/z 89.000	1039826	5.000		N/A

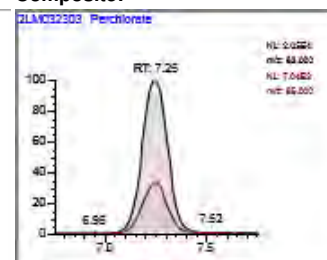
m/z 83.000



m/z 85.000



Composite:



Perchlorate

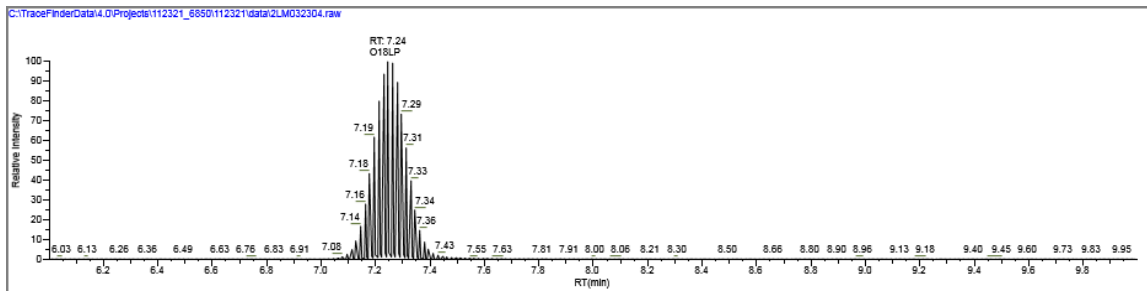
RT (min)	Ion	Response	Amount QC: 1.000	Target Range 0.850 - 1.150	Ratio
7.25	m/z 83.000	179321	0.937		N/A
7.24	m/z 85.000	57381		25.81 - 38.71	32

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R:A3	S1K0467-CRL4	2LM032304	QCMRL	QCMRL 0.2 ug/L	11/24/2021 3:19:17 AM	1:01



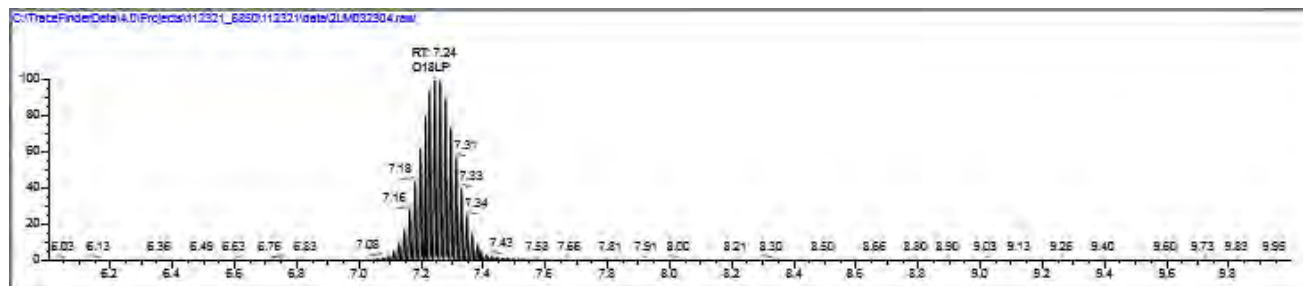
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	7.24	89	1083337			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
	7.25	83	37083	Linear	0.034	0.183 ug/L	0.183 ug/L	

# Sample Report

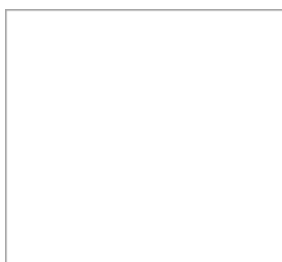
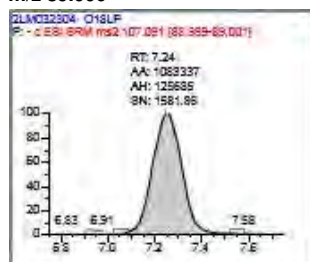
Data File: 2LM032304  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx  
 Sample ID: S1K0467-CRL4  
 Diln Factor: 1.00  
 Comments: 1:01

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

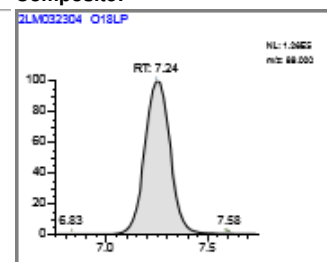
Tune report not found  
 11/24/2021 3:19:17 AM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:A3



## m/z 89.000



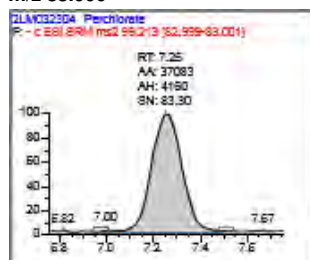
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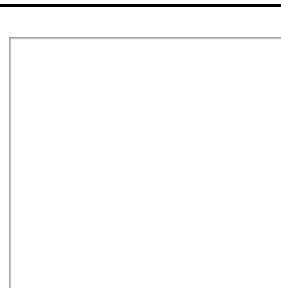
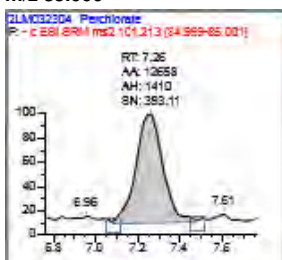
## O18LP

RT (min)	Ion	Response	Amount N/A	Target Range	Ratio
7.24	m/z 89.000	1083337	5.000		N/A

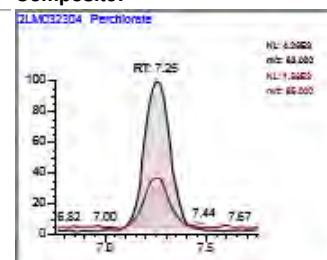
## m/z 83.000



## m/z 85.000



## Composite:



## Perchlorate

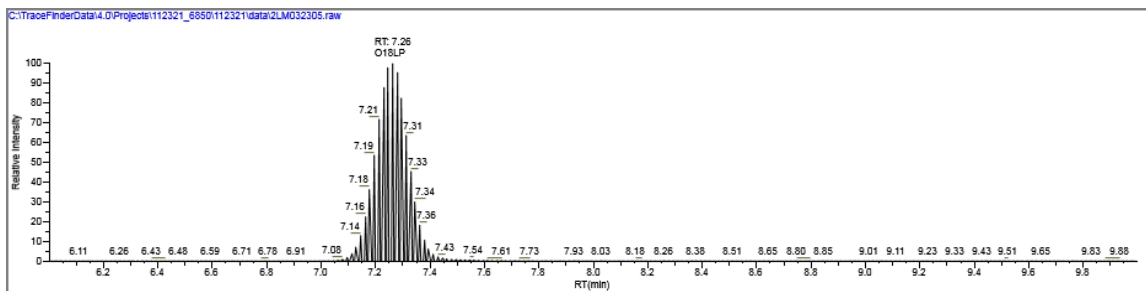
RT (min)	Ion	Response	Amount QC: 0.200	Target Range 0.140 - 0.260	Ratio
7.25	m/z 83.000	37083	0.183		N/A
7.26	m/z 85.000	12658		25.81 - 38.71	34.13

## Quantitation Report

Lab Name: Microbac OVD  
 Instrument: LCMS2  
 User: CAS  
 Batch: 112321

Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.calx

Vial Pos	Sample ID	File Name	Level	Sample Name	File Date	Comment
R-A1	S1K0467-CCB4	2LM032305	N/A	CCB	11/24/2021 3:32:31 AM	1:01



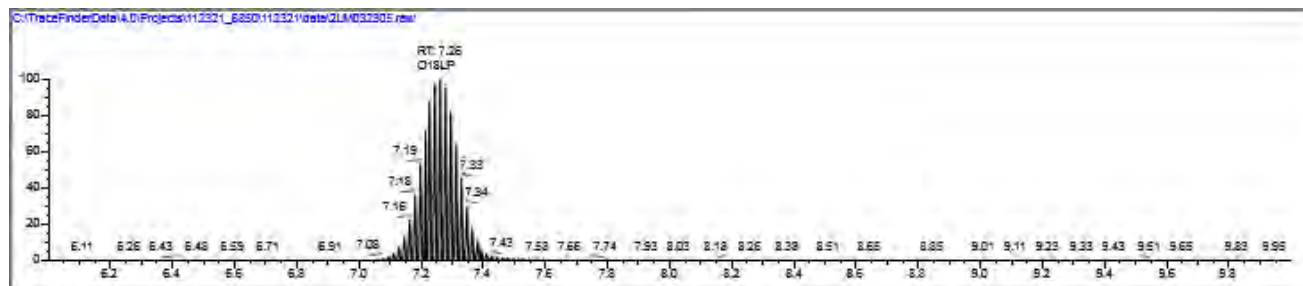
Internal Standards	RT	Quan Peak	Response			Injected Conc Units	Calculated Conc Units	Flags
	7.26	89	1046354			5.000 ug/L	5.000 ug/L	
Surrogates	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Target Compounds	RT	Quan Peak	Response	Curve Type	Average RF/ Response Ratio	Injected Conc Units	Calculated Conc Units	Flags
Perchlorate	N/F	N/F	N/F	Linear	0.000	N/F ug/L	N/F ug/L	

# Sample Report

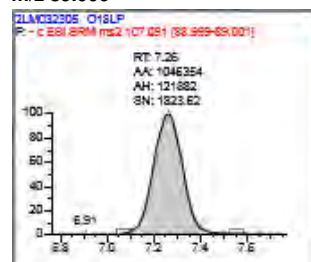
Data File: 2LM032305  
 Method: 112321\_Perchlorate 6850  
 Perchlorate 6850  
 Cali File: 112321.cali  
 Sample ID: S1K0467-CCB4  
 Diln Factor: 1.00  
 Comments: 1:01

Tune Report Date:  
 Acquisition Date:  
 Cali File Date:  
 Operator ID:  
 Instrument ID:  
 Vial Number:

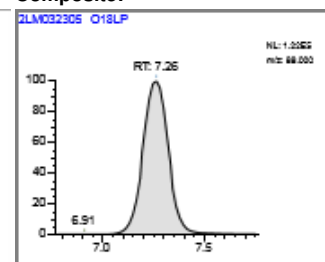
Tune report not found  
 11/24/2021 3:32:31 AM  
 11/24/2021 9:36:24 AM  
 CAS  
 LCMS2  
 R:A1



m/z 89.000



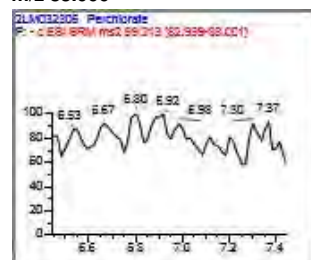
Composite:



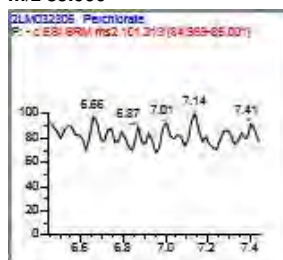
O18LP

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
7.26	m/z 89.000	1046354	5.000		N/A

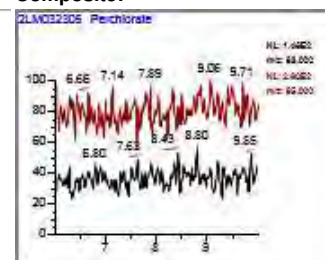
m/z 83.000



m/z 85.000



Composite:



Perchlorate

RT (min)	Ion	Response	Amount	Target Range	Ratio
			N/A		
0.00	m/z 83.000	Compound Not Found	N/A		
	m/z 85.000				



## CHAIN OF CUSTODY

Name Of Lab Shipping To: Microbac 158 Starlite Drive Marietta, OH. 45750 (304) 299-4976 Cell (740)-373-4071 Office ATTN: Stephanie Mossburg  
1 of 1

Page

<b>Project:</b> APTIM LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS			<b>Project No.</b> 501032		<b>Analyses</b>										<b>Remarks</b> (Preservatives, etc.)	<b>Lab I.D.#</b>
<b>Job:</b> LHAAP 04 November 2021																
<b>Prepared By:</b> Scott Beesinger					<b>P.O. Number</b>											
<b>Field Sample I.D.</b> Time	<b>Sample Matrix</b>	<b>Date /</b>	<b>MS / MSD</b>	<b>No. OF CONTAINERS</b>	<b>Perchlorate by SW6850</b>											
04WW07-21109	WB	11/9/21/0745		1	X											
04WW07-21109-FD	WB	11/9/21/0845		1	X											
04WW05-21109	WB	11/9/21/0830		1	X											
04WW09-21109	WB	11/9/21/0915		1	X											
04WW10-21109	WB	11/9/21/1000		1	X											
04WW10-21109-MS	WB	11/9/21/1000		1	X											
04WW10-21109-MSD	WB	11/9/21/1000		1	X											

**Additional Remarks:** Standard TAT on all parameters. Please email results to [Vicki.Graves@aptim.com](mailto:Vicki.Graves@aptim.com) and invoices to [fedinvoices@aptim.com](mailto:fedinvoices@aptim.com)

<b>Relinquished By:</b>	<b>Date</b>	<b>Time</b>	<b>Received By:</b>	<b>Date</b>	<b>Time</b>	<b>Relinquished By:</b>	<b>Date</b>	<b>Time</b>	<b>Received By:</b>	<b>Date</b>	<b>Time</b>
<i>Scott Beesinger</i>	11/9/21	1330							<i>Brenda Gregory</i>	11/10/21	0930

## For Lab Use Only

<b>Received At Lab By:</b>	<b>Date</b>	<b>Time</b>	<b>Airbill No.</b>	<b>Opened By:</b>	<b>Date</b>	<b>Time</b>	<b>Temp of Container</b>	<b>Seal No.</b>	<b>Condition</b>
<b>Remarks:</b>									



M 1 K 0 5 8 6

APTIM Tennessee  
 Rec'd: 11/10/2021 09:30  
 By: Brenda Gregory

Temp: 1.7 (Signature)

Work Order #  
M1K0586

[illegible]

pH Lot # 40157843

**pH**                      **Exceptions**

[illegible]



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

August 17, 2022

DAIN-ODB-LO

Mr. Brian Follin  
U.S. Environmental Protection Agency  
Federal Facilities Section R6  
1201 Elm Street, Suite 500  
Dallas, TX 75202-2102

**Re:** Revised Final Record of Decision for LHAAP-47, Plant 3 Area, Solid Rocket Motor Fuel Production, April 2022, Longhorn Army Ammunition Plant, Karnack, Texas

Dear Mr. Follin

Enclosed please find the April 2022 LHAAP-47 Record of Decision (ROD) for your records. This is the final ROD and includes the completed signature page with Army and EPA signatures, and the TCEQ concurrence.

The point of contact for this action is the undersigned. I may be contacted at 571-403-3232, or by email at [rose.m.zeiler.ctr@army.mil](mailto:rose.m.zeiler.ctr@army.mil).

Sincerely,

A handwritten signature in cursive script, reading "Rose M. Zeiler", is positioned below the "Sincerely," text.

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

One Enclosure  
Copies furnished:

- A. Palmie, TCEQ, Austin, TX (1 electronic only)
- P. Bruckwicki, Caddo Lake NWR, TX (1 hard copy, 1 CD)
- A. Williams, USACE, Tulsa District, OK (1 electronic only)
- C. Montoya, USAE, Tulsa District OK (1 electronic only)
- L. Sierocinski, USAEC, San Antonio, TX (1 electronic only)
- M. Bowlby, USAEC, San Antonio, TX (1 electronic only)



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

August 17, 2022

DAIN-ODB-LO

Ms. April Palmie  
Texas Commission on Environmental Quality  
Remediation Division  
12100 Park 35 Circle, Bldg D  
Austin, TX 78753

**Re:** Revised Final Record of Decision for LHAAP-47, Plant 3 Area, Solid Rocket Motor Fuel Production, April 2022, Longhorn Army Ammunition Plant, Karnack, Texas

Dear Ms. Palmie,

Enclosed please find the April 2022 LHAAP-47 Record of Decision (ROD) for your records. This is the final ROD and includes the completed signature page with Army and EPA signatures, and the TCEQ concurrence.

The point of contact for this action is the undersigned. I may be contacted at 571-403-3232, or by email at [rose.m.zeiler.ctr@army.mil](mailto:rose.m.zeiler.ctr@army.mil).

Sincerely,

A handwritten signature in cursive script, reading "Rose M. Zeiler", is located below the "Sincerely," text.

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

One Enclosure  
Copies furnished:

- B. Follin, USEPA Region 6, Dallas, TX (1 electronic only)
- P. Bruckwicki, Caddo Lake NWR, TX (1 hard copy, 1 CD)
- A. Williams, USACE, Tulsa District, OK (1 electronic only)
- C. Montoya, USAE, Tulsa District OK (1 electronic only)
- L. Sierocinski, USAEC, San Antonio, TX (1 electronic only)
- M. Bowlby, USAEC, San Antonio, TX (1 electronic only)

Jon Niermann, *Chairman*  
Emily Lindley, *Commissioner*  
Bobby Janecka, *Commissioner*  
Toby Baker, *Executive Director*



## TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

June 23, 2022

Mr. Richard C. Ramsdell  
Chief, Base Realignment and Closure Branch  
Installations Services-Environmental Division (DAIN-ISE)  
Office of the Deputy Chief of Staff, G-9  
Suite 1400 Taylor Bldg/NC3  
2530 Crystal Drive  
Arlington, Virginia 22202

Re: Record of Decision for LHAAP-47, Plant 3 Area, Solid Rocket Motor Fuel Production,  
Longhorn Army Ammunition Plant Federal Superfund Site TX6213820529  
Karnack, Harrison County, Texas

Dear Mr. Ramsdell:

The Texas Commission on Environmental Quality (TCEQ) received the final Record of Decision for LHAAP-47, Plant 3 Area, Solid Rocket Motor Fuel Production, Longhorn Army Ammunition Plant Federal Superfund Site in Karnack, Texas on June 1, 2022. The TCEQ has completed the review of the above referenced document and concurs that the described action is appropriate.

Sincerely,

A handwritten signature in black ink, appearing to read "Toby Baker".

Toby Baker  
Executive Director

cc: Ms. Lisa Price, Acting Director, Superfund and Emergency Management Division, US  
Environmental Protection Agency, Region 6, 1201 Elm Street, Suite 500, Dallas, TX 75270



*Revised Final*

## Record of Decision

for LHAAP-47,  
Plant 3 Area,  
Solid Rocket Motor Fuel Production  
Longhorn Army Ammunition Plant  
Karnack, Texas

April 2022

Prepared For:



U.S. Army Corps of Engineers – Tulsa District

Prepared By:

HDR  
9871 S. Meridian Blvd, Suite 400  
Englewood, CO 80112

Contract No. W912BV-15-D-0014  
Task Order No. W912BV18F0023

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***REVISED FINAL***  
**RECORD OF DECISION**  
**FOR**  
**LHAAP-47, PLANT 3 AREA, SOLID ROCKET MOTOR FUEL**  
**PRODUCTION**  
**LONGHORN ARMY AMMUNITION PLANT**  
**KARNACK, TEXAS**

**Prepared For:**  
**U.S. Army Corp of Engineers - Tulsa District**

**Prepared By:**  
**HDR, Inc.**  
**9871 S. Meridian Blvd, Suite 400**  
**Englewood, CO 80112**

**Contract No. W912BV-15-D-0014**  
**Task Order No. W912BV18F0023**

**April 2022**



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Appendix A: Public Notice Affidavits



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## Acronyms and Abbreviations

amsl	Above mean sea level
ARAR	applicable or relevant and appropriate requirement
BCM	BCM Engineers, Inc.
BEHP	bis(2-ethylhexyl)phthalate
BERA	Baseline Ecological Risk Assessment
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
Cis-1,2-DCE	Cis-1,2-dichloroethene
COC	contaminant of concern
COPC	chemical of potential concern
COPEC	chemicals of potential ecological concern
CSM	Conceptual Site Model
1,2-DCA	1,2-dichloroethane
1,1-DCE	1,1-dichloroethene
2,4-DNT	2,4-dinitrotoluene
2,6-DNT	2,6-dinitrotoluene
DNAPL	Dense non-aqueous phase liquid
DPT	direct push technology
ECP	Environmental condition of Property
ELCR	excess lifetime carcinogenic risk
EPS	Environmental Protection Systems, Inc.
ERH	Electrical Resistance Heating
ESD	Explanation of Significant Differences
EVO	emulsified vegetable oil
FFA	Federal Facility Agreement
GWP-Ind	groundwater protection for industrial use
GWTP	groundwater treatment plant
HDR	HDR Environmental, Operations and Construction, Inc.
HI	hazard index
HQ	hazard quotient
ISB	in-situ bioremediation
ISTD	In-situ thermal desorption
Jacobs	Jacobs Engineering Group, Inc.
LHAAP	Longhorn Army Ammunition Plant
LTM	long-term monitoring
LUC	Land Use Control
Lynntech	Lynntech, Inc.
MCL	maximum contaminant level
mg/kg	Milligrams per kilogram



mg/L	Milligrams per liter
MNA	monitored natural attenuation
MOA	Memorandum of Agreement
MSC	medium specific concentration
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&M	operation and maintenance
PCE	tetrachloroethene
PCL	Protective Concentration Level
Plexus	Plexus Scientific Corporation
PSI	Post Screening Investigation
PW	Present Worth
RAB	Restoration Advisory Board
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RfD	reference dose
RI	Remedial Investigation
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act
sf	Square foot/feet
Shaw	Shaw Environmental, Inc
STEP	Solutions To Environmental Problems
SVOC	semi-volatile organic compound
TAC	Texas Administrative Code
TCA	trichloroethane
TCDD	tetrachlorodibenzodioxin
TCE	trichloroethylene
TCEQ	Texas Commission on Environmental Quality
TDS	Total dissolved solids
TEQ	Total equivalent concentration
2,4,6-TNT	2,4,6-trinitrotoluene
trans-1,2-DCE	Trans-1,2-dichloroethene
TRRP	Texas Risk Reduction Program
U.S.	United States
U. S. C.	United States Code
U.S. Army	U.S. Department of the Army
USACE	U.S. Army Corps of Engineers
USAEHA	U.S. Army Environmental Hygiene Agency
USATHAMA	U.S. Army Toxic and Hazardous Materials Agency
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service



VC	vinyl chloride
VOC	volatile organic compound
µg/L	micrograms per liter





# 1. The Declaration

## 1.1 Site Name and Location

Longhorn Army Ammunition Plant-47 (LHAAP-47), Plant 3 Area - Solid Rocket Motor Fuel Production, Longhorn Army Ammunition Plant, Karnack, Texas.

Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS), United States (U.S.) Environmental Protection Agency (USEPA) Identification Number: TX6213820529.

## 1.2 Statement of Basis and Purpose

This Record of Decision (ROD) presents the selected remedy for LHAAP-47, Plant 3 Area, located at the LHAAP in Karnack, Texas. The remedy was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, 42 United States Code (U.S.C.) §§ 9601 et seq., and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), Code of Federal Regulations (CFR) Title 40 §§300 et seq.

The remedy selection was based on the work completed and documented in the Administrative Record for the site, including the Remedial Investigation (RI) (Jacobs Engineering Group, Inc. [Jacobs], 2002), Baseline Human Health and Screening Ecological Risk Assessment report (Jacobs, 2003), Feasibility Study (FS) (Shaw Environmental, Inc. [Shaw], 2011), Proposed Plan (PP) (AECOM Technical Services, Inc. [AECOM], 2012), Revised PP (HDR, 2021a), Post Screening Investigation (PSI) for LHAAP-47 (HDR, 2019a), PSI No. 2 Addendum Report (HDR, 2021b), and other related documents contained in the Administrative Record for LHAAP-47.

This document is issued by the U.S. Department of the Army (U.S Army), the lead agency for this installation. The U.S. Army, USEPA, and the Texas Water Commission (currently known as the Texas Commission on Environmental Quality [TCEQ]) entered into the Federal Facilities Agreement (FFA) for remedial activities at LHAAP which, became effective on December 30, 1991. The USEPA (Region 6) and the TCEQ are the regulatory agencies providing technical support, project review and comment, and oversight of the LHAAP cleanup program. The USEPA and the U.S Army jointly select the remedy and TCEQ concurs with the selected remedy in this ROD.

## 1.3 Assessment of the Site

The response action selected in this ROD is necessary to protect the public health or welfare, or the environment from actual or threatened releases of hazardous substances, pollutants, or contaminants into the environment.

## 1.4 Description of the Selected Remedy

The final selected remedy for LHAAP-47 includes excavation of perchlorate impacted soil, and the treatment of contaminated groundwater by in-situ thermal desorption (ISTD), enhanced in-situ bioremediation (ISB), biobarriers, and monitored natural attenuation (MNA). Land use controls (LUCs) will be implemented until soil and groundwater contaminants are reduced to unlimited use



and unrestricted exposure concentrations. The LUC's performance objectives consist of land use restrictions to nonresidential and prohibition of potable use of groundwater above cleanup levels until the contaminants of concern (COCs) are at levels that allow for unlimited use and unrestricted exposure.

The final selected remedy for LHAAP-47 protects human health and the environment by preventing perchlorate and trichloroethylene (TCE) in soil from migrating to groundwater, and perchlorate in surface soil from migrating by overland transport (i.e., erosion and storm water flow) into surface water (Goose Prairie Creek that runs through the southwest portion of LHAAP-47 site and then curves back through the southeastern portion of the site); preventing human exposure to unacceptable concentrations of contaminants in groundwater; by returning the groundwater to its potential beneficial use, wherever practicable; and preventing groundwater contaminated with COCs from migrating into nearby surface water (Goose Prairie Creek). Residual TCE Dense Non-aqueous Phase liquid (DNAPL) acting as a source material in shallow and upper intermediate zone groundwater near Building 46A may be considered a principal threat waste.

The human health risk scenario evaluated was based on risk to the hypothetical future maintenance worker. The COCs identified for soil and groundwater are listed below:

- Soil: Perchlorate in soil is a potential residual source for contamination to groundwater and surface water. Perchlorate in soil near Building 25C extends from the surface to approximately 10 feet below ground surface (bgs). TCE in soil is a potential residual source for contamination to groundwater. Perchlorate in soil does not pose a risk to the hypothetical future maintenance worker. Although TCE in soil was not evaluated for risk due to the depth at which it occurs (greater than 10 feet bgs), there is little or no potential for direct human exposure to the contaminated soil.
- Groundwater: The COCs are perchlorate; volatile organic compounds (VOCs) (tetrachloroethene [PCE], trichloroethylene [TCE], cis-1,2-dichloroethene [cis-1,2-DCE], trans-1,2-dichloroethene [trans-1,2-DCE], vinyl chloride [VC]), 1,1-dichloroethene [1,1-DCE], 1,2-dichloroethane [1,2-DCA], acetone, chloroform); explosives (2,4,6- trinitrotoluene [TNT]), 2,4-dinitrotoluene [DNT], 2,6-DNT); semi-volatile organic compounds (SVOCs) (bis(2-ethylhexyl)phthalate [BEHP], pentachlorophenol); and metals (aluminum, antimony, arsenic, cadmium, chromium, cobalt, manganese, nickel, silver, strontium, thallium, tin and vanadium).

Historical surface water sampling prior to the RI and prior to placement of the liner around Building 25C indicated perchlorate had seeped into Goose Prairie Creek at concentrations exceeding cleanup levels. Since installation of the liner, no perchlorate has been detected at concentrations exceeding surface water standards in samples collected from Goose Prairie Creek. As part of the selected remedy, surface water will be monitored only for those chemicals (VOCs and perchlorate) contributing to the primary risk in soil and groundwater to verify that the surface water remains unaffected by potential migration of COCs from soil and groundwater.

The components of the selected remedy are summarized below.

- Excavation of perchlorate-contaminated soil. Approximately, 9,000 cubic yards of perchlorate-contaminated soil as estimated from historical sampling results will be removed from a location near the former Building 25C, along with confirmation sampling and step-out excavation to achieve Remedial Action Objectives (RAOs).



- The residual TCE DNAPL in groundwater and TCE in soil near Building 46A will be treated using ISTD. Electrical Resistance Heating (ERH) technology is the type of ISTD that will be used. An ERH system consisting of subsurface electrodes connected to direct current through the subsurface, with a vapor extraction system to capture the volatilized water and contaminants will be installed within the areas of residual DNAPL. ISB may be implemented following the ISTD treatment if VOC concentrations in groundwater are considered too high to be addressed only through MNA. The soil conditions will be evaluated following ISTD and if required, a contingency remedy developed and implemented to complete soil remediation.
- ISB will be implemented to address COCs in the saturated zone (shallow, and intermediate zone groundwater). ISB will be implemented via two application methods as follows:
  - Area in the 'secondary source' area near Building 46A following ISTD treatment if needed, and additional locations, if necessary, will be treated using ISB via application of substrate in a grid pattern; and
  - Areas near the leading edges of the northern and southern perchlorate and VOC plumes will be treated using ISB via application of substrate in the form of biobarriers. This will be accomplished with closely spaced injections. Multiple applications of substrate may be needed based on effectiveness of the ISB. Bioaugmentation will be performed as necessary.
- MNA will be implemented to monitor reduction/degradation of COCs in groundwater outside of the influence of the ISB treatment areas and to confirm protection of human health and the environment by documenting that contaminated groundwater remains localized with minimal migration and that COCs are being reduced to cleanup levels.
  - Performance objectives will be evaluated after two years of MNA. During those two years, monitoring will be quarterly. If MNA is found to be ineffective, a contingency remedy to enhance MNA will be implemented. If MNA is found to be effective, it will be continued, and long-term monitoring (LTM) will be semiannual for three years. In subsequent years, LTM will be annual until the next five-year review and annually thereafter until recommended otherwise by the five-year review. The monitoring and reporting associated with this remedy will be used to track the effectiveness of MNA and will continue until recommended otherwise at the five-year review.
  - If MNA is found to be ineffective, a contingency remedy to enhance MNA will be developed. The contingency remedy would consist of injection of bioremediation amendments to enhance degradation of the groundwater contaminants at selected locations based on data available at the time it is determined MNA is not successful. Development and specific description of the contingency remedy will be presented in a Remedial Design/Remedial Action Work Plan (RD/RAWP).
- LTM to confirm the protection of human health and the environment by documenting the return of the groundwater to the cleanup level (maximum contaminant level [MCL] or, in the absence of federal drinking water standards, the Texas Risk Reduction Program (TRRP) Tier 1 Residential Groundwater Protective Concentration Levels (PCLs), by documenting reduction of the contaminant mass and protection of surface water through containment of the plume.
- Groundwater monitoring will be conducted to evaluate inorganic COCs and other COCs that have either not previously shown exceedances of cleanup levels or have infrequently or only



historically exceeded cleanup levels specified in Table 2-8. The need to continue groundwater monitoring for this purpose will be evaluated at five-year reviews or in some cases after two additional sampling events in which results remain below cleanup levels specified in **Table 2-8**.

- Surface water monitoring to confirm that surface water quality standards for those chemicals (VOCs and perchlorate) contributing to the primary risk in soil and groundwater are not exceeded in Goose Prairie Creek. The surface water quality standards are found in the Texas Administrative Code (TAC) for the TCEQ environmental quality standards at 30 TAC 307.6(d)(1), or if those standards are not available, the TRRP Tier 1 Residential Groundwater PCLs will be used.
- The LUC's objectives include maintaining the integrity of any current or future remedial or monitoring systems, and preventing the use of groundwater contaminated above cleanup levels as a potable water source. The groundwater treatment and MNA remedial components include a groundwater monitoring system that will be used to characterize the condition of the groundwater during the period the groundwater remedy is in place until the groundwater remediation goals are achieved, and to demonstrate achievement of the groundwater remediation goals when the groundwater remedy is complete. As a part of this groundwater remedy, the Army will maintain the remedial and monitoring systems associated with the groundwater remedies until these components of the remedy are no longer needed to achieve cleanup levels, and when these levels have been achieved. During the period of operation of the groundwater remedy, if any of the elements of the remedial and groundwater monitoring systems are damaged, destroyed, or become ineffective, they will be repaired or replaced with suitable components to ensure that the remedial and groundwater monitoring systems are able to provide data of the quality necessary to determine the progress of and eventual completion of this component of the remedy. The actions to be taken to implement these LUC objectives and requirements will be provided through modifying the "Comprehensive LUC Management Plan, Former Longhorn Army Ammunition Plant, Karnack, Texas" and detailed in the LUC RD<sup>1</sup>.
- The LUC for prohibition of groundwater use (except for monitoring and testing) shall be implemented and shall remain in place at the Site until the COCs (i.e., including all hazardous substances, pollutants and contaminants found at the Site at cleanup levels as listed in **Table 2-8**) in soil and groundwater remaining at the site are reduced below levels that would support unlimited use and unrestricted exposure. A LUC RD will be finalized as the land use component of the RD. Within 21 days of the issuance of the ROD, the Army will propose deadlines for completion of the RD Work Plan, RD and Remedial Action Work Plan. The documents will be prepared and submitted to the EPA and the TCEQ pursuant to the FFA. The LUC RD will contain implementation and maintenance actions, including periodic inspections. The long-term groundwater and surface water monitoring and MNA performance monitoring plan will also be presented in the RD. The recordation notification for the Site, which will be filed with Harrison County, will include a description of the LUCs<sup>2</sup>. The preliminary boundary for the groundwater and land use LUC is shown on **Figure 2-11**.<sup>2</sup>

<sup>1</sup> This paragraph is October 31, 2014 Dispute Decision language that is included despite the ROD not being subject to the dispute.

<sup>2,3</sup> Ibid.



- The LUC restricting land use to nonresidential shall be implemented until it is demonstrated that surface and subsurface soil and groundwater COCs are at levels that allow for unlimited use and unrestricted exposure<sup>2</sup>.
- The LUC to maintain the integrity of any current or future remedial or monitoring systems will remain in place until the levels of COCs in groundwater are met. The LUC to prohibit groundwater use (except for environmental monitoring and testing) as a potable source will remain in place until the levels of COCs (i.e., all hazardous substances, pollutants, and contaminants found at the Site at cleanup levels as listed in **Table 2-8**) in soil and groundwater allow for unlimited use and unrestricted exposure<sup>2</sup>.

CERCLA five-year reviews will be performed until the levels of COCs in soil and groundwater allow for unlimited use and unrestricted exposure.

A LUC Remedial Design (RD) will be finalized as the land use component of the Remedial Design. Within 21 days of the issuance of the ROD, the Army will propose deadlines for completion of the RD Work Plan, RD, and Remedial Action Work Plan. The documents will be prepared and submitted to EPA and TCEQ pursuant to the FFA. The LUC RD will contain implementation and maintenance actions, including periodic inspections. The long-term groundwater and surface water monitoring and MNA performance monitoring plan will also be presented in the RD.<sup>3</sup>

The Army will implement, maintain, monitor, report on and enforce land use controls at Army-owned property. The Army shall perform those actions related to land use control activities described in this ROD and in the Remedial Design for the ROD. For portions of the Site subject to land use controls that are not owned by the Army, the Army will monitor and report on the implementation, maintenance, and enforcement of land use controls, and coordinate with federal, state, and local governments and owners and occupants of properties subject to land use controls. The Army will provide notice of the groundwater and soil (surface and subsurface) contamination and any land use restrictions referenced in the ROD. The Army will send these notices to the federal, state and local governments involved at this site and the owners and occupants of the properties subject to those use restrictions and land use controls. The Army shall provide the initial notice within 90 days of ROD signature. The frequency of subsequent notifications will be described in the Remedial Design for the ROD. The Army remains responsible for ensuring that the remedy remains protective of human health and the environment. The Army will fulfill its responsibility and obligations under CERCLA and the NCP as it implements, maintains, and reviews the selected remedy.<sup>1</sup> Although Army may later transfer these procedural responsibilities to another party by contract, property transfer agreement, or through other means, the Army shall retain ultimate responsibility for remedy integrity.

Upon transfer of Army-owned property, the Army will provide written notice of the land use controls to the transferee of the groundwater and soil (surface and subsurface) contamination and any land use restrictions referenced in the ROD. Within 15 days of transfer, the Army shall provide EPA and the TCEQ with written notice of the division of implementation, maintenance, and enforcement responsibilities unless such information has already been provided in the LUC RD. The LUC RD will address the procedures to be used by the Army and the transferee to document compliance with the LUCs described in this ROD. In the event property is transferred out of Federal control, the land use





controls relating to property and groundwater restrictions shall be recorded in the deed and shall be enforceable by the United States and the state of Texas.<sup>1</sup>

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 they have been transferred.

The management strategy at LHAAP is to approach each site separately to address human health issues and to approach the sites by sub-area to address ecological risk. Thus, the implementation of this remedy at LHAAP-47 is independent of any other remedial action at LHAAP to address human health issues. To address ecological risk, LHAAP-47 was grouped with several other sites as part of the Industrial Sub-Area. The Baseline Ecological Risk Assessment (BERA) concluded that no unacceptable risk was present in the Industrial Sub-Area (Shaw, 2007a) and therefore, no further action is needed at LHAAP-47 for the protection of ecological receptors. This management strategy is considered to be endorsed by regulators as evidenced by the regulatory approval of the BERA (Shaw, 2007a) and BERA Addendum (AGEISS, 2014).

The selected remedy at LHAAP-47 is identified in the Proposed Plan (AECOM, 2012) and Revised Proposed Plan (HDR, 2021a) that has been reviewed and approved by the regulatory agencies. The Proposed Plan and Revised Proposed Plan are in the Administrative Record file for LHAAP.

## 1.5 Statutory Determinations

The final-selected remedy is protective of human health and the environment, complies with Federal and State requirements that are established as applicable or relevant and appropriate requirements (ARARs) for the remedial action, and is cost-effective. In addition, the remedy offers long-term effectiveness through excavation of perchlorate-contaminated soil and the implementation of groundwater ISB, which will reduce or eliminate the potential for contamination migration from soil and groundwater into surface water, ISTD to remediate the TCE in soil and residual TCE DNAPL in groundwater near Building 46A and reduce or eliminate the potential for soil contamination migration to groundwater, and LUCs to minimize the potential risk to the hypothetical future maintenance worker posed by the contaminated groundwater. Furthermore, performance monitoring will document the progress and effectiveness of the final selected remedy. The final selected remedy is easily and immediately implementable. The ISTD, ISB and biobarrier components of the selected remedy satisfy the statutory preference for treatment as a principal treatment element of the remedy.

Because hazardous substances, pollutants, or contaminants may remain at the site above levels that allow for unlimited use and unrestricted exposure, reviews will be conducted every 5 years as required under CERCLA, 42 United States Code (U. S. C.) §121(c), U. S. C. §9621(c). In accordance with Texas Administrative Code (TAC) Title 30 §335.566, a notification will be recorded in Harrison County records restricting land use to nonresidential until it is demonstrated that surface and subsurface soil and groundwater COCs are at levels that allow for unlimited use and unrestricted exposure; that a prohibition of groundwater use (except for environmental monitoring and testing) as a potable source will remain in place until the levels of COCs in soil and groundwater allow for unlimited use and unrestricted exposure; and, that the integrity of any current or future remedial or monitoring systems will remain in place until the levels of COCs in groundwater are met. Although the U.S. Army may later pass these procedural responsibilities to the transferee by property transfer agreement, the U.S. Army shall retain ultimate responsibility for remedy integrity per the FFA and CERCLA §121.



## 1.6 ROD Data Certification Checklist

The following information is included in the Decision Summary section of this ROD. Additional information can be found in the Administrative Record for this site.

- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of groundwater as identified in the baseline risk assessment and ROD (Section 2.6).
- Potential land and groundwater use that will be available at the site as a result of the selected remedy (Section 2.6).
- COCs and their concentrations (Section 2.7).
- Baseline risk represented by the COCs (Section 2.7).
- Cleanup levels established for the COCs and the basis for these levels (Sections 2.7.4 and 2.8).
- How contaminated soil and groundwater constituting principal threats are addressed at this site (Section 2.11).
- Key factor(s) that led to selecting the remedy (Section 2.12).
- Estimated capital, annual operation and maintenance (O&M), and total present worth (PW) costs, discount rate, and the number of years over which the remedy cost estimates are projected (Section 2.12).



## 1.7 Authorizing Signatures

As the lead agency, the U.S. Army issues this ROD for LHAAP-47 which documents the final selected remedy. The undersigned is the appropriate approval authority for this decision.

**RAMSDELL.RICHARD.C.1161451408**  
Digitally signed by  
RAMSDELL.RICHARD.C.1161451  
408  
Date: 2022.06.22 08:33:24  
-04'00'

(Name)

Richard C. Ramsdell, Chief  
Base Realignment and Closure Branch  
Installation Services Directorate, DCS, G-9  
Office of the Deputy Chief of Staff  
U.S. Army

(Date)

The United States Environmental Protection Agency approves the selected remedy as provided in the ROD for LHAAP-47.

**LISA PRICE**  
Digitally signed by LISA  
PRICE  
Date: 2022.07.19  
16:03:09 -05'00'

(Name)

Lisa Price  
Acting Director  
Superfund and Emergency Management Division  
U.S. Environmental Protection Agency  
Region 6

(Date)





## 2. Decision Summary

### 2.1 Site Name, Location, and Description

LHAAP-47, Plant 3 Area, Solid Rocket Motor Fuel Production Longhorn Army Ammunition Plant, Karnack, Texas

Comprehensive Environmental Response, Compensation, and Liability Information System USEPA Identification Number: TX6213820529

Lead Agency: U.S. Army, Department of Defense

Support Agencies: USEPA Region 6, TCEQ

Source of Cleanup Money: U.S. Army, Department of Defense

Site Type: Industrial Facility

The former LHAAP is an inactive, government-owned, formerly contractor operated and maintained, Department of Defense facility located in central east Texas (see **Figure 2-1**) in the northeast corner of Harrison County. LHAAP is approximately 14 miles northeast of Marshall, Texas, and approximately 40 miles west of Shreveport, Louisiana. The former U.S. Army installation occupied 8,416 acres between State Highway 43 at Karnack, Texas, and the southwestern shore of Caddo Lake. The facility can be accessed via State Highways 43 and 134.

LHAAP was placed on the USEPA National Priorities List (NPL) on August 9, 1990. Activities to remediate contamination began in 1990. After its listing on the NPL, the U.S. Army, the USEPA, and the Texas Water Commission (currently known as the TCEQ) entered into a CERCLA 42 U. S. C. §9620 FFA for remedial activities at LHAAP. The FFA became effective December 30, 1991. LHAAP operated until 1997 when it was placed on inactive status and classified by the U.S. Army Armament, Munitions, and Chemical Command as excess property. The majority of LHAAP, not including LHAAP-47, has been transferred by the U.S. Army to the U.S. Fish and Wildlife Service (USFWS) for management as the Caddo Lake National Wildlife Refuge.

LHAAP-47 (Plant 3 Area) is located in the north-central portion of LHAAP and covers an area of approximately 275 acres. LHAAP-47 is bounded by LHAAP-46 to the north, Karnack Avenue to the east, Marshall Avenue to the south, and Avenue "P" to the west. LHAAP-6 and LHAAP-7 are within the LHAAP-47 boundary. LHAAP-35B (37) is to the southwest of LHAAP-47, and LHAAP-50 and LHAAP-8 are to its south. **Figure 2-2** shows the site vicinity map.

### 2.2 Site History and Enforcement Activities

#### 2.2.1 History of Site Activities

LHAAP was established in December 1941 with the primary mission of manufacturing TNT. Production of TNT began at Plant 1 in October 1942 and continued through World War II until August 1945, when the facility was placed on standby status until February 1952. The LHAAP facility was reactivated with the opening of Plant 2, where pyrotechnic ammunition, such as photoflash bombs, simulators, hand signals, and tracers for 40 millimeter ammunition, were



produced until 1956. In December 1954, a third facility, Plant 3, began production of solid-fuel rocket motors for tactical missiles.

LHAAP-47 was identified through historical records as Plant 3, producing rocket motors and later pyrotechnic and illumination devices. Construction of Plant 3 began in July 1953 and production of rocket motors began in December 1954. Rocket motor production continued until the early 1980s. Some of the rocket motor production facilities were converted to produce pyrotechnic and illumination devices and were active until approximately 1997. Industrial solid wastes and possibly hazardous wastes, such as parts cleaners and spent solvents, may have been generated by these activities. Fifty waste process sumps and three waste rack sumps were located within LHAAP-47 that are included in LHAAP-35/36 along with sumps from other sites.

## **2.2.2 History of Investigative Activities**

As part of the Installation Restoration Program, the U.S. Army began an environmental investigation in 1976 at LHAAP followed by installation wide assessments/investigations that included the following:

- In 1980, the U.S. Army Toxic and Hazardous Materials Agency conducted a record search to assess the impact of the LHAAP installation activities including usage, storage, treatment, and disposal of toxic and hazardous materials on the environment, and defined conditions that may have adversely affected human health and the environment (USATHAMA, 1980).
- In 1982, as part of the LHAAP contamination survey, Environmental Protection Systems, Inc. (EPS) collected six groundwater samples for laboratory analyses. Subsequently in 1987, as part of the Resource Conservation and Recovery Act (RCRA) permit application process, and as a continuation of the contamination survey, U.S. Army Environmental Hygiene Agency (USAEHA) identified, described, and evaluated all solid waste management units at LHAAP. Units requiring further sampling, investigation and corrective action were delineated (USAEHA, 1987).
- In 1988, a preliminary RCRA Facility Assessment was conducted by the U.S. Army (Maley, 1988). Waste at the various sites was characterized, but no samples were collected.

The environmental media (soil, groundwater, surface water, sediment, and sump contents) at LHAAP-47 have been the subject of numerous investigations to identify potential contamination, including:

- Pre-RIs (EPS, 1984, BCM Engineers, Inc. (BCM), 1992), and by the U.S. Army Corps of Engineers (USACE) in 1993 (USACE, 1994).
- Phase I, Phase II, and Phase III RIs in 1993, 1995, and 1998 (Jacobs, 2002), and additional RI related investigations in 1996, 1999, 2000, and 2001.
- In November 1999, plastic liner material was placed around Building 25C by the U.S. Army over areas known to contain perchlorate in the soil to prevent migration of perchlorate to Goose Prairie Creek (Shaw, 2011). The extent of the liner is noted in the site-wide perchlorate investigation report written by Solutions To Environmental Problems (STEP, 2005).



- In September 2001 Lynntech, Inc. (Lynntech) collected soil samples at Building 25C and analyzed them for perchlorate. A total of 20 samples were collected from 5 locations over a distance spanning 35 feet (Shaw, 2011).
- A site-wide perchlorate investigation in 2002 (Solutions to Environmental Problems, Inc. (STEP) STEP, 2005), and the Environmental Site Assessment conducted in 2003 (Plexus Scientific Corporation (Plexus) Plexus, 2005).

Several follow-up investigations at LHAAP-47 were performed by USACE to further delineate the extent of contamination identified during the previous sample events. These sample events include:

- A data gaps investigation in the spring and summer of 2004 (Shaw, 2007b); 2006 soil samples for the final evaluation of sumps (Shaw, 2008).
- In 2007 groundwater samples were collected from five wells for natural attenuation evaluation, and from 25 wells for analysis of metals, perchlorate, or VOCs. Additional groundwater samples were collected from 11 wells in 2009. In 2010, soil samples were collected from 28 locations around Building 25C and Building 25D and tested for perchlorate. At that time, groundwater samples were also collected from 26 wells and tested for VOCs, perchlorate, and other parameters (Shaw, 2011).
- The BERA was completed in February 2007 (Shaw, 2007a). The BERA concluded there is no ecological impact in the industrial sub area, which includes LHAAP-47.
- In July 2011, a FS was completed to evaluate remedial alternatives against CERCLA criteria to provide a basis for selecting a preferred alternative in the follow-on Proposed Plan and ROD documents (Shaw, 2011).
- Baseline Ecological Risk Assessment Addendum. After the BERA was completed in 2007, a BERA Addendum was completed (AGEISS, 2014). The results of the re-evaluation indicated that the replacement data collected during the data gaps investigation confirmed the conclusions of the BERA that there are no ecological impacts within LHAAP-47.
- In December 2015, new plastic liner material was installed to repair exposed liner around Building 25C and emplacement of clean borrow soil to replace the eroded soil cover.
- Post-Screening Investigation (PSI) Report (HDR, 2019a). A PSI at LHAAP-47 was performed to re-assess and update the groundwater contaminant concentrations for the shallow and intermediate groundwater due to old and limited data (i.e., numerous dry shallow wells).
- A PSI Addendum. A Draft Final PSI Addendum (HDR, 2019b) was prepared to present the results of surface water sampling conducted in March and April 2019. The objective of the surface water sampling was to re-assess and update the LHAAP-47 groundwater contribution to surface water in Goose Prairie Creek.
- PSI No. 2 Report (HDR, 2021b). The initial PSI identified concentrations of TCE indicative of residual DNAPL near Building 46A that required additional investigation. The PSI No. 2 was conducted between November 2019 and July 2020 and the results defined the extent of residual TCE DNAPL in Shallow and Upper Intermediate Zone groundwater, and also



identified TCE in unsaturated soil that could be acting as a source for the groundwater contamination (HDR, 2021b). The PSI data was to be used to support revision of the 2013 Draft Final ROD, as necessary. The PSI was conducted at LHAAP-47 between April and September 2018 (HDR, 2019a) and the PSI No. 2 was conducted in November 2019 and April through September 2018, respectively (HDR, 2021b).

Figure 2-3 shows monitoring well locations at LHAAP-47.

### 2.2.3 History of CERCLA Enforcement Activities

Due to the releases of chemicals from facility operations, the USEPA placed LHAAP on the NPL on August 9, 1990. Activities to remediate contamination associated with the listing of LHAAP as a NPL site began in 1990. After the listing on the NPL, the U.S. Army, the USEPA, and the Texas Water Commission (currently known as the TCEQ) entered into a CERCLA, 42 U. S. C. §9620, FFA for remedial activities at LHAAP. The FFA became effective December 30, 1991.

The FS (Shaw, 2011), presenting an analysis of remedial alternatives for LHAAP-47, was issued in July 2011. The Proposed Plan (AECOM, 2012) was issued in December 2012. A ROD was prepared and completed to the Draft Final version in 2013. Subsequent to the Draft Final ROD, the PSI was completed as described previously (HDR, 2019a and 2021b), followed by a FS Addendum (HDR, 2021c) that identified additional technologies to address the changed groundwater and contaminant conditions near Building 46A. A Revised Proposed Plan (HDR, 2021a) was prepared to supplement the 2012 Proposed Plan. This Revised ROD follows that Proposed Plan and Revised Proposed Plan and precedes the more detailed RD document.

## 2.3 Community Participation

The U.S. Army, USEPA, TCEQ and the LHAAP Restoration Advisory Board (RAB) have provided public outreach to the surrounding community concerning LHAAP-47 and other environmental sites at LHAAP. The outreach program has included fact sheets, media interviews, site visits, invitations to attend quarterly RAB meetings, and public meetings consistent with its public participation responsibilities under 40 CFR §113(k)(2)(B), §117(a), and 42. U. S. C. §9621(f)(1)(G) (CERCLA).

The Proposed Plan (AECOM, 2012) and Revised Proposed Plan (HDR, 2021a) for the selection of the remedy for LHAAP-47 was released to the Administrative Record and made available to the public for review and comment on December 21, 2012 and July 7, 2021 respectively. The notice of availability of the Proposed Plan and Revised Proposed Plan and other related documents in the Administrative Record file was published in the *Marshall News Messenger* on December 18, 2012 and July 4, 2021 respectively. The newspaper public notices for the meetings are provided in Appendix A. The public comment period for the Proposed Plan began on January 1, 2013, and ended January 31, 2013. A public meeting was held on January 9, 2013 in a formal format and with a court reporter. The public comment period for the Revised Proposed Plan began on July 7, 2021 and ended August 6, 2021. A public meeting was held on July 21, 2021 in a formal format and with a court reporter. The transcripts for the meetings are part of the Administrative Record. The significant comments (oral or written) are addressed in the Responsiveness Summary, which is included in this ROD as Section 3.0.

The Administrative Record may be found at <http://www.longhornaap.com/> and locally at the following location:



Location: Marshall Public Library 300 S. Alamo  
Marshall, Texas, 75670  
Business Hours: Monday - Friday, (9:30 AM – 5:30 PM)

## 2.4 Scope and Role of Response Action

A plastic liner was placed in 1999 around Building 25C over areas with known perchlorate contaminated soil providing a temporary measure to mitigate soil contaminant migration to surface water and the ground water.

This ROD addresses soil and groundwater contamination and is the final remedy for contamination at the LHAAP-47 site. The final selected remedy at LHAAP-47 will remove the residual soil sources and prevent migration of perchlorate in soil to surface water and groundwater, prevent migration of TCE in soil to groundwater, prevent groundwater contaminated with perchlorate from migrating into surface water, remediate the residual TCE DNAPL in groundwater near Building 46A, and mitigate potential risks associated with exposure of the hypothetical future maintenance worker to contaminated groundwater. The groundwater COCs are perchlorate, VOCs, SVOCs, explosives, and metals. The remedial action will include ISTD, ISB, biobarriers, MNA, LUCs and LTM.

The selected action at LHAAP-47 will prevent potential risks associated with exposure to contaminated groundwater. Groundwater at LHAAP is not currently being used as drinking water, nor may it be used in the future based on its reasonably anticipated use as a national wildlife refuge. However, when establishing the RAOs for this response action, the U.S. Army has considered the NCP's expectation to return usable groundwater to its potential beneficial uses wherever practicable in a timeframe that is reasonable given the particular circumstances of the site (40 CFR §300.430(a)(1)(iii)(F)). The U.S. Army has also considered the State of Texas designation of all groundwater as potential drinking water, unless otherwise classified, and consistent with 30 TAC 335.563(h)(1) [background total dissolved solids (TDS) content less than or equal to 10,000 milligrams per liter (mg/L) and that occurs within a geologic zone that is sufficiently permeable to transmit water to a pumping well in usable quantities].

The U.S. Army intends to return the contaminated shallow and intermediate groundwater zones at LHAAP-47 to their potential beneficial uses, which for the purposes of this ROD is considered to be attainment of the Safe Drinking Water Act (SDWA) MCLs to the extent practicable, and consistent with 40 CFR §300.430(e)(2)(i)(B&C). In the absence of federal drinking water standards, clean-up levels will be based on the Texas Risk Reduction Program (TRRP) Tier 1 Residential Groundwater PCL. For soil, the TCEQ soil medium specific concentration (MSC) for industrial use based on groundwater protection (GWP-Ind) is used in accordance with 30 TAC 335.559(g)(2). If a return to potential beneficial uses is not practicable, the NCP expectation is to prevent further migration of the plume, prevent exposure to the contaminated groundwater, and evaluate further risk reduction (40 CFR §300.430(a)(1)(iii)(F)).

Historical surface water sampling prior to the RI and prior to placement of the liner around Building 25C indicated perchlorate had seeped into Goose Prairie Creek at concentrations exceeding clean-up levels. Since installation of the liner, no COCs from soil or groundwater have seeped into the surface water in Goose Prairie Creek. Because contaminated soil and groundwater has the potential to discharge to Goose Prairie Creek, surface water will be monitored only for those chemicals contributing to the primary risk (VOCs and perchlorate) in soil and groundwater to verify





that the surface water remains unaffected by potential migration of COCs from soil and groundwater. Chemical-specific ARARs for surface water consumption are appropriate and relevant because of the potential for discharge to Goose Prairie Creek. The surface water standards in Goose Prairie Creek at LHAAP-47 are the Texas surface water quality standards found at 30 TAC 307.6(d)(1), or if those standards are not available-the TRRP Tier 1 Residential Groundwater PCLs.

The selected remedy will protect human health and the environment. The human receptor evaluated was the hypothetical future maintenance worker. ISTD, ISB, and biobarriers, in conjunction with MNA, will treat/remediate and reduce contaminant mass and lower contaminant concentrations in groundwater. The LUCs to be implemented include groundwater use restrictions and land use restrictions. The LUC restricting the potable use of groundwater above cleanup levels will remain in place until the levels of the COCs in groundwater allow for unlimited use and unrestricted exposure. The LUC restricting land use to nonresidential will remain in place until the levels of the COCs in soil and groundwater allow for unlimited use and unrestricted exposure. The selected remedy will also ensure that the contaminated surface soil and groundwater does not migrate into nearby surface water.

## 2.5 Site Characteristics

This section of the ROD presents a brief comprehensive overview of LHAAP-47 site characteristics with respect to the Conceptual Site Model (CSM), physical site features, known or suspected sources of contamination, types of contamination, and affected media. Known or potential routes of contaminant migration are also discussed. Detailed information about the site characteristics can be found in the RI (Jacobs, 2002).

### 2.5.1 Conceptual Site Model

**Figure 2-4** illustrates the overall CSM for LHAAP-47. The model presents those pathways that are being considered for remediation. Those pathways that are likely to be incomplete or have negligible impact are not being considered for remediation as discussed below.

There are areas of highly contaminated groundwater at the site, including residual DNAPL near Building 46A, which may have resulted from releases from the former sumps or spills during site operations. All sumps at LHAAP-47 have been either removed or taken out of service and can no longer be a potential source of groundwater contamination. The pathway of leaching of soil contaminants into groundwater is a potential pathway. Perchlorate concentrations in the soil near Building 25C exceed the groundwater protection standard, and soil leaching may have contributed to the perchlorate contamination in the groundwater. The identification of TCE in soil near Building 46A indicates a potential source that may leach to the groundwater and may require remedial action. Metals, SVOCs, and VOCs have been detected in the groundwater at concentrations exceeding their respective MCLs or TRRP Tier 1 Residential Groundwater PCLs for chemicals that do not have USEPA MCLs. However, available data for metals, SVOCs, and VOCs other than TCE do not indicate the presence of associated soil contamination that may leach to the groundwater. Residual groundwater contamination from former sources, the residual TCE DNAPL near Building 46A, and the perchlorate-contaminated soil near Building 25C will be addressed as part of the remedial action.

Risks from exposure to soil were found to be acceptable. Overland surface water flow does not currently appear to be contributing to a migration of contaminants, as the ditch surface water did not contain VOCs, SVOCs, explosives, pesticides, or polychlorinated biphenyls. Likewise, the



sediment data show no detections of VOCs, SVOCs, explosives, or pesticides. Some metals were detected in the surface water and sediment at low concentrations that occur naturally. Based on surface water sampling data from the RI and subsequent investigations, no contaminants, including perchlorate, have seeped into Goose Prairie Creek at concentrations exceeding their respective cleanup levels. Historical surface water sampling prior to the RI and prior to placement of the liner around Building 25C indicated perchlorate had seeped into Goose Prairie Creek at concentrations exceeding its cleanup level.

The surface soil to surface water migration pathway and groundwater to surface water migration pathway are considered potentially complete pathways due to the potential for the COCs in soil and groundwater to migrate into surface water.

While the groundwater to surface water migration pathway is not likely complete under current conditions, this pathway could potentially become complete should groundwater elevations rise in the future, as expected. Preventing contaminated groundwater from migrating into surface water is included as a RAO. Surface water monitoring will include only those chemicals contributing to the primary risk (VOCs and perchlorate) in soil and groundwater to determine if there are any exceedances of applicable surface water standards.

The soil to surface water migration pathway is not currently complete because a plastic liner placed as a temporary measure mitigates soil perchlorate migration to surface water. Goose Prairie Creek runs on the south side of LHAAP-47 and the perchlorate contaminated soil may be contributing to detections of perchlorate in surface water. Although perchlorate results for the surface water are below the contact recreational value of 395 micrograms per liter ( $\mu\text{g/L}$ ) (TCEQ, 2007) and the TRRP Tier 1 Residential Groundwater PCL of 17  $\mu\text{g/L}$  (established monitoring level for perchlorate in surface water), the soil to surface water pathway is considered complete for the purposes of the remedy due to the temporary nature of the plastic liner remedy now in place.

The migration pathway, soil to surface water, is not a likely pathway for the TCE in soil due to the depth of the contamination. Thus, the only soil pathway for TCE in soil near Building 46A considered for remediation is the potential migration to groundwater.

There is no present or projected future use of the groundwater at LHAAP-47. The reasonably anticipated future use of the site is a wildlife refuge. The hypothetical pathway considered for groundwater remediation is potential ingestion by the hypothetical future maintenance worker.

## 2.5.2 Overview of the Site

LHAAP-47 was identified in historical records as Plant 3 (or Plant 3 Area) and is located within an approximately 275-acre area in the north-central portion of the former plant. The surface features at LHAAP-47 are a mixture of asphalt-paved roads, parking areas, building foundation remnants, old buildings, and overgrown wooded and grassy vegetation-covered areas. The topography in this area is relatively flat with the surface drainage flowing into tributaries of Goose Prairie Creek. Runoff from the site enters Caddo Lake via Goose Prairie Creek.

## 2.5.3 Geology and Hydrogeology

The subsurface at LHAAP-47 appears to be characterized by layers of silty clay underlain by silty sand to clayey sands. These general soil types repeat throughout the subsurface but vary in thickness and continuity in the shallow and intermediate to deep surface zones, especially in the



southern portion of LHAAP-47. Shallow, intermediate, and deep groundwater zones were initially defined during the RI. The shallow (10-35 feet below ground surface [bgs]), intermediate (40-60 feet bgs), and deep (70-95 feet bgs) saturated zones are in the Wilcox Group and are separated by clay layers that extend across the site (Jacobs, 2002). The shallow saturated zone is typically clay to silty clay at the surface underlain by a relatively thin (approximately 3-foot thick) layer of silty to poorly sorted sand that is present across the site. In the east-central portion of the site, the shallow saturated zone is underlain by thick, silty clay that separates the shallow zone from the underlying intermediate saturated zone (Jacobs, 2002).

During the PSI, the Shallow and Intermediate groundwater zones were revised or refined to reflect current conditions. The Shallow Zone currently occurs at depths between approximately 25 ft bgs and 32 ft bgs within the laminated clay/sand unit overlying the clay unit separating the Shallow Zone from the Upper Intermediate Zone. Shallow/Intermediate Zone wells were described in the PSI and have completion depths that generally range between 35 and 55 feet bgs. For development of both groundwater elevation maps and plume maps, Shallow/Intermediate Zone wells were included with Intermediate Zone wells. The Upper Intermediate Zone is the sandy unit underlying the sand-laminated clay Shallow Zone and clay unit separating the two zones.

Historically, monitoring wells with contamination at LHAAP-47 have been classified as being completed in three water bearing zones: Shallow, Shallow/Intermediate and Intermediate. Most shallow wells were dry during the 2019 PSI effort and 40-foot replacement wells were installed. Because the clay separating the Shallow and Intermediate Zones is laterally discontinuous and of varying thickness, some of the PSI wells drilled to replace dry Shallow Zone wells were completed partially in the first sand and into the clay (Shallow Zone) and others were completed partially in the clay separating the Shallow and Intermediate and into the sand of the Intermediate (Upper Intermediate). PSI Shallow Zone wells are located in two isolated areas, near Buildings 46A and 54F. Pre-existing well nomenclature for was not changed in the PSI report.

Wells installed during the PSI were completed to a depth of approximately 40 ft bgs, below the Shallow Zone sand and underlying clay aquitard and into the top of the Intermediate Zone. Wells installed at and/or below these depths are described as being completed in the Upper Intermediate Zone. The intermediate saturated zone is composed of silty sands, sandy clays, and poorly sorted sands that vary in thickness from 5 feet to 20 feet thick. The sand intervals are thickest in the central and southeast portions of LHAAP-47. The intermediate zone is underlain by a thick, silty clay layer overlying the sandy clay of the deep saturated zone (Jacobs, 2002).

Based on November-December 2007 and April 2008 groundwater elevations, the groundwater flow direction in the shallow saturated and intermediate zones below LHAAP-47 was generally to the northeast (Shaw, 2011). Groundwater elevations collected during the PSI confirmed the groundwater flow direction in the shallow saturated zone is to the northeast. Even though many of the historic shallow zone wells were dry, there were a sufficient number of wells with water to confirm the groundwater flow direction but there were too few wells with water present to prepare a potentiometric surface map. LHSMW53 was the only shallow zone well along the southern border of the site with measurable water in the 2019 PSI Report. The other well used to evaluate groundwater contribution to surface water, 08WW01, is located on the other side of Goose Prairie Creek in a different environmental site. See **Figure 2-3** for shallow zone groundwater elevation data for these wells. The groundwater flow direction in the intermediate zone was also found to flow to the northeast (**Figure 2-5**). The groundwater flow direction in the deep zone based on November-





December 2007 groundwater elevations is estimated to be to the north-northeast as shown on **Figure 2-6** (Shaw, 2011).

The base (bottom) of Goose Prairie Creek near the Site 47 southern border was measured at approximately 185 feet above mean sea level (amsl) during the PSI Addendum field investigation performed in March 2019 (HDR, 2019b). Groundwater elevations recorded at nearby monitoring wells (i.e., 08WW01 and LHSMW53) identified that groundwater was higher than the creek bottom and was likely contributing to surface water flow. Moving farther east along Goose Prairie Creek toward Caddo Lake and away from Site 47, a comparison of measurements taken of the creek bottom and nearby monitoring wells found groundwater elevations to be lower than the creek bottom elevations and not contributing to surface water flow.

Previous investigations found that shallow zone groundwater elevations (based on wells LHSMW54 and 47WW34) near the Goose Prairie Creek at Site 47 were between 175 and 180 feet amsl. The groundwater flow was generally towards Goose Prairie Creek; however, under drought conditions that occurred at that time, the groundwater elevations were several feet below the base of the creek bed. Under these previous low groundwater conditions, the interaction between surface water and groundwater at the site was that surface water would infiltrate through the vadose zone into the groundwater when water was present in Goose Prairie Creek (Shaw, 2011). In December 1998 and March 2002, groundwater elevations were higher than the Goose Prairie Creek bed (Shaw, 2011). Thus, the possibility exists that groundwater elevations can rise in the future and groundwater can discharge into the Goose Prairie Creek.

## 2.5.4 Sampling Events

Various sampling events were conducted at LHAAP-47 since 1993 to assess contamination. Testing for perchlorate began in 2000. The sampling included installation and sampling of surface water, groundwater monitoring wells and sampling of the soil at various depths and locations. The sampling events are summarized in **Table 2-1**.

**Table 2-1. Summary of Sampling Events at LHAAP-47**

<b>Pre-Phase I (Jacobs, 2002)</b>
<i>EPS, 1984</i>
<ul style="list-style-type: none"> <li>• EPS installed 1 monitoring well and collected a groundwater sample.</li> </ul>
<b>Phases I-III (Jacobs, 2002)</b>
<i>USACE, Phase I 1993</i>
<ul style="list-style-type: none"> <li>• Collected sump content sample for laboratory analysis</li> <li>• Completed borings at sump locations and collected soil samples</li> </ul>
<i>USACE, Phase II 1994</i>
<ul style="list-style-type: none"> <li>• Collected soil samples from monitoring well locations and from ditch and drainage ways</li> <li>• Installed monitoring wells and collected groundwater samples from each well</li> </ul>
<i>USACE, Pre-Phase III 1996</i>
<ul style="list-style-type: none"> <li>• Determined locations for Phase III monitoring wells by delineating plume using site characterization and analysis penetrometer system (8 locations)</li> </ul>
<i>Jacobs, Phase III 1998</i>
<ul style="list-style-type: none"> <li>• Collected soil samples at waste process sump locations</li> <li>• Collected surface water and sediment samples</li> <li>• Collected soil samples from locations</li> <li>• Installed monitoring wells and collected groundwater samples from the new and existing wells</li> </ul>



**Table 2-1 Summary of Sampling Events at LHAAP-47 cont'd**

<b>Remedial Investigation (Jacobs, 2002)</b>
<ul style="list-style-type: none"> <li>USACE collected 2 rounds of groundwater samples in 1996 (Jacobs, 2002)</li> <li>In 1999 and 2000, collected soil samples for perchlorate and total petroleum hydrocarbons (Jacobs, 2002)</li> <li>In 2000, installed and sampled 4 new monitoring wells and collected groundwater samples from existing wells (Jacobs, 2002)</li> <li>In 2001, collected groundwater samples for perchlorate (Jacobs, 2002)</li> <li>In 2001, collected soil samples for perchlorate investigation (Lynntech, 2001)</li> <li>In 2002, collected soil samples as part of the perchlorate investigation (STEP, 2005)</li> <li>In 2003, collected groundwater and soil samples at two locations as part of the Phase II Environmental Site Assessment (Plexus, 2005)</li> <li>In 2004, installed 4 monitoring wells and collected groundwater samples for VOC analysis (Shaw, 2007b)</li> <li>In 2006, collected additional soil samples from select sumps (Shaw, 2007a and 2008)</li> <li>In 2007, installed 1 monitoring well and collected samples for natural attenuation evaluation and for geochemistry evaluation</li> <li>In 2008, installed 4 monitoring wells and collected groundwater samples for VOC analysis</li> <li>In 2009, collected additional groundwater samples for VOC analysis</li> <li>In 2010, installed 2 monitoring wells and 18 temporary monitoring wells, collected additional groundwater samples for VOC, perchlorate, metals, SVOC, and MNA analysis, and collected additional soil samples for perchlorate analysis</li> </ul>
<b>Post-Screening Investigation Report (HDR, 2019a)</b>
<ul style="list-style-type: none"> <li>Advancement of 11 direct push technology borings (DPT) into the intermediate zone and collection of groundwater grab samples for a combination of analyses that included VOCs, SVOCs, perchlorate, explosives, and/or metals.</li> <li>Installation of 24 new or replacement wells and collection of groundwater samples for a combination of analyses that included VOCs, SVOCs, perchlorate, explosives, and/or metals.</li> <li>Collection of synoptic water level measurements.</li> <li>Well surveying.</li> <li>Surveying of select creek bottom locations within Goose Prairie Creek and collection of surface water samples for VOC and perchlorate analyses.</li> </ul>
<b>Addendum Post-Screening Investigation (HDR, 2019b)</b>
<ul style="list-style-type: none"> <li>Collection of 4 surface water grab samples for a combination of analyses that included VOCs and perchlorate.</li> </ul>
<ul style="list-style-type: none"> <li>Collection of synoptic groundwater level measurements.</li> </ul>
<ul style="list-style-type: none"> <li>Survey of Goose Prairie Creek bottom elevations.</li> </ul>
<ul style="list-style-type: none"> <li>Collection of surface water quality parameters stopped</li> </ul>
<b>Post-Screening Investigation No. 2 Report (HDR, 2021b)</b>
<ul style="list-style-type: none"> <li>Advancement of 27 DPT borings near Building 46A to depths between 31 and 51 bgs, and collection of 4-6 soil samples per boring for VOC analysis</li> </ul>
<ul style="list-style-type: none"> <li>Installation of temporary wells at 27 locations near Building 46A. Side-by-side wells were installed and completed in the Shallow and Upper Intermediate Zones at 16 locations, Shallow Zone only wells installed at 11 locations. Groundwater grab samples were collected from each well for VOC analysis.</li> </ul>
<ul style="list-style-type: none"> <li>Installation of 4 Shallow Zone, 3 Upper Intermediate Zone and 1 Intermediate Zone monitoring wells near Building 46A and collection of samples for VOC analysis.</li> </ul>
<ul style="list-style-type: none"> <li>Abandonment of monitoring well 47WW25R</li> </ul>
<ul style="list-style-type: none"> <li>Elevation surveys for all newly installed monitoring wells</li> </ul>



## 2.5.5 Nature and Extent of Contamination

As shown in **Figure 2-7**, perchlorate contaminated soil is located near the former Building 25C and extends to depths of 10 ft with an estimated volume of 9,000 cubic yards. In November 1999 plastic liner material was placed around Building 25C by the U.S. Army over areas known to contain perchlorate in the soil to prevent migration of perchlorate into the Goose Prairie Creek. The primary objective of the liner placement was to mitigate perchlorate runoff to surface water as well as mitigate leaching of perchlorate in soil into groundwater. The liner placement provided a temporary measure to mitigate soil to surface water and soil to groundwater pathways. The liner was repaired in 2015 after a reconnaissance survey identified three areas where the topsoil cover was eroded. One area with exposed liner was repaired with new 16-mil liner and 6 inches of clean imported soil in 2015. The three eroded areas were approximately 1,200 square foot (sf), 400 sf, and 100 sf and were covered and leveled with clean topsoil, seeded with rye grass, and covered with erosion matting (Aaron Williams, personal communication, January 6, 2022).

Perchlorate, VOCs, SVOCs, TNT, 2,4-DNT, 2,6-DNT, and metals are the COCs that exceed the respective MCLs or in the absence of federal drinking water standards, the TRRP Tier 1 Residential Groundwater PCL. Perchlorate and TCE plumes exist in the groundwater at the LHAAP-47 site.

A PSI was conducted between 2018-2020 to determine whether changes to the groundwater and surface water conditions had occurred since 2010 and to evaluate impacts to the 2013 Draft Final ROD prior to signature. Although the conclusions of the FS (Shaw, 2011) were generally confirmed and the groundwater flow directions to the northeast remained relatively unchanged, the PSI reported that most Shallow Zone wells were dry and the locations and concentrations of perchlorate, VOCs, SVOCs, TNT, 2,4-DNT, 2,6-DNT, and metals had changed. Although extensive contamination remains at the site, most of the groundwater contamination now occurs within the Intermediate Zone. An extended drought in East Texas, exacerbated by the 1997 cessation of washdown activities (potentially acting as a source of recharge to the perched and shallow groundwater systems), likely caused a large portion of the Shallow Zone to go dry. As a result, the extent of VOC contamination is substantially reduced when compared to the 2010 results reported in the FS.

A significant PSI finding was the discovery of residual TCE DNAPL (assumed when the concentration of TCE is greater than 10,000 µg/L) in Shallow Zone and upper Intermediate Zone groundwater near Building 46A. Three areas of residual DNAPL were defined in the Shallow Zone and one larger area was defined in the Upper Intermediate Zone. The apparent separation of the Shallow Zone residual DNAPL was caused by some of the wells and DPT locations that appeared dry during sampling or did not recharge sufficiently to allow samples to be collected even though the depths were at or greater than 23 ft bgs, the depth assumed to represent the saturated zone. The residual DNAPL lies within the TCE plumes in each zone. In addition, TCE in unsaturated soil exceeding the GWP-Ind MSC of 0.5 mg/kg (**Figure 2-8**) was found near Building 46A, indicating TCE could act as a continuing source of contamination to groundwater. Exceedances ranged from 0.5 to 3.3 mg/kg except for the highest concentration of 16 mg/kg in one boring.

When comparing the PSI plume data to plume data presented in the FS (Shaw 2011), the overall extent of contamination in the Intermediate Zone is similar. The extent of the TCE plume in 2010 and that observed in the PSI data are similar, with the main difference being the older data has the



plume split into separate northern and southeastern plumes. The highest concentration was noted at 47WW25R (120,000 µg/L). The southern perchlorate plume is bounded to the south by 50WW27, which is a well associated with site LHAAP-50, which lies south of LHAAP-47.

Plumes for TCE daughter products 1,1-DCE, cis-1,2-DCE, and VC generally follow the TCE plumes in shallow and intermediate zone groundwater and are entirely within the maximum extent of TCE.

The other COCs (SVOCs, TNT, 2,4-DNT, 2,6-DNT) in groundwater are isolated and do not indicate a widespread plume of contamination (Shaw, 2011).

## **2.6 Current and Potential Future Land and Resource Uses**

### **2.6.1 Current and Future Land Uses**

LHAAP is located near the unincorporated community of Karnack, Texas. Karnack is a rural community with a population of 775 people. The incorporated community of Uncertain, Texas, population 205, is located to the northeast of LHAAP on the edge of Caddo Lake and is a resort area and an access point to Caddo Lake. The industries in the surrounding area consist of agriculture, timber, oil and natural gas production, and recreation.

LHAAP has been an industrial facility since 1942. Production activities and associated waste management activities occurred until the facility was determined to be in excess of the U.S. Army's needs in 1997. The majority of the former footprint of LHAAP is now maintained and operated as the Caddo Lake Wildlife Refuge and is largely accessible to the general public. Portions of LHAAP within the refuge still requiring remediation or maintenance are surrounded by fences and warning signs (except on the border with Caddo Lake) to preclude unlimited public access.

The Caddo National Wildlife Refuge was established in 2000 pursuant to a Memorandum of Agreement (MOA) (U.S. Army, 2004) between the USFWS and the U.S. Army. The reasonably anticipated future use of LHAAP-47 is as part of this national wildlife refuge. This anticipated future use is based on the MOA, the National Wildlife Refuge System Administration Act, the National Wildlife Refuge System Improvement Act of 1997, and other acts, regulations, and executive orders relevant to management of refuge lands. The MOA documents the transfer process of the LHAAP acreage to USFWS to become the Caddo Lake National Wildlife Refuge and will be used to facilitate a future transfer of LHAAP-47. Presently the Caddo Lake National Wildlife Refuge occupies approximately 7,100 acres of the 8,416-acre former installation. In accordance with the National Wildlife Refuge System Administration Act of 1966, the land will remain as a national wildlife refuge unless there is a change brought about by an act of Congress, or the land is part of an exchange authorized by the Secretary of the Interior.

### **2.6.2 Current and Future Surface Water Uses**

Goose Prairie Creek, major drainage system on the LHAAP facility runs through the southwestern portion of LHAAP-47 and then curves back through the southeastern portion of the site. The topography of LHAAP-47 generally slopes to the east with surface drainage flowing to the east-southeast into Goose Prairie Creek, which flows into Caddo Lake. A wetland area is present just north of the intersection of Karnack Avenue and Marshall Avenue and runs along Goose Prairie



Creek toward Caddo Lake. Caddo Lake is a large recreational lake covering 51 square miles with a mean depth of 6 feet. The watershed of the lake encompasses approximately 2,700 square miles. Caddo Lake is used extensively for fishing and boating and provides drinking water supply to multiple cities/towns. The anticipated future uses of surface water are the same as the current uses.

### 2.6.3 Current and Future Groundwater Uses

Groundwater in the drinking water aquifer (~250-430 feet bgs) under and near LHAAP is currently used as a drinking water source. The drinking water aquifer should not be confused with LHAAP “deep zone” groundwater, which extends only to a depth of approximately 151 feet bgs. The deep zone groundwater and the drinking water aquifer are distinct from each other and there is no known evidence of connectivity between the contaminated zone and the drinking water aquifer.

There are five active water supply wells near LHAAP that are completed in the drinking water aquifer (**Figure 2-2**). One well is located in and owned by Caddo Lake State Park. The well is completed to a depth of 315 feet bgs and has been in use since 1935. A second well owned by the Karnack Water Supply Corporation services the town of Karnack and is located approximately 0.3 miles northwest of town. This well is completed to approximately 430 feet bgs and has been in use since 1942. The Caddo Lake Water Supply Corporation has three wells located both north and northwest of LHAAP. These wells are identified as Caddo Lake Water Supply Corporation Wells 1, 2, and 3, and all are hydraulically upgradient of LHAAP (Jacobs, 2002). These wells are completed deeper than the deepest zone of contamination at LHAAP. Because of this and the large distance between these wells and LHAAP, water removal from these wells is not expected to affect groundwater flow at the site. In addition, there are several livestock and domestic wells located in the vicinity of LHAAP with depths averaging approximately 250 feet bgs.

Three water supply wells are located within the boundary of LHAAP itself (**Figure 2-2**). One well is located at the Fire Station with a total depth of 128 feet and a screened interval from 58 to 128 feet bgs; the second well is located approximately 0.35 miles southwest of the Fire Station. The third well is located north of the USFWS administration building for Caddo Lake National Wildlife Refuge, near the main entrance to LHAAP. These three water supply wells were completed at depths greater than the zone of contamination described at LHAAP-47. Two additional wells previously supplied water to the installation, but these have been plugged and abandoned. None of these three wells are currently used for drinking water at LHAAP, although they may supply water for non-potable uses.

Although the anticipated future use of the facility as a national wildlife refuge does not include the use of the groundwater at LHAAP-47 as a drinking water source, the State of Texas designates all groundwater as potential drinking water, unless otherwise classified, and consistent with 30 TAC §335.563(h)(1). To be conservative, a hypothetical industrial use scenario was evaluated for risk. The future industrial scenario for LHAAP assumes limited use of groundwater as a drinking water source.

## 2.7 Summary of Site Risks

This section summarizes the results of the Baseline Human Health and Screening Ecological Risk Assessments conducted for the Group 4 Sites (Jacobs, 2003) which included LHAAP-47 and the BERA (Shaw, 2007a). The assessments provide the basis for taking action and identify the COCs and exposure pathways that need to be addressed by the remedial action. It also





addresses the impact of data collected after the Baseline Human Health Risk Assessment (BHHRA), including the PSI investigations conducted in 2018-2020.

## 2.7.1 Summary of Human Health Risk Assessment

The anticipated future use of the site is as a wildlife refuge; therefore, human health risks were calculated for industrial use by the future maintenance worker (Jacobs, 2003) in accordance with 30 TAC 335. The risk assessment was completed using data from groundwater samples collected through February 2001 and the soil samples through December 2000 (Jacobs, 2003). Since that time, additional groundwater and soil samples have been collected and analyzed. Results from the later investigations did not change the overall outcome of the risk assessment and are discussed in **Section 2.7.2** below.

Soil and groundwater data were used to calculate the aggregate risk values, which were then compared to the USEPA target risk range of  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$  for the excess lifetime carcinogenic risk (ELCR) and to a hazard index (HI) of 1 for non-carcinogenic hazards. If there was no unacceptable risk associated with a medium, and a cleanup level for any contaminants is not exceeded, then that medium is not identified for remediation in this ROD. The CSM associated with the risk assessment was introduced in **Section 2.5.1**, and is presented as **Figure 2-4**.

### 2.7.1.1 Exposure Assessment

The human health risk and hazard to an on-site trespasser were evaluated under current site conditions for surface soil, surface water, sediment, and fish ingestion, and a hypothetical future maintenance worker was evaluated under an industrial scenario for soil and/or groundwater.

For the on-site trespasser, reasonable exposure pathways evaluated are: incidental ingestion of the surface soil (0 to 0.5 feet bgs), dermal contact with the surface soil, inhalation of particulates, and inhalation of VOCs from the soil (0 to 0.5 feet bgs). The Baseline Human Health Risk Assessment found that for the current trespasser, none of the exposure pathways contributed to carcinogenic risk or non-carcinogenic hazard, thus the current trespasser data is not included in **Tables 2-2 and 2-3** discussed in **Section 2.7.1.2**.

For the hypothetical future maintenance worker, reasonable soil exposure routes evaluated are: incidental ingestion of the surface soil (0 to 5 feet bgs), dermal contact with the surface soil, inhalation of particulates, and inhalation of VOCs from the soil (0 to 5 feet bgs). For groundwater, reasonable exposure pathways for the hypothetical future maintenance worker are ingestion of groundwater, dermal contact while showering with contaminated groundwater, and inhalation of VOCs while showering with contaminated groundwater.

### 2.7.1.2 Identification of Chemicals of Potential Concern

The human health risk assessment identified chemicals of potential concern (COPCs) for LHAAP-47 and evaluated the carcinogenic risk and non-carcinogenic hazard for each COPC. **Tables 2-2 and 2-3** summarizes the risk assessment data for the COPCs, including maximum detected concentrations, and exposure point concentrations.

### 2.7.1.3 Toxicity Assessment

The carcinogenic and non-carcinogenic toxicity assessments from the BHHRA are summarized in **Tables 2-4 and 2-5**, respectively. The toxicity data assumes that exposure will be chronic to be conservative. Sources for the data include the USEPA's Integrated Risk Information System, 2001,



which is a database of human health effects that may result from exposure to various substances; and Health Effects Assessment Summary Tables (Jacobs, 2003).

#### **2.7.1.4 Risk Characterization**

Characterization of the carcinogenic risk and non-carcinogenic hazard are summarized in **Table 2-6**.

For carcinogens, risks are generally expressed as the incremental probability of an individual's developing cancer over a lifetime as a result of exposure to the carcinogen. These risks are probabilities that usually are expressed in scientific notation. An ELCR of  $1 \times 10^{-6}$  indicates that an individual experiencing the reasonable maximum exposure estimate has a 1 in 1,000,000 chance of developing cancer as a result of site-related exposure. This is referred to as an ELCR, because it will be in addition to the risks of cancer that individuals face from other causes such as smoking or exposure to too much sunlight. USEPA's generally acceptable risk range for site related exposures is  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$ .

Non carcinogenic health effects are evaluated by calculating hazard quotients (HQs) and HIs. This is accomplished by comparing the EDIs of the COPCs, which are averaged over the period of exposure, to chemical and route-specific reference doses (RfDs). The RfD represents the daily intake of a chemical to which a person can be exposed over the given length of time without any reasonable expectation of adverse non-carcinogenic health effects.

The HI is generated by adding the HQs for all COCs that affect the same target organ (e.g., liver) or that act through the same mechanism of action within a medium or across all media to which a given individual may reasonably be exposed. An HI < 1 indicates that, based on the sum of all HQ's from different contaminants and exposure routes, toxic non-carcinogenic effects from all contaminants are unlikely. An HI > 1 indicates that site-related exposures may present a risk to human health.

For the hypothetical future maintenance worker, the carcinogenic risk for soil (0-0.5 ft bgs) and groundwater are  $1.8 \times 10^{-5}$  and  $7.1 \times 10^{-3}$ , respectively. The non-carcinogenic risk for soil and groundwater are 0.40 and 1,120, respectively (Jacobs, 2003).

#### **2.7.2 Post Risk Assessment Data Evaluation**

Since the risk assessment, additional soil and groundwater samples have been collected and analyzed, and the more recent results do not change the conclusions of the risk assessment (Shaw, 2011). Additional groundwater and surface water samples were collected during the PSI. The objective of the PSI data was to re-assess and update the groundwater contaminant concentrations for the shallow and intermediate groundwater due to old data and declining water levels and to evaluate the groundwater to surface water pathway.

The PSI soil and groundwater data collected near Building 46A between 2018 and 2020 showed VOC concentrations higher than previously reported. In particular, the high TCE concentrations discovered in groundwater indicate that the risk levels would also be higher than calculated in the BHHRA, however, the outcome is the same. The depth of TCE soil contamination near Building 46A is 10 ft bgs and greater and indicates there is no potential for direct human exposure. The remedial actions proposed for the site will address all of the groundwater and soil contamination, and additional risk evaluation was not performed.

This sampling is discussed below.



### 2.7.2.1 Soil

Additional soil samples were collected in September 2001 (Lynntech, 2001), during the perchlorate investigation in 2002 (STEP, 2005), during the sumps investigation in September 2006 (Shaw, 2008), during the BERA in November 2006 (Shaw, 2007a), and during soil sampling in 2010. Most of the additional results were less than the concentrations used in the risk assessment, but arsenic and perchlorate results were higher. The risk associated with the greatest perchlorate concentrations found in soil is less than the allowable HQ of 1 (Shaw, 2011). Similarly, the risk associated with the highest arsenic concentration found in soil is within the acceptable risk range of  $10^{-6}$  to  $10^{-4}$  and does not change the outcome of the human health risk assessment (Jacobs, 2003). The cancer risks and non-cancer hazards posed by soil, fall within the acceptable range.

Perchlorate was detected at a maximum concentration of 350 mg/kg in the soil (Lynntech, 2001). As presented in **Table 2-7**, the TCEQ soil MSC for industrial use based on groundwater protection (GWP-Ind) for perchlorate is 7.2 mg/kg. Based on the concentrations in the groundwater, the maximum concentrations detected in soil, and the GWP-Ind, perchlorate in the soil is a residual source for perchlorate contamination in groundwater. Perchlorate in soil can also be a residual source of surface water contamination by overland transport (i.e., erosion and storm water). The soil to surface water migration pathway is not currently complete due to the plastic liner placed as a temporary measure, which mitigates soil contaminant migration into surface water.

Additional soil samples were also collected during the PSI No. 2 field efforts (HDR, 2021b) centered around Building 46A and analyzed for VOCs. The unsaturated soil results (samples collected from less than 23 ft bgs) indicated exceedances of the GWP-Ind MSC for TCE. As described in **Section 2.5.5**, an area of TCE with concentrations exceeding the MSC of 0.5 mg/kg was identified. TCE in soil was not previously identified as a COC at LHAAP-47. Exceedances ranged from 0.5 to 16 mg/kg, with the high concentration of 16 mg/kg reported in DPT-030 (10-11 ft bgs). Risk associated with TCE in soil has not been evaluated, however, there is no potential for exposure to human receptors due to the depth of the contamination. The highest concentration was reported at 10-11 ft bgs, deeper than the 0-2 ft bgs considered for incidental ingestion or dermal contact, or 0-7 ft bgs for inhalation of VOCs assumed for risk assessment (Jacobs, 2003).

### 2.7.2.2 Groundwater

Based on the human health risk assessment, groundwater at LHAAP-47 poses an unacceptable carcinogenic risk and non-carcinogenic hazard to a hypothetical future maintenance worker at LHAAP under an industrial scenario. Perchlorate and VOCs contributed the majority (97.5%) of the non-carcinogenic hazard and VOCs contributed the majority (99.8%) of the carcinogenic risk.

The perchlorate and VOC plumes presented in the FS (Shaw, 2011) did not overlap. The VOC plume is primarily of TCE, with minor occurrences of PCE, 1,1-DCE, cis-1,2- DCE, and VC. The MCL (TCE) and TRRP Tier 1 Residential Groundwater PCL (perchlorate) were used as the criteria for defining plume boundaries. The most recent perchlorate and VOC concentrations are presented in the PSI and PSI No. 2 reports (HDR, 2019a and HDR, 2021b). Compared with the FS (Shaw, 2011), the spatial extent in the Shallow and Intermediate Zones has changed with the majority of groundwater contamination now occurring within the Intermediate Zone. The extent of groundwater contamination in the Shallow Zone is reduced to small, isolated VOC plumes in the vicinity of LHSMW44 and LHSMW45 and near Building 46A. No perchlorate plumes remain in the Shallow Zone. The results of replacement wells 47WW11R and LHSMW43R in the Intermediate Zone define the presence of an additional small perchlorate plume not present in the 2010 data. The extent of the





VOC plumes in the Intermediate Zone (described in **Section 2.5.3**) observed in the PSI are similar to 2010 results with the exception that the TCE plume is no longer split into separate northern and southeastern plumes. The Upper Intermediate Zone VOC plume identified near Building 46A falls within the extent of the currently defined Intermediate Zone plume. The current extent of the TCE and perchlorate groundwater plumes from the PSI is shown on **Figure 2-9**. The extent of VOCs other than TCE fall within the maximum extent of the TCE plumes.

All groundwater COCs identified in **Table 2-8**, will be included in the groundwater monitoring program. During Five-Year Reviews, the analytical suite will be re-evaluated. COCs that have decreased to concentrations below cleanup levels, or are non-detect, or only detected sporadically below clean-up levels, or consistent with background will be removed from the monitoring program after consultation between the U.S. Army, USEPA, and TCEQ. If after 2 successive sampling events COCs that have not previously shown exceedances of cleanup levels specified in **Table 2-8** continue to show no exceedances, they will be dropped as COCs and no longer be monitored. These COCs include: 1,2-DCA, chloroform, acetone, 2,4,6-TNT, 2,4-DNT, BEHP, cobalt, and manganese. Pentachlorophenol, aluminum, antimony, arsenic, cadmium, chromium, nickel, silver, strontium, thallium, tin and vanadium have been detected infrequently or only in historical samples and may also be considered to be dropped as COCs if no additional exceedances greater than the cleanup levels specified in **Table 2-8** are reported after 2 successive sampling events. A summary of groundwater contamination at LHAAP-47 is presented below.

### **2.7.2.3 Perchlorate**

Perchlorate results from the PSI were compared to the TRRP Tier 1 Residential Groundwater PCL of 17 µg/L. Perchlorate was not detected in the Shallow Zone wells during the PSI. Shallow Zone wells that previously exceeded perchlorate cleanup standards, as reported in the FS, were dry during the PSI in 2018-2020 and no samples could be collected. Of the 21 wells sampled for perchlorate, only four results exceeded the PCL of 17 µg/L. These intermediate zone wells included 47WW11R (824 µg/L) (replacement well), 47WW38 (266 µg/L), LHSMW43R (59 µg/L) (replacement well), and LHSMW60 (33,000 µg/L). These results indicate two small plumes exist in the Intermediate Zone located at the eastern and southern edges of the site.

### **2.7.2.4 Trichloroethene**

Concentrations of TCE in groundwater were compared to the MCL (5 µg/L). The PSI and PSI No. 2 Addendum reported that TCE concentrations exceeded the MCL in 42 monitoring well samples from 29 monitoring wells; 6 shallow, 18 shallow/intermediate and upper intermediate, and 5 intermediate wells.

Two isolated Shallow Zone plumes were identified with concentrations that exceeded the MCL (HDR, 2019a), one near wells (LHSMW44 and LHSMW45) and another near Building 46A (HDR, 2021b). Residual TCE DNAPL is presumed present within the plume near Building 46A where TCE was reported at concentrations up to 57,000 µg/L. TCE concentrations in the Upper Intermediate Zone wells near Building 46A also indicate residual TCE DNAPL with concentrations up to 120,000 µg/L in well 47WW25R. The well was decommissioned and replaced with well 47WW50, which had TCE reported at 471 µg/L. TCE is present at levels greater than the MCL in Intermediate Zone groundwater throughout the site.



#### **2.7.2.5 Tetrachloroethene**

Concentrations of PCE in groundwater were compared to the MCL (5 µg/L). Historically, concentrations of PCE exceeding the MCL (5 µg/L) were limited, occurring in co-located wells LHMSW43 and 47WW09 and within the TCE plume. In 2008 a single exceedance of the MCL in 47WW09 was reported at 9.99 µg/L. LHSMW43 was dry and replacement well LHSMW43R was non-detect for PCE. The trend in PCE concentrations in 47WW09 over time has been mixed with no strong increasing or decreasing pattern.

#### **2.7.2.6 1,1-Dichloroethene**

Concentrations of 1,1-DCE in groundwater were compared to the MCL (7 µg/L). The PSI reported 1,1-DCE detections in 6 wells exceeding the MCL of 7 µg/L. A single 1,1-DCE detection was reported at 47WW25R (20.8 µg/L), near Building 46A. Another single 1,1-DCE detection was reported at 47WW09 (19.6 µg/L). Finally, a 1,1-DCE plume is present in the southeastern corner of the site, extending out of the site boundary. The maximum concentration in this plume is 176 µg/L in LHSMW56R. 1,1-DCE was detected greater than the MCL in 1 sample collected during the PSI No. 2 effort (47WW48 – 25.4 µg/L).

#### **2.7.2.7 cis-1,2-Dichloroethene**

Concentrations of cis-1,2-DCE in groundwater were compared to the MCL (70 µg/L). It is a daughter product of TCE degradation. The cis-1,2-DCE plumes are entirely within the limits of the TCE plumes in each zone. The trends for cis-1,2-DCE concentrations for individual wells over time have been mixed, with some decreasing and some increasing but the extent of the cis-1,2-DCE plumes have consistently been within the limits of the TCE plumes.

The PSI reported cis-1,2-DCE detections in 12 wells exceeding the MCL of 70 µg/L. The maximum cis-1,2-DCE concentration in samples from Shallow Zone well samples was 505 µg/L in 47WW49, and for Intermediate Zone well samples the maximum concentration was 5,260 µg/L in 47WW42.

#### **2.7.2.8 Vinyl Chloride**

Concentrations of VC in groundwater were compared to the MCL (2 µg/L). It is a daughter product of TCE degradation. The VC plume is entirely within the limits of the TCE plumes. The trends for VC concentrations in individual wells have been mixed, with some decreasing and some increasing.

The PSI reported that VC was detected in nine wells exceeding the MCL of 2 µg/L. PSI No. 2 results had VC detected greater than the MCL in 2 wells in the Shallow Zone, 6 Upper Intermediate Zone wells, and 1 Intermediate Zone well. The maximum VC concentration was reported at 1,190 µg/L in Upper Intermediate Zone well 47WW42.

#### **2.7.2.9 1,2-Dichloroethane**

Concentrations of 1,2-DCA in groundwater were compared to the MCL (5 µg/L). The most recent 1,2-DCA results, including those from the PSI, do not exceed the MCL at any monitoring well. The chemical 1,2-DCA is considered a COC because one sample from 1996 at monitoring well LHSMW48 exceeded the MCL. It is expected that the 1,2-DCA detected was a trace contaminant in the TCE solvent or a minor daughter product of TCE degradation.



#### **2.7.2.10 Chloroform**

Concentrations of chloroform in groundwater were compared to the MCL for total trihalomethanes (80 µg/L). The most recent chloroform results from the PSI do not exceed the MCL at any monitoring well. The chemical chloroform is considered a COC because one sample from 1998 at monitoring well 47WW20 exceeded the MCL. It is expected that the chloroform from 1998 was a laboratory contaminant and is not likely to be found in the future.

#### **2.7.2.11 Acetone**

Concentrations of acetone in groundwater were compared to the TRRP Tier 1 Residential Groundwater PCL (22,000 µg/L). The historical acetone results show a maximum of 21,000 µg/L in monitoring well LHSMW35 from 1998. The chemical acetone is considered a COC because the Baseline Risk Assessment used more conservative assumptions for assessing acetone risk and calculated an HQ of 8.1. The high concentration reported in the 1998 sample was an anomalous result, possibly due to sample dilution or cross-contamination from laboratory or field blank contamination. A field duplicate was collected for this well sample and the result was 4,400 µg/L. Samples collected from this well during prior and subsequent investigations were either not analyzed for acetone or the results were non-detect. None of the PSI samples reported acetone that exceeded the TRRP Tier 1 Residential Groundwater PCL of 22,000 µg/L. Since there were no detections in the PSI laboratory blanks and some detections in trip blanks, acetone detections were attributed to contamination during transportation.

#### **2.7.2.12 1,1,2-Trichloroethane**

Concentrations of 1,1,2-trichloroethane (TCA) in groundwater were compared to the MCL (5 µg/L). The most recent 1,1,2-TCA results from the PSI showed one detection less than the MCL, and previous results are all less than the MCL. The chemical 1,1,2-TCA is not considered a COC because the maximum concentration detected (4.9 µg/L at LHSMW43) is less than the MCL.

#### **2.7.2.13 2,3,7,8-Tetrachlorodibenzodioxin**

The total equivalent concentration (TEQ) of 2,3,7,8-tetrachlorodibenzodioxin (TCDD) and its congeners in groundwater were compared to the MCL ( $3.0 \times 10^{-5}$  µg/L). Samples collected in 2010 showed the TEQ for 2,3,7,8-TCDD and its congeners were all less than the MCL. The chemical 2,3,7,8-TCDD is not considered a COC because the maximum TEQ of 2,3,7,8-TCDD and its congeners detected ( $2.88 \times 10^{-6}$  µg/L at 47WW01) is less than the MCL. No samples were analyzed for TCDD during the PSI.

#### **2.7.2.14 2,4,6-TNT**

Concentrations of 2,4,6-TNT in groundwater were compared to the TRRP Tier 1 Residential Groundwater PCL (12 µg/L). The most recent 2,4,6-TNT results, including the 2018 PSI, show no detectable TNT. The chemical 2,4,6-TNT is considered a COC because a 1996 sample from monitoring well LHSMW56 showed a 6.8 µg/L 2,4,6-TNT concentration, leading to an HQ of 0.13. It is expected that the 2,4,6-TNT detected in past groundwater samples was transient and is not likely to be found in the future.

#### **2.7.2.15 2,4-Dinitrotoluene**

Concentrations of 2,4-DNT in groundwater were compared to the TRRP Tier 1 Residential Groundwater PCL (1.3 µg/L). 2,4-DNT results from samples collected in 2010 exceeded the TRRP



Tier 1 Residential Groundwater PCL at one monitoring well, 47WW11. This well was dry in August 2010 and in March 2018. The cumulative risk of all cancer risks for chemicals with no MCL is less than  $10^{-4}$ , but the chemical 2,4-DNT is retained as a COC for further sampling and evaluation.

#### **2.7.2.16 2,6-Dinitrotoluene**

Concentrations of 2,6-DNT in groundwater were compared to the TRRP Tier 1 Residential Groundwater PCL (1.3 µg/L). The most recent 2,6-DNT results, from samples collected prior to 2010, exceeded the TRRP Tier 1 Residential Groundwater PCL at one monitoring well, 47WW11. This well was dry in August 2010 and in March 2018. The cumulative risk of all cancer risks for chemicals with no MCL is less than  $10^{-4}$ , but the chemical 2,6-DNT is retained as a COC for further sampling and evaluation.

#### **2.7.2.17 BEHP**

Concentrations of bis(2-ethylhexyl)phthalate in groundwater were compared to the MCL (6 µg/L). BEHP was non-detect in 1998 sampling event though the detection limit was 10 µg/L, slightly above the MCL. Exceedances in two of the monitoring wells 47WW13 and 47WW14 in the 2010 sampling event, were identified by the laboratory as method blank or preparation blank contamination. BEHP was non-detect in the seven wells sampled for BEHP in the PSI sampling though the detection limit was between 6.74 and 7.5 µg/L, slightly above the MCL. The chemical BEHP is considered a COC because concentrations exceed the MCL. It is expected that the BEHP detected in groundwater samples may be a sampling contaminant as it has also been detected in associated equipment blanks.

#### **2.7.2.18 Pentachlorophenol**

Concentrations of pentachlorophenol in groundwater were compared to the MCL (1 µg/L). The most recent pentachlorophenol results exceeded the MCL at two monitoring wells, LHSMW46R and 47WW09 in 2018. The chemical pentachlorophenol is considered a COC because concentrations exceed the MCL. It is expected that the pentachlorophenol detected in past groundwater samples was transient and are not likely to be found in the future.

#### **2.7.2.19 Aluminum**

Concentrations of aluminum in groundwater were compared to the TRRP Tier 1 Residential Groundwater PCL (24,000 µg/L). The historical aluminum results exceeded the TRRP Tier 1 Residential Groundwater PCL at one monitoring well, 47WW13 in 2007. The chemical aluminum is considered a COC because aluminum concentrations in groundwater led to an HQ of 0.84. It is expected that the aluminum detected in past groundwater samples is related to clay minerals and future sampling with low-flow methods will show lower concentrations since low-flow sampling is frequently utilized to reduce turbidity during sample collection. The 2010 aluminum result at monitoring well 47WW13 was below the TRRP Tier 1 Residential Groundwater PCL. 47WW13 did not recharge sufficiently for sampling during the PSI in 2018. There were no exceedances in the 10 wells sampled for metals during the PSI.

#### **2.7.2.20 Antimony**

Concentrations of antimony in groundwater were compared to the MCL (6 µg/L). Antimony results exceeded the MCL at six monitoring wells, 47WW04, 47WW16, 47WW21 in 1998, 47WW22 in 2007 and LHSMW54 and LHSMW57 in 1996. The chemical antimony is considered a COC because concentrations exceed the MCL. The background results from the Shaw 2007 Evaluation of



Perimeter Well Data for Use as Groundwater Background for antimony ranged from 3.55 µg/L to 10.5 µg/L with a 95% upper tolerance limit of 12.2 µg/L for filtered samples which exceeds the MCL. Thus, it is expected that the antimony detected in past groundwater samples may have a natural source. The most recent antimony results from ten wells sampled during the PSI were below the MCL.

#### **2.7.2.21 Arsenic**

Concentrations of arsenic in groundwater were compared to the MCL (10 µg/L). The most recent arsenic samples were collected during the PSI. Ten wells were sampled, and arsenic was detected in 9 of the well samples with one MCL exceedance reported in monitoring well 47WW06 (26.2 µg/L). The background results from the Shaw 2007 Evaluation of Perimeter Well Data for Use as Groundwater Background for arsenic ranged from 0.685 µg/L to 62.1 µg/L with a 95% upper tolerance limit of 34.2 µg/L for filtered samples which exceeds the MCL. The background level for arsenic is 34.2 µg/L and the PSI samples did not show any background level exceedances. Thus, it is expected that the arsenic detected in past groundwater samples may have a natural source. Arsenic was identified as a COC in the BHHRA based on the calculated EPC. The BHHRA also notes that some of the risk is due to background.

#### **2.7.2.22 Cadmium**

Concentrations of cadmium in groundwater were compared to the MCL (5 µg/L). Cadmium results exceeded the MCL at one monitoring well, LHSMW57, in 1998. Cadmium was not detected in the ten wells sampled during the PSI. LHSMW57 was dry and could not be sampled during the PSI. The chemical cadmium is considered a COC because one sample result from 1998 exceeded the MCL. It is expected that the cadmium detected in past groundwater samples was an isolated occurrence and future sampling with low-flow methods will show lower concentrations since low-flow sampling is frequently utilized to reduce turbidity during sample collection.

#### **2.7.2.23 Chromium**

Concentrations of chromium in groundwater were compared to the MCL (100 µg/L). Chromium results for samples collected prior to 2010 exceeded the MCL at 21 monitoring wells. Most of these monitoring wells are shallow, and all are constructed with stainless steel well screens. The chemical chromium is considered a COC because concentrations exceed the MCL. Based on previous observations made at other LHAAP sites (e.g., LHAAP-48 (Y-Area), LHAAP-49) regarding elevated levels of chromium due to potential corrosion of stainless steel well screens, it is believed that chromium, nickel, and vanadium are likely from the stainless steel well materials.

The PSI reported chromium detected in one monitoring well (47WW14) exceeding the MCL of 100 µg/L. 47WW14 has a stainless steel screen, which is a potential source of chromium at this location. Two wells sampled in 2007 and 2010 (47WW13, 47WW22), showed chromium exceedances. Both of these wells were constructed with stainless steel screens, and both were dry during the PSI.

#### **2.7.2.24 Cobalt**

Concentrations of cobalt in groundwater were compared to the TRRP Tier 1 Residential Groundwater PCL (240 µg/L). Cobalt results, including the PSI data, show no concentrations above the TRRP Tier 1 Residential Groundwater PCL. The chemical cobalt is considered a COC because cobalt concentrations in groundwater led to an HQ of 0.15. It is expected that future sampling





with low-flow methods will show lower concentrations since low-flow sampling is frequently utilized to reduce turbidity during sample collection.

#### **2.7.2.25 Manganese**

Concentrations of manganese in groundwater were compared to the background level and TRRP Tier 1 Residential Groundwater PCL (1,100 µg/L). The site background for manganese is 7,820 µg/L (Shaw, 2007c). The most recent manganese results, and all past results, were below the background level. The chemical manganese is considered a COC because the Baseline Risk Assessment used more conservative assumptions for assessing manganese risk and calculated an HQ of 1.6. It is expected that the manganese detected in past groundwater samples has a natural source and future sampling with low-flow methods will show lower concentrations since low-flow sampling is frequently utilized to reduce turbidity during sample collection. The samples used to establish the groundwater background levels in the 2007 background report were collected using low-flow methods.

#### **2.7.2.26 Nickel**

Concentrations of nickel in groundwater were compared to the TRRP Tier 1 Residential Groundwater PCL (490 µg/L). Historically, nickel results exceeded the TRRP Tier 1 Residential Groundwater PCL at four monitoring wells, 47WW08, 47WW22, LHSMW51 and LHSMW55. All of these monitoring wells are shallow, and all are constructed with stainless steel well screens. The chemical nickel is considered a COC because concentrations exceed the TRRP Tier 1 Residential Groundwater PCL. Based on previous observations made at other LHAAP sites (e.g. LHAAP-48 (Y-Area), LHAAP-49) regarding elevated levels of chromium due to potential corrosion of stainless steel well screens, it is believed that chromium, nickel, and vanadium are likely from the stainless steel well materials.

47WW08 and 47WW22 were dry during the 2018 PSI and LHSMW51 and LHSMW55 were not included in the PSI effort. The PSI reported that nickel was detected in one of the ten wells sampled for metals (47WW09) at 529 µg/L, exceeding the TRRP Tier 1 Residential Groundwater PCL of 490 µg/L. 47WW09 was constructed with a stainless steel well screen.

#### **2.7.2.27 Silver**

Concentrations of silver in groundwater were compared to the TRRP Tier 1 Residential Groundwater PCL (120 µg/L). Silver results, from 10 wells sampled during the 2018 PSI did not show any detected silver. Silver exceeded the TRRP Tier 1 Residential Groundwater PCL at one monitoring well, LHSMW51 in 1998 (LHSMW51 was not included in PSI effort). The chemical silver is considered a COC because concentrations exceeded the TRRP Tier 1 Residential Groundwater PCL in a past groundwater sample. It is expected that the silver detected in past groundwater samples is anomalous and future sampling with low-flow methods will show lower concentrations since low-flow sampling is frequently utilized to reduce turbidity during sample collection.

#### **2.7.2.28 Strontium**

Concentrations of strontium in groundwater were compared to the TRRP Tier 1 Residential Groundwater PCL (15,000 µg/L). The most recent strontium results, from the 2018 PSI, show concentrations above the TRRP Tier 1 Residential Groundwater PCL. Previous results included a single exceedance (19,000 µg/L) in a sample collected from 47WW17 during the RI. The chemical



strontium is considered a COC because strontium concentrations in groundwater led to an HQ of 0.31. It is expected that future sampling with low-flow methods will show lower concentrations since low-flow sampling is frequently utilized to reduce turbidity during sample collection.

#### **2.7.2.29 Thallium**

Concentrations of thallium in groundwater were compared to the MCL (2 µg/L). The most recent thallium results, from 10 wells sampled during the 2018 PSI did not show any MCL exceedances. Thallium exceeded the MCL at one well, 47WW07, in 2007 (47WW07 was not included in PSI effort). The chemical thallium is considered a COC because previous concentrations exceed the MCL. It is expected that the thallium detected in past groundwater samples is related to sampling technique and that future sampling with low-flow methods will show lower concentrations since low-flow sampling is frequently utilized to reduce turbidity during sample collection.

#### **2.7.2.30 Tin**

Concentrations of tin in groundwater were compared to the TRRP Tier 1 Residential Groundwater PCL (15,000 µg/L). Previous tin results exceeded the TRRP Tier 1 Residential Groundwater PCL at one well, 47WW02. The chemical tin is considered a COC because the tin concentration in one RI sample exceeded the TRRP Tier 1 Residential Groundwater PCL. It is expected that the tin detected in past groundwater samples is anomalous and that future sampling with low-flow methods will show lower concentrations since low-flow sampling is frequently utilized to reduce turbidity during sample collection.

Tin was detected in the sample from one well, 47WW41, at a concentration of 439 µg/L during the PSI investigation. The detected result is below the tin TRRP Tier 1 Residential Groundwater PCL of 15,000 µg/L. 47WW02 was not included in the PSI.

#### **2.7.2.31 Vanadium**

Concentrations of vanadium in groundwater were compared to the TRRP Tier 1 Residential Groundwater PCL (44 µg/L). Vanadium results, including the 2018 PSI, exceeded the TRRP Tier 1 Residential Groundwater PCL at one monitoring well, 47WW22 in 2007 (47WW22 was dry during the 2018 PSI). The chemical vanadium is considered a COC because concentrations exceed the TRRP Tier 1 Residential Groundwater PCL. Based on previous observations made at other LHAAP sites (e.g., LHAAP-48 (Y-Area), LHAAP-49) regarding elevated levels of chromium due to potential corrosion of stainless steel well screens, it is believed that chromium, nickel, and vanadium are likely from the stainless steel well materials.

### **2.7.3 Contaminant of Concern Summary**

Groundwater contaminants (COPCs) with a HQ greater than 0.1 are listed in **Table 2-2**.

Groundwater contaminants with carcinogenic risk greater than  $1 \times 10^{-6}$  are listed in **Table 2-3**. As above, MCLs were used for the evaluation. **Tables 2-2** and **2-3** also summarize the justifications for which of the COPCs should be classified as COCs. Many of the COCs have MCLs, which are the cleanup levels. For COCs that do not have an MCL, the TRRP Tier 1 Residential Groundwater PCLs were used for evaluation. **Table 2-8** presents the final list of COCs, along with cleanup levels. The COCs for the LHAAP-47 groundwater are nine VOCs (TCE, VC, 1,1-DCE, acetone, chloroform, PCE, 1,2-DCA, cis-1,2-DCE and trans-1,2-DCE), perchlorate, two SVOCs (pentachlorophenol and BEHP), thirteen metals (Aluminum, Antimony, Arsenic, Cadmium, Chromium, Cobalt, Manganese, Nickel, Silver, Strontium, Thallium, Tin and Vanadium) and three explosives (2,4,6-TNT, 2,4-DNT



and 2,6-DNT) due to their contribution to risk and exceedance of the MCL or TRRP Tier 1 Residential Groundwater PCL. Even though 2,3,7,8-TCDD, and 1,1,2-TCA indicate risk above  $1 \times 10^{-6}$ , the maximum concentrations are below the MCL, and they are not identified as COCs. Explosives 2,4-DNT and 2,6-DNT indicate risk above  $1 \times 10^{-6}$ , but the combined indicated risk is below  $1 \times 10^{-4}$ .

There are no COCs identified for surface water. Surface water monitoring will be performed to monitor the groundwater to surface water migration pathway. Monitoring levels have been identified for surface water based on the list of COCs in groundwater. These levels are presented in **Table 2-9**.

## 2.7.4 Summary of Ecological Risk Assessment

The ecological risk for LHAAP-47 was assessed as part of the installation-wide BERA (Shaw, 2007a) and BERA Addendum (AGEISS, 2014). For the BERA, the entire Installation was divided into three large sub-areas (i.e., the Industrial Sub-Area, Waste Sub-Area, and Low Impact Sub-Area) for the terrestrial evaluation. The individual sites at LHAAP were grouped into one of these sub-areas, which were delineated based on commonalities of historical use, habitat type, and spatial proximity to each other. The conclusions regarding the potential for chemicals detected at individual sites to adversely affect the environment must be made in the context of the overall conclusions of the sub-area in which the site falls. LHAAP-47 lies within the Industrial Sub-Area. The BERA concluded that no unacceptable risk was present in the Industrial Sub-Area (Shaw, 2007a) and therefore, no further action is needed at LHAAP-47 for the protection of ecological receptors.

After the BERA was completed in 2007, additional data review determined that some explosives results used in the BERA were invalid. Additional samples were collected during a data gaps investigation to replace the invalid results and the results were combined with the previously reported useable data and data from samples collected following completion of the BERA to re-evaluate the ecological risks. The results were reported in the BERA Addendum (AGEISS, 2014). The results of the re-evaluation indicated that the replacement data collected during the data gaps investigation confirmed the conclusions of the BERA that no explosives compounds in soil should be identified as COPECs in the industrial sub-area. These results do not change the determination that the soil contamination at LHAAP-47 does not pose an unacceptable risk (as defined in the BERA for Industrial Sub-Areas) to ecological receptors.

## 2.7.5 Basis of Action

The remedial action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances, pollutants, or contaminants into the environment. Actions for the groundwater are necessary to address the potential for human health risks in the unlikely event there is an attempt to use groundwater as a potable water source. **Table 2-7** and **2-8** present the COCs and their cleanup levels for soil and groundwater. Monitoring levels have been identified for surface water based on the list of COCs in groundwater and are presented in **Table 2-9**. Actions for the soil are necessary to address the migration pathways of perchlorate and TCE in soil into groundwater and perchlorate into surface water.

As it concerns the contaminated groundwater at LHAAP-47, a SDWA MCL has been identified for each of the COCs with the exception of perchlorate, acetone, 2,4,6-TNT, 2,4-DNT, 2,6-DNT, aluminum, cobalt, manganese, strontium, tin, vanadium, nickel and silver. For those COCs and by-





product (i.e., daughter) contaminants that have an MCL, the MCL constitutes the groundwater cleanup level to be attained. In the absence of federal drinking water standards, clean-up levels will be based on TRRP Tier 1 Residential Groundwater PCLs. With respect to the surface water that could be impacted by contaminated groundwater, the Texas Surface Water Quality Standards, or if Texas Surface Water Quality Standards are not available, the TRRP Tier 1 Residential Groundwater PCLs constitute the surface water standards to be met at the site for the COCs and by-product (i.e., daughter) contaminants to confirm that the remedial action objective (RAO) for groundwater to surface water migration is achieved.

## 2.8 Remedial Action Objectives

The RAOs for LHAAP-47, which address contamination associated with the media at the site and take into account the future uses of LHAAP surface waters, land and groundwater are:

- Protect future maintenance workers by preventing exposure to unacceptable levels of contaminants in groundwater via the groundwater ingestion pathway;
- Prevent perchlorate in soil from migrating to groundwater and surface water and prevent TCE in soil from migrating to groundwater;
- Prevent groundwater contaminated with perchlorate from migrating into nearby surface water;
- Return of groundwater to its potential beneficial use, wherever practicable, within a reasonable time period given the particular site circumstances (40 CFR §300.430(a)(1)(iii)(F)).

The above RAO recognizes USEPA's policy to return all groundwater to beneficial uses based on the programmatic expectation in the NCP and is consistent with the NCP regulations requiring the lead agency, the U.S. Army in this case, to establish RAOs specifying contaminants and media of concern, potential exposure pathways, and remediation goals ((40 CFR § 300.430(a)(1)(iii)(F)).

Per these RAOs, and consistent with the NCP, groundwater will be returned to its beneficial use, wherever practicable. In the absence of federal drinking water standards, the groundwater clean-up level at the Site is the TRRP Tier 1 Residential Groundwater PCL and is protective of human health and the environment.

## 2.9 Description of Alternatives

The 2012 Proposed Plan identified Alternative 2 as the preferred alternative. This alternative used a combination of ISB, Biobarriers, MNA with LTM, soil excavation and LUCs to achieve the RAOs. With the discovery of TCE residual DNAPL and TCE in soil near Building 46A during the 2018-2020 PSI, evaluation of additional treatment technologies was required because the 2011 FS that supported the Proposed Plan did not include technologies necessary to address the TCE source areas. The FS Addendum (HDR, 2021c) evaluated additional treatment technologies and re-evaluated technologies already identified for Alternative 2 to specifically address the residual TCE DNAPL and TCE in unsaturated soil near Building 46A. The Revised Proposed Plan (HDR, Inc. 2021a) identifies Alternative 2 modified to include the ERH ISTD technology as the preferred alternative. Alternatives 3 and 4 were also modified to include ERH ISTD.



Four alternatives (including No Further Action) have been evaluated. This section introduces the remedy components, identifies the common elements and distinguishing features of each alternative, and describes the expected outcomes of each.

## **2.9.1 Description of Common Remedy Components**

Except for the No Action alternative, the other remedial alternatives have the following common components: excavation of perchlorate-contaminated soil, ISB, MNA, LUCs, LTM, and Five-Year Reviews.

### **2.9.1.1 Excavation of Perchlorate-Impacted Soil**

Perchlorate-impacted soil extends to depths of 10 feet with an estimated volume of 9,000 cubic yards exceeding the GWP-Ind. Excavated soil will be sampled and tested to determine if it is a characteristic hazardous waste prior to transportation and disposal. Prior to excavation of soil, the plastic liner located on top of the perchlorate-impacted soil will be removed and disposed of appropriately. Excavation and disposal of the impacted soil will result in eliminating the potential continuing source for perchlorate impacts to groundwater and surface water. Confirmation sampling from the excavation area will be performed to verify that soil with perchlorate impacts exceeding the GWP-Ind value is removed. The excavation area will be backfilled with clean fill material and the surface will be restored.

### **2.9.1.2 In-Situ Bioremediation**

ISB encourages growth and reproduction of indigenous microorganisms to enhance biodegradation of organic constituents in the saturated groundwater zone. The microbiological processes are used to degrade or transform contaminants to ultimately less toxic or non-toxic forms. A substrate will be injected in the areas with high contaminant concentrations via injection points or wells. The selection of specific substrate will be determined during the RD phase.

Bioaugmentation, which involves introduction of microbial culture in the aquifer capable of degrading targeted organic constituents in the subsurface environment, may be implemented during ISB, if necessary. Prior to bioaugmentation, the aquifer material (soil) and groundwater in the proposed ISB area(s) will be tested to determine if the necessary microbes are indigenously present in the aquifer in adequate population count to stimulate ISB. Bioaugmentation with the appropriate culture will be performed only if the indigenous microbes are not present and it is determined that the microbial culture to be added will not be detrimental to the characteristics of the aquifer.

### **2.9.1.3 In-Situ Thermal Desorption**

Removal of residual DNAPL via thermal treatment and extraction will remove at least 99.9% according to the thermal treatment vendors, even within low permeability zones. In addition, rebound effects are expected to be negligible as long as target temperatures are achieved and maintained throughout the contaminated zone for the prescribed timeframe. Thermal treatment also heats the overlying soil to a lesser degree, which will be anticipated to promote more rapid biodegradation of COCs in soil hot spots overlying the areas of residual DNAPL. Thermal treatment also enhances mobilization of organic matter from the aquifer matrix to groundwater, which will enhance biodegradation of the COCs. The higher ambient soil temperature imposed by the thermal treatment process during startup and cool down periods will increase hydrolysis.



An ERH system consists of subsurface electrodes connected to direct current through the subsurface, and a vapor extraction system to capture the volatilized water and contaminants. In some cases, groundwater extraction is also used to lower the water table within the treatment zone during initial stages of treatment (prior to temperatures exceeding the boiling point of subsurface water) or to provide hydraulic control. Electrodes can be installed using several different drilling or direct-push techniques, including angled or horizontal methods.

ERH electrodes will be installed to treat the areas of residual TCE DNAPL identified in the Shallow and Upper Intermediate Zones near Building 46A. The heating of overlying soil is also anticipated to treat or increase biodegradation of TCE. Following completion of the ERH treatment, if soil contamination is still present at concentrations exceeding cleanup levels, a contingent remedy will be developed.

#### **2.9.1.4 Monitored Natural Attenuation**

MNA is a passive remedial technology that relies upon naturally occurring physical, chemical, and biological processes to reduce the mass and concentrations of groundwater COCs under favorable conditions over time along with groundwater monitoring to demonstrate how MNA is working.

MNA is effective when source releases have been addressed (such as by removal of soil impacted with perchlorate), and when plume is stable when there is a source or if the plume is shrinking, and it can be demonstrated that natural attenuation mechanisms are occurring. An MNA evaluation for LHAAP-47 site demonstrated that natural attenuation is occurring and is effectively controlling COCs in the shallow and intermediate groundwater zones outside of the well field area (Shaw, 2011). As described in Appendix A of the FS (Shaw, 2011), historical perchlorate and VOC data and geochemical indicators were evaluated for the groundwater at LHAAP-47 to determine if MNA can be used as a feasible remedy for chlorinated solvents and perchlorate present in the groundwater. The MNA evaluation concluded that reductions in concentrations of perchlorate, TCE, and other VOCs demonstrate that natural attenuation is occurring in the groundwater at LHAAP-47. Even though natural attenuation may not be currently active in some individual monitoring wells (rising or mixed TCE concentrations at 47WW09, 47WW25, LHSMW45, and LHSMW56), by evaluating the trends at monitoring wells with some of the highest TCE concentrations, it has been demonstrated that attenuation is occurring. Reduction of COC concentrations is occurring by reductive dechlorination at some locations, but is also occurring through other natural attenuation processes including dispersion, dilution, and sorption as shown by reduction of concentration with distance. Thus, this evaluation concludes natural attenuation is occurring at LHAAP-47. The time period required for natural attenuation is long (estimated up to 185 years), but the affected groundwater is not in use, and is not expected to be used in the future over that time period.

Monitoring activities associated with MNA would confirm the protection of human health and the environment by documenting the return of the groundwater to its potential beneficial use as a drinking water supply, by documenting reduction of the contaminant mass and protection of surface water through containment of the plume. Under MNA, regular monitoring will be conducted throughout the program to confirm that natural attenuation is progressing towards RAOs. If MNA is not found to be effective in areas outside of direct active treatment, additional ISB treatment in those areas will be implemented. Evaluation of any additional ISB treatment outside of the current target treatment areas will be determined based on the ISB and MNA performance evaluation. MNA is recommended in each of the active remedial alternatives for areas with lower COC concentrations because it has been demonstrated historically to reduce contaminant concentrations at LHAAP-47.



Since the time to achieve the clean-up objectives is longer for MNA than areas planned for active treatment, the time to achieve the clean-up objectives is the same in each active alternative.

MNA performance monitoring will be conducted quarterly for the first two years. After eight quarterly sampling events, MNA effectiveness will be evaluated. The analytical program will consist of VOCs, including chlorinated compounds and degradation products, methane, ethene, and ethane. Initially, the following geochemical parameters will also be included in the analytical program: dissolved oxygen (field), redox potential (field), sulfate, nitrate, total organic carbon, and ferrous iron (field).

### 2.9.1.5 LUCs

LUCs are any restriction or control, arising from the need to protect human health and the environment, that limits the use of and/or exposure to any portion of that property, including water resources.

LUCs performance objectives as part of the remedial alternatives (except the No Action alternative) are:

- LUC performance objective to restrict land use to nonresidential use until it is demonstrated that the COCs in soil and groundwater are at levels that allow for unlimited use and unrestricted exposure.
- LUC performance objective to prohibit potable use of groundwater above the cleanup levels until it is demonstrated that the COCs in groundwater are at levels that allow for unlimited use and unrestricted exposure.

LUCs would be implemented to support the RAOs. The LUC for groundwater would prevent human exposure to residual groundwater contamination presenting an unacceptable risk to human health and ensure that there is no withdrawal or use of groundwater beneath the sites for anything other than environmental monitoring and testing. The LUC to prohibit groundwater use (except for environmental testing and monitoring) as a potable source would remain until the levels of COCs in groundwater are met; to restrict land use to nonresidential until it is demonstrated that the surface and subsurface soil and groundwater COCs are at levels that allow for unlimited use and unrestricted exposure; and to maintain the integrity of any current or future remedial or monitoring systems until the levels of COCs in groundwater are met.

In addition, within 90 days of signature of this ROD, the Army shall request the Texas Department of Licensing and Regulation to notify well drillers of groundwater use prohibitions based on a preliminary LUC boundary. A LUC Remedial Design (RD) will be finalized as the land use component of the Remedial Design. Within 21 days of the issuance of the ROD, the Army will propose deadlines for completion of the RD Work Plan, RD, and Remedial Action Work Plan. The documents will be prepared and submitted to EPA and TCEQ pursuant to the FFA. The LUC RD will contain implementation and maintenance actions, including periodic inspections. The long-term groundwater and surface water monitoring and MNA performance monitoring will also be presented in the RD. Consistent with the dates presented for these documents, the U.S. Army shall: 1) request the Texas Department of Licensing and Regulation to notify well drillers of the final boundary of groundwater use prohibitions; and 2) notify the Harrison County Courthouse of the LUCs to include a map showing the areas of groundwater and nonresidential use restrictions, and the monitoring system at the site, in accordance with 30 TAC 335.565.



The Army will implement, maintain, monitor, report on and enforce land use controls at Army-owned property. The Army shall perform those actions related to land use control activities described in this ROD and in the Remedial Design for the ROD. For portions of the Site subject to land use controls that are not owned by the Army, the Army will monitor and report on the implementation, maintenance, and enforcement of land use controls, and coordinate with federal, state, and local governments and owners and occupants of properties subject to land use controls. The Army will provide notice of the groundwater and soil (surface and subsurface) contamination and any land use restrictions referenced in the ROD. The Army will send these notices to the federal, state and local governments involved at this site and the owners and occupants of the properties subject to those use restrictions and land use controls. The Army shall provide the initial notice within 90 days of ROD signature. The frequency of subsequent notifications will be described in the Remedial Design for the ROD. The Army remains responsible for ensuring that the remedy remains protective of human health and the environment. The Army will fulfill its responsibility and obligations under CERCLA and the NCP as it implements, maintains, and reviews the selected remedy. Although Army may later transfer these procedural responsibilities to another party by contract, property transfer agreement, or through other means, the Army shall retain ultimate responsibility for remedy integrity.

Upon transfer of Army-owned property, the Army will provide written notice of the land use controls to the transferee of the groundwater and soil (surface and subsurface) contamination and any land use restrictions referenced in the ROD. Within 15 days of transfer, the Army shall provide EPA and TCEQ with written notice of the division of implementation, maintenance, and enforcement responsibilities unless such information has already been provided in the LUC RD. The LUC RD will address the procedures to be used by the Army and the transferee to document compliance with the LUCs described in this ROD. In the event property is transferred out of Federal control, the land use controls relating to property and groundwater restrictions shall be recorded in the deed and shall be enforceable by the United States and the state of Texas.

To transfer LHAAP-47, an Environmental Condition of Property (ECP) document will be prepared and the Environmental Protection Provisions from the ECP will be attached to the letter of transfer. The ECP would include the LUCs as part of the Environmental Protection Provisions. The property will be transferred subject to the LUCs identified in the ECP. These restrictions would prohibit or restrict property uses that might result in exposure to the contaminated groundwater (e.g., drilling restrictions) or soil (e.g., residential land use prohibition).

The U.S. Army and regulators will consult to determine appropriate enforcement actions should there be a failure of a LUC objective at these sites after they have been transferred.

#### **2.9.1.6 Long-Term Monitoring**

LTM is the monitoring conducted after a remedy is selected and implemented, and is used to evaluate the progress and degree to which a remedial action achieves its objectives. Alternatives 2 through 4 at the LHAAP-47 site include long-term groundwater monitoring activities. LTM would include monitoring of a select number of groundwater wells to evaluate contaminant migration and ensure that the groundwater COC plume continues to degrade in a manner to achieve attainment of the groundwater cleanup levels.

The LTM will be performed quarterly for the first two years, followed by semi-annual monitoring for three years, and then annually until the next Five-Year Review and annually thereafter until recommended otherwise by the Five-Year Review and with concurrence from EPA and TCEQ.

## 2.9.2 Description of Alternatives

### 2.9.2.1 Alternative 1- No Further Action

As required by the NCP, the no action alternative provides a comparative baseline against which the action alternatives can be evaluated. Under this alternative groundwater will be left “as is,” without implementing any additional containment, removal, treatment, or other mitigating actions. No other actions will be implemented to reduce existing or potential future exposure to human and ecological receptors.

There are no costs associated with the No Action alternative.

*Estimated Total Direct Capital Cost: \$0*

*Estimated Total O&M Cost: \$0*

*Cost Estimate Duration: NA*

*Estimated Total PW Cost: \$0*

### 2.9.2.2 Alternative 2 – Excavation, ISTD, ISB, Biobarriers, MNA, LTM, and LUCs

The Revised Proposed Plan identifies the Modified Alternative 2 as the preferred alternative. This alternative uses a combination of ISB, ISTD, Biobarriers, MNA with LTM, soil excavation and LUCs to achieve the RAOs. Perchlorate contaminated soil will be excavated as described under common elements in **Section 2.9.1**.

The residual TCE DNAPL in groundwater and TCE in soil near Building 46A will be treated using ISTD. ERH technology will be used. An ERH system consisting of subsurface electrodes connected to direct current through the subsurface, with a vapor extraction system to capture the volatilized water and contaminants will be installed within the areas of DNAPL. ISB may be implemented following the ISTD treatment if VOC concentrations in groundwater are considered too high to be addressed only through MNA. The soil conditions will be evaluated following ISTD and if required, a contingency remedy to treat soil hot spots (for example, excavation or enhanced soil vapor extraction) will be developed and implemented to complete soil remediation.

ISB will be completed by injecting the selected substrate in a grid pattern into the secondary source area in the vicinity of wells which have identified VOCs at concentrations greater than 1,000 µg/L and/or perchlorate at concentrations greater than 20,000 µg/L and, if needed, near Building 46A following ISTD treatment.

Biobarriers are a variant of ISB and consist of ISB injection points arranged in a closely-spaced linear fashion to form a linear treatment zone. Biobarriers will treat groundwater contaminated with perchlorate and VOCs as the groundwater flows through the treatment zone, as opposed to direct injection into areas of high contaminant concentration. Biobarriers will be installed near the northern and southern perchlorate and VOC plumes, and at the southern edge of the perchlorate plumes near Goose Prairie Creek. Bioaugmentation, which consists of introduction of microbial cultures capable of degrading the organic constituents in the subsurface environment, will be performed if necessary.

MNA will be implemented to monitor continued reduction/degradation of COCs (VOCs, SVOCs, perchlorate, 2,4,6-TNT, 2,4-DNT, 2,6-DNT, and identified metals) in the treatment areas after completion of ISB treatment and also to monitor reduction/degradation of COCs in groundwater



outside of the influence of the ISB treatment areas. LTM and LUCs will be implemented as described in the common elements section (Section 2.9.1).

Preliminary estimates indicate that the groundwater will require 30 years in the treated areas, and more than 100 years to attain cleanup levels in non-treated areas based upon MNA duration for areas of the plume with lower COC concentrations (Shaw, 2011). The timeframes for this alternative are difficult to estimate due to the thin discontinuous nature of the more permeable lenses which facilitate treatment. If MNA is not found to be effective in areas outside of direct active treatment, additional treatment using ISB will be performed in these areas. The need for additional treatment using ISB will be determined based on ISB and MNA performance evaluation. For the purposes of alternative evaluation, the duration of this alternative is estimated to be approximately 30 years. Actual time to achieve RAOs is likely to be longer than this estimate. The monitoring parameters will include VOCs, SVOCs, TNT, 2,4-DNT, 2,6--DNT, and metals (those that may be mobilized by ISB).

The estimated PW costs for this Alternative are based on two years of quarterly monitoring followed by three years of semiannual monitoring; annual monitoring thereafter until the next Five-Year Review; and thereafter once every five years.

*Estimated Total Direct Capital Cost: \$7.16 million*

*Estimated Total O&M Cost: \$3.09 million*

*Cost Estimate Duration: 30 years*

*Estimated Total Cost: \$10.25 million*

*Estimated Total PW Cost: \$9.33 million*

### **2.9.2.3 Alternative 3 – Excavation, ISTD, Re-circulating ISB, MNA, LTM, LUCs**

This alternative uses a combination of ISTD, ISB with groundwater re-circulation, MNA with LTM, soil excavation and LUCs to achieve the RAOs. Perchlorate contaminated soil will be excavated as described under common elements in **Section 2.9.1**. ISB along with groundwater re-circulation, ISTD, MNA, and LTM will be used to address COCs in site groundwater.

ISTD would be implemented as described in Alternative 2.

For the ISB, the selected substrate will be injected in a grid pattern into the secondary source areas near monitoring wells 47WW25 and LHSMW56. Bioaugmentation will be performed as necessary to introduce the appropriate kind of microbial culture into the subsurface environment.

Re-circulation zones will be established in target areas that have elevated COCs to enhance their degradation rates. Groundwater is extracted from downgradient wells in a target area, mixed with microbes and a carbon source and then reinjected in upgradient wells in a re-circulating process. The re-circulation component is expected to increase effectiveness of bioremediation by increased mixing and improving contact between contaminants and injected substrate and microbes, leading to accelerated achievement of clean-up objectives in re-circulation areas.

LTM and LUCs will be implemented as described in the common elements section (**Section 2.9.1**).



Preliminary estimates indicate that the groundwater will require 30 years in the treated areas, and more than 100 years to attain cleanup levels in non-treated areas based upon MNA duration for areas of the plume with lower COC concentrations (Shaw, 2011). The timeframes for this alternative are difficult to estimate due to the thin discontinuous nature of the more permeable lenses which facilitate treatment. If MNA is not found to be effective in areas outside of direct active treatment, additional treatment using ISB will be performed in these areas. The need for additional treatment using ISB will be determined based on ISB and MNA performance evaluation. For the purposes of alternative evaluation, the duration of this alternative is estimated to be approximately 30 years. Actual time to achieve RAOs is likely to be longer than this estimate.

The estimated PW costs for this Alternative are based on two years of quarterly monitoring followed by three years of semiannual monitoring; annual monitoring thereafter until the next Five-Year Review; and once every five years for the next 30 years.

The O&M of the re-circulation component will include periodic inspections of the system for leaks from pipelines, tanks, pumps, or equipment and is anticipated to last for five years or less.

*Estimated Total Direct Capital Cost: \$10.28 million*

*Estimated Total O&M Cost: \$3.09 million*

*Estimated Total Cost: \$13.36 million*

*Estimated Total PW Cost: \$12.6 million*

*Cost Estimate Duration: 30 years*

#### **2.9.2.4 Alternative 4 – Excavation, ISTD, Pump and Treat, ISB, MNA, LTM and LUCs**

This alternative uses a combination of ISTD, pump and treat technology, ISB, MNA with LTM, soil excavation and LUCs to achieve the RAOs. Perchlorate contaminated soil will be excavated as described under common elements in **Section 2.9.1**.

ISTD would be implemented as described in Alternative 2.

A pump and treat system will target groundwater in areas with highest COC concentrations and MNA will be implemented in areas outside the pump and treat zones until COCs (VOCs, SVOCs, perchlorate, 2,4,6-TNT, 2,4-DNT, 2,6-DNT, and identified metals) attain respective cleanup levels. Areas in the vicinity of wells with high COC concentrations, but which have insufficient groundwater yield for effective pumping and treatment will be treated via ISB.

Pump and treat is a technology in which contaminated groundwater is extracted via a network of groundwater extraction wells and treated above-grade to remove or neutralize the contaminants. Pump and treat at LHAAP-47 site will consist of extraction wells in target areas with high COC concentrations and sufficient yield available for effective pumping. Extracted groundwater will be transported and treated at the existing groundwater treatment plant (GWTP) at Burning Ground No. 3. The treated effluent will be required to meet applicable discharge criteria.

ISB will be applied in target areas that have high COC concentrations but have insufficient groundwater yield for effective pumping operation. Three target areas were identified in the 2011 FS (LHSMW43, LHSMW56, and 47WW25). However, specific locations for ISB will be identified based on current conditions during the RD.





LTM and LUCs will be implemented as described under common elements in **Section 2.9.1**.

Preliminary estimates indicate that the groundwater will require 30 years in the treated areas, and more than 100 years to attain cleanup levels in non-treated areas based upon MNA duration for areas of the plume with lower COC concentrations (Shaw, 2011). The timeframes for this alternative are difficult to estimate due to the thin discontinuous nature of the more permeable lenses which facilitate treatment. If MNA is not found to be effective in areas outside of direct active treatment, additional treatment using ISB will be performed in these areas. The need for additional treatment using ISB will be determined based on ISB and MNA performance evaluation. For the purposes of alternative evaluation, the duration of this alternative is estimated to be approximately 30 years. Actual time to achieve RAOs is likely to be longer than this estimate.

The estimated PW costs for this Alternative are based on two years of quarterly monitoring followed by three years of semiannual monitoring; annual monitoring thereafter until the next Five-Year Review; and once every five years thereafter for thirty years.

O&M of the pump and treat system will include periodic inspections of the system for leaks from pipelines, tanks, pumps, or equipment. Maintenance for pumps and equipment is assumed to be done once every 10 years.

*Estimated Total Direct Capital Cost: \$7.24 million*

*Estimated Total O&M Cost: \$8.07million*

*Cost Estimate Duration: 30 years*

*Estimated Total Cost: \$15.32 million*

*Estimated Total PW Cost: \$12.95 million*

### **2.9.2.5 Distinguishing Features of Action Alternatives**

#### **Alternative 2**

The distinguishing features of Alternative 2 are the inclusion of an in situ enhanced bioremediation by direct injection in grid or biobarrier configuration.

#### ***In-Situ Bioremediation***

The ISB target treatment areas including the secondary source area via direct push injections are targeted in the vicinity of wells which have identified VOCs at greater than 1,000 µg/L and perchlorate at greater than 20,000 µg/L. ISB will be used to treat groundwater near Building 46A following the ERH implementation if VOC concentrations greater than 1,000 µg/L remain. This technology uses a substrate and, if necessary, a bioaugmentation culture to create conditions favorable for reductive dechlorination. Substrate may include a wide variety of carbon sources: sugars (molasses), alcohols (methanol, ethanol), volatile acids (acetate, lactate), or wastes (food processing, manure). Additional direct injection events in the secondary source area may be conducted as necessary, as well as possibly other areas. Injection points will be installed using DPT at an approximate spacing of 20 feet between points. It is anticipated that the substrate will be injected once, and that the injection would occur in the contaminated interval at approximately 30 feet bgs.



### ***Biobarriers***

Biobarriers will be used to treat other targeted areas within the plume. Biobarriers are expected to provide treatment and thus prevent down gradient migration of COCs. Biobarriers will be installed by closely spaced injection points in the shallow and intermediate zones near the leading edges of the northern and southern plumes to mitigate the risk of contaminant migration into Goose Prairie Creek. For biobarrier application, the carbon source chosen would require longevity, such as emulsified vegetable oil (EVO) or a proprietary mix. The biobarriers are assumed to be installed in the first year, then follow-up injections will be administered as necessary to ensure that the conditions conducive to ISB are maintained.

### **Alternative 3**

The distinguishing feature of Alternative 3 is the implementation of ISB using direct injection and via re-circulation of the groundwater (injected with the substrate solution).

#### ***In-Situ Bioremediation***

This is same as discussed under Alternative 2.

#### ***Re-circulating ISB***

Re-circulation zones will be established in target treatment areas which have elevated COCs. Extraction and injection wells will be used to re-circulate groundwater in these zones. The re-circulation component is expected to accelerate bioremediation by increased mixing and improving contact between contaminants and injected substrate and microbes.

### **Alternative 4**

The distinguishing feature of Alternative 4 is the inclusion of a pump and treat system in addition to ISB as the active treatment technology.

The pump and treat system will consist of extraction wells in target areas with high COC concentrations and sufficient yield available for effective pumping. Extracted groundwater will be transported and treated at the existing GWTP at Burning Ground No. 3. The treated effluent is required to meet applicable discharge criteria.

## **2.9.3 Expected Outcomes of Each Alternative**

Alternative 1 would allow the site to remain a potential hazard to human receptors due to the potential ingestion of contaminated groundwater; and to the environment due to overland transport of contaminants to surface water in Goose Prairie Creek and groundwater discharge to Goose Prairie Creek in the event groundwater elevations return to pre-drought elevations. Alternatives 2 through 4 all provide treatment or removal of the contaminated soil and groundwater to meet COC cleanup levels that will be protective of human receptors and the environment. The three action alternatives therefore have very similar outcomes of preventing exposure to contaminated groundwater by utilizing either in-situ or ex-situ technologies, or both, in combination with LUCs. Alternatives 2 through 4 use ERH to treat residual TCE DNAPL and other VOCs near Building 46A. Alternatives 2 and 3 rely solely on ISB technology to treat other areas with highest COC concentrations. Alternative 4 relies primarily on groundwater extraction and takes advantage of an existing treatment system at LHAAP. All three action alternatives would also be protective of the surface waters of Goose Prairie Creek through a variety of treatment approaches.



The similar outcomes include restoration of the contaminated groundwater by attainment, to the extent practicable, of the SDWA MCLs for those COCs and by-product (i.e., daughter) contaminants that have an MCL, consistent with 40 CFR §300.430(e)(2)(i)(B&C). In the absence of federal drinking water standards, the cleanup levels for perchlorate, acetone, explosives, and seven metals will be based on the TRRP Tier 1 Residential Groundwater PCLs (**Table 2-8**). In addition, the LTM associated with Alternatives 2 through 4 would confirm the protection of human health and the environment by documenting the return of groundwater to its potential beneficial use as a drinking water supply, by documenting reduction of contaminant mass, and protection of surface water through containment of the plume. The LUC to prohibit groundwater use (except for environmental testing and monitoring) as a potable source until the levels of COCs are at levels that allow for unlimited use and unrestricted exposure; and to maintain the integrity of any current or future remedial or monitoring systems until the levels of COCs in groundwater are met.

## 2.10 Summary of Comparative Analysis of Alternatives

Nine criteria identified in 40 CFR §300.430(e)(9)(iii) are used to evaluate the different remediation alternatives individually and against each other in order to select a remedy. This section profiles the relative performance of each alternative against the nine criteria, noting how it compares to the other options under consideration. The nine evaluation criteria are discussed below. **Table 2-10** summarizes the comparative analysis of the alternatives.

### 2.10.1 Overall Protection of Human Health and the Environment

Overall protection of human health and the environment is the primary objective of a remedial action. The No Action Alternative will not achieve the RAOs and does not protect human health or the environment because no remedial activities will be conducted and no LUCs will be maintained. Therefore, LHAAP-47 contamination would present the potential for unacceptable risks to human health and the environment through ingestion of groundwater. The other three alternatives, collectively referred to as the action alternatives, are expected to achieve the RAOs for LHAAP-47 site. Alternatives 2, 3, and 4 include removal of the soil that may act as a continuing source of perchlorate contamination to groundwater and ISTD to actively treat residual TCE DNAPL in groundwater near Building 46A. Active treatment in Alternative 2 is performed solely in the subsurface environment. Impacted groundwater is brought to the surface in Alternative 3 and Alternative 4 which has the potential for human exposure. Alternatives 2, 3, and 4 all provide overall protection of human health and the environment. LUCs for groundwater would protect human health by preventing potable use of contaminated groundwater above cleanup levels until the levels of COCs allow for unlimited use and exposure.

### 2.10.2 Compliance with ARARs

CERCLA, 42 U. S. C. §9621(d) and 40 CFR §300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations, which are collectively referred to as “ARARs” unless such ARARs are waived under 42 U. S. C. §9621(d)(4). The ARARs that pertain to this ROD are discussed in **Section 2.13.2**.

Alternative 1 does not comply with chemical-specific ARARs as no remedial action or measure will be implemented. Location and action-specific ARARs do not apply to Alternative 1 since no remedial



activities will be conducted. Alternatives 2, 3, and 4 are expected to comply with chemical-specific, location-specific, and action-specific ARARs.

### **2.10.3 Long-Term Effectiveness and Permanence**

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once clean-up levels have been met. This criterion includes the consideration of residual risk that will remain onsite following remediation and the adequacy and reliability of controls.

Alternative 1 would not be effective in the long-term because no contaminant removal or treatment will take place and no active measures will be implemented to control risks posed by the contaminated site. Alternatives 2, 3, and 4 all offer a similar level of long-term effectiveness and permanence provided the underlying technologies (ISTD, ISB and pump and treat technology) are effective. Alternatives 2 through 4 use ERH to treat the residual TCE DNAPL. Alternatives 2 and 3 primarily rely upon ISB and its effectiveness and longevity is dependent upon the substrate used and microbial processes. Alternative 4 has the additional benefit of providing some level of hydraulic control of the plume via groundwater pumping, provided that conditions are favorable for such a system. In Alternative 4, the extracted groundwater will be treated and discharged to the existing GWTP. Alternatives 2, 3, and 4 all may require contingency remedies once remedies are in place and have been monitored over a period of time. Alternatives 2, 3, and 4 also rely upon LUCs for long-term protection of human health and the environment.

### **2.10.4 Reduction of Toxicity, Mobility, or Volume through Treatment**

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

Alternative 1 does not include treatment and would not result in a reduction of toxicity, mobility, or volume of contaminants except through natural attenuation processes, although the progress will be unmonitored and undocumented.

The soil excavation component of Alternatives 2, 3, and 4 provides a reduction in volume and mobility because perchlorate is removed from the site and placed in a permitted disposal facility. Reduction in toxicity and volume of perchlorate at the site will be achieved, but overall reduction will depend upon any treatment processes that may be applied by the disposal facility.

The ISTD component of Alternatives 2, 3, and 4 provides a reduction of toxicity, mobility, and volume of residual TCE DNAPL in the area around building 46A. ISTD is projected to reduce concentrations by up to 99%. ISTD is a very robust technology for treatment of VOCs, even if present as DNAPL, and minimal technical concerns exist that will hinder its implementation. The boiling point of TCE is 87 °C and since ERH will heat the groundwater to 100 °C, the TCE will volatilize readily. In addition, TCE tends to break down rapidly at these elevated temperatures. TCE breakdown products have lower boiling points and will volatilize and be captured by soil vapor extraction and subsequently destroyed in the emission control system.

Alternatives 2 and 3 offer a similar degree of reduction of toxicity, mobility, and volume of groundwater contaminants through treatment in areas with VOCs at concentrations greater than 1,000 µg/L and/or perchlorate at concentrations greater than 20,000 µg/L. Alternative 2 is designed to treat groundwater via ISTD and direct injection bioremediation and installation of biobarriers.



Alternative 3 is designed to treat groundwater via a combination of ISTD, direct injection and re-circulation bioremediation. The degree of reduction in toxicity, mobility or volume in alternatives 2 and 3 will depend upon how quickly the microbes use the substrate and degrade the COCs.

A similar degree of reduction of toxicity, mobility, and volume of contaminated groundwater will be achieved by Alternative 4 in areas with VOCs at concentrations greater than 1,000 µg/L and/or perchlorate at concentrations greater than 20,000 µg/L through a combination of ISTD, extraction and in-situ treatment. The volume of contaminants in site groundwater will be reduced via extraction and mobility will be reduced by to the extent hydraulic control is achieved. Toxicity of the extracted groundwater will be reduced by subsequent treatment in the GWTP at Burning Ground No. 3. Alternative 4 also reduces toxicity, mobility, and volume through in-situ treatment via direct injection ISB of secondary source areas lacking sufficient permeability for implementation of the pump-and-treat technology, and MNA of the remaining areas of groundwater contamination.

### **2.10.5 Short-Term Effectiveness**

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community, and the environment during construction of the remedy.

Alternative 1 does not involve any remedial actions; therefore, no short-term risks to workers, the community, or the environment would exist.

Alternatives 2, 3, and 4 involve utilization of excavation, drilling and construction equipment and also pose operational safety hazards to on-site workers. The implementation of Alternatives 2, 3, and 4 will require more time than Alternative 1 due to pre-design activities and RD. For Alternatives 2, 3, and 4, vegetation clearing throughout the well field and vicinity near Building 46A will be required to install heater and monitoring wells and surface equipment required for the ISTD process. The implementation of proper engineering controls will minimize the risk of environmental impacts.

Alternative 3 involves some level of O&M due to the re-circulation component, but the re-circulation component is expected to improve degradation rates significantly over direct injection bioremediation alone, thus reducing the duration of this alternative.

Alternative 4 is construction and O&M intensive due to the pump and treat component, thereby providing greater potential for short-term physical safety risks to on-site workers or visitors.

Through LUCs and engineered controls (e.g., administrative controls, and dust suppression), the three action alternatives will be protective of the community during implementation. By planning the construction, excavation, and transportation activities in accordance with industry and OSHA codes and requirements, risks from contaminant exposure and construction operations will be controlled to acceptable levels. Appropriate personal protective equipment will be required for remediation workers.

### **2.10.6 Implementability**

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.



Administratively, all of the alternatives are implementable. Under Alternative 1, no remedial action will be taken. Therefore, there will be no difficulties or uncertainties with implementation.

Alternatives 2, 3, and 4 can easily be implemented from a technical standpoint as all equipment, materials, and services required are readily available. The excavation, MNA, LTM, and LUCs portions of Alternatives 2, 3, and 4 are all equivalent, so the primary differences in implementability result from differences in the active treatment of groundwater in these alternatives. The equipment and materials required to implement ISTD are generally commercially available, although some parts may be covered under patents. All equipment, services and materials are readily available to conduct the activities for this technology. The LHAAP GWTP is already operational and can be used to dispose of any extracted groundwater associated with the ISTD implementation. Alternatives 2, 3, and 4, require some vegetation removal to allow installation of the ERH electrodes, and provision of power will be required for the duration of the ERH operation.

The U.S. Army will meet substantive requirements for underground injection control and obtain TCEQ approval for the active alternatives (Alternatives 2, 3, and 4) prior to implementation of the ISB and groundwater re-circulation component.

Among active alternatives, Alternative 2 is the easiest to implement. Biobarriers and direct injection bioremediation may be implemented with minimal studies or testing. No permanent piping will be necessary.

Alternative 3 requires provision of power and piping for the groundwater re-circulation component and design and testing of wells and control systems may be necessary.

Alternative 4 is the most difficult to implement, involving construction and operation of a groundwater extraction system which will require provision of power and piping, as well as design and testing of wells and control system. The collection tank and pipeline to the existing GWTP will require additional construction and modifications and improvements to the existing GWTP and control system, in addition to more O&M costs for equipment repair, maintenance and potential replacement over the remedy duration.

### **2.10.7 Cost**

Cost estimates are used in the CERCLA process to eliminate those remedial alternatives that are significantly more expensive than competing alternatives without offering commensurate increases in performance or overall protection of human health or the environment. The cost estimates developed are preliminary estimates with an intended accuracy range of –30 to +50 percent. Final costs will depend on actual labor and material costs, actual site conditions, productivity, competitive market conditions, final scope, final schedule, final engineering design, and other variables.

The cost estimates include capital costs (including fixed-price remedial construction) and long term O&M costs (post-remediation). PW costs were developed for each alternative assuming a discount rate of 2.8 percent. No costs are associated with Alternative 1 because no remedial activities will be conducted. Of the action alternatives, Alternative 2 is the least expensive, followed by Alternative 3, and then Alternative 4, which is the most expensive alternative. The PW costs for the alternatives are summarized below.





Alternative 1 Total PW Cost: \$0

Alternative 2 Total PW Cost: \$9.33 million

Alternative 3 Total PW Cost: \$12.6 million

Alternative 4 Total PW Cost: \$12.95 million

### **2.10.8 State/Support Agency Acceptance**

The USEPA and TCEQ have reviewed the Proposed Plan and the Revised Proposed Plan, which presented Alternative 2 and the Modified Alternative 2 respectively, as the preferred alternative. Comments received from the USEPA and TCEQ during the Proposed Plan and Revised Proposed Plan development have been incorporated. Both agencies concur with the selected remedial action.

### **2.10.9 Community Acceptance**

Community acceptance is an important consideration in the final evaluation of the selected remedy. Public comments were received during the 30-day public comment periods for the Proposed Plan and Revised Proposed Plan, respectively, and during the January 9, 2013 and July 21, 2021 public meetings. The topics of the comments for the January 2013 public meeting and comment period included: time to complete, evidence of natural attenuation occurrence, MNA effectiveness, estimation of natural attenuation rates, hydraulic conductivity estimation, metal remediation, perchlorate cleanup standard, and surface water modeling. The topics of comments for the July 2021 meeting and comment period included: time to complete, evidence of natural attenuation occurrence, MNA effectiveness, estimation of natural attenuation rates, hydraulic conductivity estimation, metal remediation, perchlorate cleanup standard, surface water modeling, prior implementation of thermal technologies, schedule for remedial implementation, power source for the thermal technology, treatment temperature for the technology, presence of arsenic in groundwater, and need for re-evaluation of background levels.

The written comments received, and their responses are presented in the Responsiveness Summary (**Section 3.0**).

## **2.11 Principal Threat Wastes**

Perchlorate contaminated soil is considered as a principal threat waste at the LHAAP-47 site. The perchlorate contaminated soil provides a source for perchlorate impacts to groundwater (via the impacted soil leaching to groundwater pathway) as well as to surface water (via the overland impacted surface soil migration into surface water). The migration pathways are temporarily mitigated with the liner placed on top of the perchlorate impacted soil. An estimated volume of approximately 9,000 cubic yards of perchlorate impacted soil represents the principal threat. The TCE concentrations reported in groundwater near Building 46A are high enough to be considered a highly toxic source material and indicate TCE in the saturated zone in this area is a principal threat waste. The areas of residual DNAPL in groundwater have a combined estimated volume of 237,799 - 532,669 gallons in the Shallow Zone, and one larger area of residual DNAPL in groundwater in the Upper Intermediate Zone has an estimated volume of 261,890 – 586,634 gallons.



## 2.12 The Selected Remedy

### 2.12.1 Summary of Rationale for the Selected Remedy

Alternative 2, consisting of excavation of perchlorate impacted soil, ISTD, ISB, biobarriers, MNA, LTM, LUCs and Five Year Reviews is the selected alternative for LHAAP-47 and is consistent with the intended future use of the site as a national wildlife refuge. This alternative would satisfy the RAOs for the site through the following:

- Excavation of the perchlorate impacted soil and disposal in a permitted landfill will result in the removal of soil that is a potential source of perchlorate contamination to groundwater and surface water. With the removal of this soil, the potential migration of perchlorate from soil to groundwater and surface water will be eliminated and long-term operations/management for impacted soil would not be required.
- Groundwater within the areas of Residual TCE DNAPL near Building 46A will be thermally treated using ERH. This consists of installing an array of electrodes and heating the groundwater to the boiling point. The steam produced from pore-water serves as a medium to carry out volatilized VOCs for capture via SVE and subsequent ex-situ treatment of extracted vapors. The halo-effect of the heating is also expected to treat the TCE in soil overlying the plumes.
- Groundwater will be treated in target areas using ISB. This consists of implementing ISB near target areas and Building 46A following ERH implementation, if necessary. Areas with VOCs greater than 1,000 µg/L or perchlorate greater than 20,000 µg/L are expected to be the target areas.
- Biobarriers will be installed near the leading edges of the northern and southern perchlorate and VOC plumes, and at the southern edge of the perchlorate plume near Goose Prairie Creek to mitigate the risk of contaminant migration into Goose Prairie Creek.
- MNA for areas outside the influence of the active treatment will provide protection of human health and the environment by documenting that further reductive dechlorination is occurring within the groundwater plume and that contaminant concentrations are being reduced to attain surface water and groundwater standards/levels.
- The LUC to prohibit groundwater use (except for environmental testing and monitoring) as a potable source will be implemented to ensure protection of human health by preventing exposure to groundwater until the levels of COCs in groundwater are met. The LUC restricting land use to nonresidential will be implemented until it is demonstrated that the surface and subsurface soil and groundwater COCs (i.e., including all hazardous substances, pollutants, and contaminants found at the Site at cleanup levels as listed in **Table 2-8**) are at levels that allow for unlimited use and unrestricted exposure. The LUC to maintain the integrity of any current or future remedial or monitoring systems will be implemented until the levels of COCs in groundwater are met.
- Long-term monitoring and reporting would continue until the cleanup levels are achieved in groundwater to confirm protection of human health by preventing exposure to groundwater until cleanup levels are met.





The selected remedy employing treatment will significantly reduce contaminant concentrations. The performance of MNA will be evaluated after completion of quarterly sampling for eight events. If MNA is not found to be effective in areas outside of direct active treatment, additional treatment using ISB will be performed in those area. The need for additional treatment using ISB will be determined based on ISB and MNA performance evaluation.

Five-Year Reviews will be performed to document that the remedy remains protective of human health and the environment.

Alternative 2 is readily implementable and has no significant short-term risks to worker health and safety or to the community. The PW cost of Alternative 2 is lower than the other remedial alternatives except for Alternative 1. Based on the information currently available, the U.S. Army believes that the selected alternative meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to 42 U. S. C. §121(b) criteria used to evaluate remedial alternatives. The selected alternative will 1) be protective of human health and the environment; 2) comply with ARARs; 3) be cost-effective; 4) utilize permanent solutions; and 5) utilize treatment as a principal element.

The U.S Army will present details of the ISTD, ISB and biobarrier implementation, groundwater and surface water monitoring plan, LUC RD, and the MNA remedy implementation in the RD for LHAAP-47.

## 2.12.2 Description of the Selected Remedy

The selected remedy, Alternative 2, was outlined in **Section 2.9**; that description is expanded in the following discussion. The remedy may undergo modifications as a result of the RD and construction processes. Modifications of the remedy described in the ROD will be documented using a technical memorandum in the Administrative Record, an Explanation of Significant Differences (ESD), or a ROD amendment.

The major components of the remedy and the contingency remedies include:

- **ERH (ISTD).** Use of ERH as a thermal treatment to remediate the areas of residual TCE DNAPL near Building 46A is expected to effectively remediate the groundwater and reduce TCE concentrations by up to 99%. **Figure 2-10** shows the areas of residual TCE DNAPL greater than 10,000 µg/L in the shallow and intermediate zone groundwater targeted for ERH treatment. ERH involves the application of electrical current through the subsurface, resulting in the generation of heat. ERH uses the natural electrical resistance within the subsurface where energy is dissipated through ohmic, or resistive losses. This manner of in-situ heating allows energy to be focused into a specific source zone. When the subsurface temperature is increased to the boiling point of the pore water or the saturated media in the treatment zone, steam is generated. The steam strips contaminants from the aquifer matrix and enables them to be extracted from the subsurface. In addition, contaminants are directly volatilized from unsaturated soil.

An ERH system consists of subsurface electrodes connected to direct current through the subsurface, and a vapor extraction system to capture the volatilized water and contaminants. In some cases, groundwater extraction is also used to lower the water table within the treatment zone during initial stages of treatment (prior to temperatures exceeding the boiling point of subsurface water) or to provide hydraulic control.



Typically, utility (60 Hertz) electrical power is used with power conversion equipment to regulate voltage or to convert the phase characteristics of the power. Multi-phase heating requires additional space for a transformer (typically mounted on a standard tractor trailer), which can also be designed to include voltage controls. Vapor extraction systems are typically used to remove volatilized water and contaminants from the subsurface. The vapor extraction and aboveground treatment equipment include blowers, condensate removal system, emission control system (refrigerated condenser, thermal/catalytic oxidizer or activated carbon) and associated control equipment. Higher temperature conditions should be considered when designing extraction and monitoring wells and associated equipment for the treatment area. Existing equipment may require modifications or replacement to accommodate these elevated temperature conditions. The design of the electrode field and required supporting technologies will be developed during the RD.

- **In Situ Bioremediation.** The desired outcome will be to reduce contaminant mass and lower the contaminant concentrations in hot spots. For the purposes of costing, target areas were assumed to be near monitoring wells 47WW09, 47WW25, 47WW30, 47WW34, LHSMW43, and LHSMW56 with VOCs greater than 1,000 µg/L or near well LHSMW60 where perchlorate is greater than 20,000 µg/L. ISB will be used for any remaining hot spots near Building 46A following ERH implementation. The target areas including the horizontal and vertical target zones will be further refined during the RD phase. Appropriate substrates for in-situ bioremediation of the TCE and perchlorate hot spots will be identified during the RD phase.

The COCs at LHAAP-47 can degrade under anaerobic conditions under different mechanisms and redox requirements. Therefore, the addition of a carbon source will encourage the growth of microorganisms in the subsurface. A microbial culture will be added, if necessary, to provide microbial species specifically able to degrade TCE and its daughter products to harmless end products. A substrate injection of the carbon source and bioaugmentation culture into the aquifer will be accomplished utilizing direct push technology. Carbon source includes a wide variety of nutrients: sugars (molasses), alcohols (methanol, ethanol), volatile acids (acetate, lactate), or wastes (food processing, manure). The injection would occur in the contaminated interval, at approximately 30 feet bgs. Additional future injections may occur near well 47WW25 and additional locations, if necessary to support continued remediation in the target area. The number of DPT injection points and the injection volumes, as well as the appropriate substrate, will be finalized in the RD. A substrate specific to perchlorate will be developed and used to treat perchlorate hot spots.

- **Biobarriers.** Biobarriers will be installed near the leading edges of the northern and southern perchlorate and VOC plumes, and at the southern edge of the perchlorate plume near Goose Prairie Creek (**Figure 2-10**). Biobarriers will be installed by closely spaced injection points in the shallow and intermediate zones. A substrate will be injected in the target treatment areas via injection points or wells. The selected substrate is expected to enable native microorganisms to create favorable conditions for degradation of the COCs. A bioaugmentation culture may be introduced, if necessary, to the subsurface environment to provide appropriate microbes able to degrade the COCs to non-toxic end products. The biobarriers will be installed in the first year, then follow-up injections will be administered as necessary to ensure that the conditions conducive to biological processes are maintained.



The specific locations for biobarriers, substrate selection and injection frequency will be determined in the RD.

- **Excavation.** Perchlorate impacted soil extends to depths of 10 feet with an estimated volume of 9,000 cubic yards based on historical soil sampling exceedances of the GWP-Ind value. The extent of perchlorate-contaminated soil to be removed is shown on **Figure 2-10**. Excavated soil will be sampled to determine if it is a characteristic hazardous waste prior to transportation and disposal. Prior to excavation of perchlorate impacted soil, the plastic liner located on top of the perchlorate impacted soil will be removed and appropriately disposed. Pre-excavation sampling will also be completed to confirm planned extent of excavation based upon the clean-up objectives. Confirmation sampling will be completed along the sidewalls and floor of the excavation, with excavation proceeding until the clean-up objective of the GWP-Ind are achieved. If groundwater intrusion is present in the excavation, water will be managed and disposed of at the GWTP until the excavation reaches 10 feet in depth. If residual contamination exists in soil at this depth it will be addressed under the groundwater remedy for the site. Excavation and disposal of the soil will result in eliminating the potential continuing source for perchlorate impacts to groundwater and surface water. The excavation area will be backfilled with certified clean backfill soil located from an off-site source.
- **Monitored Natural Attenuation.** An MNA evaluation for LHAAP-47 site demonstrated that natural attenuation is occurring and is effectively controlling COCs in the shallow and intermediate groundwater zones outside of the well field area (Shaw, 2011). Under MNA, regular monitoring will be conducted throughout the program to confirm that natural attenuation is progressing towards the groundwater cleanup levels. Select wells will be monitored for eight consecutive quarters to evaluate and confirm the occurrence of natural attenuation in conjunction with historical data. Data from the eight quarterly events will be combined with historic data to evaluate the effectiveness of various natural physical, chemical, and biological processes in reducing contaminant concentrations. If MNA is not found to be effective in areas outside of direct active treatment, a contingency remedy may be implemented. The contingency remedy will be determined based on aquifer conditions at that time.
- **Groundwater Monitoring.** Groundwater monitoring will be conducted to evaluate inorganic COCs and other COCs that have either not previously shown exceedances of cleanup levels or have infrequently or only historically exceeded cleanup levels specified in **Table 2-8**. The need to continue groundwater monitoring for this purpose will be evaluated at five-year reviews or in some cases after two additional sampling events in which results remain below cleanup levels specified in **Table 2-8**.
- **Performance objectives to evaluate the MNA remedy performance after 2 years.** Each of the general performance objectives must be met as indicated below. If the criteria are not met to illustrate that MNA is an effective remedy, the contingency action will be initiated. If MNA is effective, a baseline will be established from the data to this point in time. Specific evaluation criteria will be developed in the RD. The MNA evaluation will be based on the USEPA lines of evidence (USEPA, 1999) and the anaerobic screening (USEPA, 1998) as follows:



- Plume stability (i.e., the plume concentrations are decreasing in the majority of performance wells, and the plume is not expanding in area as demonstrated with compliance wells).
  - MNA Process Evaluation demonstrated based on an attenuation rate calculated with empirical performance monitoring data, and MNA Process Demonstration based on the presence of daughter products and bacterial culture counts.
- **Additional Treatment using ISB if MNA is found to be ineffective.** If MNA is not found to be effective in areas outside of direct active treatment, additional treatment using ISB will be performed in those areas. The need for additional treatment using ISB will be determined based on ISB and MNA performance evaluation.
- **Initiate LTM.** Monitoring will be conducted to evaluate the remedy performance and determine if the plume conditions remain constant, improve or worsen after the baseline is established. The performance monitoring plan will be developed in the RD and will be in accordance with USEPA guidance (USEPA, 2004). LTM will be implemented such that it is consistent with USEPA's long-term monitoring criteria, the NCP, and the USEPA's Guidance (Summary of Key Existing USEPA CERCLA Policies for Groundwater Restoration). The number and location of the wells and surface water sample locations in the LTM will be reviewed during the Five-Year Reviews. LTM will be conducted to evaluate contaminant migration, ensure that the COC plume continues to degrade, and to demonstrate compliance with ARARs until groundwater cleanup levels are met. LTM will follow the 2-years of quarterly MNA monitoring, and will consist of semiannual monitoring for three years (through Year 5), and annual monitoring until the next Five-Year Review, when the analytical suite, and number and location of monitoring points will be re-evaluated. Monitoring will continue annually thereafter until recommended otherwise by the Five-Year Review and with concurrence of EPA and TCEQ. Annual reports will be prepared to document the effectiveness of the treatment and provide an evaluation of the effectiveness of the selected remedy until the end of annual monitoring (Year 10). It is assumed that after Year 10, monitoring will be performed once every 5 years with samples analyzed for VOCs and perchlorate only.
- **Surface Water Monitoring.** Surface water monitoring will be performed at LHAAP-47 beginning with a baseline sampling prior to excavation and continuing quarterly throughout the first two years to ensure that COCs are not migrating to surface water in Goose Prairie Creek. To the extent feasible, surface water sampling at the site will be performed at times when the groundwater table is believed to be in contact with surface water or during or after precipitation events. Following completion of the MNA evaluation, surface water monitoring locations, frequency, and contaminants included for analysis will be re-evaluated. The monitoring program frequency and duration will be established during RD.
- **Land Use Control.** The LUC objectives include maintaining the integrity of any current or future remedial or monitoring systems, and preventing the use of groundwater contaminated above cleanup levels as a potable water source. The groundwater treatment and MNA remedial components include a groundwater monitoring system that will be used to characterize the condition of the groundwater during the period the groundwater remedy is in place until the groundwater remediation goals are achieved, and to demonstrate achievement of the groundwater remediation goals when the groundwater remedy is complete. As a part of this groundwater remedy, the Army will maintain the remedial and



monitoring systems associated with the groundwater remedies until these components of the remedy are no longer needed to achieve cleanup levels, and cleanup levels have been achieved. During the period of operation of the groundwater remedy, if any of the elements of the remedial and groundwater monitoring systems are damaged, destroyed, or become ineffective, they will be repaired or replaced with suitable components to assure that the remedial and groundwater monitoring systems are able to provide data of the quality necessary to determine the progress of and eventual completion of this component of the remedy. The actions to be taken to implement these LUC objectives and requirements will be provided through modifying the “Comprehensive Land Use Control (LUC) Management Plan, Former Longhorn Army Ammunition Plant, Karnack, Texas” and detailed in the LUC RD.

- The LUC for prohibition of groundwater use (except for monitoring and testing) shall be implemented and shall remain in place at the Site until the COCs (i.e., including all hazardous substances, pollutants and contaminants found at the Site at cleanup levels as listed in **Table 2-8**) in soil and groundwater remaining at the site are reduced below levels that would support unlimited use and unrestricted exposure. A LUC RD will be finalized as the land use component of the Remedial Design. Within 21 days of the issuance of the ROD, the Army will propose deadlines for completion of the RD Work Plan, RD and Remedial Action Work Plan. The documents will be prepared and submitted to the EPA and the TCEQ pursuant to the FFA. The LUC RD will contain implementation and maintenance actions, including periodic inspections. The long-term groundwater and surface water monitoring and MNA performance monitoring plan will also be presented in the RD. The recordation notification for the Site which will be filed with Harrison County will include a description of the LUCs. The preliminary boundary for the groundwater and land use LUC is shown on **Figure 2-11**.
- The LUC restricting land use to nonresidential shall be implemented until it is demonstrated that surface and subsurface soil and groundwater COCs are at levels that allow for unlimited use and unrestricted exposure.
- The LUC to maintain the integrity of any current or future remedial or monitoring systems will remain in place until the levels of COCs in groundwater are met. The LUC to prohibit groundwater use (except for environmental monitoring and testing) as a potable source will remain in place until the levels of COCs (i.e., all hazardous substances, pollutants, and contaminants found at the Site at cleanup levels as listed in **Table 2-8**) in soil and groundwater allow for unlimited use and unrestricted exposure.

The Army will implement, maintain, monitor, report on and enforce land use controls at Army-owned property. The Army shall perform those actions related to land use control activities described in this ROD and in the Remedial Design for the ROD. For portions of the Site subject to LUCs that have been transferred out of Army control, the Army will monitor and report on the implementation, maintenance, and enforcement of LUCs, and coordinate with federal, state, and local governments and owners of properties subject to LUCs. The Army will provide notice of the groundwater and soil (surface and subsurface) contamination and any land use restrictions referenced in the ROD. The Army will send these notices to the federal, state and local governments involved at this site and the owners and occupants of the properties subject to those use restrictions and land use controls. The Army shall provide the initial notice within 90 days of ROD signature. The frequency of subsequent notifications will be described in the Remedial Design for the ROD. The Army remains responsible





for ensuring that the remedy remains protective of human health and the environment. The Army will fulfill its responsibility and obligations under CERCLA and the NCP as it implements, maintains, and reviews the selected remedy.

Upon transfer of Army-owned property, the Army will provide written notice of the land use controls to the transferee of the groundwater and soil (surface and subsurface) contamination and any land use restrictions referenced in the ROD. Within 15 days of transfer, the Army shall provide EPA and TCEQ with written notice of the division of implementation, maintenance, and enforcement responsibilities unless such information has already been provided in the LUC RD. The LUC RD will address the procedures to be used by the Army and the transferee to document compliance with the LUCs described in this ROD. In the event property is transferred out of Federal control, the land use controls relating to property and groundwater restrictions shall be recorded in the deed and shall be enforceable by the United States and the state of Texas.

LUC implementation and maintenance actions will be described in the RD for LHAAP-47. The LUCs will be included in the property transfer documents and a recordation of the area of groundwater prohibition will be filed in the Harrison County Courthouse. The LUC for groundwater will prevent human exposure to groundwater contaminated with chlorinated solvents and perchlorate through the prohibition of groundwater use. In addition, within 90 days of signature of this ROD, the Army shall request the Texas Department of Licensing and Regulation to notify well drillers of groundwater use prohibitions based on a preliminary LUC boundary. A LUC Remedial Design (RD) will be finalized as the land use component of the Remedial Design. Within 21 days of the issuance of the ROD, the Army will propose deadlines for completion of the RD Work Plan, RD, and Remedial Action Work Plan. The documents will be prepared and submitted to EPA and TCEQ pursuant to the FFA. The LUC RD will contain implementation and maintenance actions, including periodic inspections. The long-term groundwater and surface water monitoring and monitored natural attenuation (MNA) performance monitoring plan will also be presented in the remedial design (RD). Consistent with the dates presented for these documents, the U.S. Army shall: 1) request the Texas Department of Licensing and Regulation to notify well drillers of groundwater use prohibitions; and 2) notify the Harrison County Courthouse of the LUC to include a map showing the areas of groundwater use prohibition at the site, in accordance with 30 TAC 335.565.

Monitoring activities associated with the LUC will be undertaken to ensure that groundwater is not being used. Long-term operational requirements under this alternative would include maintenance of the LUCs. Groundwater monitoring will demonstrate no migration of the plume and the eventual reduction of contaminants to levels below cleanup levels. Sampling frequency and analytical requirements will be presented as an appendix to the RD for LHAAP-47.

CERCLA Five-Year Reviews will be conducted to evaluate whether the remedy remains protective of human health and the environment. The need for continued groundwater monitoring will be evaluated every 5 years during the reviews. All groundwater COCs identified in **Table 2-8**, will be included in the final remedy groundwater monitoring program. During each Five-Year Review, the analytical suite will be re-evaluated. COCs that have decreased to concentrations below cleanup levels, or are non-detect, or only detected sporadically below clean-up levels, or consistent with background will be removed from the monitoring program after review by the U.S. Army, USEPA, and TCEQ.



### 2.12.3 Cost Estimate for the Selected Remedy

**Table 2-11** presents the PW analysis of the cost for the selected remedy, Alternative 2. The information in the table is based on the best available information regarding the anticipated scope of the remedial alternative. The quantities used in the estimate are for estimating purposes only. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. Modifications may be documented in the form of a memorandum in the Administrative Record, an ESD, or a ROD amendment. This is an order-of-magnitude engineering cost estimate that is expected to be within -30 to +50 percent of the actual project cost.

The total project PW cost of this alternative is approximately \$9.33 million using a discount rate of 2.8%. The capital cost PW is estimated at \$6.76 million. The total O&M present value cost is estimated at approximately \$2.56 million. The O&M cost includes LTM associated with the LUCs, and the assessment of ISB performance. The LTM will support the required CERCLA Five-Year Reviews.

### 2.12.4 Expected Outcomes of Selected Remedy

The purpose of this response action is to attain the RAOs stated in **Section 2.8** of this ROD. The groundwater will be restored to attain groundwater cleanup standards/levels, to the extent practicable. With respect to the COCs and by-product contaminants found in the groundwater at the site, the groundwater cleanup standards/levels include attainment of the SDWA MCL for those COCs and by-product (i.e., daughter) contaminants that have a MCL, to the extent practicable, consistent with 40 CFR §300.430(e)(2)(i)(B & C). In the absence of federal drinking water standards, clean-up levels will be based on TRRP Tier 1 Residential Groundwater PCLs (**Table 2-8**). Surface water monitoring levels for groundwater COCs (**Table 2-9**) are the Texas Surface Water Quality Standards found at 30 TAC 307.6(d)(1), or if a standard is not available, the TRRP Tier 1 Residential Groundwater PCL.

The expected outcome of the selected remedy is that the COCs and their by-products in groundwater will be reduced to attain the SDWA MCLs or TRRP Tier 1 Groundwater Residential PCLs and that groundwater discharging into Goose Prairie Creek will have COC concentrations that do not result in exceedances of the Texas surface water quality standards for the COCs and their byproducts (or TRRP Tier 1 Residential Groundwater PCLs where Texas surface water quality standards are not available). Attainment of the groundwater cleanup standards/levels is anticipated to be completed in approximately 100 years. The site will be made part of a national wildlife refuge operated by USFWS, and will continue in such use for the foreseeable future. This approximate timeframe to achieve cleanup levels is considered reasonable for the anticipated future land use as a national wildlife refuge with no other reasonably anticipated use. When the levels of COCs in soil and groundwater allow for unlimited use and unrestricted exposure, the agency with jurisdiction over the property may petition to remove the LUCs restricting groundwater use and restricting land use to nonresidential, if it so desires.

## 2.13 Statutory Determinations

Under 42 U. S. C. §9621 and the NCP, the U.S. Army must select remedies that are protective of human health and the environment, comply with ARARs (unless a waiver is justified), are cost effective, and utilize permanent solutions and alternative treatment technologies or resource



recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous wastes as a principal element and a bias against off-site disposal of untreated wastes. The following sections discuss how the selected remedy meets the statutory requirements.

### 2.13.1 Protection of Human Health and the Environment

The selected remedy will achieve the RAOs for LHAAP-47 by protecting human health from exposure to contaminated groundwater, reducing the COCs and their by-products within the groundwater plume to below groundwater cleanup standards/levels, and by maintaining surface water quality in Goose Prairie Creek such that surface water standards/levels for COCs and by-products are not exceeded. LUCs would ascertain that receptors are not exposed to unacceptable levels of contaminated groundwater. The LUCs will be required until the COCs attain levels that allow for unlimited use and unrestricted exposure.

The soil remedial action under this remedy would remove the potential sources of perchlorate migration to groundwater and surface water and TCE to groundwater. The groundwater remedial action would eventually achieve the cleanup levels for COCs present in groundwater. Therefore, the residual site risk after completion of these actions will be within the target risk range for a hypothetical future maintenance worker.

The facility-wide Ecological Baseline Risk Assessment concluded that risks to ecological receptors at the LHAAP-47 (part of the industrial sub area) were within the acceptable risk range (Shaw, 2007a).

There are no short-term threats associated with the selected remedy that cannot be readily controlled. In addition, no adverse cross-media impacts are expected from the selected remedy.

### 2.13.2 Compliance with ARARs

The selected remedy complies with all ARARs. The ARARs are presented below and in **Table 2-12**.

#### 2.13.2.1 Chemical-Specific ARARs

- **Soil.** Since there are no federally promulgated chemical-specific ARARs for soil, the ROD applies the State of Texas promulgated cleanup standards under 30 TAC 335, Subchapter S, specifically 30 TAC 335.559 (g)(2) which specifies contaminant concentration limits for nonresidential soil and are used as the chemical-specific ARARs for the site soils. The concentrations represent the non-residential soil-to-ground water cross-media protection concentrations that must be met to demonstrate that a contaminant in soil does not pose the potential for a future release of leachate in excess of the groundwater concentration considered to be protective for nonresidential worker exposure. It is anticipated that removal of contaminated soils above the Texas standards will prevent further contamination of the groundwater from soil at the site.
- **Surface Water.** 42 U. S. C. §9621(d)(2) states that every remedial action shall require a level of control which at least attains surface water quality criteria established under Sections 304 or 303 of the Clean Water Act of 1972 (CWA). Therefore, surface water quality criteria may be ARARs if there is a remedial action that affects surface water, and measures will be





implemented during construction to prevent off-site migration of contaminants to surface waters. In the event of remedy failure resulting in or potentially resulting in a release to surface water, 40 CFR §§122, 125, 129, and 130 – 131 and 30 TAC 307.1, 307.2, 307.3, 307.4, 307.5(a) and (b), 307.6.(d)(1), 307.7, 307.8 and 307.9 are considered potential future ARARs.

Chemical-specific ARARs for surface water consumption are appropriate and relevant. Specifically, Texas surface water quality standards are set forth in 30 TAC §307.6(d)(1). For COCs that are not listed in Table 2 of 30 TAC §307.6(d)(1), the TRRP Tier 1 Residential Groundwater PCLs for those COCs apply.

- **Groundwater.** Cleanup levels are presented in **Table 2-8**. In the absence of federal drinking water standards, clean-up levels will be based on TRRP Tier 1 Residential Groundwater PCLs. This alternative will return the contaminated shallow and intermediate groundwater zones at LHAAP-47 to their potential beneficial use as drinking water, wherever practicable, which for the purposes of this ROD is considered to be attainment of the relevant and appropriate SDWA MCLs, and consistent with 40 CFR§300.430(e)(2)(i)(B&C). If a return to potential beneficial uses is not practicable, this alternative would still meet the NCP expectation to prevent further migration of the plume, prevent exposure to the contaminated groundwater, and evaluate further risk reduction.

### **2.13.2.2 Location-Specific ARARs**

This remedy includes activities which may be implemented in close proximity to internationally recognized wetlands and extra precaution will be taken to avoid unduly stressing the ecosystem or sensitive habitat. The remedy does not include any dredging, filling, or other wetlands destruction components. There will not be any impacts to archeological resources or threatened and endangered species. The only other location-specific ARAR is the placement of hazardous waste facilities in floodplains under 40 CFR §264.18(b).

### **2.13.2.3 Action-Specific ARARs**

The selected remedy has potential action-specific ARARs related to the following activities: site preparation and soil excavation activities, waste and disposal activities, well construction, and water treatment.

- **Site Preparation, Construction, and Excavation Activities.** Certain on-site preparation, construction, and/or excavation, and vegetation clearing activities will be necessary to prepare the site for remediation, including the soil-moving or site-grading activities. Control of fugitive emissions and storm water runoff during implementation of these activities will be required. Airborne particulate matter resulting from construction or excavation activities is subject to the fugitive dust and opacity limits listed in 30 TAC 111, Subchapter A. No person may cause, suffer, allow, or permit visible emissions from any source to exceed an opacity of 30 percent for any 6-minute-period (30 TAC 111.111(a)). Reasonable precautions must also be taken to achieve maximum control of dust to the extent practicable, including the application of water or suitable chemicals or the complete covering of materials (30 TAC 111.143 and 30 TAC 111.145). Texas has also promulgated general nuisance rules for air contaminants mandating that no person shall discharge from any source whatsoever one or more air contaminants, or combinations thereof, in such concentration and of such duration as are or may tend to be injurious to or to adversely affect human health or welfare, animal life, vegetation, or property, or as to interfere with the



normal use and enjoyment of animal life, vegetation, or property (30 TAC 101.4). Storm water discharges from construction activities that disturb equal to or greater than one acre of land must comply with the substantive requirements of a USEPA National Pollutant Discharge Elimination System general permit (40 CFR§ 122.26), depending on the amount of acreage disturbed. Substantive requirements include implementation of good construction management techniques; phasing of large construction projects; minimal clearing; and sediment, erosion, structural, and vegetative controls to mitigate runoff and ensure that discharges meet required parameters.

- **Waste and Disposal Activities.** The processes of monitoring and treating contaminated groundwater may generate a variety of primary and secondary waste streams (e.g., soil, personal protective equipment, and dewatering and decontamination fluids). These waste streams are expected to be nonhazardous waste. All solid waste (defined as any solid, liquid, semisolid, or contained gaseous material intended for discard [40 CFR §261.2]) generated during remedial activities must be appropriately characterized to determine whether it contains RCRA hazardous waste (40 CFR § 262.11; 30 TAC 335.62; 30 TAC 335.503(a)(4); 30 TAC 335.504). If feasible, secondary waste streams generated due to dewatering, well development activities, or from decontamination activities will be sent to the LHAAP-18/24 wastewater treatment facility for further treatment in accordance with applicable regulations. All wastes must be managed, stored, treated (if necessary), and disposed of in accordance with the ARARs for waste management listed in **Table 2-12** for the particular type of waste stream or contaminants in the waste.
- **Well Construction.** The remedial action may involve the placement, use, or eventual plugging and abandonment of some type of groundwater monitoring, injection, and/or extraction wells, either for in situ treatment or extraction of the contaminated groundwater or for LTM of the groundwater. Available standards for well construction and plugging/abandonment provide ARARs for such actions and include 30 TAC 331, Subchapters A and H. Specific provisions 30 TAC §331.9(a); 30 TAC §331.10(a); 30 TAC §331.10(d); 30 TAC §331.21; 30 TAC §331.132(a); 30 TAC §331.132(c); 30 TAC §331.132(d)(1); 30 TAC §331.132(d)(4); 30 TAC §331.133(e) apply. Texas has promulgated technical requirements in Chapter 76 of Title 16 of the TAC applicable to construction, operation, and plugging/abandonment of water wells. In particular, 16 TAC 76.1000 (*Locations and Standards of Completion for Wells*), 16 TAC 76.1002 (*Standards for Wells Producing Undesirable Water or Constituents*) (LHAAP-47 contaminated groundwater could be considered “undesirable water” defined pursuant to Section 76.10(36) as “water that is injurious to human health and the environment or water that can cause pollution to land or other waters”), 16 TAC 76.1004 (*Standards for Capping and Plugging of Wells and Plugging Wells that Penetrate Undesirable Water or Constituent Zones*), and 16 TAC 76.1008 (*Pump Installation*) may provide ARARs for the placement, construction, and eventual plugging/abandonment of groundwater injection or extraction wells or the placement and long-term operation of groundwater monitoring wells for groundwater remedial strategies.
- **Water Treatment.** Contaminated groundwater and wastewaters collected during well drilling or decontamination activities could be transported to the groundwater treatment plant at LHAAP-18/24 for processing and would subsequently be discharged in compliance with the effluent limits for that plant. Such waters will be characterized, as required, before transport and managed accordingly in compliance with requirements for the type of waste



contaminating the water. To assure compliance with the groundwater treatment plant's discharge limits, the incoming water must meet the waste acceptance criteria for the facility. On-site wastewater treatment units (as defined in 40 CFR §260.10) that are part of a wastewater treatment facility that is subject to regulation under Section 402 or Section 307(b) of the Clean Water Act of 1972 are not subject to RCRA Subtitle C hazardous waste management standards (40 CFR §270.1(c)(2)(v); 40 CFR §264.1(g)(6); 30 TAC 335.42(d)(1)). The USEPA has clarified that this exemption applies to all tanks, conveyance systems, and ancillary equipment, including piping and transfer trucks, associated with the wastewater treatment unit (Federal Register Title 53, 34079, September 2, 1988).

### **2.13.3 Cost-Effectiveness**

Alternative 2 has the lowest PW and capital costs of the action alternatives that were evaluated in the FS (Shaw, 2011) and FS Addendum (HDR, 2021c). Alternative 2 utilizes active technologies (ISTD, ISB and biobarriers) combined with MNA; those active technologies lead to much lower monitoring costs in the future, thus giving Alternative 2 a relatively low total present value cost.

### **2.13.4 Utilization of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to the Maximum Extent Practicable**

The U.S. Army has determined that the selected final remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the site. Soil excavation would remove impacted soils. ISTD and ISB (if needed) will lower groundwater COC concentrations in the most contaminated portion of the groundwater plumes. Biobarriers or grids will provide additional reduction of COC concentrations in the groundwater through degradation by biological processes. The active biodegradation that occurs as part of the natural attenuation, together with dilution, dispersion and other natural processes has the capability to ultimately reduce the groundwater contaminants to cleanup levels.

Alternative 2 would provide almost immediate protection because the LUCs will be implemented relatively quickly. Maintenance of this control will be required until COC concentrations in groundwater allow for unlimited use and unrestricted exposure.

### **2.13.5 Preference for Treatment as a Principal Element**

The selected remedy satisfies the statutory preference for treatment as a principal element of the remedy. The selected final remedy will reduce the toxicity, mobility, or volume of the COCs in groundwater through the implementation of ERH. ERH will lower COC concentrations in the groundwater plume to meet cleanup level. ISB will be implemented following ERH if needed. ISB will be the primary treatment technology in areas outside of the Building 46A area. The ERH and biological activity in the ISB treatment areas will significantly reduce the overall mass of COCs in the groundwater.

### **2.13.6 Five-Year Review Requirements**

42 U. S. C. § 121(c) and 40 §300.430(f)(5)(iii)(C) provide the statutory and legal bases for conducting Five-Year Reviews. Because this remedy will result in contaminants that remain onsite above levels that allow unlimited use and unrestricted exposure, a review will be conducted at least



every 5 years to ascertain that the remedy continues to provide adequate protection of human health and the environment.

## **2.14 Significant Changes from the Proposed Plan**

The Proposed Plan for LHAAP-47 was released for public comments on December 21, 2012. The Proposed Plan identified Alternative 2 as the Preferred Alternative for groundwater remediation. In 2021, the Proposed Plan was revised to address significant new information obtained during the 2018-2020 PSI. The Revised Proposed Plan incorporated the results of the FS Addendum (HDR, Inc. 2021c) which evaluated additional treatment technologies specific to remediating residual TCE DNAPL. The Revised Proposed Plan was released for public comments on July 7, 2021. The Revised Proposed Plan identified a modified Alternative 2 as the Preferred Alternative for groundwater remediation. The U.S. Army reviewed all written comments during the public comment period and verbal comments during the January 9, 2013 and July 21, 2021 public meetings. After careful consideration of the comments, it was determined that no significant changes to the modified remedy are necessary or appropriate.



**Table 2-2. Chemicals with Hazard Quotient Greater than 0.1 in Groundwater**

Chemical	Baseline Risk Assessment			Recent Maximum Result			Comparison Level		Retained as COC?
	EPC (µg/L)	Well	Groundwater Hazard Quotient	Recent Maximum (µg/L)	Date	Well <sup>a</sup>	MCL (µg/L)	TRRP Tier 1 Residential Groundwater PCL (µg/L)	
Perchlorate	82,900	LHSMW60	900	56,600	08/30/10	LHSMW60		17	Yes, 1
Trichloroethene	29,400	LHSMW43	110	13,300 6,240	04/03/09 02/19/09	47WW25 LHSMW43	5		Yes, 2
Chloroform	120	47WW20	69	1.61 JB -	10/09/09 -	47WW35 47WW20	80 <sup>b</sup>		Yes, 2
Thallium	93	LHSMW47	11	4.62 ND	09/13/07 05/18/98	47WW07 LHSMW47	2		Yes, 2
Acetone	21,000	LHSMW35	8.1	12.5 -	10/09/08 -	47WW36 LHSMW35		22000	Yes, 1
Cadmium	200	LHSMW57	3.9	5.07 -	11/29/07 -	47WW22 LHSMW57	5		Yes, 2
Nickel	8,000	LHSMW51	3.9	17,500 -	11/29/07 -	47WW22 LHSMW51		490	Yes, 1
cis-1,2-Dichloroethene	2,090	LHSMW43	2.5	1,440 325	08/04/10 02/19/09	47WW13 LHSMW43	70		Yes, 2
Silver	1,000	LHSMW51	2	ND -	08/04/10 -	47WW13 LHSMW51		120	Yes, 1
Tin	120,000	47WW02	2	Not Tested After Risk Assessment				15000	Yes, 1
Antimony	76	LHSMW60	1.9	7.5 1.62 J	11/29/07 08/30/10	47WW22 LHSMW60	6		Yes, 2
Manganese	7,750	47WW16	1.6	3,280 -	11/29/07 -	47WW22 47WW16		1100	Yes, 1
Aluminum	86,000	LHSMW48	0.84	63,000 -	11/29/07 -	47WW22 LHSMW48		24000	Yes, 1
Strontium	19,000	47WW17	0.31	Not Tested After Risk Assessment				15000	Yes, 1
Chromium	43,000	LHSMW51	0.28	356,000 -	11/29/07 -	47WW22 LHSMW51	100		Yes, 2
Vanadium	130	LHSMW48	0.18	1,820 -	11/29/07 -	47WW22 LHSMW48		44	Yes, 1
Cobalt	311	LHSMW53	0.15	171 80	11/29/07 05/20/98	47WW22 LHSMW53		240	Yes, 1
2,4,6-Trinitrotoluene	6.8	LHSMW56	0.13	Not Tested After Risk Assessment				12	Yes, 1

**Notes and Abbreviations:**

Lists chemicals with hazard quotient greater than 0.1.

1. Retained as a COC because hazard quotient is greater than 0.1.
2. Retained as a COC because at least 1 result is greater than the MCL.

<sup>a</sup> When 2 wells are listed, the recent maximum was from a different well.

<sup>b</sup> MCL for Total Trihalomethanes used as a surrogate.



µg/L      micrograms per liter  
COC      chemical of concern  
EPC      exposure point concentration

MCL      maximum contaminant level  
PCL      Protective Concentration Level  
TCEQ      Texas Commission on Environmental Quality

Source: Shaw 2011, Final Feasibility Study, LHAAP-47, Plant 3, Group 4  
TRRP Tier 1 Residential Groundwater PCLs, 4/27/2018 Update



**Table 2-3. Chemicals Contributing to Carcinogenic Risk in Groundwater**

Chemical	Baseline Risk Assessment			Recent Maximum Result			Comparison Level		Retained as COC?
	EPC (µg/L)	Well	Cancer Risk Groundwater	Recent Maximum (µg/L)	Date	Well <sup>a</sup>	MCL (µg/L)	TRRP Tier 1 Residential Groundwater PCL (µg/L)	
Trichloroethene	29,400	LHSMW43	5.70E-03	13,300 6,240	04/03/09 02/19/09	47WW25 LHSMW43	5		Yes, 1
Vinyl Chloride	127	LHSMW56	7.30E-04	249 14.3	08/04/10 04/03/09	47WW13 LHSMW56	2		Yes, 1
1,1-Dichloroethene	32.2	LHSMW48	2.60E-04	108 2.9	04/03/09 05/19/98	LHSMW56 LHSMW48	7		Yes, 1
Chloroform	120	47WW20	1.80E-04	1.61 JB -	10/09/09 -	47WW35 47WW20	80 <sup>b</sup>		Yes, 1
Tetrachloroethene	168	LHSMW43	1.50E-04	38.4	02/19/09	LHSMW43	5		Yes, 1
2,3,7,8-TCDD	2.88E-06	47WW01	1.40E-05	2.31E-06	11/07/98	47WW01	3.00E-05		No, 2
Pentachlorophenol	7.9	LHSMW47	1.20E-05	Not Tested After Risk Assessment			1		Yes, 1
1,2-Dichloroethane	5.7	LHSMW48	1.20E-05	0.746 ND	02/23/09 05/19/98	47WW34 LHSMW48	5		Yes, 1
2,4-Dinitrotoluene	1.4	47WW11	3.30E-06	Not Tested After Risk Assessment				1.3	Yes, 3
2,6-Dinitrotoluene	1.4	47WW11	3.30E-06	Not Tested After Risk Assessment				1.3	Yes, 3
1,1,2-Trichloroethane	4.9	LHSMW43	1.90E-06	1.8	02/22/09	LHSMW43	5		No, 2
bis(2-Ethylhexyl)phthalate	21	LHSMW45	1.70E-06	Not Tested After Risk Assessment			6		Yes, 1

Notes and Abbreviations:

1. Retained as a COC because at least 1 result exceeded the MCL
2. Excluded as a COC because all results are less than the MCL
3. Retained as a COC because cumulative cancer risk is greater than  $1.0 \times 10^{-6}$

<sup>a</sup> The recent maximum from the well cited in the BHHRA is shown;

if there was a higher concentration for the chemical from a different well, that value and well are also shown

<sup>b</sup> MCL for Total Trihalomethanes used as a surrogate

µg/L      micrograms per liter  
COC      chemical of concern  
EPC      exposure point concentration  
MCL      maximum contaminant level  
PCL      Protective Concentration Level

Source: Shaw 2011, Final Feasibility Study, LHAAP-47, Plant 3, Group 4  
TRRP Tier 1 Residential Groundwater PCLs, 4/27/2018 Update



**Table 2-4. Cancer Toxicity Data-Oral Dermal Exposure, Group 4 Risk Assessment\*\***

Chemical of Potential Concern	Oral CSF (mg/kg-day) <sup>1</sup>	Reference	ABSgi * (unitless)	Reference	Dermal CSF (mg/kg-day) <sup>1</sup>	Weight of Evidence/ Cancer Guideline Description	Reference
Trichloroethane	1.1E-02	EPA-NCEA, 2001	1	TCEQ, 1998	1.1E-02	B2	EPA-IRIS, 2001
Vinyl Chloride	1.5E+00	EPA-IRIS, 2001	1	TCEQ, 1998	1.50E+00	A	EPA-IRIS-2001
1,1-Dichloroethene	6.00E-01	EPA-IRIS, 2001	1	TCEQ, 1988	6.00E-01	C	EPA-IRIS-2001
Chloroform	6.10E-03	EPA-IRIS, 2001	0.2	TCEQ, 1988	3.05E-01	B2	EPA-IRIS-2001
Tetrachloroethene	5.2E-02	EPA-NCEA, 2001	1	TCEQ, 1988	5.2E-01	B2	EPA-IRIS-2001
2,3,7,8-TCDD	1.50E+05	EPA-HEAST, 1997	0.5	TCEQ, 1998	3.00E+05	Not Classified	--
Pentachlorophenol	1.2E-01	EPA-IRIS, 2001	0.76	TCEQ, 1988	1.58E-01	B2	EPA-IRIS, 2001
1,2-Dichloroethane	9.10E-02	EPA-IRIS, 2001	1	TCEQ, 1988	9.1E-02	B2	EPA-IRIS, 2001
2,4-Dinitrotoluene	--	--	--	--	--	--	--
2,6-Dinitrotoluene	--	--	--	--	--	--	--
1,1,2-Trichloroethane	5.7E-02	EPA-IRIS, 2001	0.81	TCEQ, 1988	7.04E-02	C	EPA-IRIS, 2001
Bis(2-ethylhexyl)phthalate	1.4E-02	EPA-IRIS, 2001	0.19	TCEQ, 1988	7.37E-02	B2	EPA-IRIS, 2001

EPA-HEAST, 1997 Health Effects Summary Tables (HEAST0. FY-1995. EPA/540/R-95-036.

EPA-IRIS, 2001 Integrated Risk Information System (IRIS). United States Protection Agency Online Database for Toxicity Information on Hazardous Chemicals. 2001. TCEQ, 1998. Consistency Memorandum Attachment C. Office of Waste Management. 23 July 1998

Notes and Abbreviations:

\* The dermal RfD was derived by multiplying the Oral RfD by the ABSgi.

\*\* The human health risk is based on baseline human health risk assessment adopted from 'Final Baseline Human Health and Screening Ecological Risk Assessment for the Group 4 Sites' (Jacobs, 2003)"

ABSgi     gastrointestinal absorption factor NA= Information not available  
NTV       no toxicity value available CSF = cancer slope factor  
TCDD     tetrachlorodibenzo-p-dioxin  
TCEQ      Texas Commission on Environmental Quality





**Table 2-5. Non-Cancer Toxicity Data-Oral Dermal Exposure, Group 4 Risk Assessment**

Chemical of Potential Concern	Oral RfD (mg/kg- day)	Reference	ABSgi * (unitless)	Reference	Dermal RfD (mg/kg- day)	Target Endpoint	Combined Uncertainty/ Modifying Factors	Reference
Perchlorate	9.00E-04	EPA, 1994	1	Health Consultation, 1997	9.00E-04	NA	NA	--
Trichloroethene	6.00E-03	EPA-NCEA, 2001	1	TCEQ, 1998	6.00E-03	NA	NA	--
Chloroform	1.00E-02	EPA-IRIS, 2001	0.2	TCEQ, 1988	2.00E-03	Cyst formation in liver	1000/1	EPA-IRIS, 2001
Thallium	8.00E-05	EPA-IRIS, 2001	1	TCEQ, 1988	8.00E-05	Blood	3000/1	EPA-IRIS, 2001
Acetone	1.00E-01	EPA-IRIS, 2001	0.83	TCEQ, 1988	8.30E-02	Liver and kidney effects	1000/1	EPA-IRIS, 2001
Cadmium	5.00E-04	EPA-IRIS, 2001	0.025	TCEQ, 1988	1.25E-05	Proteinuria	10/1	EPA-IRIS, 2001
Nickel	2.00E-01	EPA-IRIS, 2001	0.04	TCEQ, 1988	8.00E-04	Decreased body weight	300/1	EPA-IRIS, 2001
cis-1,2 Dichloroethene	1.00E-02	EPA-HEAST, 1997	1	TCEQ, 1988	1.00E-02	Decreased hematocrit and hemoglobin in blood	3000/1	EPA-IRIS, 2001
Silver	5.00E-03	EPA-IRIS, 2001	0.04	TCEQ, 1988	2.00E-04	Argyria	3/1	EPA-IRIS, 2001
Tin	6.00E-01	EPA-HEAST, 1997	0.1	TCEQ, 1988	6.00E-02	Liver/kidney	100/1	EPA- HEAST, 199
Antimony	4.00E-04	EPA-IRIS, 2001	0.15	TCEQ, 1988	6.00E-05	Longevity, blood glucose and cholesterol	1000/1	EPA-IRIS, 2001
Manganese	4.70E-04	EPA-IRIS, 2001	0.06	TCEQ, 1988	2.82E-03	Central nervous system	1/1	EPA-IRIS, 2001
Aluminum	1.00E+00	EPA-NCEA, 2001	0.1	TCEQ, 1988	1.00E-01	NA	NA	--
Strontium	6.00E-01	EPA-IRIS, 2001	0.2	TCEQ, 1988	1.2E-01	Rachitic bone	300/1	EPA-IRIS, 2001
Chromium	1.50E+00	EPA-IRIS, 2001	0.013	TCEQ, 1988	1.95E-02	No observed effects	1000/10	EPA-IRIS, 2001
Vanadium	7.00E-03	EPA-HEAST, 1997	0.026	TCEQ, 1988	1.82E-04	NA	NA	--
Cobalt	2.00E-02	EPA-NCEA, 2001	0.8	TCEQ, 1988	1.60E-02	NA	NA	--
2,4,6-trinitrotoluene	5.00E-04	EPA-IRIS, 2001	0.6	TCEQ, 1998	3.00E-04	Liver effects	1000/1	EPA-IRIS, 2001

Notes and Abbreviations:

EPA, 1998. Perchlorate Environmental Contamination: Toxicological Review and Risk Characterization Based on Emerging Information, Review Draft, Office of research and Development, NCEA-1-0503, 31 December 1998.

EPA-IRIS, 2001 Integrated Risk Information System (IRIS). United States Protection Agency Online Database for Toxicity Information on Hazardous Chemicals. 2001. EPA-NCEA, 2001. EPA Region III Risk-Based Concentration Tables (5/8/2001). Referenced values from National center for Environmental Assessment.

Health Consultation, 1997. Health Consultation, Perchlorate Contamination in the Citizens Utilities Suburban and Security Park Water Service Areas. Aerojet General Corporation. February 1997.

TCEQ, 1998. Consistency Memorandum Attachment C. Office of Waste Management. 23 July 1998

\* The dermal RfD was derived by multiplying the Oral RfD by the ABSgi.

ABSgi gastrointestinal absorption factor

NA Information not available

NTV no toxicity value available

RfD Reference Dose



**Table 2-6. Summary of Carcinogenic Risks and Non-Carcinogenic Hazard at LHAAP-47**

Scenario	Total Hazard Index	Total Cancer Risk
<b>Risks from Soil</b>		
Future Maintenance Worker (0 to 0.5 feet bgs)	0.40	$1.82 \times 10^{-5}$
Future Maintenance Worker (0 to 2 feet bgs)	0.46	$1.77 \times 10^{-5}$
<b>Risks from Groundwater</b>		
Future Maintenance Worker	1,120	$7.07 \times 10^{-3}$
<b>Combined Risks- Soil and Groundwater</b>		
Future Maintenance Worker (0 to 0.5 feet bgs)	1,120	$7.09 \times 10^{-3}$
Future Maintenance Worker (0 to 2 feet bgs)	1,120	$7.09 \times 10^{-3}$

Notes and Abbreviations:

bgs = below ground surface

Source: Jacobs, 2003. Final Baseline Human Health and Screening Ecological Risk Assessment for the Group 4 Sites (Sites 04, 08, 35A, 35B, 35C, 46, 47, 48, 50, 60, 67, Goose Prairie Creek, Saunders Branch, Central Creek, and Caddo Lake), Longhorn Army Ammunition Plant, Karnack, Texas, Final, Oak Ridge, Tennessee, June.(Table 3-72)

**Table 2-7. Cleanup Levels for Target COCs in Soil**

COCs Targeted for Remediation	Cleanup Level <sup>a</sup> (mg/kg)
Perchlorate	7.2
TCE	0.5

Notes and Abbreviations:

<sup>a</sup> Unless otherwise noted, cleanup level applies to soil from surface to groundwater interface

mg/kg milligrams per kilogram

COC contaminant of concern

GWP-Ind soil medium specific concentration for industrial use based on groundwater protection

Source: HDR, 2021c, Final Feasibility Study Addendum, LHAAP-47, Plant 3, Group 4



**Table 2-8. Cleanup Levels for Target COCs in Groundwater**

COCs Targeted for Remediation	MCL (µg/L)	TRRP Tier 1 Residential Groundwater PCLs (µg/L)	Background (µg/L)	Cleanup Level (µg/L)
Perchlorate	--	17	--	17
1,1-Dichloroethene	7	--	--	7
1,2-Dichloroethane	5	--	--	5
Acetone	--	22,000	--	22,000
Chloroform	80	--	--	80
cis-1,2-Dichloroethene (cis-1,2-DCE)	70	--	--	70
Tetrachloroethene (PCE)	5	--	--	5
trans-1,2-Dichloroethene (trans-1,2- DCE) (daughter product)	100	--	--	100
Trichloroethene (TCE)	5	--	--	5
Vinyl Chloride (VC)	2	--	--	2
2,4,6-Trinitrotoluene	--	12	--	12
2,4-Dinitrotoluene	--	1.3	--	1.3
2,6-Dinitrotoluene	--	1.3	--	1.3
bis(2-Ethylhexyl)phthalate	6	--	--	6
Pentachlorophenol	1	--	--	1
Aluminum*	--	24,000	2,680	24,000
Antimony	6	--	12.2	12.2
Arsenic	10	--	34.2	34.2
Cadmium	5	--	5.1	5.1
Chromium	100	--	15.8	100
Cobalt*	--	240	187	240
Manganese	--	1,100	7,820	7,820
Nickel	--	490	229	490
Silver	--	120	1.92	120
Strontium	--	15,000	7,330	15,000
Thallium	2	--	--	2
Tin	--	15,000	--	15,000
Vanadium	--	44	3.99	44

Notes and Abbreviations

Source: The source of this table is the *Final Feasibility Study, LHAAP-47, Plant 3, Group 4* (Shaw, 2011)

Background concentration from *Final Evaluation of Perimeter Well Data for Use as Groundwater Background* (Shaw, 2007c)

µg/L micrograms per liter

COCs Contaminants of Concern

MCL Safe Drinking Water Act maximum contaminant level

TRRP Texas Risk Reduction Program

PCL Protective Concentration Level

TRRP Tier 1 Residential Groundwater PCL 4/27/2018 Update

**Table 2-9. Monitoring Levels for Perchlorate and VOCs in Surface Water**

Chemicals	Texas Surface Water Quality Standards <sup>a</sup> (µg/L)
Perchlorate <sup>b</sup>	17 <sup>b</sup>
1,1-Dichloroethene	7
1,2-Dichloroethane	5
Acetone <sup>b</sup>	22,000 <sup>b</sup>
Chloroform	70
cis-1,2-Dichloroethene (cis-1,2-DCE) <sup>c</sup>	70 <sup>c</sup>
Tetrachloroethene (PCE)	5
trans-1,2-Dichloroethene (trans-1,2-DCE) (daughter product) <sup>c</sup>	100 <sup>c</sup>
Trichloroethene (TCE)	5
Vinyl Chloride (VC)	0.23

Notes and Abbreviations:

<sup>a</sup> Texas Surface Water Quality Standards are adopted from 30 Texas Administrative Code (TAC) §307.6(d)(1) (Human Health Protection for Water and Fish consumption).

<sup>b</sup> There is no Texas surface water quality standard for this chemical. The value provided is the TRRP Tier 1 Residential Groundwater PCL for this chemical

<sup>c</sup> There is no Texas surface water quality standard for this chemical. The value provided is the MCL for this chemical.

µg/L micrograms per liter

TRRP Tier 1 Residential Groundwater PCL

MCL Safe Drinking Water Act maximum contaminant level

PCL Protective Concentration Level

TCEQ Texas Commission on Environmental Quality

TRRP Texas Risk Reduction Program

VOCs Volatile Organic Compounds

Source: Shaw 2011, Final Feasibility Study, LHAAP-47, Plant 3, Group 4

**Table 2-10. Comparative Analysis of Alternatives**

Comparative Analysis of Alternatives Criteria	Alternative 1 No Action	Alternative 2 Excavation, In Situ Thermal Desorption, In Situ Bioremediation, MNA, and LUC	Alternative 3 Excavation, In Situ Thermal Desorption, Recirculating Bioremediation, MNA, and LUC	Alternative 4 Excavation, In Situ Thermal Desorption, Pump and Treat, In Situ Bioremediation, MNA, and LUC
Overall protection of human health and the environment	No protection. Does not achieve RAOs.	<ul style="list-style-type: none"> <li>Achieves RAOs. Protection of human health and environment provided by remediation of groundwater COCs in areas of highest contamination by ISTD and in situ bioremediation..</li> <li>Groundwater monitoring and LUC in place until cleanup levels are attained.</li> <li>Removal of perchlorate contaminated source soils protect the groundwater from future perchlorate migration from soil to groundwater.</li> </ul>	<ul style="list-style-type: none"> <li>Achieves RAOs. Protection of human health and environment provided by remediation of groundwater COCs in areas of highest contamination by recirculating bioremediation and in situ bioremediation.</li> <li>Groundwater monitoring and LUC in place until cleanup levels are attained.</li> <li>Removal of perchlorate contaminated source soils protect the groundwater from future perchlorate migration from soil to groundwater.</li> </ul>	<ul style="list-style-type: none"> <li>Achieves RAOs. Protection of human health and environment provided by groundwater extraction and ex situ treatment for areas with available water, and by in situ bioremediation for areas without sufficient water to pump.</li> <li>Groundwater monitoring and LUC in place until cleanup levels are attained.</li> <li>Removal of perchlorate contaminated source soils protect the groundwater from future perchlorate migration from soil to groundwater.</li> </ul>
Compliance with ARARs	No compliance with chemical-specific ARARs.	<ul style="list-style-type: none"> <li>Complies with ARARs.</li> </ul>	<ul style="list-style-type: none"> <li>Complies with ARARs.</li> </ul>	<ul style="list-style-type: none"> <li>Complies with ARARs.</li> </ul>



Comparative Analysis of Alternatives Criteria	Alternative 1 No Action	Alternative 2 Excavation, In Situ Thermal Desorption, In Situ Bioremediation, MNA, and LUC	Alternative 3 Excavation, In Situ Thermal Desorption, Recirculating Bioremediation, MNA, and LUC	Alternative 4 Excavation, In Situ Thermal Desorption, Pump and Treat, In Situ Bioremediation, MNA, and LUC
Long-term effectiveness and permanence	Not effective.	<ul style="list-style-type: none"> <li>Should be effective and permanent; however, uncertainty exists concerning the effectiveness and time needed for in situ biological treatment and degradation to cleanup levels.</li> <li>ERH is expected to be effective on DNAPL in groundwater near Building 46A</li> <li>In situ bioremediation expected to be effective and permanent for areas of groundwater contamination outside of Building 46A area, however, uncertainty exists concerning the effectiveness and time needed for in situ biological treatment and degradation to cleanup levels.</li> <li>Treatability study may be required. Long-term groundwater monitoring will follow treatment.</li> <li>LUC will be effective and reliable so long as they are maintained until cleanup levels are attained.</li> <li>Removal of perchlorate soil eliminates a potential future source of groundwater contamination via infiltration.</li> </ul>	<ul style="list-style-type: none"> <li>Should be effective and permanent; however, uncertainty exists concerning the effectiveness and time needed for in situ biological treatment and degradation to cleanup levels.</li> <li>ERH is expected to be effective on DNAPL in groundwater near Building 46A</li> <li>Recirculating bioremediation expected to be effective and permanent for areas of groundwater contamination outside of Building 46A area, however, uncertainty exists concerning the effectiveness and time needed for in situ biological treatment and degradation to cleanup levels.</li> <li>Treatability study may be required. Long-term groundwater monitoring will follow treatment.</li> <li>Operation &amp; maintenance of recirculation systems will be required.</li> <li>LUC will be effective and reliable so long as they are maintained until cleanup levels are attained.</li> <li>Removal of perchlorate soil eliminates a potential future source of groundwater contamination via infiltration.</li> </ul>	<ul style="list-style-type: none"> <li>Should be effective and permanent. Uncertainty exists concerning time needed for extraction and attenuation to cleanup levels.</li> <li>ERH is expected to be effective on DNAPL in groundwater near Building 46A</li> <li>Pilot study may be required.</li> <li>In situ bioremediation expected to be effective and permanent for areas of groundwater contamination outside of Building 46A area, however, uncertainty exists concerning the effectiveness and time needed for in situ biological treatment and degradation to cleanup levels.</li> <li>Construction, operation, and maintenance of the extraction system will be required.</li> <li>LUC will be effective and reliable so long as they are maintained until cleanup levels are attained.</li> <li>Removal of perchlorate soil eliminates a potential future source of groundwater contamination via infiltration.</li> </ul>

Comparative Analysis of Alternatives Criteria	Alternative 1 No Action	Alternative 2 Excavation, In Situ Thermal Desorption, In Situ Bioremediation, MNA, and LUC	Alternative 3 Excavation, In Situ Thermal Desorption, Recirculating Bioremediation, MNA, and LUC	Alternative 4 Excavation, In Situ Thermal Desorption, Pump and Treat, In Situ Bioremediation, MNA, and LUC
Reduction of toxicity, mobility, or volume through treatment	No reduction.	<ul style="list-style-type: none"> <li>Provides permanent reduction in groundwater through in situ thermal desorption using ERH, and in situ bioremediation in the areas of highest contamination provided conditions are favorable. Provides permanent reduction of perchlorate contaminated soil by removal.</li> </ul>	<ul style="list-style-type: none"> <li>Provides permanent reduction in groundwater through in situ thermal desorption using ERH, and in situ bioremediation and recirculation in the areas of highest contamination provided treatment is successful at improving conditions. Provides permanent reduction of perchlorate contaminated soil by removal.</li> </ul>	<ul style="list-style-type: none"> <li>Provides permanent reduction in groundwater through in situ thermal desorption using ERH, and extraction from areas of highest contamination and ex situ treatment, and from in situ bioremediation. Provides permanent reduction of perchlorate contaminated soil by removal.</li> </ul>
Short-term effectiveness	No short-term impacts.	<ul style="list-style-type: none"> <li>Minimal impacts to the community, workers, or the environment from short-term activities. Provides almost immediate protection. Some potential impacts to workers and minimal impact to community during excavation and transportation activities.</li> <li>Potential for impacts to workers from exposure to hot fluids and high voltage power during ERH application.</li> </ul>	<ul style="list-style-type: none"> <li>Minimal impacts to the community, workers, or the environment from short-term activities. Provides almost immediate protection. Some potential impacts to workers and minimal impact to community during excavation and transportation activities. Some potential impacts to workers from exposure to contaminated groundwater in recirculation system.</li> <li>Potential for impacts to workers from exposure to hot fluids and high voltage power during ERH application.</li> </ul>	<ul style="list-style-type: none"> <li>Minimal impacts to the community, workers, or the environment from short-term activities. Provides almost immediate protection. Some potential impacts to workers and minimal impact to community during excavation and transportation activities. Some potential impacts to workers from exposure to contaminated groundwater in extraction system and transport pipeline.</li> <li>Potential for impacts to workers from exposure to hot fluids and high voltage power during ERH application.</li> </ul>



Comparative Analysis of Alternatives Criteria	Alternative 1 No Action	Alternative 2 Excavation, In Situ Thermal Desorption, In Situ Bioremediation, MNA, and LUC	Alternative 3 Excavation, In Situ Thermal Desorption, Recirculating Bioremediation, MNA, and LUC	Alternative 4 Excavation, In Situ Thermal Desorption, Pump and Treat, In Situ Bioremediation, MNA, and LUC
Implementability	Inherently implementable.	<ul style="list-style-type: none"> <li>Implementable, but uncertainty exists in the effectiveness and time required to reduce contaminants in groundwater to cleanup levels.</li> <li>Specialized knowledge required for implementation.</li> <li>ERH has been proven to be effective on DNAPL and within low hydraulic conductivity zones.</li> <li>Soil excavation readily implemented with standard earthmoving equipment. In situ bioremediation is a commercially available treatment technology.</li> </ul>	<ul style="list-style-type: none"> <li>Implementable, but uncertainty exists in the effectiveness and time required to reduce contaminants in groundwater to cleanup levels.</li> <li>Specialized knowledge required for implementation.</li> <li>ERH has been proven to be effective on DNAPL and within low hydraulic conductivity zones.</li> <li>Soil excavation readily implemented with standard earthmoving equipment. In situ bioremediation is a commercially available treatment technology.</li> </ul>	<ul style="list-style-type: none"> <li>Implementable, but uncertainty exists in the effectiveness and time required to reduce contaminants in groundwater to cleanup levels.</li> <li>Specialized knowledge required for implementation.</li> <li>ERH has been proven to be effective on DNAPL and within low hydraulic conductivity zones.</li> <li>Soil excavation readily implemented with standard earthmoving equipment. In situ bioremediation is a commercially available treatment technology.</li> </ul>
Capital Cost	\$0	\$7,158,439	\$10,276,520	\$7,242,398
Operation and Maintenance Cost	\$0	\$3,087,383	\$3,087,383	\$8,073,291
Present Worth	\$0	\$9,326,411	\$12,600,292	\$12,950,292

Notes and Abbreviations:

ARARs applicable or relevant and appropriate requirements

LUC land use controls

MCLs maximum contaminant levels

RAOs remedial action objectives

Costs escalated to 2020 dollars

Source: Shaw 2011, Final Feasibility Study, LHAAP-47, Plant 3, Group 4; HDR, 2021c, Draft Final Feasibility Study Addendum for LHAAP-47, Building 46A Plant 3 Area.





Table 2-11. Escalated Costs and Present Worth Analysis of Selected Remedy

Alternative 2 – Excavation, In Situ Thermal Desorption, In Situ Bioremediation, MNA and LUC Costs and Present Value, 2011 and 2020 Escalated Values

Alternative 2															
Years		Capital Costs										O&M Costs			
		Design, permitting, Construction Management		Bioremediation		Excavation		Monitoring		Electrical Resistance Heating (ERH)		MNA/LUCs		5 Year Review (2011 FS)	
Estimate Base Year		2011	2020	2011	2020	2011	2020	2011	2020	2020	2011		2020	2011	2020
1		\$ 163,122	\$ 203,903	\$ 591,970	\$ 739,963	\$ 1,385,818	\$ 1,732,273	\$ 59,439	\$ 74,299	\$ 3,161,400	\$ 440,364		\$ 550,455		
2											\$ 440,364		\$ 550,455		
3				\$ 160,900	\$ 201,125						\$ 200,944		\$ 251,180		
4											\$ 200,944		\$ 251,180		
5											\$ 200,944		\$ 251,180	\$ 42,525	\$ 53,156
6				\$ 418,191	\$ 522,739						\$ 81,244		\$ 101,555		
7											\$ 81,244		\$ 101,555		
8											\$ 81,244		\$ 101,555		
9											\$ 81,244		\$ 101,555		
10											\$ 81,244		\$ 101,555	\$ 42,525	\$ 53,156
11				\$ 418,191	\$ 522,739										
12															
13															
14															
15											\$ 81,244		\$ 101,555	\$ 42,525	\$ 53,156
16															
17															
18															
19															
20											\$ 81,244		\$ 101,555	\$ 42,525	\$ 53,156
21															
22															
23															
24															
25											\$ 81,244		\$ 101,555	\$ 42,525	\$ 53,156
26															
27															
28															
29															
30											\$ 81,244		\$ 101,555	\$ 42,525	\$ 53,156
2011 Cost Estimate		\$ 163,122		\$ 1,589,252		\$ 1,385,818		\$ 59,439			\$ 2,214,756			\$ 255,150	
2020 Cost Estimate			\$ 203,903		\$ 1,986,565		\$ 1,732,273		\$ 74,299	\$ 3,161,400			\$ 2,768,445		\$ 318,938
2020 Total Capital/O&M Cost										\$ 7,158,439				\$ 3,087,383	
2020 Total Alternative Cost														\$ 10,245,821	



Table 2-11. Escalated Costs and Present Worth Analysis of Selected Remedy (continued)

Alternative 2 – Excavation, In Situ Thermal Desorption, In Situ Bioremediation, MNA and LUC Costs and Present Value, 2011 and 2020 Escalated Values

Net Present Value														
Discount Rate 2.8%														
		Design, permitting, Construction		Bioremediation		Excavation		Monitoring		Electrical	MNA/LUCs		5 Year Review (2011 FS)	
Estimate Base Year	Discount Factor	2020 Cost	NPV	2020 Cost	NPV	2020 Cost	NPV	2020 Cost	NPV	NPV	2020 Cost	NPV	2020 Cost	NPV
1	0.97	\$ 203,903	\$ 198,349	\$ 739,963	\$ 719,808	\$ 1,732,273	\$ 1,685,090	\$ 74,299	\$ 72,275	\$ 3,075,292	\$ 550,455	\$ 535,462		
2	0.95										\$ 550,455	\$ 520,877		
3	0.92			\$ 201,125	\$ 185,134						\$ 251,180	\$ 231,210		
4	0.90										\$ 251,180	\$ 224,912		
5	0.87										\$ 251,180	\$ 218,786	\$ 53,156	\$ 46,300.83
6	0.85			\$ 522,739	\$ 442,921						\$ 101,555	\$ 86,048		
7	0.82										\$ 101,555	\$ 83,705		
8	0.80										\$ 101,555	\$ 81,425		
9	0.78										\$ 101,555	\$ 79,207		
10	0.76										\$ 101,555	\$ 77,050	\$ 53,156	\$ 40,329.53
11	0.74			\$ 522,739	\$ 385,798									
12	0.72													
13	0.70													
14	0.68													
15	0.66										\$ 101,555	\$ 67,113	\$ 53,156	\$ 35,128.34
16	0.64													
17	0.63													
18	0.61													
19	0.59													
20	0.58										\$ 101,555	\$ 58,457	\$ 53,156	\$ 30,597.93
21	0.56													
22	0.54													
23	0.53													
24	0.52													
25	0.50										\$ 101,555	\$ 50,918	\$ 53,156	\$ 26,651.80
26	0.49													
27	0.47													
28	0.46													
29	0.45													
30	0.44										\$ 101,555	\$ 44,351	\$ 53,156	\$ 23,214.58
Total NPV			\$ 198,349		\$ 1,733,661		\$ 1,685,090		\$ 72,275	\$ 3,075,292		\$ 2,359,521		\$ 202,223
		Total Capital Cost NPV			Total O&M/Five Yr Review Cost NPV									
		\$ 6,764,667			\$ 2,561,744									
		Total Cost NPV			\$ 9,326,411									

Table 2-12. Description of ARARs for the Selected Remedy

Citation	Activity or Prerequisite/Status	Requirement
Chemical-specific ARARs		
Surface/Subsurface Soil		
TCEQ Texas Risk Reduction Rules 30 TAC 335.558 and 335.559(g)(2)	Ensures adequate protection of human health and the environment from potential exposure to contaminants associated with releases – <b>relevant and appropriate</b> for remediation of contaminated soil for cross-media contamination pathways such as soil to groundwater and for hypothetical future maintenance workers.	Non-residential (industrial) soils shall conform to the non-residential soil-to-groundwater cross media protection concentration MSC (GWP-Ind) values for TCE and Perchlorate in accordance with 30 TAC §335.559(g)(2) and as listed in Table 2-7 of this report.
Groundwater		
<b>Federal Safe Drinking Water Act MCLs</b> 40 CFR §141.61 and §141.62	Applicable to drinking water at the tap— <b>relevant and appropriate</b> for water that could potentially be used for human consumption.	Must not exceed SDWAMCLs for water designated as a current or potential source of drinking water. The MCLs for organic contaminants TCE, PCE, 1,2-DCA, 1,1-DCE, cis-1,2-DCE, bis-2-ethylhexylphthalate, pentachlorophenol, chloroform, trans-1,2-DCE, and VC are provided in 40 CFR §141.61(a) and the MCLs for inorganic contaminants arsenic, cadmium, chromium and thallium are provided in 40 CFR §141.62 (b) and Table 2-8 of this report.
Surface Water <sup>(1)</sup>		
Texas Surface Water Quality Standards (30 TAC §307.6(d)(1))	Applicable to chemicals in surface water (Goose Prairie Creek) for water that could potentially be used for human consumption.	Chemicals must not exceed the Texas surface water quality standards in waters of the Goose Prairie Creek. The surface water quality standards for TCE, PCE, 1,2-DCA, 1,1-DCE, chloroform and VC are provided in 30 TAC §307.6(d)(1) and Table 2-9 of this report.
Location-specific ARARs		
<b>Requirements for Hazardous Waste Facilities in Floodplains</b> Resource Conservation and Recovery Act (RCRA) 40 CFR §264.18(b)	If excavated soil is found to constitute RCRA hazardous waste, these requirements are <b>relevant and appropriate</b> since part of LHAAP-47 is located within a 100-year floodplain. However, it is not anticipated that the excavated soil will be classified as hazardous.	A hazardous waste treatment, storage, or disposal facility used for remediation waste and located in the 100-year floodplain must be designed, constructed, operated, and maintained to prevent washout of such waste by a 100-year flood unless owner/operator show that procedures are in effect to remove waste safely before flood water can reach the facility.
Action-specific ARARS		
General Site Preparation, Construction, and Excavation Activities		
<b>Air Contaminants – General Nuisance Rules</b>  30 TAC 101.4	Emissions of air contaminants— <b>applicable</b> .	No person shall discharge from any source whatsoever one or more air contaminants or combinations thereof, in such concentration and of such duration as are or may tend to be injurious to or to adversely affect human health or welfare, animal life, vegetation, or property, or as to interfere with the normal use and enjoyment of animal life, vegetation, or property.
<b>Opacity Standard</b>  30 TAC 111.111(a)(8)(A)	Fugitive emissions from land-disturbing activities (e.g., excavation, construction)— <b>applicable</b> .	Visible emissions shall not be permitted to exceed opacity of 30% for any 6-minute period from any source.
<b>Fugitive Particulate Matter Standard</b>  30 TAC 111.145	Fugitive emissions from land-disturbing activities (e.g., excavation, construction)— <b>applicable</b> .	<ul style="list-style-type: none"><li>No person may cause, suffer, allow, or permit a structure, road, street, alley or parking area to be constructed, altered, repaired, or demolished, or land to be cleared without taking at least the following precautions to achieve control of dust emissions:</li><li>Use of water or of suitable oil or chemicals for control of dust in the demolition of structures, in construction operations, in work performed on a road, street, alley, or parking area, or in the clearing of land; and</li><li>Use of adequate methods to prevent airborne particulate matter during sandblasting of structures or similar operations.</li></ul>
<b>Storm Water Runoff Controls</b>  40 §122.26;	Storm water discharges associated with construction activities— <b>applicable</b> to disturbances of equal to or greater than 1 acre of land.	Specific to areas of excavation of contaminated soil. Good construction management techniques, phasing of construction projects, minimal clearing, and sediment, erosion, structural, and vegetative controls shall be implemented to mitigate storm water run-on/runoff.
Waste Generation, Management, and Storage		
<b>Characterization of Solid Waste</b>  40 CFR §262.11 30 TAC 335.62 30 TAC 335.504 30 TAC 335.503(a)(4)	Generation of solid waste, as defined in 30 TAC 335.1— <b>applicable</b> .	<ul style="list-style-type: none"><li>Must determine whether the generated solid waste is RCRA hazardous waste by using prescribed testing methods or applying generator knowledge based on information regarding material or process used. If the waste is determined to be hazardous, it must be managed in accordance with 40 CFR § 262–268.</li><li>After making the hazardous waste determination as required, if the waste is determined to be nonhazardous, the generator shall then classify the waste as Class 1, Class 2, or Class 3 (as defined in Section 335.505 through Section 335.507) using one or more of the methods listed in Section 335.503(a)(4) and Section 335.508 and manage the waste in accordance with the requirements of Chapter 335 of the TAC for industrial solid waste.</li></ul>
<b>Characterization of Hazardous Waste</b>  40 CFR §264.13(a)(1); 40 CFR §268.7 30 TAC 335.504(3) 30 TAC 335.509 30 TAC 335.511	Generation of a RCRA hazardous waste for treatment, storage, or disposal— <b>applicable</b> if hazardous waste is generated (e.g., PPE).	<ul style="list-style-type: none"><li>Must obtain a detailed chemical and physical analysis of a representative sample of the waste(s) that at a minimum contains all the information that must be known to treat, store, or dispose of the waste in accordance with 40 CFR §264 and §268.</li><li>Must also determine whether the waste is restricted from land disposal under 40 CFR §268 et seq. by testing in accordance with prescribed methods or use of generator knowledge of waste.</li></ul>
<b>Requirements for Temporary Storage of Hazardous Waste in Accumulation Areas</b>  40 CFR §262.34(a) and (c)(1) 30 TAC 335.69(a) and (d)	On-site accumulation of 55 gallons or less of RCRA hazardous waste for 90 days or less at or near the point of generation— <b>applicable</b> if hazardous waste is generated (e.g., PPE) and stored in an accumulation area.	<ul style="list-style-type: none"><li>Remedial activities derived waste (from monitoring and treating contaminated groundwater) is expected for this facility. A generator may accumulate hazardous waste at the facility provided that</li><li>Waste is placed in containers that comply with 40 CFR §264.171 to §264.173 (Subpart I); and</li><li>Container is marked with the words “hazardous waste”; or container may be marked with other words that identify the contents.</li></ul>
<b>Requirements for the Use and Management of Containers</b>	On-site storage/treatment of RCRA hazardous waste in containers for greater than 90 days— <b>applicable</b> if hazardous waste is generated (e.g.,	Design and operating standards of 40 CFR § 264.175(c) and 40 CFR §264.171, §264.172, and §264.173(a) and (b) must be met for the use and management of hazardous waste in containers.

40 CFR §264.171–264.173 30 TAC 335.69(e) 30 TAC 335.152(a)(7)	PPE) and is stored in containers.	
Well Construction		
Well Construction Standards— Monitoring or Injection Wells  16 TAC 76.1000	Construction of water wells— <b>applicable</b> to construction of new monitoring orinjection wells, if needed.	Injection wells shall be completed in accordance with the technical requirements of Section 76.1000, as appropriate. Substantive requirements applicable to the injection wells will be adhered to.
Class V Injection Wells  30 TAC §331.9(a); 30 TAC §331.10(a); 30 TAC §331.10(d); 30 TAC §331.21; 30 TAC §331.132(a); 30 TAC §331.132(b)(1); 30 TAC §331.132(c); 30 TAC §331.132(d)(1); 30 TAC §331.132(d)(4); 30 TAC §331.133(e)	Installation, operation, and closure ofinjection wells fall in the category of Class V Injection Wells – <b>relevant andappropriate</b> .	<ul style="list-style-type: none"><li>Injection wells shall be constructed to the required specifications for isolation casing, surface completion, prevention of commingling, and confinement of undesirable groundwater to its zone of origin.</li><li>Closure shall be accomplished by removing all of the removable casing and the entire well shall be pressure filled via a tremie pipe with cement from bottom to the land surface, or closure shall be performed by the alternative method for Class V Wells completed in zones of undesirable groundwater. Groundwater concentrations at time of well closure will determine the appropriate method of abandonment.</li></ul>
Well Construction Standards— Extraction Wells  16 TAC 76.1000(a) and (c) through (h) 16 TAC 76.1002(a) through (c) 16 TAC 76.1008(a) through (c)	Construction of water wells— <b>applicable</b> to construction of extraction (recovery)wells.	<ul style="list-style-type: none"><li>Substantive requirements applicable to extraction (recovery) wells will be adhered to. Wells shall be completed in accordance with the technical requirements of Section 76.1000, as appropriate.</li><li>Water wells completed to produce undesirable water shall be cased to prevent the mixing of water or constituent zones.</li><li>The annular space between the casing and the wall of the borehole shall be pressure grouted with cement or bentonite grout to the land surface. Bentonite grout may not be used if a water zone contains chloride water above 1500 parts per million (ppm) or if hydrocarbons are present.</li><li>Wells producing undesirable water or constituents shall be completed in such a manner that will not allow undesirable fluids to flow onto the land surface.</li><li>During installation of a water well pump, installer shall make a reasonable effort to maintain integrity of groundwater and to prevent contamination by elevating the pump column and fittings, or by other means suitable under the circumstances. Pump shall be constructed so that no unprotected openings into the interior of the pump or well casing exist</li></ul>
Treatment/Disposal		
Disposal of Wastewater (e.g., contaminated groundwater, dewatering fluids, decontamination liquids)  40 CFR §268.1(c)(4)(i) 30 TAC 335.431(c)	RCRA-restricted characteristicallyhazardous waste intended for disposal— <b>applicable</b> if extracted groundwater isdetermined to be RCRA characteristically hazardous.	Disposal is not prohibited if such wastes are managed in a treatment system subject to regulation under Section 402 of the CWA that subsequently discharges to waters of the United States.
Closure		
Standards for Plugging Wells that Penetrate Undesirable Water or Constituent Zones  16 TAC 76.1004(a) through (c)	Plugging and abandonment of wells— <b>applicable</b> to plugging and closure of monitoring and/or extraction wells.	If a well is abandoned, all removable casing shall be removed and the entire well pressure filled via a tremie pipe with cement from bottom up to the land surface. In lieu of this procedure, the well shall be pressure-filled via a tremie tube with bentonite grout of a minimum 9.1 lb/gal weight followed by a cement plug extending from land surface to a depth of not less than 2 feet. Undesirable water or constituents or the freshwater zone(s) shall be isolated with cement plugs.

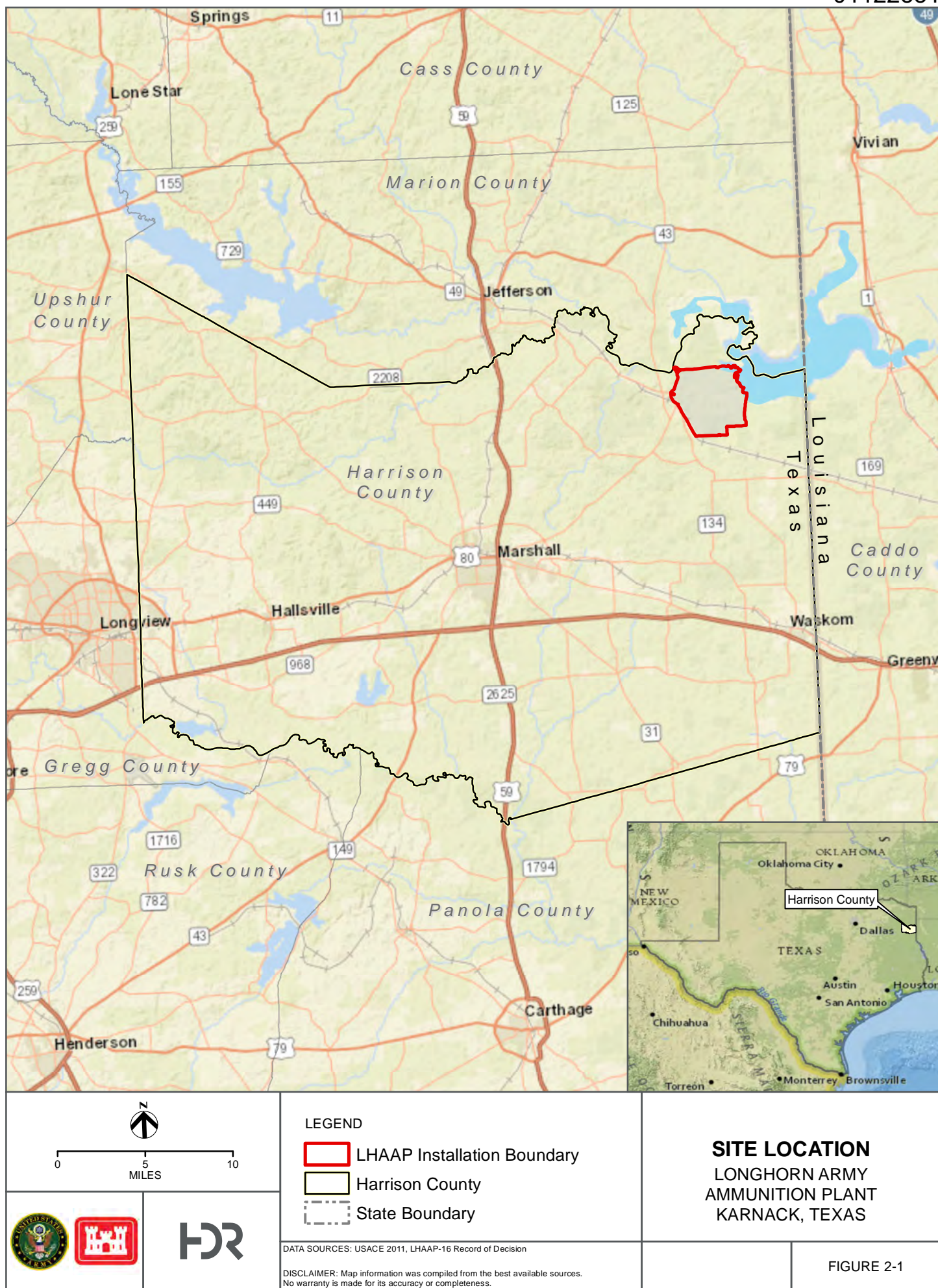
Notes and Abbreviations:

ARAR	applicable or relevant and appropriate requirement
bgs	below ground surface
CFR	Code of Federal Regulations
CWA	Clean Water Act of 1972
FR	Federal Register
GWP-Ind	soil MSC for industrial use based on groundwater protection
lb/gal	pound per gallon
LHAAP	Longhorn Army Ammunition Plant
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
MSC	Medium-specific concentration
%	percent
PPE	personal protective equipment
ppm	parts per million
RCRA	Resource Conservation and Recovery Act of 1976
SWDA	Safe Drinking Water Act
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
USEPA	United States Environmental Protection Agency
USC	United States Code

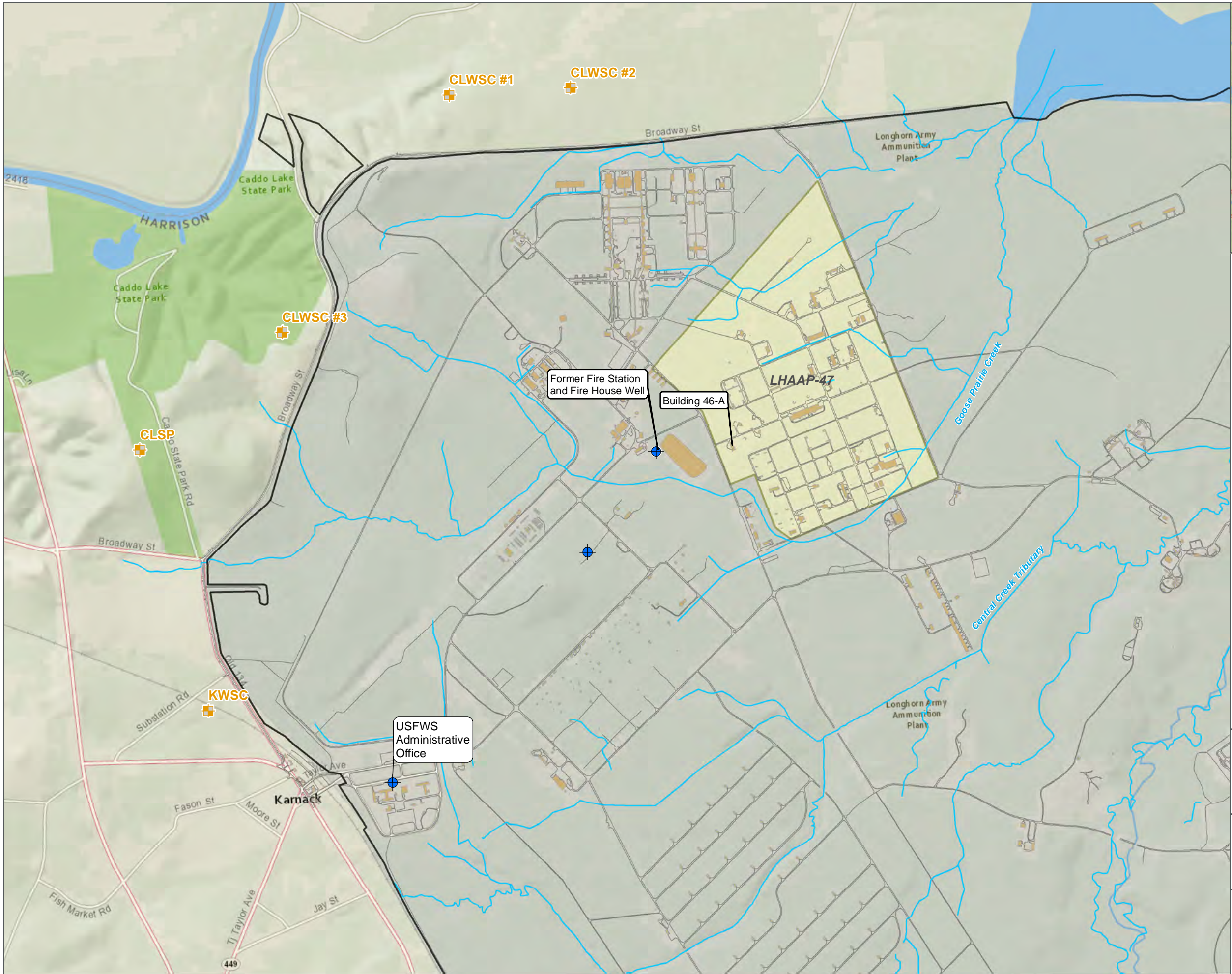
(1) No constituents of concern (COCs) are identified in surface water at Site 47. However, surface water will be monitored for perchlorate and VOCs (chemicals contributing to the primary risk) in soil and groundwater at LHAAP-47 site.

Source: Shaw 2011, Final Feasibility Study, LHAAP-47, Plant 3, Group 4









LEGEND

- Public Water Supply Well Locations
- Potable Water Wells
- Stream
- Roads
- Buildings
- LHAAP-47 Site

DATA SOURCES: July 2011 Final Feasibility Study Report for LHAAP-47, Plant 3 Area, Group 4, Longhorn Army Ammunition Plant, Karnack, Harrison County, Texas (Shaw, 2011)

Surface Water and Sediment Sampling Locations are taken from the Remedial Investigation R1 Report (Jacobs, 2002).

DISCLAIMER: Map information was compiled from the best available sources. No warranty is made for its accuracy or completeness.

SITE VICINITY

LHAAP 47  
LONGHORN ARMY AMMUNITION PLANT  
KARNACK, TEXAS

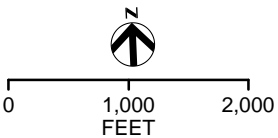
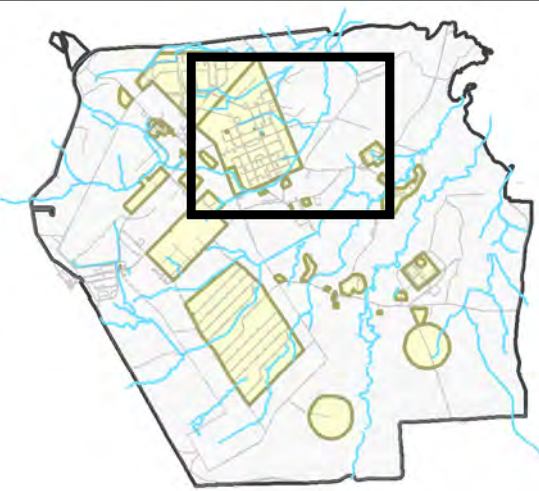
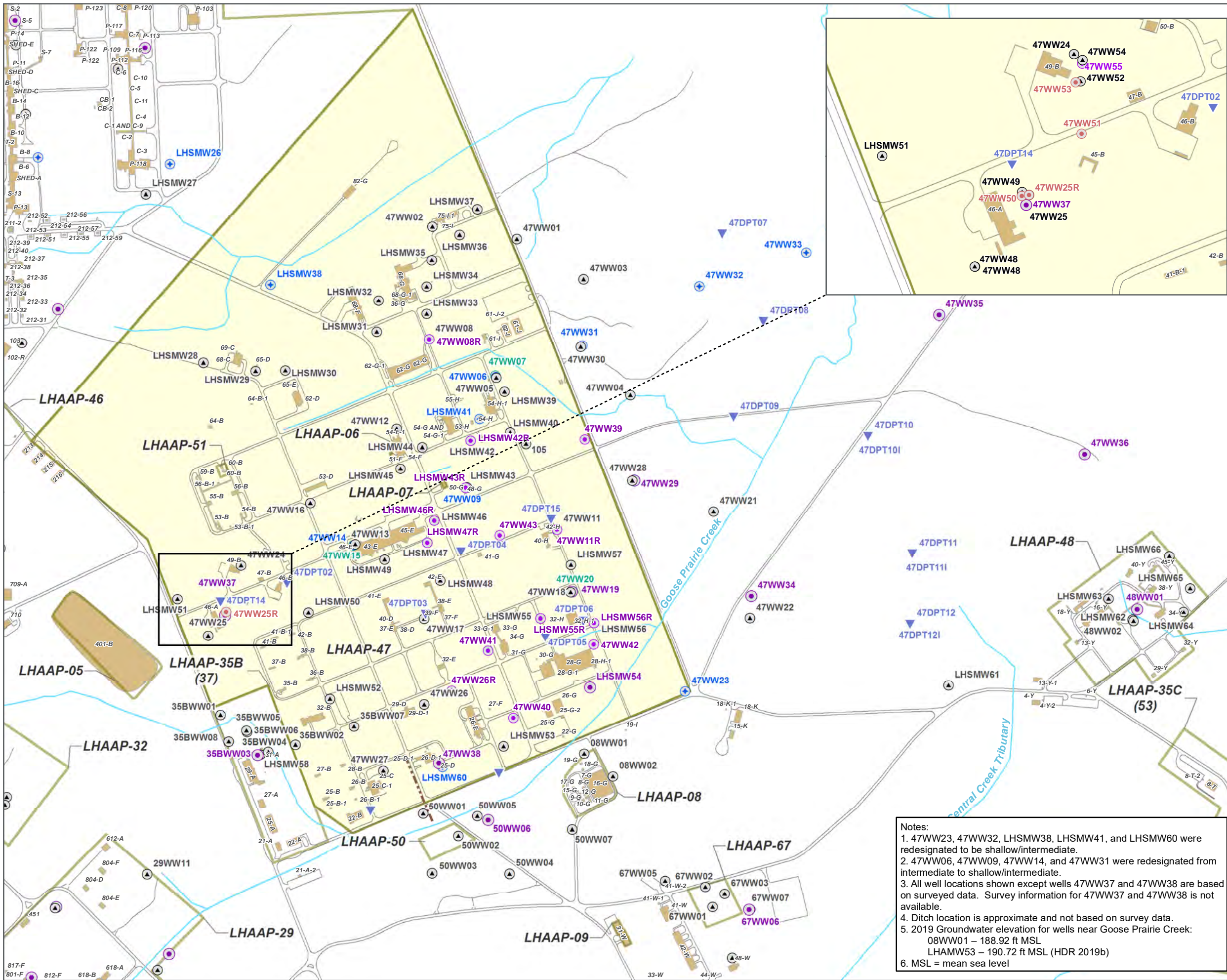


FIGURE 2-2





LEGEND

- ▼ DPT Sample 2010
- ⊙ Shallow Monitoring Well
- ⊕ Shallow/Intermediate Monitoring Well
- ⊙ Intermediate Monitoring Well
- ⊙ Upper Intermediate Monitoring Zone
- ⊙ Deep Monitoring Well
- Ditches
- Stream
- Roads
- Buildings
- LHAAP-47 Site
- LHAAP Site

NOTES: 47WW25R was abandoned and replaced by 47WW50.

DATA SOURCES: July 2011 Final Feasibility Study Report for LHAAP-47, Plant 3 Area, Group 4, Longhorn Army Ammunition Plant, Karnack, Harrison County, Texas (Shaw, 2011)

DISCLAIMER: Map information was compiled from the best available sources. No warranty is made for its accuracy or completeness.

MONITORING WELL LOCATIONS

LHAAP 47  
LONGHORN ARMY AMMUNITION PLANT  
KARNACK, TEXAS

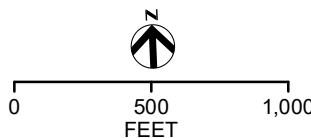
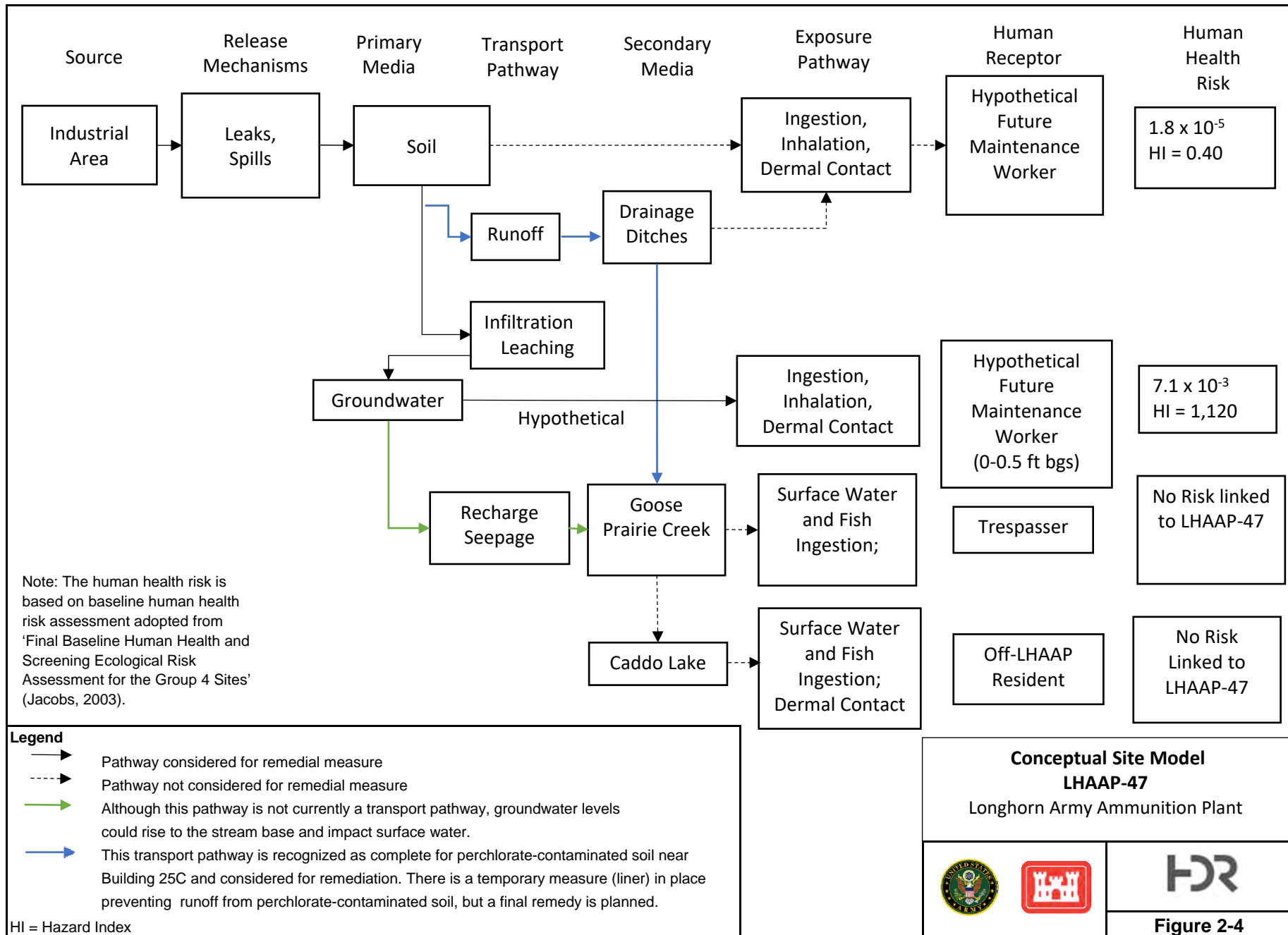


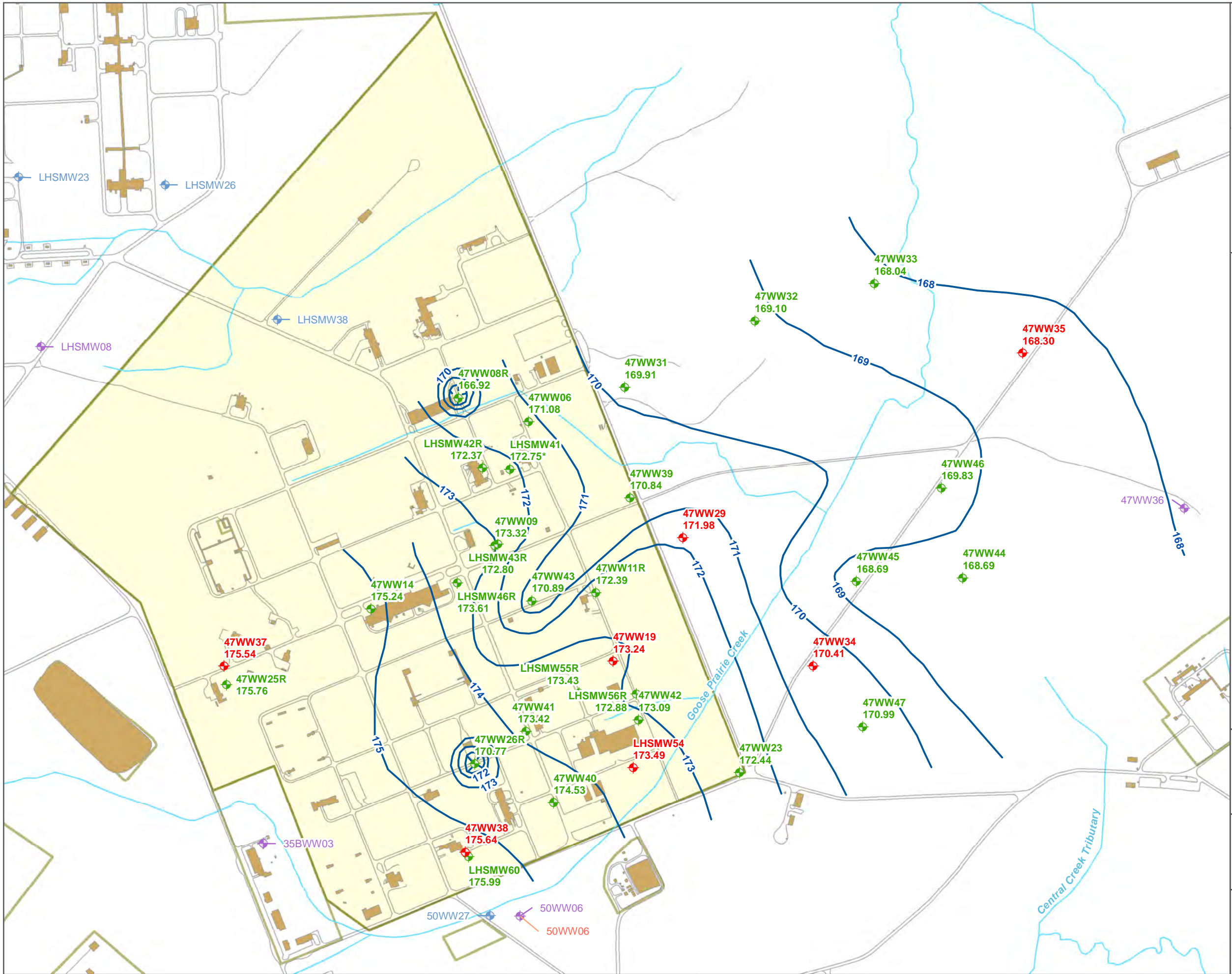
FIGURE 2-3

- Notes:
1. 47WW23, 47WW32, LHSMW38, LHSMW41, and LHSMW60 were redesignated to be shallow/intermediate.
  2. 47WW06, 47WW09, 47WW14, and 47WW31 were redesignated from intermediate to shallow/intermediate.
  3. All well locations shown except wells 47WW37 and 47WW38 are based on surveyed data. Survey information for 47WW37 and 47WW38 is not available.
  4. Ditch location is approximate and not based on survey data.
  5. 2019 Groundwater elevation for wells near Goose Prairie Creek:  
08WW01 – 188.92 ft MSL  
LHAMW53 – 190.72 ft MSL (HDR 2019b)
  6. MSL = mean sea level









LEGEND

- Intermediate (Upper) Monitoring Well (Not Measured)
- Intermediate (Upper) Monitoring Well (with Groundwater Elevation)
- Intermediate Monitoring Well (Not Measured)
- Intermediate Monitoring Well (with Groundwater Elevation)
- Groundwater Elevation Contour
- Road
- Stream
- Building
- LHAAP-47 Site
- LHAAP Site

NOTES:  
\* = July 2018 water level

DISCLAIMER: Map information was compiled from the best available sources. No warranty is made for its accuracy or completeness.

2018 INTERMEDIATE ZONE  
GROUNDWATER ELEVATIONS

LHAAP-47  
LONGHORN ARMY AMMUNITION PLANT  
KARNACK, TEXAS

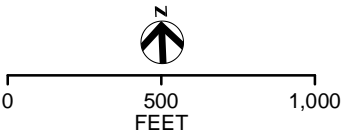
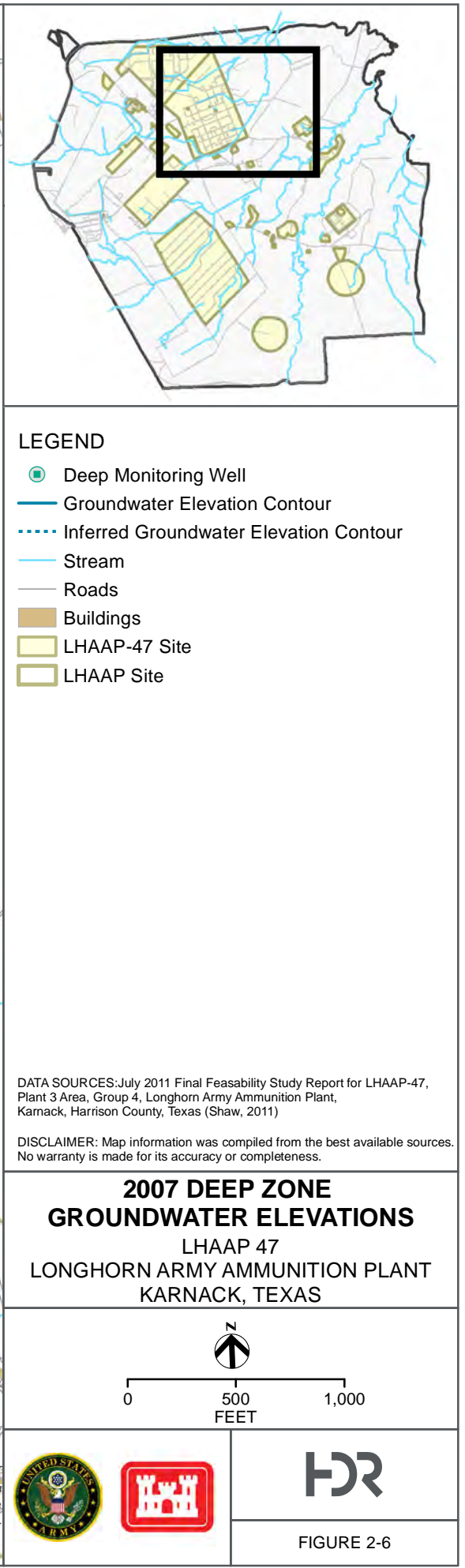


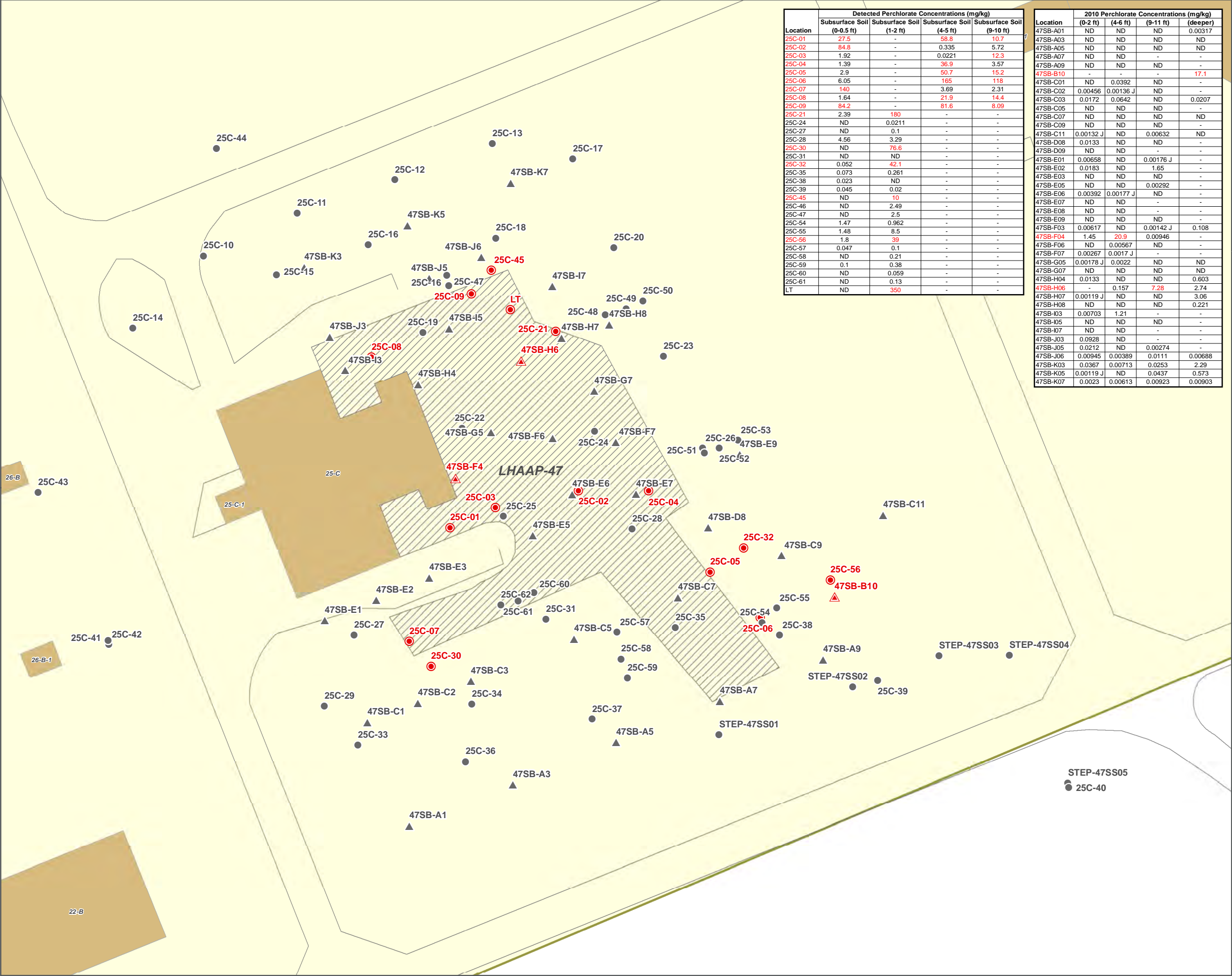
FIGURE 2-5

April 2022 2-73









**LEGEND**

Perchlorate Sample Locations

- ▲ 2010 <7.2 mg/kg
- ▲ 2010 >7.2 mg/kg
- Previous <7.2 mg/kg
- Previous >7.2 mg/kg
- Approximate Extent of Liner
- Stream
- Roads
- Buildings
- LHAAP-47 Site
- LHAAP Site

DATA SOURCES: Shaw 2011 Feasibility Study Report

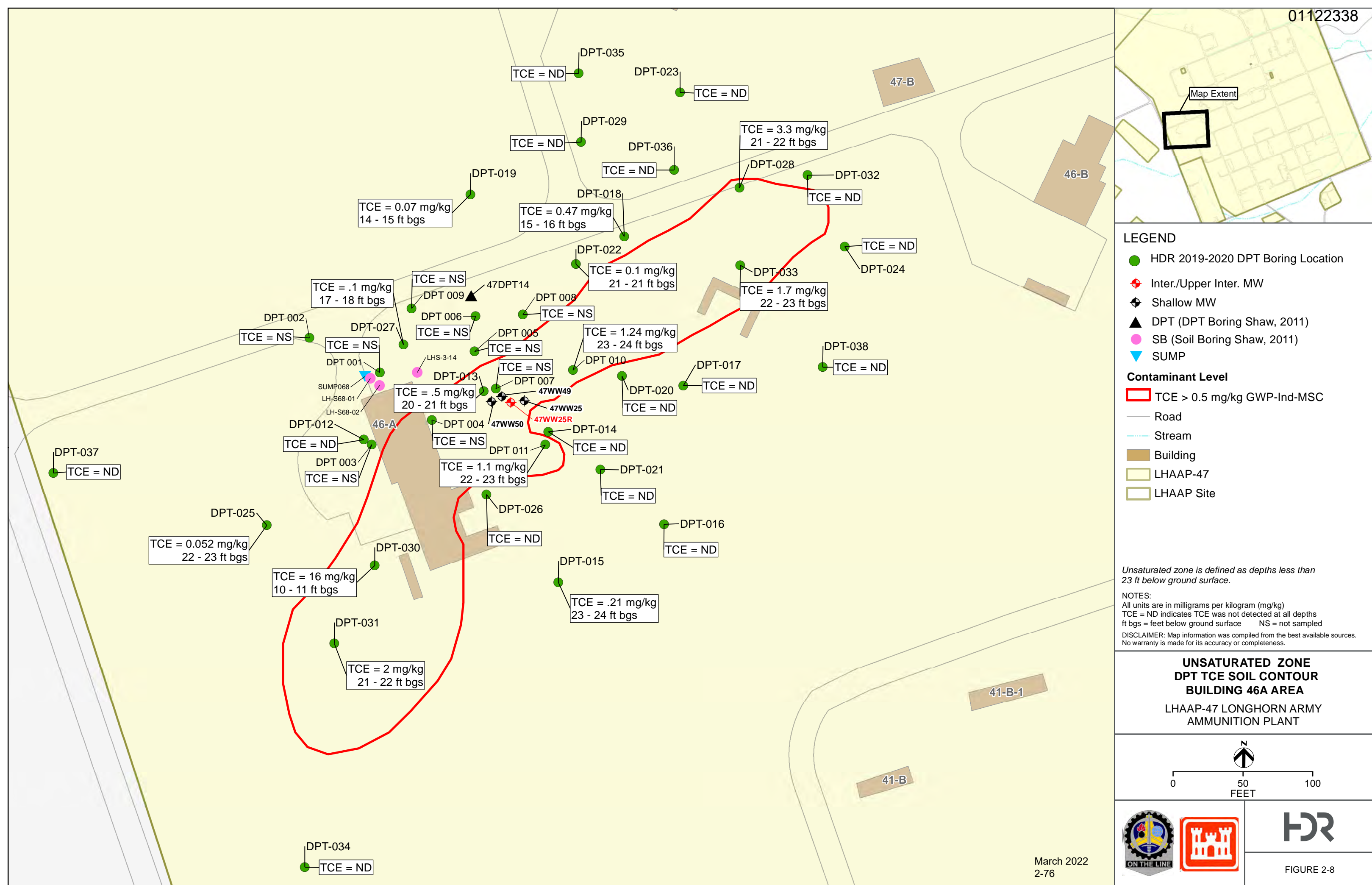
DISCLAIMER: Map information was compiled from the best available sources. No warranty is made for its accuracy or completeness.

**PERCHLORATE IN SOIL AT BUILDING 25C  
(FEASIBILITY STUDY, 2011)**

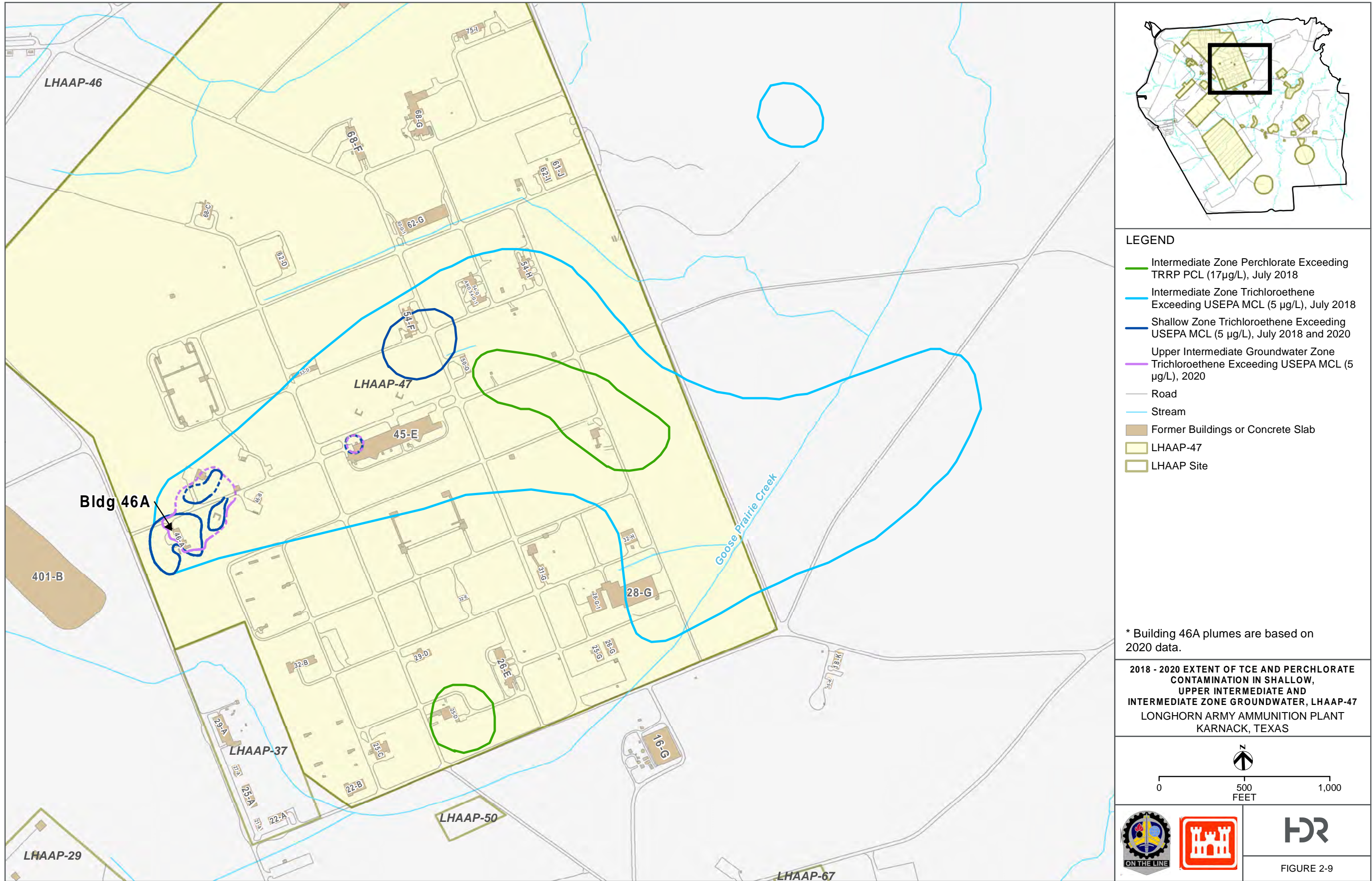
LHAAP 47  
LONGHORN ARMY AMMUNITION PLANT  
KARNACK, TEXAS

0 50 100  
FEET

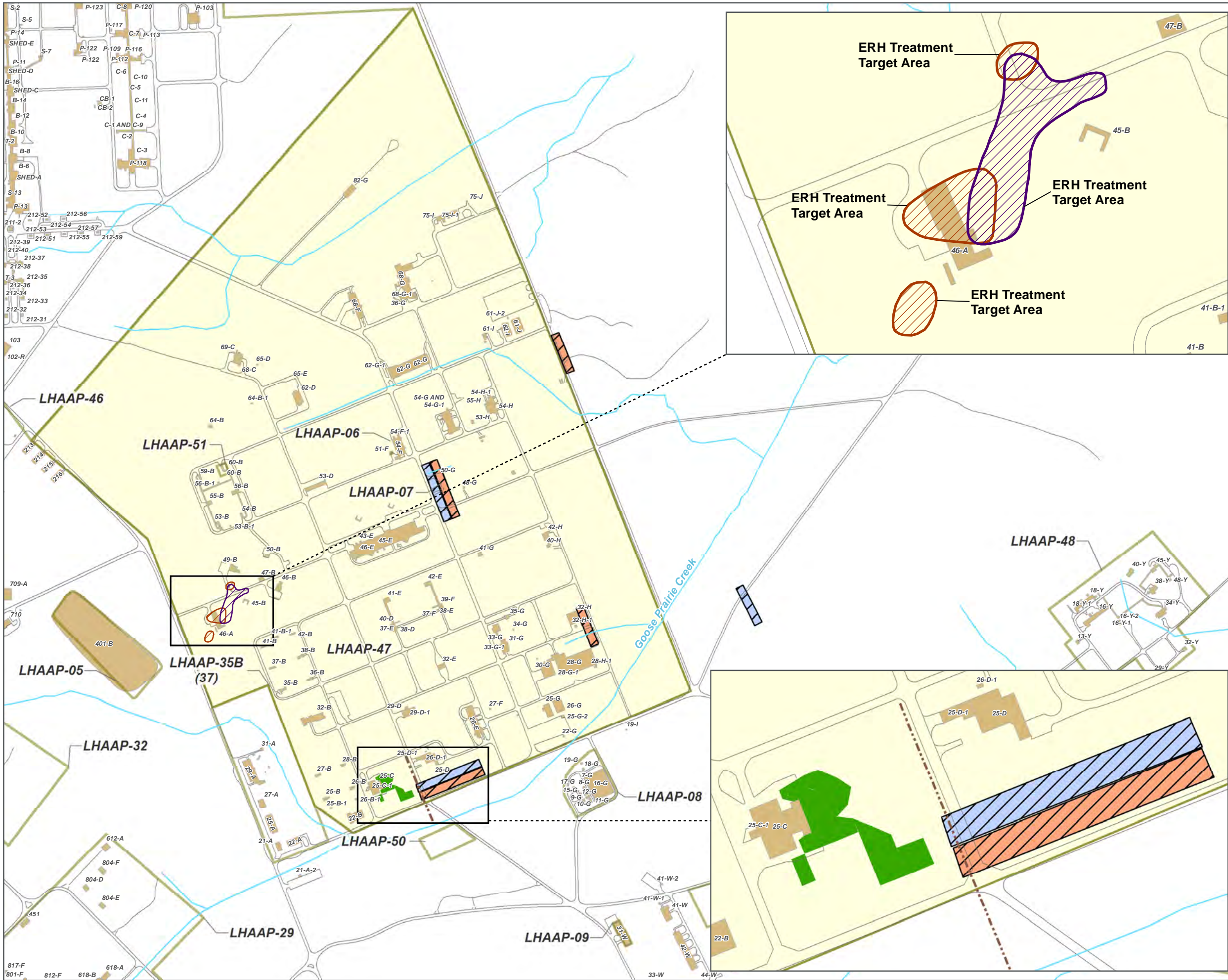
FIGURE 2-7











LEGEND

Shallow Groundwater Zone TCE Iso-Concentration Contours

TCE > 10,000 µg/L

Upper Intermediate Groundwater Zone TCE Iso-Concentration Contours

TCE > 10,000 µg/L

ISB Biobarrier Intermediate

ISB Biobarrier Shallow

Building 25C - Proposed Excavation

Ditches

Stream

Roads

Buildings

LHAAP-47 Site

LHAAP Site

Biobarrier locations are based on the FS and the extent of contaminated groundwater has changed since 2010. The final locations and design will be presented in the Remedial Design.

DATA SOURCES: July 2011 Final Feasability Study Report for LHAAP-47, Plant 3 Area, Group 4, Longhorn Army Ammunition Plant, Karnack, Harrison County, Texas (Shaw, 2011)

DISCLAIMER: Map information was compiled from the best available sources. No warranty is made for its accuracy or completeness.

MODIFIED ALTERNATIVE 2 ISB BIOARRIER, SOIL EXCAVATION, AND ERH TARGET AREAS

LHAAP 47  
LONGHORN ARMY AMMUNITION PLANT  
KARNACK, TEXAS

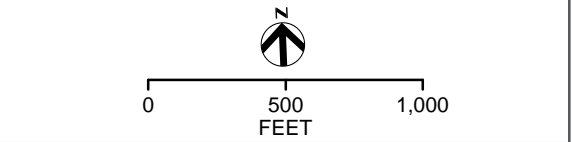
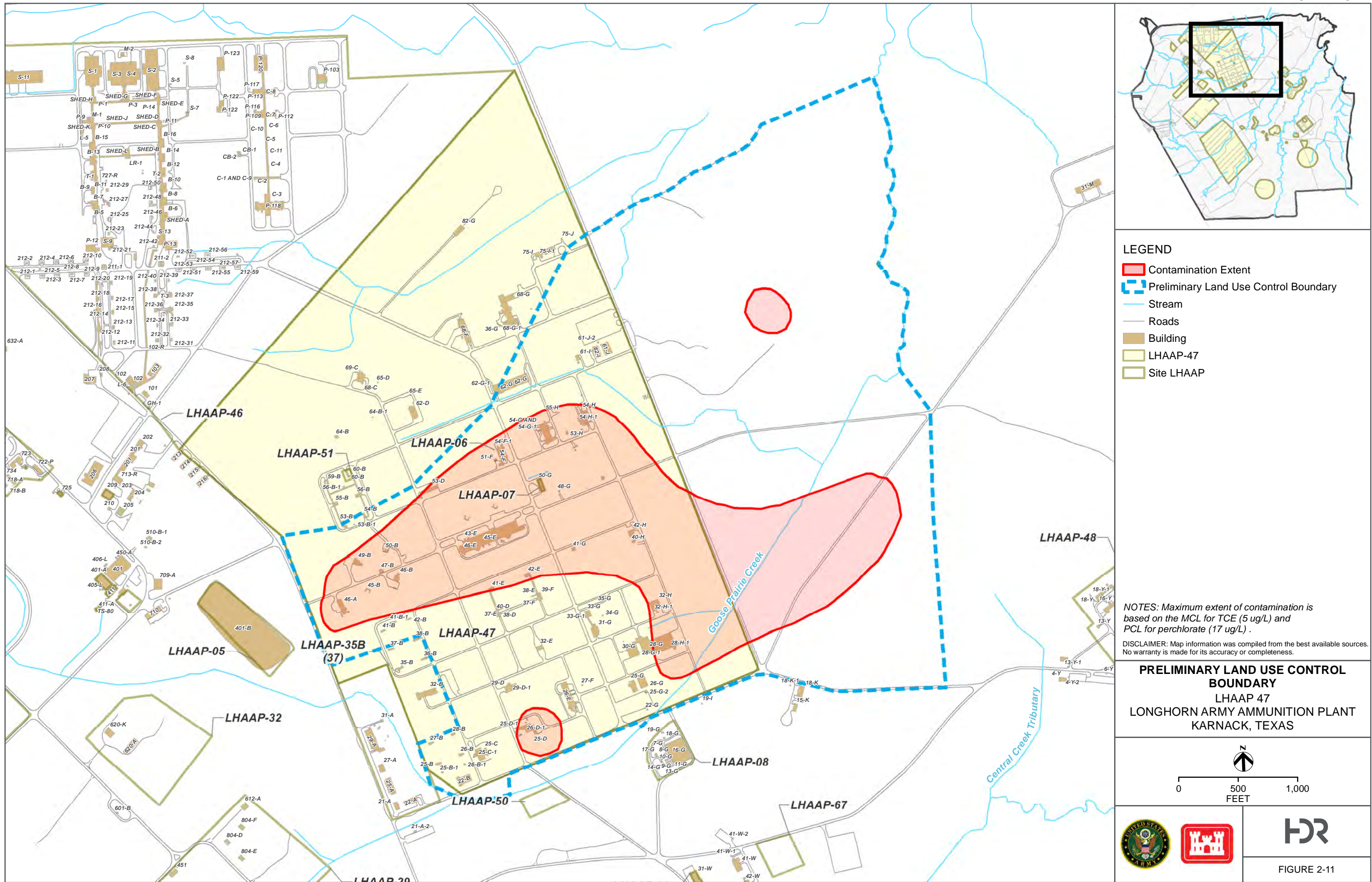


FIGURE 2-10









### 3. Responsiveness Summary

The Responsiveness Summary serves three purposes. First, it provides the U. S. Army, USEPA, and TCEQ with information about community concerns with the preferred alternative at LHAAP-47 as presented in the Proposed Plan. Second, it shows how the public's comments were considered in the decision-making process for selection of the remedy. Third, it provides a formal mechanism for the U.S. Army to respond to public comments.

The U.S. Army, USEPA, and TCEQ provide information regarding LHAAP-47 through public meetings, the Administrative Record for the facility, and announcements published in the Marshall News Messenger. **Section 2.3** discusses community participation on LHAAP-47, including the dates for the public comment period, the date, location, and time of the public meetings, and the location of the Administrative Record. The following documents related to community involvement were added to the Administrative Record:

- Transcripts of the public meetings on January 9, 2013 and July 21, 2021.
- Presentation slides from the January 9, 2013 and July 21, 2021 public meetings.
- Written questions and comments from the public during the public comment period, and the U.S. Army response to those comments.

#### 3.1 Stakeholder Issues and Lead Agency Responses

This section responds to significant issues raised by stakeholders including the public and community groups that were received in written or verbal form.

##### 3.1.1 2021 Revised Proposed Plan, Public Meeting and Presentation Comments

**Question/Comment:** Has the Army implemented thermal treatment technology at any other sites?

**Response:** *The Army has not implemented these technologies at this point but have confidence that it will work at Longhorn. ISB would not be effective to treat the residual DNAPL areas, and excavation would not be feasible due to the depth of contamination and total volume that would have to be removed. Dewatering would also be an issue for excavation.*

**Question/Comment:** Is there a schedule or timeline for implementing thermal technology at the other two Longhorn sites where it is planned?

**Response:** *Thermal treatment is planned at both LHAAP-29 and LHAAP-18/24. LHAAP-18/24 will likely be the first site, with RD to be completed in mid-2022, and remedy construction and implementation in 2023. LHAAP-29 might possibly be first, depending on additional investigation required to complete the RD. Simultaneous implementation at these two sites is not expected.*

**Question/Comment:** Where will the power for this come from?

**Response:** *Power is anticipated to be connected to the lines operated by the co-op that run near the site. This will be evaluated and details for getting power to the site will be developed as part of the RD.*





**Question/Comment:** What temperature do you need to heat the groundwater to for the technology to work?

**Response:** *Heating is usually to near the boiling point of water. Heating was to about 90 degrees Centigrade at an Air Force site.*

**Question/Comment:** None of the metals really represent a problem except for arsenic. If you want to establish a cleanup level for metals at any site, either the MCL should be used or the background study should be redone to obtain reliable values. Was there current testing done for arsenic at Building 46A?

**Response:** *Arsenic is a naturally occurring metal that is present in groundwater across the state and it has been demonstrated at Longhorn that it is present naturally in site groundwater. Elevated levels of arsenic in LHAAP-47 groundwater data may be the result of suspended particulates (high turbidity). Low-flow sampling is frequently utilized to reduce turbidity during sample collection. Arsenic can also be temporarily mobilized by reducing conditions that may be present within contaminant plumes. Once the plume is remediated, the reducing conditions no longer exist and the arsenic will return to a less soluble form and not occur at such high concentrations in groundwater. Please refer to Appendix B of the Feasibility Study (Shaw, 2011) for a thorough discussion and analysis of arsenic in groundwater at LHAAP-47.*

*The PSI conducted for the Building 46A area focused on VOCs due to the discovery of TCE DNAPL and metals were not tested during that effort. Arsenic and other metals have been included as part of LTM and the need for post-remedial monitoring and evaluation of arsenic concentrations can be done at that time.*

**Question/Comment:** The Army's cleanup standard for perchlorate in groundwater is a risk-based level of 26 µg/L. However, the EPA has decided to regulate perchlorate under the Safe Drinking Water Act and has established an Interim Drinking Water Health Advisory of 15 µg/L. The EPA and the Army are currently discussing this issue. Pending the outcome of discussions with the EPA, the Army should assume that the perchlorate cleanup level will be 15 µg/L, and plan accordingly.

Note - the purpose of excavating perchlorate contaminated soils will be to protect the underlying groundwater. A more stringent perchlorate groundwater standard may mean that the cleanup standard for soils will also have to be more stringent.

**Response:** *The groundwater cleanup level for perchlorate is 17 µg/L the TRRP Tier 1 PCL for residential groundwater use as established through the dispute resolution process. The potential for groundwater impacts from perchlorate will be evaluated as part of the LTM program and if it appears that perchlorate levels are not decreasing, the need for additional action will be evaluated.*

**Question/Comment:** Surface Water Modeling. The Army recognizes the deficiencies in modeling performed to assess the effect of groundwater contaminants on surface water in Goose Prairie Creek. The Army will re-do the modeling. This is the correct course of action.

**Response:** *As noted, surface water modeling will be updated as part of the RD.*



### 3.1.2 2013 and 2021 Proposed Plan, Public Meeting and Presentation Comments

The following comments were received for both the 2013 and 2021 public meetings/public comment periods.

**Question/comment:** Time to complete cleanup. All of the alternatives evaluated by the Army have an estimated cleanup time of more than 100 years. It is not possible to determine whether this is a reasonable length of time because the Army did not design an alternative with a significantly shorter cleanup time. Remediation methods that might result in shorter cleanup times include:

- Bioremediation or pump and treat in areas beyond the hot spots.
- Air sparging/vapor extraction in areas beyond the hot spots.
- Horizontal wells or trenches along the axes of contaminant plumes.

**Recommendation:** The Army should design and evaluate at least one alternative that will result in a cleanup time that is significantly less than 100 years.

**Response:** *Based on the extents of the TCE and perchlorate plumes, and current concentrations, any alternative that is designed to achieve cleanup time shorter than 30 years (or significantly shorter than 100 years) will cost at least an order of magnitude more than the current alternatives evaluated. As shown below for comparative analysis, a cost estimate was developed for a remedial scenario in which ISB using EVO will be implemented in a combination of grid and biobarriers across the entire TCE and perchlorate plumes in the shallow and intermediate zones. The objective of this scenario is to reduce the time frame to achieve cleanup levels by actively targeting the entire TCE and perchlorate plumes. The total estimated time frame for this scenario is ten years including remedial action, O&M, and LTM. The table below provides a summary of the estimated costs.*

Remedial Activity	Estimated Cost <sup>(1)</sup>
Remedial Design	\$315,592
Remedial Action	\$15,779,620
Operation and Maintenance	\$64,822,490
Long-term Monitoring	\$423,525
<b>TOTAL</b>	<b>\$81,341,227</b>

(1) The estimated cost was developed using Remedial Action Cost Engineering and Requirements software (AECOM, 2013b), accepted for government environmental project estimating purposes.

*Based upon the reuse of the property as a wildlife refuge, the high cost of this alternative makes it unreasonable to carry forward beyond this point in the CERCLA process. It is also noted that implementation of this aggressive approach would not ensure that cleanup goals will be met given the properties of the COCs and the type and complexity of the hydrogeologic regime. In addition, ISB or biobarriers would not be effective to treat the newly discovered residual TCE DNAPL since the high concentrations are toxic to the microbes needed to metabolize the TCE and other VOCs. The proposed thermal treatment is anticipated to reduce TCE concentrations by more than 99% within the estimated implementation duration of 137 to 183 days.*



**Question/Comment:** Evidence that natural attenuation is occurring. The Army cites reduction in contaminant concentrations in specific wells as evidence that natural attenuation is occurring at LHAAP-47. However, while natural attenuation appears to be reducing perchlorate and PCE concentrations, it is not as effective for TCE.

TCE is the most widespread contaminant at LHAAP-47, but TCE concentrations are decreasing in only about half of the contaminated wells. In the remainder of the wells, TCE concentrations either fluctuate without a clear trend, or are increasing.

Because TCE is so widespread, the overall effectiveness of natural attenuation at this site is questionable.

**Response:** *As indicated in the Proposed Plan, if MNA is not found to be effective, a contingency remedy may be implemented. This MNA evaluation will be completed after 8 quarters of monitoring.*

**Question/Comment:** Evaluation of MNA Effectiveness. The Army would use several criteria to determine whether natural attenuation is reducing contaminant concentrations at an acceptable rate. However, the Army's primary criterion is vague:

- Demonstrate that MNA is occurring according to the expectations.

**Recommendation:** The Army should use quantifiable criteria to determine whether natural attenuation is reducing contaminant concentrations at an acceptable rate (e.g., a reduction in contaminant concentrations by a given percentage within two years).

**Response:** *The USEPA Guidance Document, Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater (USEPA, 1998) will be used to evaluate MNA remedy. In addition, as indicated by the TCEQ, the non-parametric Mann-Kendall statistic may be used to evaluate solute plume stability. Specific quantifiable criteria that may be used will be discussed in the RD.*

**Question/Comment:** Estimation of natural attenuation rates. The Army calculated contaminant half-lives as a means of estimating natural attenuation rates. However, most of the half-life calculations do not satisfy the EPA's requirement for performing the calculations. The EPA states that a decrease in contaminant concentration of at least one order of magnitude is necessary in order to reliably calculate a half-life (rate law). Only eight of the 21 calculations meet this requirement.

**Recommendation:** The Army should not use any half-lives that do not satisfy the EPA's requirement.

**Response:** *The calculated half-lives that were previously used were based on preliminary data available at the time. As part of MNA evaluation, estimation of natural attenuation rates will be performed in accordance with EPA's requirements using the Guidance Document Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater (USEPA, 1998).*

**Question/Comment:** Estimating hydraulic conductivity. The Army used slug tests to estimate hydraulic conductivity. However, estimates of hydraulic conductivity based on slug test data are subject to large errors. Slug test data are often affected by a 'skin effect' that is caused by incomplete development. This results in estimates of hydraulic conductivity that are too low. Because calculated groundwater flow rates are directly proportional to the hydraulic conductivity, any groundwater flow rates based on the slug test data will probably be low.



**Recommendation:** The Army should not rely on data from slug tests to estimate hydraulic conductivity. The Army should use a more reliable method, such as pumping tests.

**Response:** *Limitations to slug test data are acknowledged. Provided water table conditions are amenable for a pump test, limited aquifer pump testing may be performed during RD to validate/refine previous hydraulic conductivity estimates (and, thereby, groundwater flow rates).*

**Question/Comment:** Metals. High concentrations of metals are present in groundwater (e.g., arsenic, cadmium, thallium), but the proposed cleanup plan does not directly address metals. Instead, the Army states: *Monitoring will be performed to track metals concentrations for future potential treatment or elimination as COCs.* This statement does not specify how, or when, the Army would decide to implement cleanup methods designed for metals.

**Recommendation:** The Army should develop explicit and quantifiable criteria to address the cleanup of metals.

**Response:** *Many metals are believed to be present due to turbidity or well-corrosion and not due to CERCLA releases. It is also possible that some exceedances are associated with presence of VOCs in groundwater. No explicit treatment is directed at reducing metals because of the small percentage of hazard associated with them (2.5% of non-carcinogenic hazard). Metals will be monitored during the remedy implementation. While metals may potentially increase in concentrations during ISB implementation, they typically attenuate without additional treatment. The RD will discuss specific criteria to address metals' cleanup.*



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## **Appendix A**

### **Public Notices**



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## PUBLIC NOTICE

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

### **LHAAP-47 (PLANT 3)**

**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 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-47. 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 January 1, 2013 and ends January 31, 2013. On Wednesday, January 9, 2013, from 7:00 to 8:00 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-47, including a short discussion of the planned Remedial Action, is provided below.

LHAAP-47, known as Site 47, was identified in historical records as Plant 3, is approximately 275 acres and is located in the north-central portion of the former plant. The site produced rocket motors, and pyrotechnic and illumination devices beginning in July 1953 until approximately 1997. The contaminant(s) of concern (COC) are perchlorate in soil and perchlorate, VOCs, SVOCs, TNT, 2,4-DNT, 2,6-DNT, and metals in groundwater. In November 1999, plastic liner material was placed around Building 25-C by the U.S. Army over areas known to contain perchlorate in the soil to prevent migration of perchlorate into Goose Prairie Creek. The Preferred Alternative to clean-up the soil will include removal and offsite disposal of the plastic liner and perchlorate contaminated soil to eliminate potential for migration of perchlorate from soil into the surface water and groundwater. The Preferred Alternative to clean-up the groundwater is in-situ bioremediation with monitored natural attenuation in groundwater which is expected to reduce COCs, prevent migration of the plume, and reduce or eliminate exposure to contaminated groundwater. Appropriate Land Use Controls will also be established and maintained until contaminant levels in affected media are reduced below levels consistent with residential use.

For further information or to submit comments contact:

*Rose Zeiler, Ph.D.  
P.O. Box 220  
Ratcliff, Arkansas 72951  
479-635-0110  
rose.zeiler@us.army.mil*



**US Army Corps  
of Engineers ®**  
Tulsa District

**THE UNITED STATES ARMY INVITES PUBLIC COMMENT ON THE REVISED PROPOSED PLAN FOR THE FINAL REMEDY FOR ENVIRONMENTAL SITE LHAAP-47, PLANT 3 AREA, SOLID ROCKET MOTOR FUEL PRODUCTION, LONGHORN ARMY AMMUNITION PLANT, TEXAS**

**PUBLIC MEETING ON JULY 21, 2021 AT THE CADDO LAKE STATE PARK GROUP HALL, KARNACK, TX**

The U.S. Army is the lead agency for environmental response actions at Longhorn Army Ammunition Plant (LHAAP). In partnership with the U.S. Environmental Protection Agency Region 6 (USEPA), the lead Oversight Agency, and Texas Commission on Environmental Quality, the Supporting Agency, the U.S. Army has developed the Revised Proposed Plan for site LHAAP-47, Plant 3 Area, Solid Rocket Motor Fuel Production. The purpose of this Revised Proposed Plan is to present for public review proposed modifications to Alternative 2 for LHAAP-47, which was selected in 2013. After public review during the public comment period from January 1 – January 31, 2013 and the public meeting held January 9, 2013 at the Karnack Community Center in Karnack, TX, Alternative 2 was selected. Although the Revised Proposed Plan identifies the preferred technology to supplement the final remedy for the site, the U.S. Army welcomes the public's review and comment. Beginning on July 7, 2021, copies of the Revised Proposed Plan, the 2012 Proposed Plan, and supporting documentation will be available for public review at the Marshall Public Library, 300 S. Alamo, Marshall, Texas, 75670 and on the LHAAP website at <http://www.longhornaap.com/LHAAP-47>. The public comment period is July 7, 2021 through August 6, 2021. **The public meeting will be held on July 21, 2021 at the Caddo Lake State Park Group Hall, Karnack, TX beginning at 6:00 PM and ending at 7:30 PM.** Caddo Lake State Park is located at 245 Park Road 2, Karnack TX 75661. Questions, comments, and responses on the Proposed Plan will be recorded by a court reporter during the public meeting. Written comments will be accepted throughout the public comment period.

LHAAP is an inactive, government-owned, formerly contractor-operated industrial facility located in central-east Texas in the northeastern corner of Harrison County. The former installation occupied 8,416 acres between State Highway 43 at Karnack, Texas, and the western shore of Caddo Lake. LHAAP was established in December 1941 near the beginning of World War II for the manufacture of trinitrotoluene. Other past industrial operations at the installation included the production of secondary explosives, rocket motor propellants, and various pyrotechnics. LHAAP was found to have actual and potential releases of hazardous substances or pollutants or contaminants associated with past operations, and it was added to the National Priorities List (NPL) in 1990.

LHAAP-47, known as the Plant 3 Area, Solid Rocket Motor Fuel Production, is 275 acres, located in the north-central portion of LHAAP. The Plant 3 site produced rocket motor, pyrotechnic, and illumination devices. Construction of Plant 3 began in July 1953 and production of rocket motors began in December 1954. Rocket motor production continued until the early 1980s. Some of the rocket motor production facilities were converted to produce pyrotechnic and illumination devices and were active until approximately 1997. Industrial solid wastes and hazardous wastes, such as parts cleaners and spent solvents, may have been generated by these activities. Fifty waste process sumps and three waste rack sumps were located within the LHAAP-47 site. Production activities at Building 46A began in 1960 when it was constructed as a casting and curing building. Among other things, it contained two degreasers. A sump was located on the north end of the building. Investigations conducted between 2018-2020 identified sufficiently high concentrations of trichloroethene (TCE) in groundwater to indicate the presence of residual Dense Non-Aqueous Liquid (DNAPL) near Building 46A, and TCE in soil at concentrations exceeding groundwater protection levels.

The Revised Proposed Plan for LHAAP-47 addresses potential risks associated with exposure to contaminated soil and groundwater in the shallow, upper intermediate, and intermediate zones, and also identifies technologies to prevent contaminated soil and groundwater from migrating and impacting surface water at

unacceptable levels. The Revised Proposed Plan presents the preferred supplemental technology to remediate residual TCE DNAPL in groundwater and TCE in soil near Building 46A. The previously selected Alternative 2 has been modified to include in-situ thermal desorption technology (ISTD) to address the DNAPL in addition to the previously identified remedy components to address contaminants across the remainder of the site. The modified alternative includes excavation and off-site disposal and Land Use Controls (LUCs) for perchlorate in soil; ISTD using Electrical Resistance Heating technology for residual TCE DNAPL in groundwater and TCE in soil near Building 46A; in-situ bioremediation and biobarriers for groundwater in other parts of the site; and Monitored Natural Attenuation and LUCs for groundwater across the remainder of the site. This remedy will assure protection of human health and the environment. Through the use of treatment technologies Alternative 2 will permanently reduce the toxicity, mobility, and volume of source materials that constitute the principal threat wastes at the site.

For further information or to submit written comments, contact:  
Dr. Rose M. Zeiler, Longhorn Army Ammunition Plant, P.O. Box 220, Ratcliff, Arkansas, 72951;  
phone number 479-635-0110 or email [rose.m.zeiler.civ@mail.mil](mailto:rose.m.zeiler.civ@mail.mil).

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## Initial Notice of Land Use Controls

LHAAP-47, Plant 3 Area - Solid Rocket Motor Fuel  
Production

Longhorn Army Ammunition Plant, Karnack, Texas

The former Longhorn Army Ammunition Plant (LHAAP) is an inactive government-owned, formerly contractor-operated and maintained Department of Defense facility located in central east Texas in the northeast corner of Harrison County. LHAAP is approximately 14 miles northeast of Marshall, Texas. The facility is approximately 40 miles west of Shreveport, Louisiana. The former U.S. Army installation occupied nearly 8,416 acres between State Highway 43 at Karnack, Texas and the southwestern shore of Caddo Lake. The installation can be accessed by State Highways 43 and 134.

LHAAP was placed on the National Priorities List (NPL) on August 9, 1990. Activities to remediate contamination began in 1990. After its listing on the NPL, the U.S. Army, the USEPA, and the Texas Water Commission (currently known as the Texas Commission of Environmental Quality [TCEQ]) entered into a CERCLA Section 120 Federal Facilities Agreement (FFA) for remedial activities at LHAAP. The FFA became effective December 30, 1991. LHAAP operated until 1997 when it was placed on inactive status and classified by the U.S. Army Armament, Munitions, and Chemical Command as excess property.

The site addressed in this Initial Notice of Land Use Controls is LHAAP-47, which is shown on the attached figures and discussed below.

Land Use Controls (LUCs) are applied at LHAAP-47 as part of the remedy in accordance with the LHAAP-47 Record of Decision finalized July 19, 2022. The LUCs are necessary because contaminants are present in groundwater at levels that do not support unlimited use and unrestricted exposure. The LUC boundaries may change during remedy implementation.

### Contaminants of Concern (COCs)

The COCs in groundwater for LHAAP-47 are Volatile Organic Compounds (VOCs), perchlorate, Semi-Volatile Compounds (SVOCS), and metals, which are found at concentrations exceeding acceptable levels in the shallow, upper intermediate, and intermediate groundwater zones. In addition, there are isolated locations in these groundwater zones where metals are present at concentrations exceeding U.S. Environmental Protection Agency Maximum Contaminant Levels or TCEQ Protective Concentration Levels.

### Land Use Controls

- The LUC prohibiting groundwater use (except for environmental monitoring and testing) shall be implemented and shall remain in place at the site until the levels of COCs in soil and groundwater allow for unlimited use and unrestricted exposure.
- The LUC restricting land use to nonresidential shall be implemented and shall remain in place at the site until the levels of COCs in surface and subsurface soil, and groundwater allow for unlimited use and unrestricted exposure.
- The LUC to maintain the integrity of any current or future remedial or monitoring systems shall remain in place until groundwater cleanup levels of COCs are met.

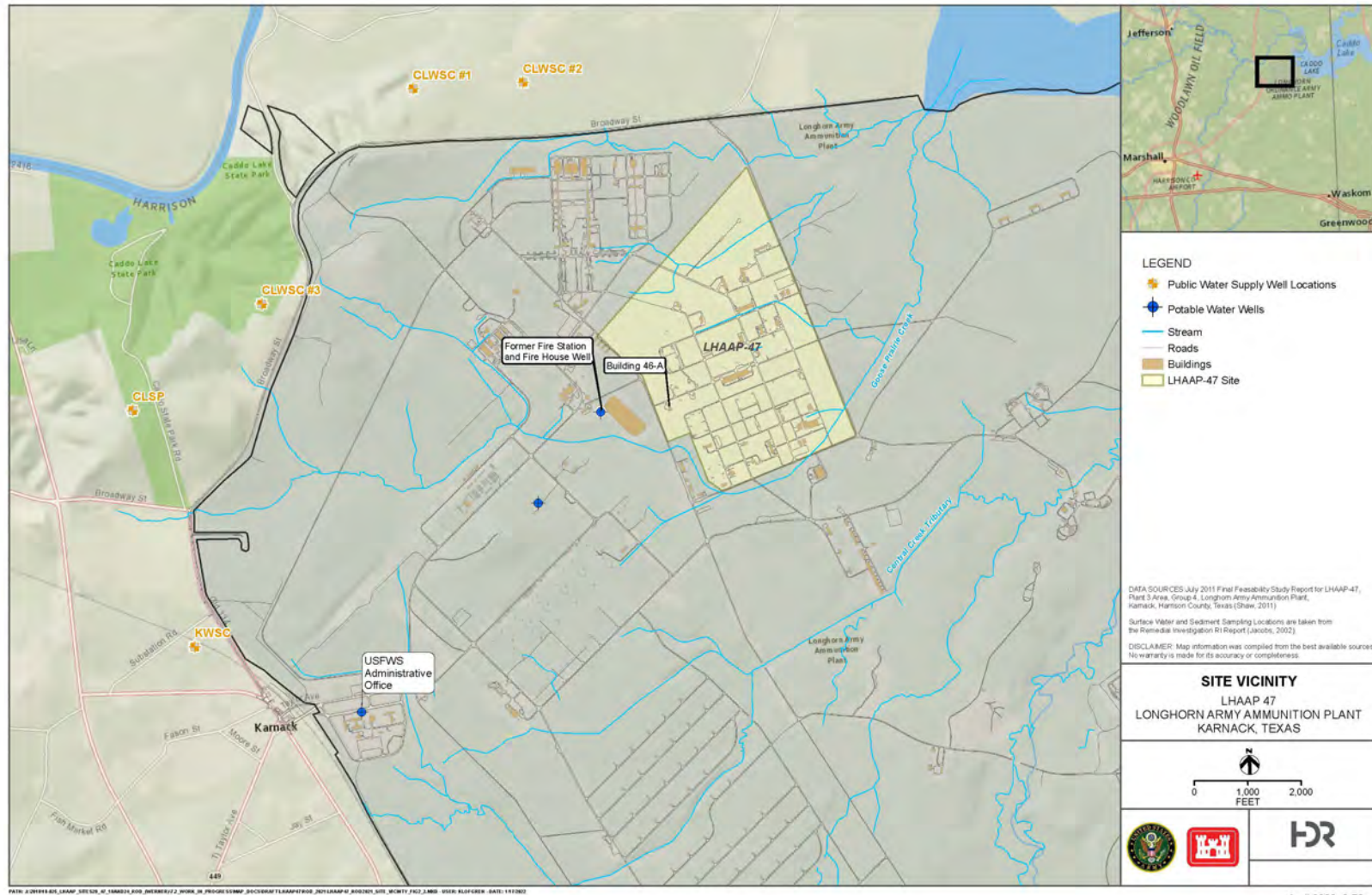
Further information may be found in the Administrative Record at the Marshall Public Library, at website [www.longhornaap.com](http://www.longhornaap.com) or by contacting Rose M. Zeiler (571-403-3232 or [rose.m.zeiler.ctr@army.mil](mailto:rose.m.zeiler.ctr@army.mil)).



## Initial Notice of Land Use Controls

LHAAP-47 Plant 3 Area - Solid Rocket Motor Fuel Production,  
Longhorn Army Ammunition Plant, Karnack Texas

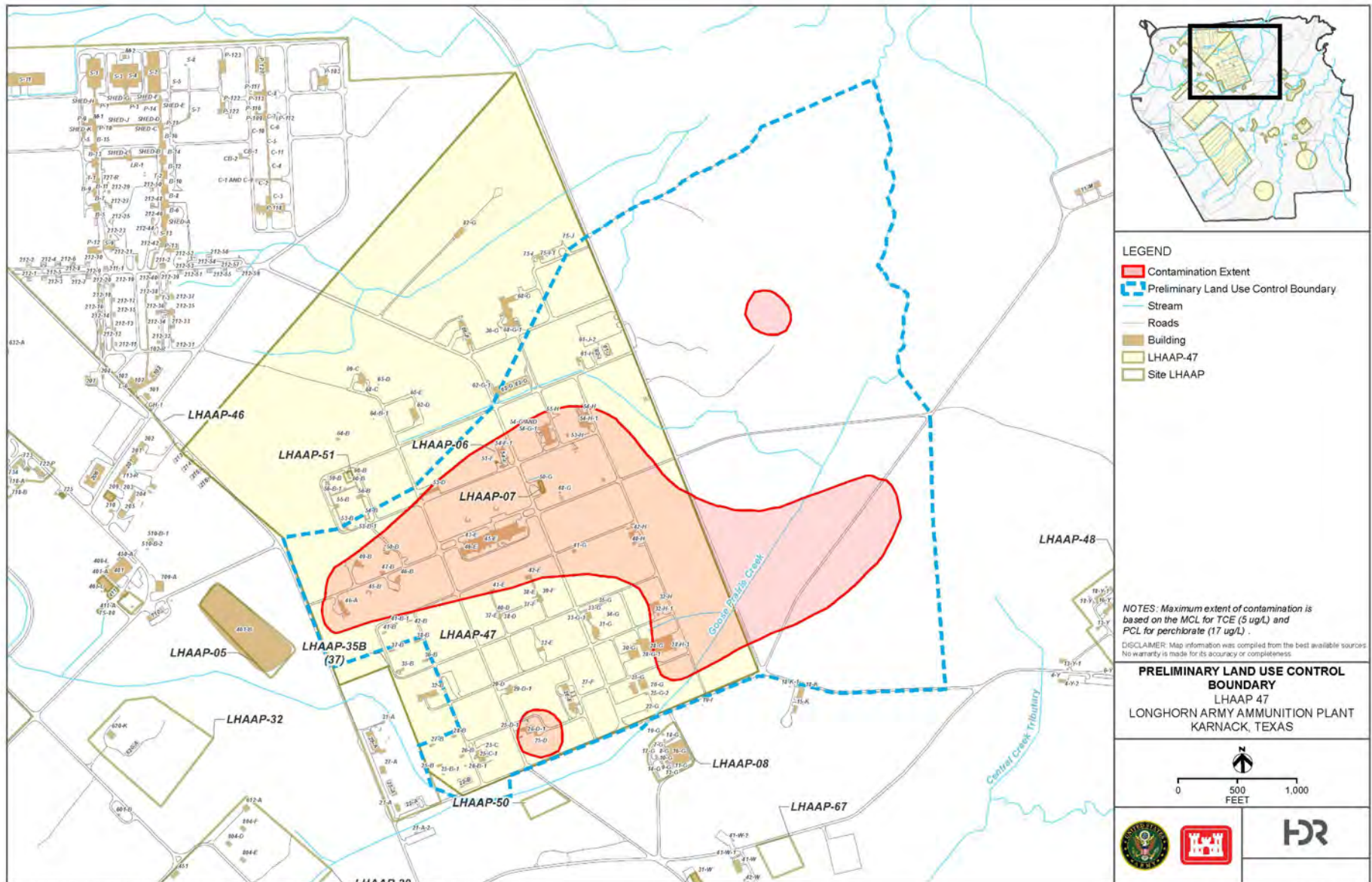
Figure 1. Location of LHAAP-47



## Initial Notice of Land Use Controls

LHAAP-47 Plant 3 Area - Solid Rocket Motor Fuel Production,  
Longhorn Army Ammunition Plant, Karnack Texas

Figure 2. LHAAP-47 Preliminary LUC Boundary





August 17, 2022

DAIN-ODB-LO

Senator Ted Cruz  
305 S. Broadway, Suite 501  
Tyler, TX 75702

Re: Initial Notice of Land Use Controls for one environmental site at Longhorn Army  
Ammunition Plant (LHAAP), Karnack, Texas

The final Record of Decision (ROD) for one site, LHAAP-47, Plant 3 Area - Solid  
Rocket Motor Fuel Production, Longhorn Army Ammunition Plant, Karnack, Texas.,  
was signed on July 19, 2022.

The attached information is provided to fulfill a requirement of the ROD by giving notice of the  
groundwater and soil (surface and subsurface) contamination and any land use restrictions  
referenced in the ROD within 90 days of ROD signature. The notices are being sent to federal,  
state and local governments involved at this site and the owners and occupants of the property  
subject to the use restrictions and land use controls.

The point of contact for this action is the undersigned. I may be contacted at 571-403-3232, or  
by email at [rose.m.zeiler.ctr@army.mil](mailto:rose.m.zeiler.ctr@army.mil).

Sincerely,

A handwritten signature in cursive script, reading "Rose M. Zeiler", is positioned below the "Sincerely," text.

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

Three Enclosures  
Copies furnished:  
B. Follin, USEPA Region 6, Dallas, TX  
A. Palmie, TCEQ, Austin, TX  
K. Nemmers (Administrative Record)





August 17, 2022

DAIN-ODB-LO

Senator John Cornyn  
517 Hart Senate Office Bldg.  
Washington, DD 20510

Re: Initial Notice of Land Use Controls for one environmental site at Longhorn Army  
Ammunition Plant (LHAAP), Karnack, Texas

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

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K. Nemmers (Administrative Record)



August 17, 2022

DAIN-ODB-LO

Congressman Louie Gohmert  
Congressional District 1  
1121 ESE Loop 323, Ste 206  
Tyler, TX 75701

Re: Initial Notice of Land Use Controls for one environmental site at Longhorn Army  
Ammunition Plant (LHAAP), Karnack, Texas

The final Record of Decision (ROD) for one site, LHAAP-47, Plant 3 Area - Solid Rocket Motor Fuel Production, Longhorn Army Ammunition Plant, Karnack, Texas., was signed on July 19, 2022.

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K. Nemmers (Administrative Record)



August 17, 2022

DAIN-ODB-LO

Senator Bryan Hughes  
P.O. Box 12068  
Capitol Station  
Austin, Texas 78711

Re: Initial Notice of Land Use Controls for one environmental site at Longhorn Army  
Ammunition Plant (LHAAP), Karnack, Texas

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K. Nemmers (Administrative Record)



August 17, 2022

DAIN-ODB-LO

Representative District 9  
Room E2.502  
P.O. Box 2910  
Austin, TX 78768

Re: Initial Notice of Land Use Controls for one environmental site at Longhorn Army  
Ammunition Plant (LHAAP), Karnack, Texas

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A. Palmie, TCEQ, Austin, TX  
K. Nemmers (Administrative Record)



August 17, 2022

DAIN-ODB-LO

Chad Sims - Harrison County Judge  
Harrison County Historical Courthouse  
#1 Peter Whetstone Square, Room 314  
Marshall, TX 75670

Re: Initial Notice of Land Use Controls for one environmental site at Longhorn Army  
Ammunition Plant (LHAAP), Karnack, Texas

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August 17, 2022

DAIN-ODB-LO

William Hatfield  
Harrison County Historical Courthouse  
#1 Peter Whetstone Square, Room 307  
Marshall, TX 75670

Re: Initial Notice of Land Use Controls for one environmental site at Longhorn Army  
Ammunition Plant (LHAAP), Karnack, Texas

The final Record of Decision (ROD) for one site, LHAAP-47, Plant 3 Area - Solid  
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by email at [rose.m.zeiler.ctr@army.mil](mailto:rose.m.zeiler.ctr@army.mil).

Sincerely,

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

Three Enclosures  
Copies furnished:  
B. Follin, USEPA Region 6, Dallas, TX  
A. Palmie, TCEQ, Austin, TX  
K. Nemmers (Administrative Record)



August 17, 2022

DAIN-ODB-LO

Sam Canup  
P.O Box 277  
Uncertain, TX 75661

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August 17, 2022

DAIN-ODB-LO

Erik Duerkop  
USFWS - Caddo Lake NWR  
15600 State Hwy 134  
National Wildlife Refuge  
Karnack, Texas 75661

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August 17, 2022

DAIN-ODB-LO

Carl Shelton, President  
Leigh Water Supply Corporation Board of Directors  
P.O. Box 760  
Scottsville, TX 75688

Re: Initial Notice of Land Use Controls for one environmental site at Longhorn Army  
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August 17, 2022

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John Pritchard  
Leigh Water Supply Corporation Board of Directors  
P.O. Box 760  
Scottsville, TX 75688

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August 17, 2022

DAIN-ODB-LO

Octavia Polk, Vice President  
Leigh Water Supply Corporation Board of Directors  
P.O. Box 760  
Scottsville, TX 75688

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August 17, 2022

DAIN-ODB-LO

Brenda Walker, Secretary/Treasurer  
Leigh Water Supply Corporation Board of Directors  
P.O. Box 760  
Scottsville TX 75688

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August 17, 2022

DAIN-ODB-LO

Terry Britt – President  
Caddo Lake Water Supply Corporation Board of Directors  
159 Easy St.  
Karnack, TX 75661

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August 17, 2022

DAIN-ODB-LO

Robert Wall – Vice-President  
Caddo Lake Water Supply Corporation Board of Directors  
2153 Dorrough Rd.  
Karnack, TX 75661

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Joe Oliphant – Secretary Treasurer  
Caddo Lake Water Supply Corporation Board of Directors  
2451 Blairs Landing Rd.  
Karnack, TX 75661

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Billy Wall  
2149 Dorrough Rd.  
Karnack, TX 75661

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David Smith  
Caddo Lake Water Supply Corporation Board of Directors  
449 Cypress Drive  
Uncertain, TX 75661

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Jay Webb  
Director, Caddo Lake Water Supply Corporation  
1027 Cypress Dr.  
Uncertain, TX 75661

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Ernest Knott  
195 Mossy Brake Rd.  
Uncertain, TX 75661

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Gary Kempf  
Director, Caddo Lake Water Supply Corporation  
2249 Blairs Landing Rd.  
Karnack, TX 75661

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Russell Wright  
3057 Dorrough Rd.  
Karnack, TX 75661

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**Subject:** Final Monthly Managers' Meeting (MMM),  
**Longhorn Army Ammunition Plant (LHAAP)**  
**Location of Meeting:** WebEx Conference Call  
**Date of Meeting:** 18 August 2022 – 11:00 AM Central Daylight Time (CDT)

**Attendees:**

Army BRAC: Rose M. Zeiler (RMZ)  
 USEPA: Brian Follin (BF); Tim Bartos and Christopher Braun with United States Geological Survey (USGS) in support of the USEPA  
 USAEC: Lena Sierocinski  
 TCEQ: April Palmie (ABP)  
 USACE: Aaron Williams (AW)  
 Bhate: Kim Nemmers (KN)  
 APTIM: William Foss (WF) and Praveen Srivastav (PS)  
 HDR: Amita Patel (AP)  
 TLI: Jonathan Tatman (JT)

**Defense Environmental Restoration Program (DERP) Performance-Based Remediation Update**

**Groundwater Treatment Plant (GWTP)** – KN said that the GWTP was operating properly. She explained that the ICTs at LHAAP-18/24 were running properly but that there are a few pumps that are tripping out. She said that the electrician would be looking at those pumps. KN said that repairs were made to the nutrient pump, associated with the fluidized bed reactor (FBR), this past week when a leak was observed due to a portion of the piping that was rubbing and there was some leaking from the nutrient pump this week. KN said that Scott Beesinger (SB) and Kennie Moore (KM) require confined space, entry training to be able to complete additional repairs due to an apparent blockage in the system. She explained that the system is not operating as designed and that Scott stated that entrance into tanks was necessary last time this happened. So, once SB and KM have confined space training and permitting, the repairs can be completed. KN explained that the 2<sup>nd</sup> Quarter GWTP Report would outline the blockage issue identified. She also said that the GWTP is receiving water from the LHAAP-17 extraction system.

**Field Work** – KN said that LHAAP-04 sampling was completed earlier in the month. She said that the LHAAP-18/24 sampling was ongoing and expected to be completed early the following week.

ZB asked everyone to refer to the Document and Issues (DI) Tracking Table dated 18 August 2022.

- **Task 1** (Project Management) – KN said that the July 2022 Monthly Manager's Meeting (MMM) minutes were issued Final. KN said that the next RAB is scheduled for 16 November 2022.
- **Task 4** (LHAAP-04) – PS stated that the Year 3 2<sup>nd</sup> semiannual Remedial Action-Operation (RA-O) Sampling Event was completed in August 2022. PS said that the validated data would be presented at the October 2022 MMM. PS said that the Draft Year 2 Annual RA-O Report was submitted as Draft Final in early August and is considered final based on receipt of approval emails from the United States Environmental Protection Agency (USEPA) and Texas Commission on Environmental Quality (TCEQ).
- **Task 5** (LHAAP-12) – PS said responses to comments on the Draft 2021 Annual RA-O Report were submitted to TCEQ and USEPA with the Draft Final on 13 July 2022 and the report is now considered final based on their approval emails.
- **Task 6** (LHAAP-16) – PS said that the Year 3 1<sup>st</sup> Semiannual RA-O Sampling Event was completed in June/July 2022. PS said that the Year 2 RA-O Report is in progress with

estimated delivery to the regulators in August 2022, but it may slide into early September 2022 depending on resolution of Army comments.

- **Task 9** (LHAAP-37) – PS said that the Year 5 RA-O Report is being prepared and will be submitted in September 2022 to the Regulators.
- **Task 10** (LHAAP-46) – PS said that the Year 8 RA-O Report is in progress and will be submitted in September 2022 to the Regulators.
- **Task 11** (LHAAP-50) – PS said that the Year 8 RA-O Report is in progress and will be submitted in September 2022 to the Regulators.
- **Task 12** (LHAAP-58) – KN stated that the Year 8 LHAAP-58 Report was being prepared and that the validated data for the June 2022 semiannual sampling event was included in the August 2022 MMM. KN presented the data explaining that the detections were consistent with the previous year data such that the plume is stable. She pointed out the bacteria present and that ethene is being produced such that the chlorinated solvents are fully degrading.
- **Task 13** (LHAAP-67) – PS stated that the Year 8 Annual RA-O Report is final.
- **Task 14** (LHAAP-001-R-01 and LHAAP-003-R-01) – KN said that land use control (LUC) inspections at LHAAP-001-R-01 and LHAAP-003-R-01 will be completed upon contract modification.
- **Task 16** (GWTP) – KN said that TCEQ and USEPA comments on the 1<sup>st</sup> Quarter 2022 GWTP Report were received and would be addressed by the 2<sup>nd</sup> Quarter 2022 GWTP Report, which is currently in internal review. KN explained that the comments received will require change pages for the 1<sup>st</sup> Quarter 2022 GWTP Report and will be provided with the 2<sup>nd</sup> Quarter 2022 GWTP.
- **Task 17** (LHAAP-18/24) – KN said that the validated data package will be presented at the October 2022 MMM.
- **Task 18** (Surface Water) – KN said that due to dry conditions the 3<sup>rd</sup> Quarter 2022 surface water samples have not been collected. KN explained that the treated groundwater is currently going to the Intermediate Range Nuclear Forces (INF) Pond following F FBR and ion exchange (IX) vessel treatment. She explained that Bhate continues to collect effluent after the FBR and between the IX vessels to assess the performance of the treatment system. KN said that results are presented in the validated data that may show levels greater than the protective concentration levels after the FBR, but that none of water exceeds these levels once treated by the IX vessel. Obtaining data following the FBR treatment allows for determination if maintenance is required early on (e.g repair or replace nutrient pump).
- **Task 19** (2022 Land Use Control Management Plan) – KN said that the LUC Management Plan would be updated started in September 2022.
- **Administrative Record (AR)** – PS said that the January – March 2022 AR was printed and has been shipped. PS said that the list is being compiled for the April – June 2022 AR. PS said that the website is being updated.

#### Update on other DERP Sites:

- **LHAAP 18/24** – AP stated that the 30-percent (Conceptual Design) LHAAP-18/24 Remedial Design comments were received and that the 60-percent Remedial Design is on schedule for submission to the Regulators on 25 August 2022.
- **LHAAP-29** – AW said that the Draft Pre-Design Investigation (PDI) Report is also under concurrent regulatory review. AW stated that TCEQ has provided comments but comments from the USEPA are pending. AW stated that the 30-percent remedial design comments are due 12 September 2022 from the Regulators. AP then asked if the expectation is for HDR, Inc. to turn around with a 60-percent design. AW stated that the comments on the 30-

percent design will be addressed with the 60-percent design. RMZ stated that the issue with the reviews is a problem with the turn around being so quick. RMZ asked ABP and BF if they would be able to complete their review within 2 weeks of receiving the 30-percent design to which ABP said no. So, RMZ said that it would be best to move the 60-percent review out two weeks to allow 30 day for regulatory review. AP then said that HDR, Inc. needs 30 days minimum to prepare the 60-percent design. RMZ asked if the Regulators were okay with a 30-day revision period ending 12 October 2022 with the draft returned on or around 12 November 2022. ABP and BF said the revised dates should work for them. RMZ acknowledged the number of documents being submitted in August and September 2022 and that an extension may be required at a later date. RMZ said that she would send out an email making the request to push out the 60-percent remedial design to November 2022.

- **LHAAP-47** – AW said that HDR, Inc. sent an email with the concurrence letter for the Final Record of Decision (ROD) from TCEQ in front. He said that the document will be placed into the AR and has been signed by the Army and received USEPA signature on 20 July 2022.
- **LHAAP-17** – JT said that the groundwater extraction system was completed on 6 August 2022. JT said that the Draft Interim Remedial Action Completion Report (I-RACR) was planned for submittal in September 2022. AW clarified that the submittal in September 2022 would be to the Army and not the Regulators. JT concurred.

**Per- and Polyfluoroalkyl Substance (PFAS) Update:** RMZ said that the Quality Assurance Project Plan (QAPP) is being reviewed by the Army. RMZ said that she understood that the Regulators would like to be provided with a complimentary review copy. BF said that the USEPA would like to review. BF clarified that the sampling was for the Site Inspection (SI). RMZ mentioned slides with the Areas of Potential Interest (AOPIs), already provided to the regulators, that will be incorporated into the SI. ABP said that she has not seen the slides. RMZ said that there were over 10 AOPIs. AW said that the QAPP will present the AOPIs. RMZ said that she will resend the slides. AW stated that the site investigation field work is scheduled for November 2022. AW said that the QAPP was sent to the Center of Excellence (CX) so the review period will not be completed for at least another 3 weeks. ABP clarified that the regulatory review is just courtesy review such that the SI will continue regardless of the Regulator comments. RMZ stated the Federal Facility Agreement does not commence until the Remedial Investigation phase. RMZ said that comments will be considered.

**Transfer Update:** RMZ stated that the Army is working on the Environmental Condition of Property (ECP) for the transfer. RMZ said that she would like to release the Environmental Protection Provisions (EPPs) to the Regulators. The EPPs are attachments to the ECPs and have language that needs to be provided to the Regulators ahead of transfer. However, with the end of the fiscal year, RMZ noted that getting the EPPs out may be difficult. RMZ said that she hopes to provide the EPPs to the Regulators for review in the next week or so.

**Schedule Next Managers' Meeting:** The next MMM will be held on Wednesday, 21 September 2022 at 10:00 am CDT via WebEx.

Meeting concluded at approximately 11:37 pm CDT.

**ACRONYM LIST**

AP	Amita Patel
ABP	April Palmie
APTIM	APTIM Federal Services, LLC
AR	Administrative Record
AW	Aaron Williams
BF	Brian Follin
Bhate	Bhate Environmental Associates, Inc.
BRAC	Base Realignment and Closure
CDT	Central Daylight Time
CX	Center for Excellence
DERP	Defense Environmental Restoration Program
DI	Documents and Issues
ECP	Environmental Condition of Property
EPP	Environmental Protection Provisions
FBR	Fluidized Bed Reactor
GWTP	Groundwater Treatment Plant
INF	Intermediate Range Nuclear Forces
I-RACR	Interim Remedial Action Completion Report
IX	Ion Exchange
KM	Kennie Moore
LHAAP	Longhorn Army Ammunition Plant
LUC	Land Use Control
MMM	Monthly Managers' Meeting
PDI	Pre-Design Investigation
PFAS	Per- and Polyfluoroalkyl Substance
QAPP	Quality Assurance Project Plan
RAB	Restoration Advisory Board
RA-O	Remedial Action – Operation
RMZ	Rose M. Zeiler
ROD	Record of Decision
SI	Site Inspection
SB	Scott Beesinger
TCE	Trichloroethene
TCEQ	Texas Commission on Environmental Quality
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WF	William (Bill) Foss

**August 2022 Monthly Managers Meeting  
Validated Data**

**LHAAP-58**

*Semi-Annual Sampling Event– June 2022*

Anions (9056)

VOC (8260C)

Total Organic Carbon (415.1)

Metabolic Acids (HPLC-METACIDS)

Dechlorinating Bacteria (CENSUS)

Dissolved Gases (RSK-175)

Arsenic (6020A)

**GWTP Effluent**

*Weekly Perchlorate Sampling –July 2022*

Perchlorate (6850)

**GWTP Effluent**

*Weekly, Bi-Weekly, and Monthly Sampling – July 2022*

Ammonia (350.3)

Ortho-Phosphate (365.3)

Total Organic Carbon (415.1)

VOC (8260C)

Metals (6020A)

Hexavalent Chromium (7196A)

1,4-Dioxane (8270D-SIM)

Anions (9056)

**GWTP Influent**

*Monthly Sampling – July 2022*

Metals (6020A)

Perchlorate (6850)

Hexavalent Chromium (7196A)



**Legend**  
J = Estimated value  
U = Result is less than the laboratory detection limit  
<=less than  
COC = Contaminant of Concern  
USEPA = United States Environmental Protection Agency  
MCL = Maximum Contaminant Limit  
DCA = Dichloroethane  
DCE = Dichloroethene  
PCE = Tetrachloroethene  
TCA = Trichloroethane  
TCE = Trichloroethene  
VC = Vinyl Chloride  
**Bold Red** values exceed the USEPA MCL  
All results and MCLs are reported in micrograms per liter (µg/L)

COCs shown on this figure	
COC	MCL
1,1-DCE	7
1,1,2-TCA	5
1,2-DCA	5
Benzene	5
cis-1,2-DCE	70
PCE	5
trans-1,2-DCE	100
TCE	5
VC	2

LHSMW06		12/3/2020	6/3/2021
COC	MCL	Result	Result
1,1-DCE	7	14	11
cis-1,2-DCE	70	62	71
TCE	5	14	19
VC	2	4.8	3.2

35AWW20		12/3/2020	6/3/2021
COC	MCL	Result	Result
1,1,2-TCA	5	73	73
1,1-DCE	7	950	1,600
1,2-DCA	5	16	17
Benzene	5	8.2	8.9 J
cis-1,2-DCE	70	63	87
TCE	5	91	190
VC	2	1,800	780

LHSMW07		12/3/2020	6/2/2021
COC	MCL	Result	Result
1,1-DCE	7	64	12
VC	2	42	<0.5U

35AWW18		12/1/2020	12/1/2020	6/1/2021
COC	MCL	Result	Dup. Result	Result
1,1-DCE	7	22	22	20

03WW01		12/1/2020	6/2/2021
COC	MCL	Result	Result
PCE	5	<5.0U	11
TCE	5	24	3.0
VC	2	<5.0U	1.6

35AWW09		12/7/2020	6/2/2021	6/2/2021
COC	MCL	Result	Result	Dup. Result
PCE	5	370	350	310
TCE	5	140	130 J	130 J

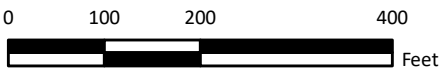
35AWW08		12/1/2020	6/2/2021
COC	MCL	Result	Result
PCE	5	<5.0U	<25U
TCE	5	<5.0U	53
VC	2	6.1 J	24 J

35AWW14		12/7/2020	6/1/2021
COC	MCL	Result	Result
1,1-DCE	7	9.4	10.0
TCE	5	11	14

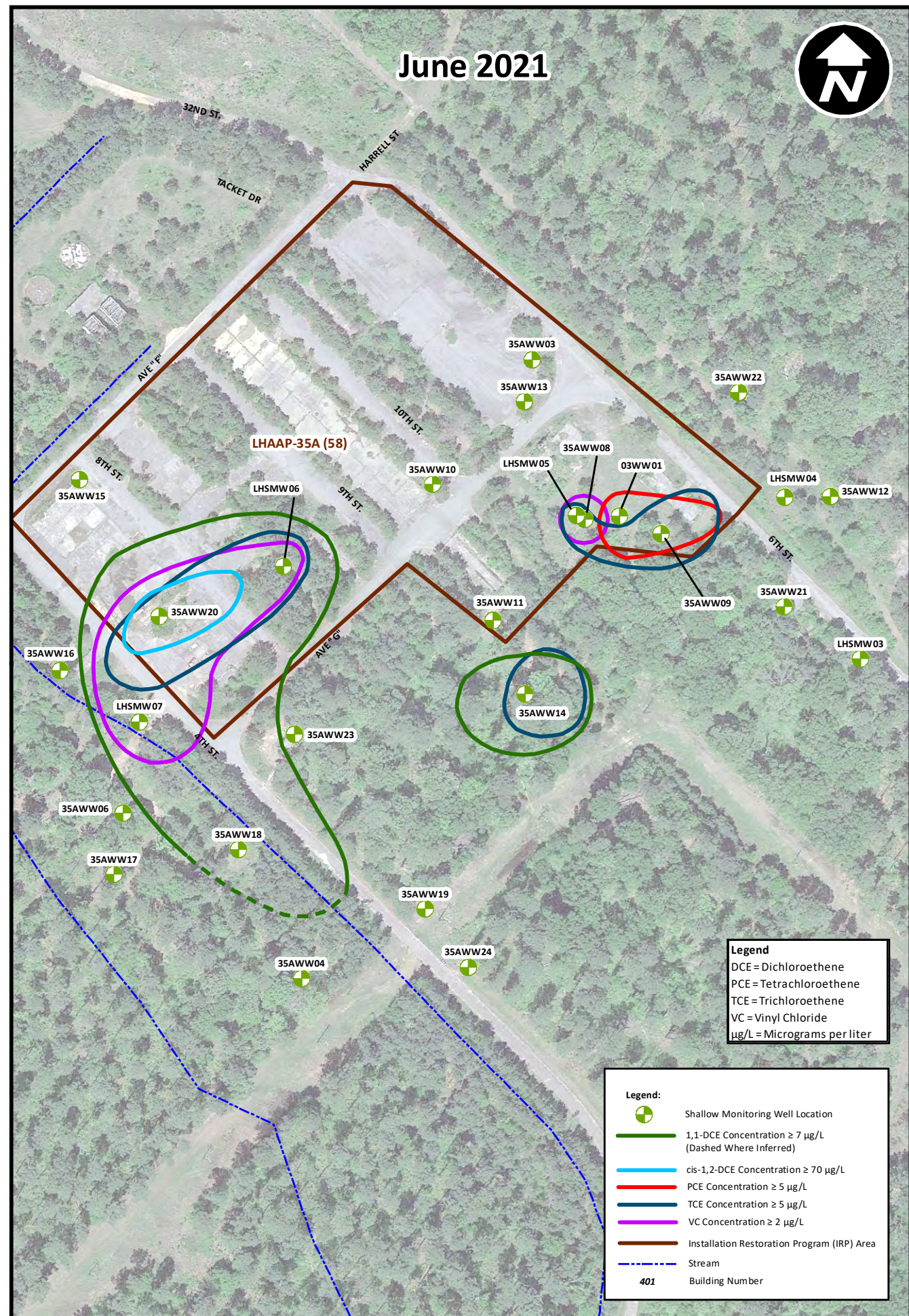
**Legend:**

- Shallow Monitoring Well Location
- Shallow Temporary Monitoring Well Location
- Shallow Monitoring Well Location  
No exceedances above MCLs for listed COCs
- Shallow Monitoring Well Location - Removed from RA(O)
- KB1® Plus Injection Point Locations (March 2018)
- KB1® Injection Point Locations (March 2018)
- Injection Locations (2013)
- (NS) Not Sampled
- Installation Restoration Program (IRP) Area
- Direction of Groundwater Flow (June 2021)
- Stream
- 401 Building Number

Aerial Photography Source: Google Earth, April 2018









LHAAP-58 Remedial Action Operation Validated Data - June 2022

Location ID: Sample Date:	Units	MCL/MSC	03WW01_060622 6/06/22	35AWW01_060622 6/06/22	35AWW01_060622_a 6/06/22	35AWW05_060922 6/9/22	35AWW06_060822 6/8/22	35AWW08_060622 6/06/22	35AWW09_060622 6/06/22	35AWW10_060622 6/06/22	35AWW11_060822 6/8/22	35AWW12_060622 6/6/22	35AWW12_060622_a 6/6/22
Location Description			Site 58 - E, inside site boundary.	Site 58 - E, inside site boundary.	Site 58 - E, inside site boundary. Field Duplicate.	Site 58 - SW, outside site boundary.	Site 58 - SW, outside site boundary.	Site 58 - E, inside site boundary.	Site 58 - E, inside site boundary.	Site 58 - ESE, inside site boundary.	Site 58 - SE, inside site boundary.	Site 58 - E, outside site boundary.	Site 58 - E, outside site boundary. Field Duplicate
Location Depth			Shallow	Intermediate	Intermediate	Intermediate	Shallow	Shallow	Shallow	Shallow	Shallow	Shallow	Shallow
Lab Package			HS22060438	HS22060438	HS22060438	HS22060604	HS22060453	HS22060438	HS22060438	HS22060438	HS22060453	HS22060438	HS22060438
Volatile Organic Compounds (8260C)													
1,1,1,2-Tetrachloroethane	µg/L	110	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1,1-Trichloroethane	µg/L	200	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 2.5 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
1,1,2,2-Tetrachloroethane	µg/L	14	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1,2-Trichloroethane	µg/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethane	µg/L	10000	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 2.5 U	0.59 J	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
1,1-Dichloroethene	µg/L	7	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	1.00 J	< 2.5 U	< 0.50 U	< 0.50 U	0.51 J	< 0.50 U	< 0.50 U
1,1-Dichloropropene	µg/L	2.9	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	2.1	< 1.0 U	< 1.0 U
1,2,3-Trichlorobenzene	µg/L	310	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,2,3-Trichloropropane	µg/L	0.041	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,2,4-Trichlorobenzene	µg/L	70	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,2,4-Trimethylbenzene	µg/L	5100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,2-Dibromo-3-chloropropane	µg/L	0.2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,2-Dibromoethane	µg/L	0.05	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 2.5 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
1,2-Dichlorobenzene	µg/L	600	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,2-Dichloroethane	µg/L	5	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 2.5 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
1,2-Dichloropropane	µg/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,3,5-Trimethylbenzene	µg/L	5100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,3-Dichlorobenzene	µg/L	3100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,3-Dichloropropane	µg/L	29	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,4-Dichlorobenzene	µg/L	75	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
2,2-Dichloropropane	µg/L	42	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 2.5 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
2-Butanone	µg/L	61000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
2-Chlorotoluene	µg/L	2000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
2-Hexanone	µg/L	6100	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 10 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
4-Chlorotoluene	µg/L	2000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
4-Isopropyltoluene	µg/L	10000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
4-Methyl-2-pentanone	µg/L	8200	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 10 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Acetone	µg/L	92000	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 10 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Benzene	µg/L	5	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 2.5 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
Bromobenzene	µg/L	2000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Bromochloromethane	µg/L	4100	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 2.5 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
Bromodichloromethane	µg/L	4.6	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 2.5 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
Bromoform	µg/L	36	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Bromomethane	µg/L	140	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Carbon disulfide	µg/L	10000	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 10 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Carbon tetrachloride	µg/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Chlorobenzene	µg/L	100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Chloroethane	µg/L	41000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Chloroform	µg/L	1000	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 2.5 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
Chloromethane	µg/L	220	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 2.5 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
cis-1,2-Dichloroethene	µg/L	70	7.3	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 2.5 U	1.1	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
cis-1,3-Dichloropropene	µg/L	5.3	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 2.5 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
Dibromochloromethane	µg/L	34	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Dibromomethane	µg/L	380	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 2.5 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
Dichlorodifluoromethane	µg/L	20000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Ethylbenzene	µg/L	700	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Hexachlorobutadiene	µg/L	20	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Isopropylbenzene	µg/L	10000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U



LHAAP-58 Remedial Action Operation Validated Data - June 2022

Location ID: Sample Date:	Units	MCL/MSC	03WW01_060622 6/06/22	35AWW01_060622 6/06/22	35AWW01_060622_a 6/06/22	35AWW05_060922 6/9/22	35AWW06_060822 6/8/22	35AWW08_060622 6/06/22	35AWW09_060622 6/06/22	35AWW10_060622 6/06/22	35AWW11_060822 6/8/22	35AWW12_060622 6/6/22	35AWW12_060622_a 6/6/22
Location Description			Site 58 - E, inside site boundary.	Site 58 - E, inside site boundary.	Site 58 - E, inside site boundary. Field Duplicate.	Site 58 - SW, outside site boundary.	Site 58 - SW, outside site boundary.	Site 58 - E, inside site boundary.	Site 58 - E, inside site boundary.	Site 58 - ESE, inside site boundary.	Site 58 - SE, inside site boundary.	Site 58 - E, outside site boundary.	Site 58 - E, outside site boundary. Field Duplicate
Location Depth			Shallow	Intermediate	Intermediate	Intermediate	Shallow	Shallow	Shallow	Shallow	Shallow	Shallow	Shallow
Lab Package			HS22060438	HS22060438	HS22060438	HS22060604	HS22060453	HS22060438	HS22060438	HS22060438	HS22060453	HS22060438	HS22060438
Volatile Organic Compounds (8260C)													
m,p-Xylene	µg/L	10000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Methylene chloride	µg/L	5	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 10 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
n-Butylbenzene	µg/L	4100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
n-Propylbenzene	µg/L	4100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Naphthalene	µg/L	2000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
o-Xylene	µg/L	10000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
sec-Butylbenzene	µg/L	4100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Styrene	µg/L	100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
tert-Butylbenzene	µg/L	4100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	µg/L	5	9.9	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	380	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Toluene	µg/L	1000	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 2.5 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
trans-1,2-Dichloroethene	µg/L	100	0.74 J	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	3.9 J	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
trans-1,3-Dichloropropene	µg/L	29	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 2.5 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
Trichloroethene	µg/L	5	10	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 2.5 U	140	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
Trichlorofluoromethane	µg/L	31000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Vinyl chloride		2	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 2.5 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
Total Organic Carbon (415.1/SM5310C)													
Total Organic Carbon	mg/L	NV	NA	NA	NA	NA	10.6	NA	NA	NA	9.72	NA	NA
Volatile Fatty Acids (HPLC-METACIDS)													
Acetic Acid	mg/L	NV	NA	NA	NA	NA	< 2.0 U	NA	NA	NA	< 2.0 U	NA	NA
Butyric Acid	mg/L	NV	NA	NA	NA	NA	< 1.0 U	NA	NA	NA	< 1.0 U	NA	NA
Lactic Acid	mg/L	NV	NA	NA	NA	NA	< 1.0 U	NA	NA	NA	< 1.0 U	NA	NA
Propionic Acid	mg/L	51	NA	NA	NA	NA	< 1.5 U	NA	NA	NA	< 1.5 U	NA	NA
Pyruvic Acid	mg/L	NV	NA	NA	NA	NA	< 0.10 U	NA	NA	NA	< 0.10 U	NA	NA
ICP-MS Metals (6020A)													
Arsenic	mg/L	0.01	0.00955	0.000828 J	0.000915 J	NA	NA	0.0314	0.000526 J	NA	NA	NA	NA
Anions (9056A)													
Chloride	mg/L	NV	NA	NA	NA	NA	938	NA	NA	NA	1,880	NA	NA
Nitrate	mg/L	10	NA	NA	NA	NA	0.0666 J	NA	NA	NA	0.198 J	NA	NA
Sulfate	mg/L	NV	NA	NA	NA	NA	457	NA	NA	NA	485	NA	NA
Dissolved Gases (RSK-175)													
Carbon Dioxide	µg/L	NV	NA	NA	NA	NA	391,000	NA	NA	NA	622,000	NA	NA
Ethane	µg/L	NV	NA	NA	NA	NA	< 0.250 U	NA	NA	NA	< 0.250 U	NA	NA
Ethene	µg/L	NV	NA	NA	NA	NA	< 0.500 U	NA	NA	NA	< 0.500 U	NA	NA
Methane	µg/L	NV	NA	NA	NA	NA	2,740	NA	NA	NA	1,410	NA	NA
Dechlorinating Bacteria													
BAV1 Vinyl Chloride Reductase	cells/mL	NV	NA	NA	NA	NA	0.400 J	NA	NA	NA	1.90	NA	NA
Dehalobacter spp.	cells/mL	NV	NA	NA	NA	NA	1,070	NA	NA	NA	137,000	NA	NA
Dehalococoides	cells/mL	NV	NA	NA	NA	NA	7.20	NA	NA	NA	1,750	NA	NA
tceA Reductase	cells/mL	NV	NA	NA	NA	NA	0.300 J	NA	NA	NA	0.300 J	NA	NA
Vinyl Chloride Reductase	cells/mL	NV	NA	NA	NA	NA	< 0.700 U	NA	NA	NA	141	NA	NA

Blue Highlighting Indicates concentrations above the MCL/MSC

MCL/MSC - Maximum Contaminant Limit/Medium-Specific Concentrations

NA - Not Analyzed

µg/L - micrograms per liter

mg/L - milligrams per liter

J - Estimated: Between the method detection limit and reporting limit and/or due to discrepancies in meeting certain analyte-specific quality control criteria.

U - Undetected: The analyte was analyzed for, but not detected.

NV - No Value

LHAAP-58 Remedial Action Operation Validated Data - June 2022

Location ID: Sample Date:	Units	MCL/MSC	35AWW13_060622 6/06/22	35AWW14_060622 6/6/22	35AWW15_060922 6/9/22	35AWW16_060922 6/9/22	35AWW17_060922 6/9/22	35AWW18_060922 6/9/22	35AWW19_060822 6/8/22	35AWW20_060822 6/8/22	35AWW21_060922 6/9/22	35AWW22_060622 6/06/22	35AWW23_060822 6/8/22
Location Description			Site 58 - SE, outside site boundary.	Site 58 - SE, outside site boundary.	Site 58 - W, inside site boundary.	Site 58 - SW, outside site boundary, near Building 744-A.	Site 58 - SW, outside site boundary.	Site 58 - SSW, outside site boundary.	Site 58 - S, outside site boundary.	Site 58 - SW, inside site boundary.	Site 58 - ESE, outside site boundary, beside Building 725.	Site 58 - ENE, outside site boundary.	Site 58 - SW, outside site boundary.
Location Depth			Shallow	Shallow	Shallow	Shallow	Shallow	Shallow	Shallow	Shallow	Shallow	Shallow	Shallow
Lab Package			HS22060438	HS22060438	HS22060604	HS22060604	HS22060604	HS22060604	HS22060453	HS22060453	HS22060604	HS22060438	HS22060453
Volatile Organic Compounds (8260C)													
1,1,1,2-Tetrachloroethane	µg/L	110	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1,1-Trichloroethane	µg/L	200	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 2.5 U	< 0.50 U	< 0.50 U	< 0.50 U
1,1,2,2-Tetrachloroethane	µg/L	14	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1,2-Trichloroethane	µg/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	62	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethane	µg/L	10000	< 0.50 U	13	< 0.50 U	< 0.50 U	< 0.50 U	3.5	0.63 J	520	< 0.50 U	< 0.50 U	< 0.50 U
1,1-Dichloroethene	µg/L	7	< 0.50 U	9.6	< 0.50 U	< 0.50 U	< 0.50 U	15	2.9	1,600	< 0.50 U	< 0.50 U	< 0.50 U
1,1-Dichloropropene	µg/L	2.9	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,2,3-Trichlorobenzene	µg/L	310	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,2,3-Trichloropropane	µg/L	0.041	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,2,4-Trichlorobenzene	µg/L	70	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,2,4-Trimethylbenzene	µg/L	5100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,2-Dibromo-3-chloropropane	µg/L	0.2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,2-Dibromoethane	µg/L	0.05	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 2.5 U	< 0.50 U	< 0.50 U	< 0.50 U
1,2-Dichlorobenzene	µg/L	600	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	27	< 1.0 U	< 1.0 U	< 1.0 U
1,2-Dichloroethane	µg/L	5	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	0.98 J	13	< 0.50 U	< 0.50 U	< 0.50 U
1,2-Dichloropropane	µg/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,3,5-Trimethylbenzene	µg/L	5100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,3-Dichlorobenzene	µg/L	3100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,3-Dichloropropane	µg/L	29	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,4-Dichlorobenzene	µg/L	75	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
2,2-Dichloropropane	µg/L	42	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 2.5 U	< 0.50 U	< 0.50 U	< 0.50 U
2-Butanone	µg/L	61000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
2-Chlorotoluene	µg/L	2000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
2-Hexanone	µg/L	6100	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 10 U	< 2.0 U	< 2.0 U	< 2.0 U
4-Chlorotoluene	µg/L	2000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
4-Isopropyltoluene	µg/L	10000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
4-Methyl-2-pentanone	µg/L	8200	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 10 U	< 2.0 U	< 2.0 U	< 2.0 U
Acetone	µg/L	92000	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 10 U	< 2.0 U	< 2.0 U	< 2.0 U
Benzene	µg/L	5	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	7.2	< 0.50 U	< 0.50 U	< 0.50 U
Bromobenzene	µg/L	2000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Bromochloromethane	µg/L	4100	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 2.5 U	< 0.50 U	< 0.50 U	< 0.50 U
Bromodichloromethane	µg/L	4.6	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 2.5 U	< 0.50 U	< 0.50 U	< 0.50 U
Bromoform	µg/L	36	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Bromomethane	µg/L	140	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Carbon disulfide	µg/L	10000	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 10 U	< 2.0 U	< 2.0 U	< 2.0 U
Carbon tetrachloride	µg/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Chlorobenzene	µg/L	100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Chloroethane	µg/L	41000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Chloroform	µg/L	1000	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 2.5 U	< 0.50 U	< 0.50 U	< 0.50 U
Chloromethane	µg/L	220	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 2.5 U	< 0.50 U	< 0.50 U	< 0.50 U
cis-1,2-Dichloroethene	µg/L	70	< 0.50 U	5.0	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	89	< 0.50 U	< 0.50 U	< 0.50 U
cis-1,3-Dichloropropene	µg/L	5.3	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 2.5 U	< 0.50 U	< 0.50 U	< 0.50 U
Dibromochloromethane	µg/L	34	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Dibromomethane	µg/L	380	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 2.5 U	< 0.50 U	< 0.50 U	< 0.50 U
Dichlorodifluoromethane	µg/L	20000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Ethylbenzene	µg/L	700	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Hexachlorobutadiene	µg/L	20	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Isopropylbenzene	µg/L	10000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U

LHAAP-58 Remedial Action Operation Validated Data - June 2022

Location ID: Sample Date:	Units	MCL/MSC	35AWW13_060622 6/06/22	35AWW14_060622 6/6/22	35AWW15_060922 6/9/22	35AWW16_060922 6/9/22	35AWW17_060922 6/9/22	35AWW18_060922 6/9/22	35AWW19_060822 6/8/22	35AWW20_060822 6/8/22	35AWW21_060922 6/9/22	35AWW22_060622 6/06/22	35AWW23_060822 6/8/22
Location Description			Site 58 - SE, outside site boundary.	Site 58 - SE, outside site boundary.	Site 58 - W, inside site boundary.	Site 58 - SW, outside site boundary, near Building 744-A.	Site 58 - SW, outside site boundary.	Site 58 - SSW, outside site boundary.	Site 58 - S, outside site boundary.	Site 58 - SW, inside site boundary.	Site 58 - ESE, outside site boundary, beside Building 725.	Site 58 - ENE, outside site boundary.	Site 58 - SW, outside site boundary.
Location Depth			Shallow	Shallow	Shallow	Shallow	Shallow	Shallow	Shallow	Shallow	Shallow	Shallow	Shallow
Lab Package			HS22060438	HS22060438	HS22060604	HS22060604	HS22060604	HS22060604	HS22060453	HS22060453	HS22060604	HS22060438	HS22060453
Volatile Organic Compounds (8260C)													
m,p-Xylene	µg/L	10000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Methylene chloride	µg/L	5	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 10 U	< 2.0 U	< 2.0 U	< 2.0 U
n-Butylbenzene	µg/L	4100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
n-Propylbenzene	µg/L	4100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Naphthalene	µg/L	2000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
o-Xylene	µg/L	10000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
sec-Butylbenzene	µg/L	4100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Styrene	µg/L	100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
tert-Butylbenzene	µg/L	4100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	µg/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Toluene	µg/L	1000	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 2.5 U	< 0.50 U	< 0.50 U	1.4
trans-1,2-Dichloroethene	µg/L	100	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	6.4	< 0.50 U	< 0.50 U	< 0.50 U
trans-1,3-Dichloropropene	µg/L	29	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 2.5 U	< 0.50 U	< 0.50 U	< 0.50 U
Trichloroethene	µg/L	5	< 0.50 U	13	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	150	< 0.50 U	< 0.50 U	< 0.50 U
Trichlorofluoromethane	µg/L	31000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Vinyl chloride		2	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	840	< 0.50 U	< 0.50 U	< 0.50 U
Total Organic Carbon (415.1/SM5310C)													
Total Organic Carbon	mg/L	NV	NA	NA	NA	NA	NA	NA	2.43	17.7	NA	NA	14.2
Volatile Fatty Acids (HPLC-METACIDS)													
Acetic Acid	mg/L	NV	NA	NA	NA	NA	NA	NA	< 2.0 U	< 2.0 U	NA	NA	2.0 J
Butyric Acid	mg/L	NV	NA	NA	NA	NA	NA	NA	< 1.0 U	< 1.0 U	NA	NA	< 1.0 U
Lactic Acid	mg/L	NV	NA	NA	NA	NA	NA	NA	< 1.0 U	< 1.0 U	NA	NA	< 1.0 U
Propionic Acid	mg/L	51	NA	NA	NA	NA	NA	NA	< 1.5 U	< 1.5 U	NA	NA	< 1.5 U
Pyruvic Acid	mg/L	NV	NA	NA	NA	NA	NA	NA	< 0.10 U	< 0.10 U	NA	NA	< 0.10 U
ICP-MS Metals (6020A)													
Arsenic	mg/L	0.01	NA	NA	NA	NA	NA	NA	NA	0.00221 J	NA	NA	NA
Anions (9056A)													
Chloride	mg/L	NV	NA	NA	NA	NA	NA	NA	529	668	NA	NA	807
Nitrate	mg/L	10	NA	NA	NA	NA	NA	NA	0.0352 J	0.0300 J	NA	NA	0.0720 J
Sulfate	mg/L	NV	NA	NA	NA	NA	NA	NA	675	1,040	NA	NA	1.47
Dissolved Gases (RSK-175)													
Carbon Dioxide	µg/L	NV	NA	NA	NA	NA	NA	NA	520,000	458,000	NA	NA	520,000
Ethane	µg/L	NV	NA	NA	NA	NA	NA	NA	2.34	< 0.250 U	NA	NA	< 0.250 U
Ethene	µg/L	NV	NA	NA	NA	NA	NA	NA	< 0.500 U	16.1	NA	NA	< 0.500 U
Methane	µg/L	NV	NA	NA	NA	NA	NA	NA	2.91	714	NA	NA	3,170
Dechlorinating Bacteria													
BAV1 Vinyl Chloride Reductase	cells/mL	NV	NA	NA	NA	NA	NA	NA	71.3	67,400	NA	NA	2.8
Dehalobacter spp.	cells/mL	NV	NA	NA	NA	NA	NA	NA	2,960	18,400	NA	NA	12,900
Dehalococoides	cells/mL	NV	NA	NA	NA	NA	NA	NA	138	70,400	NA	NA	158
tceA Reductase	cells/mL	NV	NA	NA	NA	NA	NA	NA	51.2	1.00	NA	NA	41.6
Vinyl Chloride Reductase	cells/mL	NV	NA	NA	NA	NA	NA	NA	13.4	1.80	NA	NA	63.9

Blue Highlighting Indicates concentrations above the MCL/MSC

MCL/MSC - Maximum Contaminant Limit/Medium-Specific Concentrations

NA - Not Analyzed

µg/L - micrograms per liter

mg/L - milligrams per liter

J - Estimated: Between the method detection limit and reporting limit and/or due to discrepancies

U - Undetected: The analyte was analyzed for, but not detected.

NV - No Value

Location ID: Sample Date:	Units	MCL/MSCL	35AWW24_060822 6/8/22	35AWW24_060822_a 6/08/22	LHSMW06_060922 6/9/22	LHSMW07_060822 6/8/22
Location Description			Downgradient Western Plume well	Downgradient Western Plume well Field Duplicate.	Site 58 - SW, inside site boundary, beside Building 715.	Site 58 - SW, outside site boundary.
Location Depth			Shallow	Shallow	Shallow	Shallow
Lab Package			HS22060453	HS22060453	HS22060604	HS22060453
Volatile Organic Compounds (8260C)						
1,1,1,2-Tetrachloroethane	µg/L	110	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1,1-Trichloroethane	µg/L	200	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
1,1,2,2-Tetrachloroethane	µg/L	14	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1,2-Trichloroethane	µg/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethane	µg/L	10000	< 0.50 U	< 0.50 U	5.5	9.8
1,1-Dichloroethene	µg/L	7	< 0.50 U	< 0.50 U	9.1	8.8
1,1-Dichloropropene	µg/L	2.9	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,2,3-Trichlorobenzene	µg/L	310	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,2,3-Trichloropropane	µg/L	0.041	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,2,4-Trichlorobenzene	µg/L	70	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,2,4-Trimethylbenzene	µg/L	5100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,2-Dibromo-3-chloropropane	µg/L	0.2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,2-Dibromoethane	µg/L	0.05	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
1,2-Dichlorobenzene	µg/L	600	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,2-Dichloroethane	µg/L	5	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
1,2-Dichloropropane	µg/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,3,5-Trimethylbenzene	µg/L	5100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,3-Dichlorobenzene	µg/L	3100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,3-Dichloropropane	µg/L	29	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,4-Dichlorobenzene	µg/L	75	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
2,2-Dichloropropane	µg/L	42	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
2-Butanone	µg/L	61000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
2-Chlorotoluene	µg/L	2000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
2-Hexanone	µg/L	6100	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
4-Chlorotoluene	µg/L	2000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
4-Isopropyltoluene	µg/L	10000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
4-Methyl-2-pentanone	µg/L	8200	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Acetone	µg/L	92000	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Benzene	µg/L	5	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
Bromobenzene	µg/L	2000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Bromochloromethane	µg/L	4100	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
Bromodichloromethane	µg/L	4.6	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
Bromoform	µg/L	36	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Bromomethane	µg/L	140	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Carbon disulfide	µg/L	10000	< 2.0 U	< 2.0 U	< 1.0 U	< 2.0 U
Carbon tetrachloride	µg/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Chlorobenzene	µg/L	100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Chloroethane	µg/L	41000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Chloroform	µg/L	1000	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
Chloromethane	µg/L	220	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
cis-1,2-Dichloroethene	µg/L	70	< 0.50 U	< 0.50 U	81	< 0.50 U
cis-1,3-Dichloropropene	µg/L	5.3	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
Dibromochloromethane	µg/L	34	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Dibromomethane	µg/L	380	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
Dichlorodifluoromethane	µg/L	20000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Ethylbenzene	µg/L	700	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Hexachlorobutadiene	µg/L	20	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Isopropylbenzene	µg/L	10000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U

Location ID: Sample Date:	Units	MCL/MSC	35AWW24_060822 6/8/22	35AWW24_060822_a 6/08/22	LHSMW06_060922 6/9/22	LHSMW07_060822 6/8/22
Location Description			Downgradient Western Plume well	Downgradient Western Plume well Field Duplicate.	Site 58 - SW, inside site boundary, beside Building 715.	Site 58 - SW, outside site boundary.
Location Depth			Shallow	Shallow	Shallow	Shallow
Lab Package			HS22060453	HS22060453	HS22060604	HS22060453
Volatile Organic Compounds (8260C)						
m,p-Xylene	µg/L	10000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Methylene chloride	µg/L	5	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
n-Butylbenzene	µg/L	4100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
n-Propylbenzene	µg/L	4100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Naphthalene	µg/L	2000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
o-Xylene	µg/L	10000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
sec-Butylbenzene	µg/L	4100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Styrene	µg/L	100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
tert-Butylbenzene	µg/L	4100	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	µg/L	5	< 1.0 U	< 1.0 U	1.9	< 1.0 U
Toluene	µg/L	1000	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
trans-1,2-Dichloroethene	µg/L	100	< 0.50 U	< 0.50 U	1.3	< 0.50 U
trans-1,3-Dichloropropene	µg/L	29	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
Trichloroethene	µg/L	5	< 0.50 U	< 0.50 U	13	0.71 J
Trichlorofluoromethane	µg/L	31000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Vinyl chloride		2	< 0.50 U	< 0.50 U	2.3	< 0.50 U
Total Organic Carbon (415.1/SM5310C)						
Total Organic Carbon	mg/L	NV	NA	NA	NA	6.23
Volatile Fatty Acids (HPLC-METACIDS)						
Acetic Acid	mg/L	NV	NA	NA	NA	< 2.0 U
Butyric Acid	mg/L	NV	NA	NA	NA	< 1.0 U
Lactic Acid	mg/L	NV	NA	NA	NA	< 1.0 U
Propionic Acid	mg/L	51	NA	NA	NA	< 1.5 U
Pyruvic Acid	mg/L	NV	NA	NA	NA	< 0.10 U
ICP-MS Metals (6020A)						
Arsenic	mg/L	0.01	NA	NA	0.000446 J	NA
Anions (9056A)						
Chloride	mg/L	NV	NA	NA	NA	1,960
Nitrate	mg/L	10	NA	NA	NA	0.262 J
Sulfate	mg/L	NV	NA	NA	NA	2,970
Dissolved Gases (RSK-175)						
Carbon Dioxide	µg/L	NV	NA	NA	NA	173,000
Ethane	µg/L	NV	NA	NA	NA	< 0.250 U
Ethene	µg/L	NV	NA	NA	NA	38.9
Methane	µg/L	NV	NA	NA	NA	1,950
Dechlorinating Bacteria						
BAV1 Vinyl Chloride Reductase	cells/mL	NV	NA	NA	NA	0.400 J
Dehalobacter spp.	cells/mL	NV	NA	NA	NA	2850
Dehalococoides	cells/mL	NV	NA	NA	NA	4680
tceA Reductase	cells/mL	NV	NA	NA	NA	0.80
Vinyl Chloride Reductase	cells/mL	NV	NA	NA	NA	623.0

Blue Highlighting Indicates concentrations above the MCL/MSC

MCL/MSC - Maximum Contaminant Limit/Medium-Specific Concentrations

NA - Not Analyzed

µg/L - micrograms per liter

mg/L - milligrams per liter

J - Estimated: Between the method detection limit and reporting limit and/or due to discrepancies

U - Undetected: The analyte was analyzed for, but not detected.

NV - No Value

## GWTP Weekly/Effluent Perchlorate Sampling - July 2022

Location ID: Sample Date:	Units	Daily Maximum Conc	PCL	LH18/24- SP650_070622_ BIX 7/6/22	LH18/24- SP650_070622_ AIX 7/6/22	LH18/24- SP650_071222_ BIX 7/12/22	LH18/24- SP650_071222_ AIX 7/12/22	LH18/24- SP650_071222_ AIX 7/12/22	LH18/24- SP650_071922_ BIX 7/19/22	LH18/24- SP650_071922_ AIX 7/19/22	LH18/24- SP650_072622_ BIX 7/26/22	LH18/24- SP650_072622_ AIX 7/26/22
Location Description												
				Weekly	Weekly	Weekly	Weekly	Monthly EFF	Weekly	Weekly	Weekly	Weekly
Perchlorate (6850)												
Perchlorate	µg/L	589	17	9.16	< 0.0500 U	0.285	0.0318 J	0.186	7.86	1.32	0.0964 J	0.0476 J

µg/L - micrograms per liter

BIX - before ion exchange/AIX - after ion exchange

U- Undetected: The analyte was analyzed for, but not detected and reported to the limit of detection.

J - estimated value between the detection limit and limit of quantitation

## GWTP Weekly Sampling - July 2022

Location ID: Sample Date:	Units	Daily Maximum Conc	LH18/24-SP650_070622 7/6/22	LH18/24-SP650_071222 7/12/22	LH18/24-SP650_071922 7/19/22	LH18/24-SP650_072622 7/26/22
Location Description			GWTP—Collected from a spigot on the discharge of effluent TK-650. Sampled Weekly.			
<b>Ammonia as N (350.3)</b>						
Ammonia as N	mg/L	NV	13	18	24	17
<b>Ortho-Phosphate (365.3)</b>						
Ortho-Phosphate	mg/L	NV	4.57	3.96	8.05	2.9
<b>Organic Carbon (415.1)</b>						
Total Organic Carbon (TOC)	mg/L	NV	15.5	30.9	13.0	24.3

mg/L - milligrams per liter

NV - No Value

## GWTP Bi-Weekly Sampling - July 2022

Location ID: Sample Date:	Units	(Bayou) Daily Maximum Conc	(INF pond) MCL	LH18/24-SP650_070622 7/6/22	LH18/24-SP650_071922 7/19/22
Location Description				GWTP – Collected from a spigot on the discharge of effluent TK-650. Sampled Biweekly.	
<b>Volatile Organic Compounds (8260C)</b>					
1,1,1-Trichloroethane	µg/L	7,230	200	< 0.50 U	< 0.50 U
1,1,2-Trichloroethane	µg/L	216.9	5	< 1.0 U	< 1.0 U
1,1-Dichloroethane	µg/L	14,032	NV	< 0.50 U	< 0.50 U
1,1-Dichloroethene	µg/L	253	7	< 0.50 U	< 0.50 U
1,2-Dichloroethane	µg/L	181	5	< 0.50 U	< 0.50 U
1,2-Dichloropropane	µg/L	5	5	< 1.0 U	< 1.0 U
Acetone	µg/L	2,395	NV	< 2.0 U	< 2.0 U
Benzene	µg/L	181	5	< 0.50 U	< 0.50 U
Carbon tetrachloride	µg/L	181	5	< 1.0 U	< 1.0 U
Chlorobenzene	µg/L	47,180	100	< 1.0 U	< 1.0 U
Chloroform	µg/L	3,615	NV	< 0.50 U	< 0.50 U
cis-1,2-Dichloroethene	µg/L	NV	70	<b>2.9</b>	<b>3.2</b>
Ethylbenzene	µg/L	57,025	700	< 1.0 U	< 1.0 U
m,p-Xylene	µg/L	83.6	NV	< 1.0 U	< 1.0 U
Methylene chloride	µg/L	1,699	5	< 1.0 U	< 1.0 U
o-Xylene	µg/L	83.6	NV	< 1.0 U	< 1.0 U
Styrene	µg/L	5,987	100	< 1.0 U	< 1.0 U
Tetrachloroethene	µg/L	180.7	5	< 1.0 U	< 1.0 U
Toluene	µg/L	4,189	10	< 0.50 U	< 0.50 U
Trichloroethene	µg/L	181	5	< 0.50 U	< 0.50 U
Vinyl chloride	µg/L	72	2	< 0.50 U	< 0.50 U
<b>Anions (9056)</b>					
Chloride	mg/L	NV	NV	<b>944</b>	<b>1,030</b>
Sulfate	mg/L	NV	NV	<b>16.5</b>	<b>19.9</b>

µg/L - micrograms per liter

mg/L - milligrams per liter

U - Undetected: The analyte was analyzed for, but not detected and reported to the limit of detection.

NV - No Value



## GWTP Monthly Effluent Sampling - July 2022

Location ID: Sample Date:	Units	Daily Maximum Conc	(INF pond) MCL	LH18/24-SP650_071222 7/12/22
Location Description				GWTP – Collected from a spigot on the discharge of effluent TK-650. Sampled monthly
<b>Volatile Organic Compounds (8260C)</b>				
1,1,1-Trichloroethane	µg/L	7,230	200	< 0.50 U
1,1,2-Trichloroethane	µg/L	216.9	5	< 1.0 U
1,1-Dichloroethane	µg/L	14,032	NV	< 0.50 U
1,1-Dichloroethene	µg/L	253	7	< 0.50 U
1,2-Dichloroethane	µg/L	181	5	< 0.50 U
1,2-Dichloropropane	µg/L	5	5	< 1.0 U
Acetone	µg/L	2,395	NV	< 2.0 U
Benzene	µg/L	181	5	< 0.50 U
Carbon tetrachloride	µg/L	181	5	< 1.0 U
Chlorobenzene	µg/L	47,180	100	< 1.0 U
Chloroform	µg/L	3,615	NV	< 0.50 U
cis-1,2-dichloroethene	µg/L	NV	70	<b>2.9</b>
Ethylbenzene	µg/L	57,025	700	< 1.0 U
m,p-Xylene	µg/L	83.6	NV	< 1.0 U
Methylene chloride	µg/L	1,699	5	< 2.0 U
o-Xylene	µg/L	83.6	NV	< 1.0 U
Styrene	µg/L	5,987	100	< 1.0 U
Tetrachloroethene	µg/L	180.7	5	< 1.0 U
Toluene	µg/L	4,189	10	< 0.50 U
Trichloroethene	µg/L	181	5	< 0.50 U
Vinyl chloride	µg/L	72	2	< 0.50 U
<b>Metals (6020A)</b>				
Barium	mg/L	2	2	<b>0.239</b>
Lead	mg/L	0.0046	0.015	< 0.00125 U
Selenium	mg/L	0.012	0.05	< 0.00250 U
Silver	mg/L	0.003	0.1	< 0.000500 U
<b>Hexavalent Chromium (7196A)</b>				
Hexavalent Chromium	mg/L	0.1244	NV	< 0.00600 U
<b>Semi-Volatile Organic Compounds (8270D SIM)</b>				
1,4-Dioxane	µg/L	134.2	NV	<b>14</b>

µg/L - micrograms per liter

mg/L - milligrams per liter

U- Undetected: The analyte was analyzed for, but not detected and reported to the limit of detection.

NV - no value

**GWTP Monthly Influent Sampling - July 2022**

<b>Location ID:</b>		<b>LH18/24-SP140_071222</b>
<b>Sample Date:</b>	<b>Units</b>	<b>7/12/22</b>
<b>Location Description</b>		<b>GWTP – Collected from a spigot on the influent to TK-140. Sampled Monthly.</b>
<b>Metals (6020A)</b>		
Selenium	mg/L	< 0.00250 U
Silver	mg/L	< 0.000500 U
<b>Hexavalent Chromium (7196A)</b>		
Hexavalent Chromium	mg/L	< 0.00600 U
<b>Perchlorate (6850)</b>		
Perchlorate	µg/L	<b>8,330</b>

mg/L - milligrams per liter

µg/L - micrograms per liter

U- Undetected: The analyte was analyzed for, but not detected and reported to the limit of detection.

**QUARTERLY EVALUATION REPORT  
2<sup>ND</sup> QUARTER (APRIL – JUNE) 2022  
GROUNDWATER TREATMENT PLANT  
LONGHORN ARMY AMMUNITION PLANT  
KARNACK, TEXAS**

**September 2022**

Prepared For:



**U.S. Army Corps of Engineers  
Tulsa District**

**Contract No. W9128F-13-D-0012  
Task Order No. W912BV17F0150  
Bhate Project No. NWO1312.0150.016.0001.03**

Prepared By:



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**GWTP QUARTERLY EVALUATION REPORT – 2<sup>ND</sup> QUARTER 2022**  
**LONGHORN ARMY AMMUNITION PLANT**

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## ACRONYMS AND ABBREVIATIONS

<	Less than
AECOM	AECOM Technical Services, Inc.
AIX	Sample collected after the first IX vessel
AMCV(s)	Air Monitoring Comparison Value(s)
amsl	Above mean sea level
Ark-La-Tex	Ark-La-Tex Electric
bgs	Below ground surface
Bhate	Bhate Environmental Associates, Inc.
BIX	Sample collected before the first IX vessel
BLOC	Bloc Design Build, LLC
COD	Chemical oxygen demand
DCA	Dichloroethane
DCE	Dichloroethene
Envirogen	Envirogen Technologies
ESD	Explanation of Significant Difference
ESL(s)	Effects Screening Level(s)
FBR	Fluidized bed reactor
ft	Feet or foot
GAC	Granular activated carbon
gpd	Gallons per day
gph	Gallons per hour
gpm	Gallons per minute
GWTP	Groundwater Treatment Plant
HCl	Hydrochloric acid
HDPE	High density polyethylene
ICT(s)	Interception-collection trench(es)
IRA	Interim Remedial Action
IX	Ion exchange
J	Estimated concentration
lbs/hr	Pounds per hour
LHAAP	Longhorn Army Ammunition Plant

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MCL(s)	Maximum Contaminant Level(s)
µg/L	Micrograms per liter
MC	Methylene chloride
Mg(OH) <sub>2</sub>	Magnesium hydroxide
mV	Millivolts
NA	Not applicable
NaOH	Sodium hydroxide
No.	Number
ORP	Oxidation-reduction potential
Palmetto	Palmetto Services
PCE	Tetrachloroethene
PCL	Protective Concentration Level
pH	Potential of Hydrogen
PID	Photoionization detector
PLC	Programmable Logic Controller
psi	Pounds per square inch
PVC	Polyvinyl chloride
ROD	Record of Decision
S.U.	Standard Unit
SWEPCO	Southwestern Electric Power Company
TAC	Texas Administrative Code
TCE	Trichloroethene
TCEQ	Texas Commission on Environmental Quality
tpy	Tons per year
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VC	Vinyl chloride
VOC(s)	Volatile Organic Compound(s)



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## EXECUTIVE SUMMARY

The operation of the Groundwater Treatment Plant (GWTP) is part of the Interim Remedial Action (IRA) at Burning Ground Number (No.) 3, also referred to as Longhorn Army Ammunition Plant (LHAAP)-18/24. A historical pilot test for nearby landfill LHAAP-16 resulted in the installation of eight extraction wells which also contributed groundwater to the GWTP, but ceased after implementation of the final remedy in September 2019. The only groundwater treated and discussed within this report is from LHAAP-18/24.

The groundwater remediation processing for Burning Ground No. 3 at LHAAP includes the following operable systems:

- Equalization tank (water storage) pretreatment system (metals removal);
- Air stripper system;
- Sludge treatment system (thickening, devolatilization, and belt filter press);
- Perchlorate treatment system (fluidized bed reactor [FBR] and ion exchange [IX] vessels);
- Various pumps, meters, piping, and valves tying the treatment systems together; and
- Programmable Logic Controller (PLC) that communicates the status of the operable systems, including the extraction wells, to a central computer that can then notify the operators of shut-downs and similar issues remotely.

Contaminated water from the extraction wells and interception-collection trenches (ICTs) is pumped into the GWTP and stored in the equalization storage tank. The contaminated water is then pumped to the pretreatment system for precipitation of metals. The sludge from the pretreatment system is delivered to the sludge treatment system to be thickened, air stripped of volatile organic compounds (VOCs), and filter pressed for disposal in a landfill. The water from the pretreatment system is delivered to the air stripper system for air stripping of VOCs. Water from the air stripper is stored in the effluent storage tank for further treatment by the perchlorate system, which consists of a FBR and IX vessels.

To provide the integration necessary for proper water process management, a stand-alone central PLC and operator console is used to control the operating systems of the GWTP. The belt filter press operates independently with a polymer pump and sludge feed pump interfaced with the central PLC.

The pretreatment system and air stripper system are equipped with instrument junction boxes and motor starter control panels. The control panels contain a transformer, run indication lights, motor starters, hand or automatic switches, and relays to interface with the central PLC. The control panels have monitors and/or logic to monitor the operating parameters and determine when abnormal conditions occur.

Interface relays will indicate to the central PLC that there is a problem within the systems. The central PLC will provide the logic for the proper action required for that specific set of circumstances.

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Groundwater extraction, treatment, discharge, and monitoring activities consist of:

- Continuous extraction of groundwater from multiple ICTs and extraction wells at LHAAP-18/24;
- Treatment of extracted groundwater for heavy metals, chlorinated compounds, and perchlorate using precipitation, air stripping, and biological methods, respectively;
- Evaluation of the hydraulic effectiveness of the extraction system by groundwater monitoring;
- Monitoring and analysis of treated groundwater to ensure compliance with the discharge limits; and
- Discharge of treated water to Harrison Bayou or to a holding pond (INF Pond), or the treated water may be released as irrigation water on LHAAP-18/24.

The location of the extraction wells and ICTs are shown on **Figure A-1** in **Appendix A**. The process flow diagram of the GWTP is shown on **Figure A-2** in **Appendix A**. **Figure ES-1** shows the monthly total volume of groundwater that was extracted from the ICT and extraction wells at LHAAP-18/24 between January 2014 and June 2022 and at LHAAP-16 between January 2014 and September 2019. Historical details regarding the operation of the GWTP, including downtime and resolutions are discussed in Section 1.1.1 of this Quarterly Evaluation Report.

During the 2<sup>nd</sup> Quarter 2022 (April – June) the new inline potential of hydrogen (pH) probe was installed. Previously, on 29 July 2021, Envirogen Technologies (Envirogen) mobilized to the site to troubleshoot the FBR. The GWTP was brought offline to diagnose continuous elevated perchlorate effluent results. Envirogen determined that the fluidization flow at 230 gallons per minute (gpm) and the inlet pressure to the FBR at 14 pounds per square inch (psi) was satisfactory. Envirogen determined that the inline pH probe was not calibrating properly and that the probe was giving an incorrect reading of 7.4. In July 2021, the pH reading was 8.24, which is above the FBR operating parameters. Ideally, the pH measured in the FBR should be between 7.1 and 7.4. A high pH can inhibit biological activity. Envirogen recommended the installation and calibration of a new pH probe. The new inline pH probe was received and replaced by Bloc Design Build, LLC (BLOC) on 6 April 2022. On the afternoon of 2 May 2022, partial power was lost to the GWTP. After an inspection of the overhead power lines, a blown fuse was found on Southwestern Electric Power Company's (SWEPCO's) transformer causing a partial loss of power to the GWTP. SWEPCO responded to the notification and replaced the fuse on 2 May 2022. The GWTP was completely powered down on 2 May 2022 as a safety precaution while SWEPCO addressed the blown fuse. In addition to the blown fuse, there was also a small fire observed on the ground at the base of the transformer load breaker switch at the GWTP. The United States Fish and Wildlife Service (USFWS) was notified. Upon USFWS arrival, the fire was extinguished with a water sprayer on 2 May 2022. The status of the load breaker switch on the transformer could not be assessed until power was fully restored. However, before power could be restored at the GWTP, a severe storm on 3 May 2022 knocked down another tree. The downed tree fell on the overhead line, breaking the overhead line and two cross arms. Ark-La-Tex Electric (Ark-La-Tex) repaired the overhead line, cross arms, and assessed the load breaker switch on 11 May 2022. Power was restored to the GWTP on 11 May 2022, and a new load

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breaker switch was ordered. Ark-La-Tex returned on 17 May 2022 to install the replacement load breaker switch.

In July 2021, Envirogen noted that the granulated activated carbon (GAC) settled bed height was 6.33 feet (ft) and the expanded bed height was 9 ft. The design settled bed height for the GAC is 9 ft and the design expanded bed height is 15 ft, with the expanded bed height being a key performance indicator for the FBR. Therefore, Envirogen recommended the addition of two supersacks of GAC media. One supersack of GAC was delivered, pre-wetted, and loaded in the FBR on 29 July 2021. After the addition of one supersack of GAC (1,000 pounds), the settled bed height was measured at 9.1 ft and the expanded bed height was measured at 11.3 ft. A second supersack of GAC (1,000 pounds) was received on 17 June 2022. On 20 June 2022, the FBR was topped off with approximately 150 pounds of GAC expanding the bed height to 15 ft as designed.

As shown on **Figure ES-1**, the total extracted groundwater volume from LHAAP-18/24 during the 2<sup>nd</sup> Quarter of 2022 was 771,403 gallons. The extracted groundwater volume was recorded on a monthly basis as the sum of the difference between the flow meter totalizer reading at each ICT between the beginning and end of each month. Extraction quantities in LHAAP-18/24 were 242,784 gallons in April 2022; 210,203 gallons in May 2022; and 318,416 gallons in June 2022.

The discharge flowrate from the GWTP was estimated as 145.3 gpm during the 2<sup>nd</sup> Quarter of 2022. As shown in **Table ES-1**, approximately 714,259 gallons of groundwater was treated and discharged from the GWTP to the Harrison Bayou. No treated groundwater from the GWTP was discharged to the INF Pond or returned to LHAAP-18/24 via the sprinkler system. **Table ES-1** also presents the INF Pond staff gauge readings by date, which is used to determine the freeboard available in the pond.

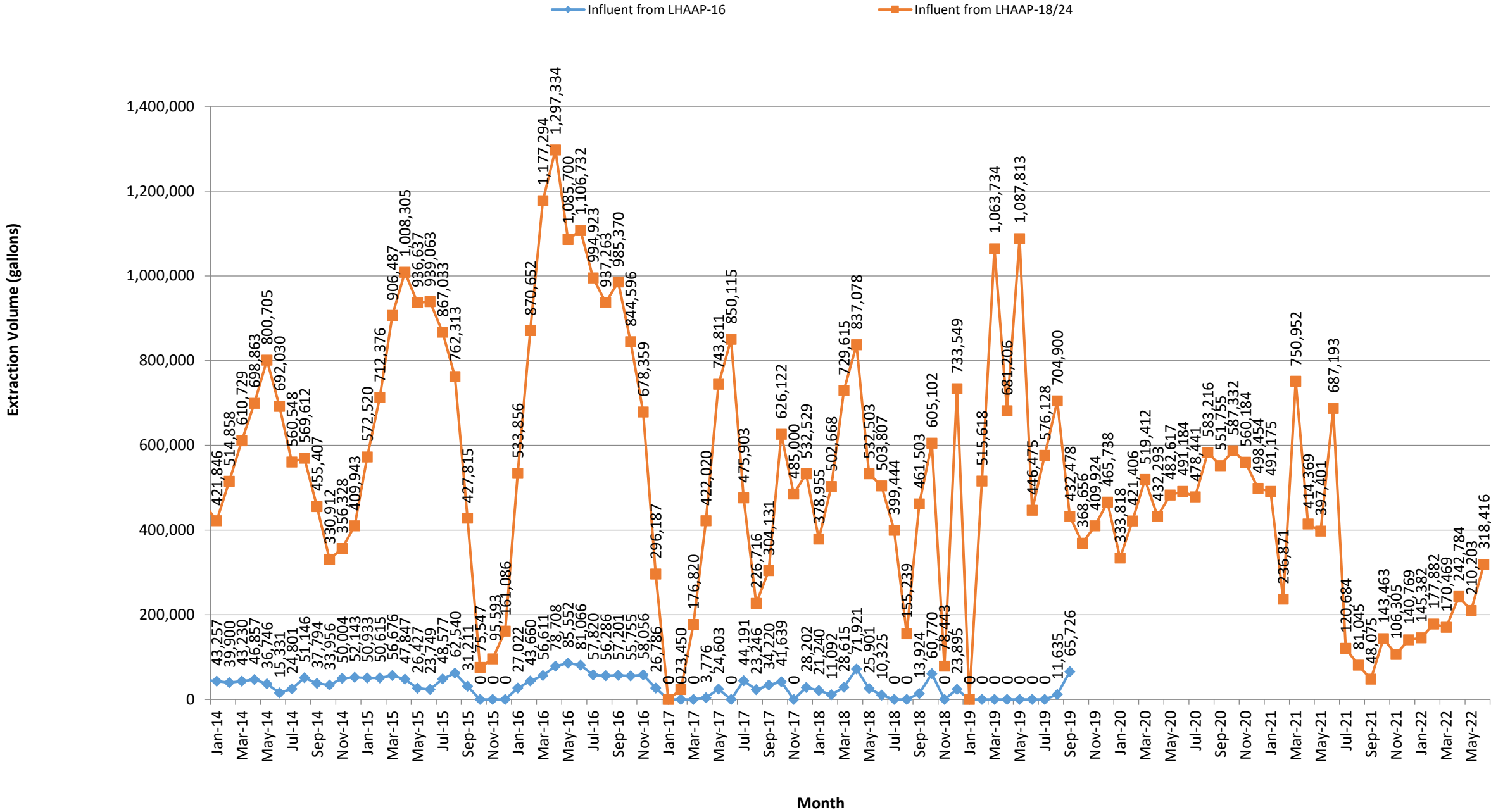
A quarterly GWTP influent sample was collected for perchlorate analysis on 24 May 2022 with a concentration of 6,990 micrograms per liter (µg/L). Monthly GWTP influent samples were collected for perchlorate analysis on 12 April 2022 and 7 June 2022. Due to the power outage in May 2022, no monthly influent sample was collected. The perchlorate levels were measured at 6,370 µg/L on 12 April 2022 and 7,010 µg/L on 7 June 2022. Considering the quarterly and monthly influent perchlorate results, the average perchlorate concentration in the GWTP influent during the quarter was 6,790 µg/L. Grab perchlorate samples from the GWTP effluent were collected weekly after the first IX vessel to confirm perchlorate treatment prior to discharge to the Harrison Bayou. None of the perchlorate concentrations in any effluent samples discharged to the INF Pond or the Harrison Bayou exceeded the Protective Concentration Level (PCL) (17 µg/L) during the 2<sup>nd</sup> Quarter 2022.

The treated water quantities each month since June 2012 and discharged into the Harrison Bayou are shown on **Figure ES-2**.

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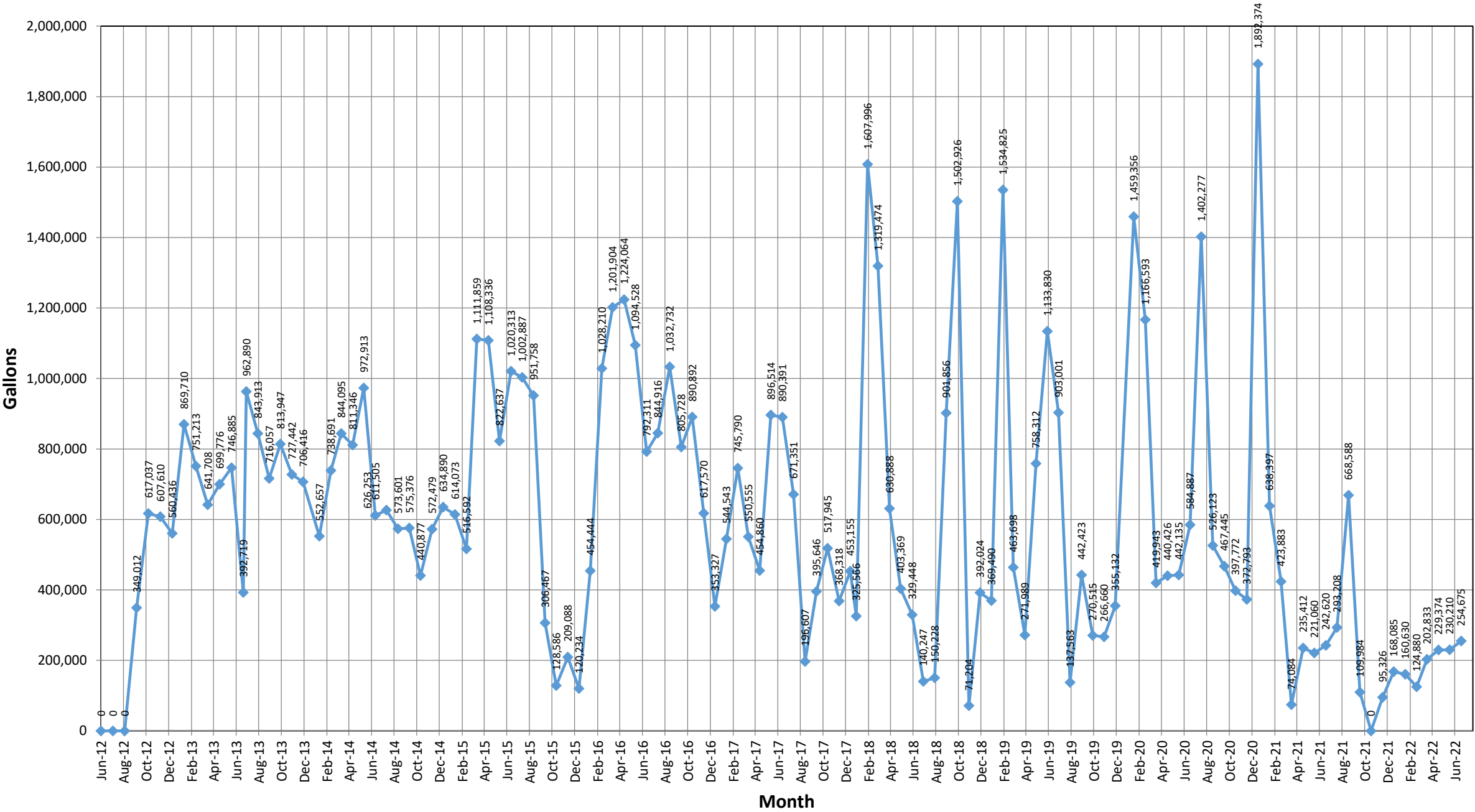
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Figure ES-1. Groundwater Recovery from January 2014 through June 2022  
LHAAP-18/24 & LHAAP-16



Note: Starting in September 2019, no groundwater was extracted subsequent to the final remedy of injections being implemented at LHAAP-16.

Figure ES-2. Treated Groundwater Discharged Monthly from June 2012 through June 2022



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**Table ES-1. Discharge Information to Harrison Bayou during 2<sup>nd</sup> Quarter 2022**

DATE	Harrison Bayou Flow (gpm)	Maximum Rate Allowed (gpm)	Released From GWTP To Harrison Bayou (gallons)	Released From INF Pond to Harrison Bayou (gallons)	Released From GWTP to INF Pond (gallons)	Combined Total Released to Harrison Bayou (gallons)	INF Pond Staff Reading (6.20 = 3 ft. Freeboard)
04/01/2022	8,875	1,846	0	0	0	0	3.39
04/02/2022	8,256	1,717	0	0	0	0	3.39
04/03/2022	7,894	1,641	0	0	0	0	3.38
04/04/2022*	7,257	1,512	15,210	0	0	15,210	3.38
04/05/2022	5,947	1,239	5,067	0	0	5,067	3.57
04/06/2022	10,320	2,150	7,690	0	0	7,690	3.56
04/07/2022	9,158	1,907	5,189	0	0	5,189	3.55
04/08/2022	7,053	1,469	0	0	0	0	3.55
04/09/2022	6,235	1,278	0	0	0	0	3.54
04/10/2022	5,498	1,143	0	0	0	0	3.54
04/11/2022*	4,510	939	32,400	0	0	32,400	3.53
04/12/2022	3,559	741	3,385	0	0	3,385	3.53
04/13/2022	2,590	539	8,231	0	0	8,231	3.52
04/14/2022	6,548	1,364	15,100	0	0	15,100	3.52
04/15/2022	5,633	1,173	2,213	0	0	2,213	3.51
04/16/2022	5,298	1,101	0	0	0	0	3.51
04/17/2022	4,987	1,037	0	0	0	0	3.50
04/18/2022*	4,782	996	31,040	0	0	31,040	3.50
04/19/2022	5,437	1,132	2,707	0	0	2,707	3.49
04/20/2022	5,146	1,072	10,927	0	0	10,927	3.49
04/21/2022	4,552	948	7,162	0	0	7,162	3.48
04/22/2022	4,353	906	13,347	0	0	13,347	3.48
04/23/2022	3,987	829	0	0	0	0	3.47

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**Table ES-1. Discharge Information to Harrison Bayou during 2<sup>nd</sup> Quarter 2022**

DATE	Harrison Bayou Flow (gpm)	Maximum Rate Allowed (gpm)	Released From GWTP To Harrison Bayou (gallons)	Released From INF Pond to Harrison Bayou (gallons)	Released From GWTP to INF Pond (gallons)	Combined Total Released to Harrison Bayou (gallons)	INF Pond Staff Reading (6.20 = 3 ft. Freeboard)
04/24/2022	3,625	754	0	0	0	0	3.47
04/25/2022*	3,381	704	30,831	0	0	30,831	3.46
04/26/2022	FLOOD STAGE	MAXIMUM	9,815	0	0	9,815	3.66
04/27/2022	16,627	3,464	9,920	0	0	9,920	3.66
04/28/2022	12,105	2,521	9,463	0	0	9,463	3.65
04/29/2022	7,603	1,584	9,677	0	0	9,677	3.65
04/30/2022	6,913	1,437	0	0	0	0	3.64
05/01/2022	NA	NA	0	0	0	0	3.64
05/02/2022*	6,091	1,269	26,389	0	0	26,389	3.64
05/03/2022	NA	NA	0	0	0	0	3.88
05/04/2022	NA	NA	0	0	0	0	3.87
05/05/2022	NA	NA	0	0	0	0	4.15
05/06/2022	NA	NA	0	0	0	0	4.14
05/07/2022	NA	NA	0	0	0	0	4.13
05/08/2022	NA	NA	0	0	0	0	4.12
05/09/2022	NA	NA	0	0	0	0	4.11
05/10/2022	NA	NA	0	0	0	0	4.10
05/11/2022	NA	NA	0	0	0	0	4.09
05/12/2022	9,145	1,905	10,541	0	0	10,541	4.08
05/13/2022	8,016	1,670	9,295	0	0	9,295	4.06
05/14/2022	6,958	1,447	0	0	0	0	4.04
05/15/2022	6,123	1,273	0	0	0	0	4.02
05/16/2022*	5,427	1,130	42,397	0	0	42,397	4.00
05/17/2022	4,549	947	12,268	0	0	12,268	3.98
05/18/2022	3,651	760	10,855	0	0	10,855	3.96



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**Table ES-1. Discharge Information to Harrison Bayou during 2<sup>nd</sup> Quarter 2022**

DATE	Harrison Bayou Flow (gpm)	Maximum Rate Allowed (gpm)	Released From GWTP To Harrison Bayou (gallons)	Released From INF Pond to Harrison Bayou (gallons)	Released From GWTP to INF Pond (gallons)	Combined Total Released to Harrison Bayou (gallons)	INF Pond Staff Reading (6.20 = 3 ft. Freeboard)
05/19/2022	2,743	571	6,015	0	0	6,015	3.94
05/20/2022	2,332	485	12,292	0	0	12,292	3.92
05/21/2022	2,198	457	0	0	0	0	3.90
05/22/2022	1,985	412	0	0	0	0	3.96
05/23/2022*	3,514	732	33,018	0	0	33,018	3.94
05/24/2022	2,917	607	4,369	0	0	4,369	3.92
05/25/2022	6,707	1,397	14,477	0	0	14,477	3.95
05/26/2022	5,399	1,124	10,653	0	0	10,653	3.93
05/27/2022	4,310	898	571	0	0	571	3.91
05/28/2022	4,098	852	0	0	0	0	3.89
05/29/2022	3,788	787	0	0	0	0	3.87
05/30/2022	3,469	721	0	0	0	0	3.85
05/31/2022*	3,215	668	37,070	0	0	37,070	3.83
06/01/2022	2,194	457	0	0	0	0	3.81
06/02/2022	1,688	351	0	0	0	0	3.84
06/03/2022	1,381	287	9,535	0	0	9,535	3.82
06/04/2022	1,322	274	0	0	0	0	3.80
06/05/2022	1,269	263	0	0	0	0	3.78
06/06/2022*	1,225	255	32,903	0	0	32,903	3.76
06/07/2022	1,181	246	9,706	0	0	9,706	3.74
06/08/2022	1,099	229	10,272	0	0	10,272	3.72
06/09/2022	1,005	209	6,676	0	0	6,676	3.70
06/10/2022	758	158	9,650	0	0	9,650	3.68
06/11/2022	670	139	0	0	0	0	3.67
06/12/2022	589	122	0	0	0	0	3.65

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**Table ES-1. Discharge Information to Harrison Bayou during 2<sup>nd</sup> Quarter 2022**

DATE	Harrison Bayou Flow (gpm)	Maximum Rate Allowed (gpm)	Released From GWTP To Harrison Bayou (gallons)	Released From INF Pond to Harrison Bayou (gallons)	Released From GWTP to INF Pond (gallons)	Combined Total Released to Harrison Bayou (gallons)	INF Pond Staff Reading (6.20 = 3 ft. Freeboard)
06/13/2022*	504	105	27,439	0	0	27,439	3.62
06/14/2022	485	101	9,992	0	0	9,992	3.60
06/15/2022	430	89	9,029	0	0	9,029	3.57
06/16/2022	423	88	4,573	0	0	4,573	3.55
06/17/2022	403	83	12,141	0	0	12,141	3.52
06/18/2022	391	81	0	0	0	0	3.49
06/19/2022	379	78	0	0	0	0	3.47
06/20/2022*	363	75	24,853	0	0	24,853	3.44
06/21/2022	323	67	9,718	0	0	9,718	3.42
06/22/2022	308	64	10,132	0	0	10,132	3.39
06/23/2022	285	59	6,421	0	0	6,421	3.37
06/24/2022	253	52	7,494	0	0	7,494	3.34
06/25/2022	226	47	0	0	0	0	3.31
06/26/2022	201	41	0	0	0	0	3.29
06/27/2022*	175	36	25,433	0	0	25,433	3.27
06/28/2022	150	31	11,050	0	0	11,050	3.25
06/29/2022	139	28	9,255	0	0	9,255	3.23
06/30/2022	120	24	8,403	0	0	8,403	3.21
<b>TOTALS</b>			<b>714,259</b>	<b>0</b>	<b>0</b>	<b>714,259</b>	

Notes: The maximum discharge rate from the INF Pond is 170 gallons per minute (gpm) and the maximum discharge rate from the GWTP is 30 gpm.

NA = Not applicable

Treated groundwater volume released over the weekend is included in the total for the next working day. These dates are marked with an asterisk (\*).

## 1 EVALUATION OF GROUNDWATER TREATMENT PLANT

The Groundwater Treatment Plant (GWTP) was constructed as part of the Interim Remedial Action (IRA) at Burning Ground Number (No.) 3, also referred to as Longhorn Army Ammunition Plant (LHAAP)-18/24, to treat groundwater extracted from interception-collection trenches (ICTs) and extraction wells. **Figure A-1** located in **Appendix A** presents the layout of the ICTs and extraction wells at LHAAP-18/24. The groundwater contamination at LHAAP-18/24 likely resulted from infiltration from an Unlined Evaporation Pond that was used to store manufacturing wastewater, and from burning trenches and other industrial processes used to flash pyrotechnic, propellant, and explosive waste streams. The groundwater at LHAAP-18/24 is contaminated mainly with chlorinated ethenes and perchlorate, and with lesser concentrations of 1,4-dioxane.

The GWTP no longer receives flow from LHAAP-16 due to injections completed as a part of the final remedy implementation, which commenced in September 2019. The GWTP had previously received flow from eight extraction wells installed at LHAAP-16 as part of a historic treatability study. The extraction wells were installed in 1996 and 1997 at LHAAP-16.

### 1.1 Treatment Configuration

The process flow diagram for the GWTP is presented in **Appendix A, Figure A-2**. Groundwater extraction, treatment, discharge, and monitoring activities consist of the following:

- Continuous extraction of groundwater from multiple ICTs and extraction wells located at LHAAP-18/24;
- Treatment of extracted groundwater for heavy metals, chlorinated compounds, and perchlorate using precipitation, air stripping, and biological methods, respectively;
- Evaluation of the hydraulic effectiveness of the extraction system by groundwater monitoring;
- Monitoring and analysis of treated groundwater to ensure compliance with the discharge limits; and discharge of treated water to Harrison Bayou or to a holding pond (INF Pond) or the treated water may be released as irrigation water on LHAAP-18/24.

Contaminated water from the extraction wells and ICTs is pumped into the GWTP and stored in the equalization storage tank. The contaminated water is then pumped to the pretreatment system for precipitation of metals. The sludge from the pretreatment system is delivered to the sludge treatment system to be thickened, air stripped of volatile organic compounds (VOCs), and filter pressed for burial in a landfill. The water from the pretreatment system is delivered to the air stripper system for air stripping of VOCs. Water from the air stripper is stored in the effluent storage tank for further treatment by the perchlorate system, which consists of a fluidized bed reactor (FBR) and ion exchange (IX) vessels. The process flow diagram for the GWTP is presented in **Appendix A, Figure A-2**.

To provide the integration necessary for proper water process management, a stand-alone central Programmable Logic Controller (PLC) and operator console is used to control all of the

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operating systems of the GWTP. The belt filter press operates independently with a polymer pump and sludge feed pump interfaced with the central PLC.

The pretreatment system and air stripper system are equipped with instrument junction boxes and motor starter control panels. The control panels contain a transformer, run indication lights, motor starters, hand or automatic switches, and relays to interface with the central PLC. The control panels have monitors and/or logic to monitor the operating parameters and determine when abnormal conditions occur.

Interface relays will indicate to the central PLC that there is a problem within the systems. The central PLC will provide the logic for the proper action required for that specific set of circumstances.

The GWTP was not operational between 24 May 2012 and 6 September 2012, due to malfunction of the scrubber unit associated with the catalytic oxidizer. Since 6 September 2012, the GWTP has operated without air abatement equipment. Although major repairs were conducted on the GWTP (e.g., replacement of level alarms, repair of the hydrochloric acid (HCl) tank, replacement of TK-650, replacement of malfunctioning valves and flow meters, replacement of metering pumps, repair or replacement of various system pumps, rust removal and repainting of various tanks, and replacement and repair of various extraction pumps, motors, and level switches), the GWTP treatment configuration has remained relatively unchanged. The only exception to this is that IX vessels were installed in November 2018 following the FBR to further remove perchlorate prior to discharging to the INF pond.

#### **1.1.1 Historical GWTP Operation**

The GWTP was not operational from 24 May 2012 until 6 September 2012. This was related to meltdown of the scrubber system, associated with the catalytic oxidizer, due to system overheating. Overheating occurred when the blower became inoperable after the bearing on the scrubber blower unit was shattered and damaged the blower. This occurred around 1300 on 21 May 2012.

After developing an interim air monitoring plan and obtaining concurrence from the Texas Commission on Environmental Quality (TCEQ) and the United States Environmental Protection Agency (USEPA) to operate the GWTP without use of air abatement equipment, a pilot run of the GWTP was conducted on 6 September 2012. In that first pilot run, 85,170 gallons of water that had been stored in the influent equalization tank (TK-140) were treated. The treated water was re-circulated through the FBR to revive the FBR after 3 months of dormancy. Treated groundwater samples were collected and analyzed, respectively, for perchlorate, metals, and VOCs. Air samples were collected and analyzed for VOCs only.

On 19 September 2012, a second pilot run was performed at the GWTP and 107,264 gallons of water were treated. Based on the successful re-start of the GWTP, continuous groundwater extraction began again on 24 September 2012. While groundwater extraction occurs on a continuous basis, operation of the GWTP occurs intermittently due to the low volume of water available for treatment with respect to the design capacity of the GWTP. During the 3<sup>rd</sup> Quarter

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of 2012, groundwater extraction occurred only from LHAAP-18/24. Groundwater extraction from LHAAP-16 was not performed due to equipment failure. However, extraction from LHAAP-16 began in October 2012 and the extraction volumes increased steadily throughout the 4<sup>th</sup> Quarter of 2012, as pumping equipment was gradually repaired/replaced. The GWTP operated under normal conditions until September 2015.

On 14 September 2015, at 1115, the blower on the air stripper (BL-340) malfunctioned during routine operation. The wiring on the blower was repaired and the blower operated for less than 2 hours on 17 September 2015, when the blower malfunctioned again. It was determined that the blower needed to be replaced, and groundwater extraction and operation of the GWTP ceased beginning 18 September 2015, as the influent equalization tank (TK-140) became full. Beginning on 2 October 2015, it was determined that the GWTP could operate without the blower at a reduced extraction rate. The operation of the GWTP allowed extraction of groundwater from ICTs 12E, 13A, 13B, and 13C (13C was changed to 13E on 12 October 2015), which were considered critical ICTs to prevent migration of contaminants to Harrison Bayou. Groundwater extraction was switched frequently between ICTs 12E, 13A, 13B, and 13E to ICTs 14B, 14C, and 14D beginning on 14 December 2015.

Malfunction of the blower on the air stripper (BL-340), on 14 September 2015 and 17 September 2015, disrupted continuous extraction and routine operations of the GWTP, which lasted through 7 January 2016. Prior to this occurrence, the GWTP performed as designed and the GWTP was operated on an as needed basis (i.e., semi-continuous operational basis). During the 4<sup>th</sup> Quarter of 2015, groundwater was extracted from a limited number of ICTs (ICTs 12E, 13A, 13B, 13C, and/or 13E, or ICTs 14B, 14C, and 14D). Operation of the GWTP occurred on a batch basis through the FBR. After replacement of the blower, attempts were made to restore continuous operations to the FBR, but they remained predominantly on a batch basis throughout January 2016.

On 12 December 2016, flange bolts at TK-380 failed and allowed HCl to drain into the sump. The secondary containment area was washed down and the sump contents were transferred into the influent equalization tank (TK-140). Because of the acid release, extraction of groundwater from the ICTs was halted, and the GWTP was put into recycle mode (effluent sent back as influent) until the acid was neutralized and perchlorate, metals, and VOCs were below discharge criteria on 17 March 2017. The FBR performance was challenged by the increased chlorides in the neutralized wastewater, but performance gradually returned to normal in the 1<sup>st</sup> Quarter of 2017. Groundwater extraction was gradually increased to full rates during the 2<sup>nd</sup> Quarter of 2017.

On 12 August 2017, severe storms caused a power outage at LHAAP-18/24. When electrical service was restored, the main transformer failed due to a manufacturing defect. A portable emergency generator was brought on-site on 21 August 2017, to allow the FBR to operate in full recycle mode. After a replacement transformer was installed on 12 September 2017, extraction began from ICTs 13B, 13C, 13D, 13E, 13F, 7, and EW01 and the FBR was put into normal operation. Beginning on 21 September 2017, groundwater was extracted from all of the ICTs.

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On 27 December 2018, severe storms caused a power outage in Karnack, Texas. When electrical service was restored, the main transformer was determined to have failed. A portable emergency generator was brought on-site on 28 December 2018, to allow the FBR to operate in full recycle mode. On 5 February 2019, the smaller generator mobilized in December 2018 was replaced with a larger generator capable of powering the LHAAP-18/24 well field and the entire GWTP.

On 8 February 2019, the transformer at the GWTP was tested to ensure that it could handle back feeding necessary to power the LHAAP-18/24 well field due to the necessary step-down in power from the generator. Following additional system modifications based upon the testing, the well field at LHAAP-18/24 had power restored on 11 February 2019, using the generator and transformer at the GWTP.

From 11 June to 17 June 2019, a double-walled pipe in the burning grounds (ICTs 14C and 14D) was found to be leaking at a joint and repaired. In addition, the line to well 18WW17 was cut off due to leaks identified following repair of the other section of pipe. The ground was too wet to dig and replace the other double-walled pipe at that time. From 28 October to 31 October 2019, a new double-walled pipe to well 18WW17 was installed by Palmetto Services (Palmetto).

Groundwater is no longer extracted from LHAAP-16 because in situ bioremediation injections were completed in September 2019 as part of the final remedial action. The only groundwater treated and discussed within this report is from LHAAP-18/24.

On 11 January 2020, a possible tornado and straight-line winds came through the area and broke the power lines. The breaker was shut off at the transformer until power lines could be repaired on 14 and 15 January 2020, by Ark-La-Tex Electric (Ark-La-Tex). On 18 January 2020, power was lost to the GWTP and it was discovered that there was a blown fuse on the power lines. Ark-La-Tex was called to the site to replace the fuse and power was restored to the GWTP the same day. On 29 March 2020, there was a power glitch that caused the air compressors to shut down. The air compressors and FBR were restarted on the same day. On 13 April 2020, two trees fell across a power line and caused loss of power to the plant. Ark-La-Tex removed the trees and restored power at 0945 on 14 April 2020. On 2 May 2020, a tree fell across Southwestern Electric Power Company's (SWEPCO's) line inside the plant that feeds the GWTP. SWEPCO came out and removed the tree from the line. Power was restored the same day. On 29 December 2020, housing was built for the acetic acid pump associated with the FBR to prevent rainwater from causing it to shut down.

On 13 February 2021, inclement weather began and it stayed below freezing until 20 February 2021. The level transmitter on TK-650 froze, making the discharge pump inoperable. The level transmitter was thawed out and pumping was restarted. On 20 February 2021, the air compressors were able to be started again. The FBR began operation in recycle mode, but the oxidation-reduction potential (ORP) was greater than the normal operating requirements. From 21 February through 9 March 2021, repairs from the freeze were made on broken polyvinyl chloride (PVC) pipes, valves, fittings, and level transmitters. The ORP on the FBR remained

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elevated and the FBR was in recycle mode until 25 March 2021 when the ORP returned to normal range and discharge to the Harrison Bayou was able to resume.

A power outage occurred on 12 May through 13 May 2021, due to downed power lines. On 14 May 2021, Ark-La-Tex was on-site to replace the broken power pole and repair broken power lines. On 28 May 2021, a power outage occurred at 0430, due to a downed tree. SWEPCO restored power the following day on 29 May 2021. On 2 June 2021, elevated perchlorate effluent results, precipitated replacement on the acetic acid nutrient feed pump. Perchlorate effluent results dropped below discharge limits but not to expected concentrations. As a result, the FBR was placed in recycle mode from 18 June 2021 through the end of the 2<sup>nd</sup> Quarter 2021.

On 29 July 2021, Envirogen Technologies (Envirogen) mobilized to the site to troubleshoot the FBR. The plant was brought offline to diagnose why perchlorate effluent results remained elevated. Envirogen found the fluidization flow at 230 gallons per minute (gpm) and the inlet pressure to the FBR at 14 pounds per square inch (psi) as satisfactory. Envirogen determined that the inline potential of hydrogen (pH) probe was not calibrating properly, and it was giving an incorrect reading of 7.4. In July 2021 the pH reading was 8.24 which is above the enhanced FBR operating parameters. Ideally, the pH should be between 7.1 and 7.4 in the FBR. A high pH can inhibit biological activity. Envirogen recommended the installation and calibration of a new pH probe. A new inline pH probe was ordered, and replacement and calibration were completed on 6 April 2022.

Additionally, Envirogen noted that the granulated activated carbon (GAC) settled bed height was 6.33 feet (ft) and the expanded bed height was 9 ft. The design settled bed height for the GAC was 9 ft and the design expanded bed height was 15 ft, with the expanded bed height being a key performance indicator for the FBR. Therefore, Envirogen recommended the addition of two supersacks of GAC media. One supersack of GAC was delivered, pre-wetted, and loaded in the FBR on 29 July 2021. After the addition of one supersack of GAC, the settled bed height was measured at 9.1 ft and the expanded bed height was measured at 11.3 ft. Additional GAC was ordered and added to the FBR. The GWTP was brought back online on 3 August 2021.

Palmetto was on-site from 20 September through 24 September 2021 to replace sand in the sand filter. The sand in the sand filter collects debris that is filtered out of the water as designed. However, over time the debris restricts the flow of water through the filter. Therefore, the GWTP was taken offline on 20 September 2021 to replace the sand. Palmetto removed the sand and screens, acid washed the screens, put the screens back in place, and then added new sand using a crane. Approximately 4.5 tons of 10 x 20 silica sand and 12 tons of 8 x 12 silica sand were placed into the sand filter. While the plant was down for the sand filter activities, the 10-inch PVC line between the clarifier effluent and the sludge tanks was replaced, and the polymer feed line was unclogged. However, before the GWTP could be operated again, the HCl feed pump malfunctioned as discussed below in Section 1.1.2.

On 4 October 2021, the GWTP was unable to operate due to a malfunctioning pump motor on the HCl feed pump (P-390). On 5 October 2021, Bloc Design Build, LLC (BLOC) was on-site to diagnose the problem with the HCl pump motor (P-390) which was seized and inoperable. A new



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pump motor was ordered and on 14 October 2021, BLOC returned and installed wiring to the new motor on the HCl pump (P-390).

Upon arrival at the GWTP on 5 October 2021, there was no power at the GWTP. A blown fuse was found on SWEPCO's transformer. SWEPCO replaced the fuse, however, only partial power was restored to the GWTP on 5 October 2021. On 7 October 2021, Ark-La-Tex was on-site to troubleshoot the electrical power issue and determined that the load break switch (commonly referred to as an arc strangler) was blown at the transformer at the GWTP and needed to be replaced. The load break switch malfunction had caused the fuse to fail, cutting power to the GWTP. On 11 October 2021, Ark-La-Tex was on-site to repair the load break switch and restore power to the GWTP. Following the restoration of power, and replacement of the HCl pump, the GWTP operation resumed on 18 October 2021.

In March 2022, a severe storm blew down a tree damaging two power poles, but there was no power loss at the time of the storm event. On 16 March 2022 and 17 March 2022, Ark-La-Tex arrived on-site to replace the power poles and to repair the power lines. As a result, power was shut off at the plant for approximately 24 hours from 16 March to 17 March 2022, to allow Ark-La-Tex to safely work with the power lines.

#### **1.1.2 2<sup>nd</sup> Quarter 2022 GWTP Operation**

As discussed in Section 1.1.1, Envirogen identified that the inline pH probe was not working properly and recommended replacement. A high pH can inhibit biological activity and the inline pH probe allows the GWTP to automatically adjust the acid feed and keep the pH within the ideal operating parameters between 7.1 and 7.4. The new inline pH probe was received and replaced on 6 April 2022.

On the afternoon of 2 May 2022, there was partial power loss to the GWTP. After an inspection of the overhead power lines, a fuse was found blown on SWEPCO's transformer. SWEPCO was alerted and responded on 2 May 2022 to replace the fuse. The GWTP was completely powered down on 2 May 2022 as a safety precaution while SWEPCO addressed the blown fuse. In addition to the blown fuse, there was also a small fire observed on the ground at the base of the transformer load breaker switch at the GWTP. The United States Fish and Wildlife was alerted and the fire was put out with a water sprayer on 2 May 2022. The status of the load breaker switch on the transformer could not be assessed until power was fully restored.

However, before power could be restored a GWTP, a severe storm on 3 May 2022 knocked down another tree. The downed tree fell on the overhead line, breaking the overhead line and two cross arms. Ark-La-Tex repaired the overhead line, cross arms, and assessed the load breaker switch on 11 May 2022. Power was restored to the GWTP on 11 May 2022 and a new load breaker switch was ordered. Ark-La-Tex returned on 17 May 2022 to install the replacement load breaker switch.

A supersack of GAC (1,000 pounds) was delivered on 17 June 2022. On 20 June 2022, the FBR was topped off with approximately 150 pounds of GAC expanding the bed height to 15 ft as designed. The expanded bed height is a key performance indicator for optimal performance of



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the FBR. In addition to the electrical issues, multiple repairs were completed on the ICT well field during the 2<sup>nd</sup> Quarter 2022. In April 2022, an electrical issue was repaired on ICT 7 and the flow meter was replaced on ICT 13E. In June 2022, the pump was replaced on ICT 13B. ICT repairs are summarized in **Table A-2** in **Appendix A**.

In the 2<sup>nd</sup> Quarter 2022, the GWTP processed approximately 1,422,729 gallons of water including influent water from LHAAP-18/24, rainwater from the catch basin, and decanted water from the metals treatment and solids removal processes. In addition, a suspected blockage restricted flow through the pretreatment process causing a leak prior to Tank 200A. This leak, also captured in the catch basin, is included in the processed volumes. During the 2<sup>nd</sup> Quarter 2022, the GWTP operated for 163 hours. Flow rates for the treatment processes for metals and VOCs ranged between 142 and 150 gpm with an average of approximately 145.3 gpm for the operating hours (i.e., this flow rate does not represent continuous flows). The treatment configuration of the plant at these rates (with minor variations) is shown in the following tables.

**GWTP Metals Precipitation Operating Parameters**

Pretreatment Settings	Tank 200-A Mg(OH) <sub>2</sub> Mixing	Tank 200-B NaOH Mixing	Tank 200-C Polymer Mixing	Tank 300 feed line to Air Stripper
pH Adjustment	9.0	10.5	NA	5.0 to meet ≤ 8.0 release from stripper
Feed Pump Settings	Speed 100% Stroke 100% 10 gph Mg(OH) <sub>2</sub>	Speed 100% Stroke 100% 9.0 gph NaOH	Speed 90% Stroke 100% 40 gph water	Speed 80% Stroke 80% 10 gph HCl
Notes: gph - gallons per hour, NaOH - sodium hydroxide, Mg(OH) <sub>2</sub> - magnesium hydroxide, NA - not applicable, % - percent, ≤ - less than or equal to.				

**GWTP Air Compressors Operating Parameters**

Air Compressors	K-700A	K-700B	K-701
Air Pressure Settings	88 psi	88 psi	105 psi

**GWTP Stripper Operating Parameters**

pH Setting	7.4
Inlet Pressure Gauge	Not operational
Stripper Pressure Gauge	Not operational
Air Flow Rate	Not operational

**GWTP Fluidized Bed Reactor Operating Parameters**

Carbon Bed Height	12 feet and 8 to 11 inches
Recycle Flow Rate	200 gpm
pH	7.1 to 7.4
Recycle ORP	<-430 mV
Note: mV – millivolts	

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## 1.2 Work Performed at the GWTP

Groundwater extraction, treatment, discharge, and monitoring activities consist of:

- Continuous extraction of groundwater from multiple ICTs and extraction wells at LHAAP-18/24;
- Treatment of extracted groundwater for heavy metals, chlorinated compounds, and perchlorate using precipitation, air stripping, and biological methods, respectively;
- Evaluation of the hydraulic effectiveness of the extraction system by groundwater monitoring;
- Monitoring and analysis of treated groundwater to ensure compliance with the discharge limits; and
- Discharge of treated water to Harrison Bayou or to a holding pond (INF Pond).

Maintenance performed at the GWTP during the 2<sup>nd</sup> Quarter of 2022 is described in the following subsections.

### 1.2.1 Major Maintenance

The major maintenance items that were completed at the GWTP during this quarterly reporting period are:

- On 6 April 2022, BLOC was on-site to install pH probe on FBR.
- On 23 April 2022, BLOC was on-site to repair electrical problem at potable water pump house.
- On 27 April 2022, Ark-La-Tex was on-site to repair pot transformer for Army trailer.
- On 11 May 2022, Ark-La-Tex was on-site to replace broken cross arms on power poles and to repair broken wire.
- On 17 May 2022, Ark-La-Tex was on-site to install new load break switch in transformer.
- On 29 June 2022, Ark-La-Tex was on-site to repair FIT-686 flow meter.

### 1.2.2 Routine Maintenance

The following routine maintenance items were completed at the GWTP during 2<sup>nd</sup> Quarter 2022:

- Performed housekeeping in GWTP office, Army trailer, around GWTP and containment area, and in GWTP Shop
- Mowed grass around GWTP office, Army trailer, GWTP and containment area, and around the GWTP Shop
- Removed and cleaned basket from 4-inch strainer on discharge of FBR
- Changed out filter socks before IX vessels
- Replaced ¼ inch suction tubing on P-103
- Rebuilt priming valve on P-103
- Added approximately 150 pounds of GAC to the FBR

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- Collected quarterly air samples at GWTP
- Collected quarterly surface water samples
- Removed fallen tree from power line
- Rebuilt Grundfos pumps
- Repaired keypad on automatic gate

#### **1.2.2.1 Lubrication**

No lubrication maintenance was conducted during 2<sup>nd</sup> Quarter 2022.

#### **1.2.2.2 Air Compressors**

The following maintenance was conducted on the air compressors during 2<sup>nd</sup> Quarter 2022:

- Tightened belts and replaced ¼ inch tubing and blow down valve on K-701 air compressor
- Replace belts on K-700A and K-700B air compressors
- Added oil to K-700B

#### **1.2.2.3 Belt Press and Waste Disposal**

No belt press or waste disposal was conducted during 2<sup>nd</sup> Quarter 2022.

#### **1.2.2.4 Sand Filter**

No maintenance or repairs were conducted on the sand filter (FL-290) during 2<sup>nd</sup> Quarter 2022.

#### **1.2.2.5 Well Field at LHAAP-18/24**

The following activities were conducted at the well field at LHAAP-18/24 during the reporting period:

- Measured monthly water levels
- Repaired electrical problem on ICT 7
- Replaced pump on ICT 13B

#### **1.2.2.6 Miscellaneous Activities**

No miscellaneous activities were performed during the 2<sup>nd</sup> Quarter 2022 reporting period.

### **1.2.3 Routine Maintenance (Potable Water Wells)**

The following activity was conducted during the 2<sup>nd</sup> Quarter 2022:

- Flushed potable water lines
- Replaced pump and motor at potable water pump house
- Reattached 1 ½" pipe to pump at potable water pump house

## **1.3 Filter Cake Operations and Management**

No filter cake operations took place during the 2<sup>nd</sup> Quarter 2022 reporting period.

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## 1.4 Fluidized Bed Reactor Operations

The operating parameters for the GWTP FBR are presented in **Table 1**. Measurements indicating pH or ORP values that fell outside of the optimal range are highlighted gray.

**Table 1. Enhanced Fluidized Bed Reactor Operating Parameters – 2<sup>nd</sup> Quarter 2022**

Date	pH (7.1-7.4 (S.U.))	ORP (< -430 mV)	Temperature (Degrees Fahrenheit)
4/1/2022	7.6	-550	66
4/2/2022	7.6	-555	67
4/3/2022	7.6	-562	67
4/4/2022	7.7	-557	68
4/5/2022	7.7	-549	70
4/6/2022	7.2	-551	70
4/7/2022	7.2	-536	68
4/8/2022	7.3	-541	68
4/9/2022	7.3	-517	70
4/10/2022	7.2	-521	70
4/11/2022	7.2	-556	72
4/12/2022	7.2	-566	72
4/13/2022	7.3	-465	71
4/14/2022	7.4	-470	69
4/15/2022	7.3	-526	69
4/16/2022	7.3	-512	70
4/17/2022	7.3	-509	70
4/18/2022	7.4	-460	70
4/19/2022	7.4	-533	70
4/20/2022	7.4	-558	69
4/21/2022	7.4	-499	70
4/22/2022	7.4	-577	73
4/23/2022	7.4	-566	73
4/24/2022	7.4	-563	74
4/25/2022	7.3	-470	73
4/26/2022	7.4	-559	72
4/27/2022	7.4	-567	72
4/28/2022	7.4	-480	72
4/29/2022	7.4	-573	72
4/30/2022	7.4	-576	72
5/1/2022	7.3	-568	76
5/2/2022	7.3	-475	76

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**Table 1. Enhanced Fluidized Bed Reactor Operating Parameters – 2<sup>nd</sup> Quarter 2022**

<b>Date</b>	<b>pH (7.1-7.4 (S.U.))</b>	<b>ORP (&lt; -430 mV)</b>	<b>Temperature (Degrees Fahrenheit)</b>
5/3/2022	No Power	No Power	No Power
5/4/2022	No Power	No Power	No Power
5/5/2022	No Power	No Power	No Power
5/6/2022	No Power	No Power	No Power
5/7/2022	No Power	No Power	No Power
5/8/2022	No Power	No Power	No Power
5/9/2022	No Power	No Power	No Power
5/10/2022	No Power	No Power	No Power
5/11/2022	No Power	No Power	No Power
5/12/2022	7.1	-470	81
5/13/2022	7.3	-503	80
5/14/2022	7.3	-471	81
5/15/2022	7.3	-474	82
5/16/2022	7.3	-503	83
5/17/2022	7.3	-559	83
5/18/2022	7.3	-572	84
5/19/2022	7.3	-494	83
5/20/2022	7.4	-490	83
5/21/2022	7.4	-541	83
5/22/2022	7.4	-550	82
5/23/2022	7.4	-535	78
5/24/2022	7.4	-557	77
5/25/2022	7.4	-577	77
5/26/2022	7.4	-469	75
5/27/2022	7.4	-510	74
5/28/2022	7.4	-570	75
5/29/2022	7.4	-555	77
5/30/2022	7.4	-529	78
5/31/2022	7.4	-491	81
6/1/2022	7.4	-461	85
6/2/2022	7.4	-471	82
6/3/2022	7.4	-470	80
6/4/2022	7.4	-567	82
6/5/2022	7.4	-572	82
6/6/2022	7.4	-552	83
6/7/2022	7.4	-568	83
6/8/2022	7.3	-564	84

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**Table 1. Enhanced Fluidized Bed Reactor Operating Parameters – 2<sup>nd</sup> Quarter 2022**

Date	pH (7.1-7.4 (S.U.))	ORP (< -430 mV)	Temperature (Degrees Fahrenheit)
6/9/2022	7.4	-561	82
6/10/2022	7.4	-571	82
6/11/2022	7.4	-574	83
6/12/2022	7.3	-572	84
6/13/2022	7.3	-566	86
6/14/2022	7.2	-561	86
6/15/2022	7.2	-559	87
6/16/2022	7.1	-545	86
6/17/2022	7.1	-552	87
6/18/2022	7.1	-554	88
6/19/2022	7.1	-562	89
6/20/2022	7.1	-550	86
6/21/2022	7.0	-556	85
6/22/2022	7.0	-557	87
6/23/2022	7.0	-555	88
6/24/2022	7.1	-557	86
6/25/2022	7.1	-550	88
6/26/2022	7.1	-554	89
6/27/2022	7.2	-563	88
6/28/2022	7.2	-568	86
6/29/2022	7.2	-565	87
6/30/2022	7.3	-562	86
Note: Shaded regions - pH outside of operating parameters, S.U. - standard unit, mV - millivolts			

On 29 July 2021, Envirogen was on-site and identified that the inline pH probe was not working properly. As a result, pH was measured manually from 29 July 2021 through 5 April 2022. The elevated pH shaded grey in **Table 1** above was identified as one of the issues contributing to the poor performance of the FBR. The inline pH probe was installed on 6 April 2022, which allowed the pH to be adjusted within the operating parameters.

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## 1.5 Process Chemical Usage at GWTP

Approximate chemical consumption and the quantity delivered during the 2<sup>nd</sup> Quarter of 2022 are shown in **Table 2**.

**Table 2. Chemical Usage and Delivery Table**

Chemical	Usage 2 <sup>nd</sup> Quarter 2022	Quantity Delivered 2 <sup>nd</sup> Quarter 2022
Hydrochloric acid	615 gallons	22,500 pounds = 2,000 gallons
Sodium hydroxide (35%)	875 gallons	0
Acetic acid (50%)	1 drum = 55 gallons	0
Phosphoric acid (75%)	54.3 liters	0
Magnesium hydroxide	210 gallons	0
Urea	401.4 pounds	12 bags = 600 pounds
Polymer (magnafloc 110-Liters)	10.5 liters	0

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## 2 EVALUATION OF LHAAP-18/24 ICT EFFECTIVENESS

The ICT system at Burning Ground No. 3 is composed of 14 sections ranging in length from 100 ft to 1,300 ft. A total of approximately 5,000 linear ft of trench was installed within and around three sides of Burning Ground No. 3. The trench sections extend approximately 22 ft to 45 ft below ground surface (bgs). Most, but not all, of the trenches are as deep as the confining clay layer of the shallow groundwater zone. High density polyethylene (HDPE) liners were installed outside of ICTs 12A-12E and 13A-13G, located on the southwestern and northwestern boundaries of LHAAP-18/24, respectively. The locations of the liners are shown on **Figure A-1** and depths of the ICTs are presented on **Table A-1** in **Appendix A**.

### 2.1 Groundwater Elevation

Water levels from 92 monitoring wells and 11 piezometers are measured monthly to generate potentiometric surface maps that assist in monitoring the effectiveness of the groundwater extraction system on plume containment. Piezometer 12 (BGPZ-12) was damaged and plugged and abandoned in May 2013, and monitoring wells 18WW01 and 18WW16 were abandoned in August 2020. The groundwater contours are generated using the water levels from the shallow zone and Wilcox Formation wells. The water level data are presented in **Table 3**. No reinjection of treated groundwater or reapplication of groundwater to LHAAP-18/24 grounds via the existing irrigation system occurred during the 2<sup>nd</sup> Quarter of 2022. Groundwater elevations measured during the 2<sup>nd</sup> Quarter of 2022 are discussed in Section 2.2. Potentiometric surface maps based on the groundwater elevations measured during the 2<sup>nd</sup> Quarter 2022 are contained in **Appendix B**.

### 2.2 Performance of Plume Capture

The intent of the ICTs is to control groundwater gradients, prevent off-site migration of contaminated groundwater, extract the most highly contaminated groundwater, and reduce the mass of contaminants in groundwater. Liners were installed in the ICTs on the northern (ICT 13) and western (ICT 12) site boundaries to limit migration of contaminated water from the site towards Harrison Bayou. At the same time, the liners reduce or prevent removal of contaminated groundwater that is outside the ICT containment area, between the site and Harrison Bayou. The ICTs are installed within the shallow subsurface at the site and capture primarily shallow groundwater (e.g., < 40 ft bgs).

In 2007 and 2008, in consultation with the TCEQ and the USEPA, the Army ceased operations of ICTs 1, 3, 5, 10, 12A and 13G for groundwater extraction (note that extraction from ICT 12A was resumed after pump replacement in December 2012). Two other ICTs (ICT 6 and ICT 9) were changed from extraction ICTs to re-injection ICTs which ceased in July 2012. Groundwater extraction from well EW-1 located in the northeast central portion of the site began in October 2008 and well 18WW17 located to the northeast of the ICT containment area began in January 2008. **Table A-2** in **Appendix A** presents a summary of extraction equipment replacement since 2011, as dictated by poor extraction performance (malfunctioning pumps, poor pump positioning

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with respect to groundwater, non-operational level probes, scale build up, etc.). Further discussion of extraction performance of various ICTs and extraction wells is presented in Section 2.3.

Potentiometric surface maps of the shallow zone groundwater in the vicinity of LHAAP-18/24, based on groundwater elevations measured on 28 April, 24 May, and 29 June 2022, are shown on **Figures B-1, B-2, and B-3 in Appendix B**, respectively. The potentiometric surface maps of the shallow zone were contoured using the Kriging geostatistical interpolation method included in the Golden Software Surfer® data analysis software.

The HDPE liners in the ICTs, where present, continue to retard groundwater flow. The potentiometric surface maps for April through June 2022 continue to reflect high groundwater elevations in the northern/northwestern portion of the site with groundwater flowing radially from groundwater highs at monitoring wells located inside the ICT containment area. Monitoring wells MW-1 and 123, which are installed in the shallow zone, had groundwater elevations in June 2022 of 174.15 ft above mean sea level (amsl) and 173.18 ft amsl, respectively. Monitoring wells MW-1 and 123 are near one another. From the groundwater high at monitoring wells MW-1 and 123, groundwater flows radially towards the surrounding ICTs which include ICT 13 to the north and northwest, and ICT 12 to the west and southwest.

The extracted groundwater volume was measured on a monthly basis as the sum of the difference between the flow meter totalizer reading at each ICT between the beginning and end of each month. During the 2<sup>nd</sup> Quarter 2022, approximately 771,403 gallons of groundwater were extracted from the ICTs for treatment, 242,784 gallons in April 2022; 210,203 gallons in May 2022; and 318,416 gallons in June 2022 (**Table 5**). Note that the sum of the ICT totalizers does not matchup to the influent totalizer (FIT-140) at the groundwater treatment plant. As shown on **Figure 2-1** the influent totalizer volume for the 2<sup>nd</sup> Quarter 2022 was 778,677 gallons. The influent totalizer biases are high because the reading assumes the pipe is completely full, which often is not the case.

During the 2<sup>nd</sup> Quarter 2022, approximately 714,259 gallons of treated groundwater was discharged to Harrison Bayou from the GWTP. No treated groundwater from the GWTP discharged to the INF pond or was returned to LHAAP-18/24 via the sprinkler system during the 2<sup>nd</sup> Quarter 2022. Throughout the 2<sup>nd</sup> Quarter of 2022, the treated groundwater was processed through the IX vessels to provide additional water treatment for perchlorate prior to discharge to Harrison Bayou. **Table 4** presents the daily discharge rates and volume for the 2<sup>nd</sup> Quarter of 2022.

Groundwater levels in Wilcox Formation wells (less than [ $<$ ] 40 to 50 ft bgs) were measured during the 2<sup>nd</sup> Quarter of 2022 groundwater gauging events. Wilcox Formation wells correspond to those wells previously identified as “intermediate” and “deep” wells. “Intermediate” wells are designated as Upper Wilcox Formation wells and “Deep” wells are designated as Lower Wilcox Formation wells. Groundwater in the Upper and Lower Wilcox Formation wells are in hydraulic communication and so can be treated as a single hydrogeologic unit. Therefore, the groundwater elevations in Upper Wilcox wells were used to construct the potentiometric surface maps for the

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Wilcox Formation. It is noted that there are locations where groundwater elevation and contamination concentration data indicate a lack of hydraulic communication between the Upper and Lower Wilcox formation wells. However, the Upper and Lower Wilcox formation wells are treated as a single hydrogeologic unit for the purposes of this report. **Figures B-4, B-5, and B-6 in Appendix B** show the locations of the Wilcox Formation monitoring wells and the potentiometric surface of the Wilcox Formation, based on static water levels measured during the April, May, and June 2022 gauging events, respectively. Groundwater in the Wilcox Formation flows in a northerly direction, towards Caddo Lake and there is a downward vertical gradient between the overlying shallow zone and the Wilcox Formation. A groundwater high is present in the Wilcox Formation in the area of monitoring wells MW-14 and 18CPTMW01SW.

### 2.3 Quantity of Water Extracted from LHAAP-18/24

In the 2<sup>nd</sup> Quarter 2022, flow rates for the treatment processes for metals and VOCs ranged between 142 and 150 gpm with an average of approximately 145.3 gpm for the operating hours (i.e., this flow rate does not represent continuous flows). The GWTP operated for 163 hours during the quarter. The treatment configuration of the plant at these rates (with minor variations) is shown in the following tables.

The average daily extraction rates from the ICTs were approximately 8,093 gallons per day (gpd) in April 2022, approximately 6,781 gpd in May 2022, and approximately 10,614 gpd in June 2022 (**Table 5**). The volume of groundwater removed from LHAAP-18/24 during the 2<sup>nd</sup> Quarter of 2022 measured approximately 778,677 gallons based on the influent totalizer (FIT-140). **Figure 2-1** shows the historical trends of extracted volumes based on the influent totalizer by quarter. Additionally, approximately 46,006 gallons of accumulated rainwater, 57,904 gallons of decanted water from the metals treatment process, and 32,883 gallons decanted water from the solids removal process was added from the secondary containment catch basin back into the GWTP equalization tank (TK-140) via the sump. A total of 915,470 gallons of water was processed through TK-140 in the 2<sup>nd</sup> Quarter of 2022. The processed water measured on the equalization tank (TK-140) effluent totalizer (FIT-172) was recorded at 1,422,729 gallons indicating that the FIT-172 gauge may need to be calibrated for consistency with influent totalizer (FIT-140) and the discharge effluent totalizer (FIT-668). Additionally, a suspected blockage within the pretreatment process is causing a leak after the FIT-172 gauge and prior to Tank 200A (Oxidation-Reduction Potential tank). This extra volume of water from the suspected blockage leak is captured in the catch basin and is also pumped back through the equalization tank via the sump. During the next reporting period, the FIT-172 totalizer will be calibrated and assessment of the blockage in the pretreatment process will be completed. The evaluation will include an estimated volume of leaking water and measures necessary to remove the blockage.

In contrast to the approximate total of influent groundwater processed at the GWTP (915,470 gallons), the total estimated volume discharged to the Harrison Bayou and the INF Pond (**Table 4**) following treatment by the GWTP was 714,259 gallons discharged in the 2<sup>nd</sup> Quarter of 2022. The difference between the total influent and total discharged volumes during the 2<sup>nd</sup> Quarter of 2022 is approximately 201,211 gallons as of 30 June 2022. The discrepancy in influent and

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discharged volumes can be partially accounted for due to the volume of water loss from the air stripper evaporative losses estimated at 81,522 gallons. The remaining volume (119,689 gallons) is accounted for in the storage capacity of the plant in the equalization tank (TK-140) and the effluent storage tank (TK-630). Effluent from LHAAP-18/24 is pumped to the GWTP and is stored in the 300,000-gallon equalization tank (TK-140). The equalization tank stores water until it is run through the treatment process and acts as a batch tank. For the FBR treatment to function properly, the flow of water is restricted, and as a result all the groundwater that is pumped from LHAAP-18/24 does not necessarily run through the GWTP before the end of the reporting period. Therefore, the storage capacity of the plant is estimated to account for the discrepancy between influent and effluent volumes. For example, at the end of the previous quarter in March 2022, approximately 241,182 gallons of water was already stored in the GWTP. Therefore, the storage capacity of the GWTP is estimated to account for the discrepancy between influent and effluent volumes. At the end of the 2<sup>nd</sup> Quarter, approximately 119,689 gallons of water was stored in the GWTP.

As indicated by **Table 5**, 23 of 28 ICTs and wells produced water in the 2<sup>nd</sup> Quarter 2022. ICTs 1, 3, 5, 10, and 13G did not produce water in the 2<sup>nd</sup> Quarter of 2022. ICTs 1, 3, 5, and 10 were deactivated on 18 February 2008 as part of a pilot study for system optimization. ICT 13G is dry and no longer active. While ICTs 12A, 13C, and 14A produced water during the 2<sup>nd</sup> Quarter 2022, each ICT pumped significantly less volume over the course of the quarter than the other ICTs. Low production at ICTs 12A, 13C, and 14A is attributed to the low water levels present in these ICTs. ICT repairs completed in 2<sup>nd</sup> Quarter 2022 included replacement of the pump at ICT 13B and repair of an electrical issue on ICT 7.

## 2.4 Sampling Activities at LHAAP-18/24

No groundwater was sampled for off-site analysis at LHAAP-18/24 in the 2<sup>nd</sup> Quarter 2022. The next sampling event will be completed in the 3<sup>rd</sup> Quarter of 2022.

## 2.5 Groundwater Treatment Plant Sampling and Analysis

Sampling and analysis were conducted in accordance with the requirements specified in the Final Revised Sampling and Analysis Plan (AECOM Technical Services [AECOM], Inc., September 2017). Besides the Record of Decision (ROD) sampling requirement, additional sample analyses are typically performed on the influent and effluent samples to monitor the effectiveness of the perchlorate treatment (FBR and/or IX vessels) process. Sections 2.5.1 through 2.5.4 present the results of analyses conducted during the 2<sup>nd</sup> Quarter of 2022. The complete laboratory results are provided in **Appendix C**.

### 2.5.1 Weekly Perchlorate Sampling

**Table 6** presents the weekly effluent perchlorate results for the 2<sup>nd</sup> Quarter of 2022. Throughout the 2<sup>nd</sup> Quarter of 2022, the treated groundwater was processed through the IX vessels to provide additional water treatment for perchlorate prior to discharge to Harrison Bayou. In the effluent samples collected during the 2<sup>nd</sup> Quarter of 2022, perchlorate was not detected, above

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the Harrison Bayou Maximum Allowable Daily Discharge Perchlorate Concentration (589 µg/L). The effluent perchlorate concentrations from samples collected after FBR treatment and before the first IX vessel (BIX), ranged from 24.8 µg/L (7 June 2022) to 273 µg/L (12 April 2022). The effluent perchlorate samples collected after the first IX vessel (AIX) ranged from undetected (28 June 2022) to 15.70 µg/L (12 April 2022). In general, FBR performance improved between April 2022 and at the end of June 2022 resulting in lower perchlorate effluent concentrations after the inline pH probe was installed on 6 April 2022.

#### 2.5.2 Monthly VOC Sampling

**Tables 7, 8, and 9** present the effluent VOC results for April, May, and June 2022. Sampling of the effluent for VOCs was conducted on a bi-weekly basis. The tables also provide monthly influent concentrations for perchlorate. Monthly influent or effluent samples were not collected in May 2022 as a power outage at the beginning of the month occurred on Monday, 2 May 2022, and the GWTP was not operational until 11 May 2022. However, a bi-weekly effluent sample was collected on 17 May 2022. The monthly and bi-weekly effluent results from the 2<sup>nd</sup> Quarter 2022 were below the discharge limits.

#### 2.5.3 Monthly Metals Sampling

**Tables 7, 8, and 9** present the monthly influent and effluent metals results for April, May, and June 2022. Sampling of the influent and effluent for metals is typically conducted on a monthly basis per the Final Installation-Wide Work Plan (Bhate, May 2018). However, monthly influent or effluent samples were not collected in May 2022 as a power outage at the beginning of the month occurred on Monday, 2 May 2022, and the GWTP was not operational until 11 May 2022. None of the metals exceeded the effluent discharge limits in April or June 2022.

#### 2.5.4 Quarterly Sampling

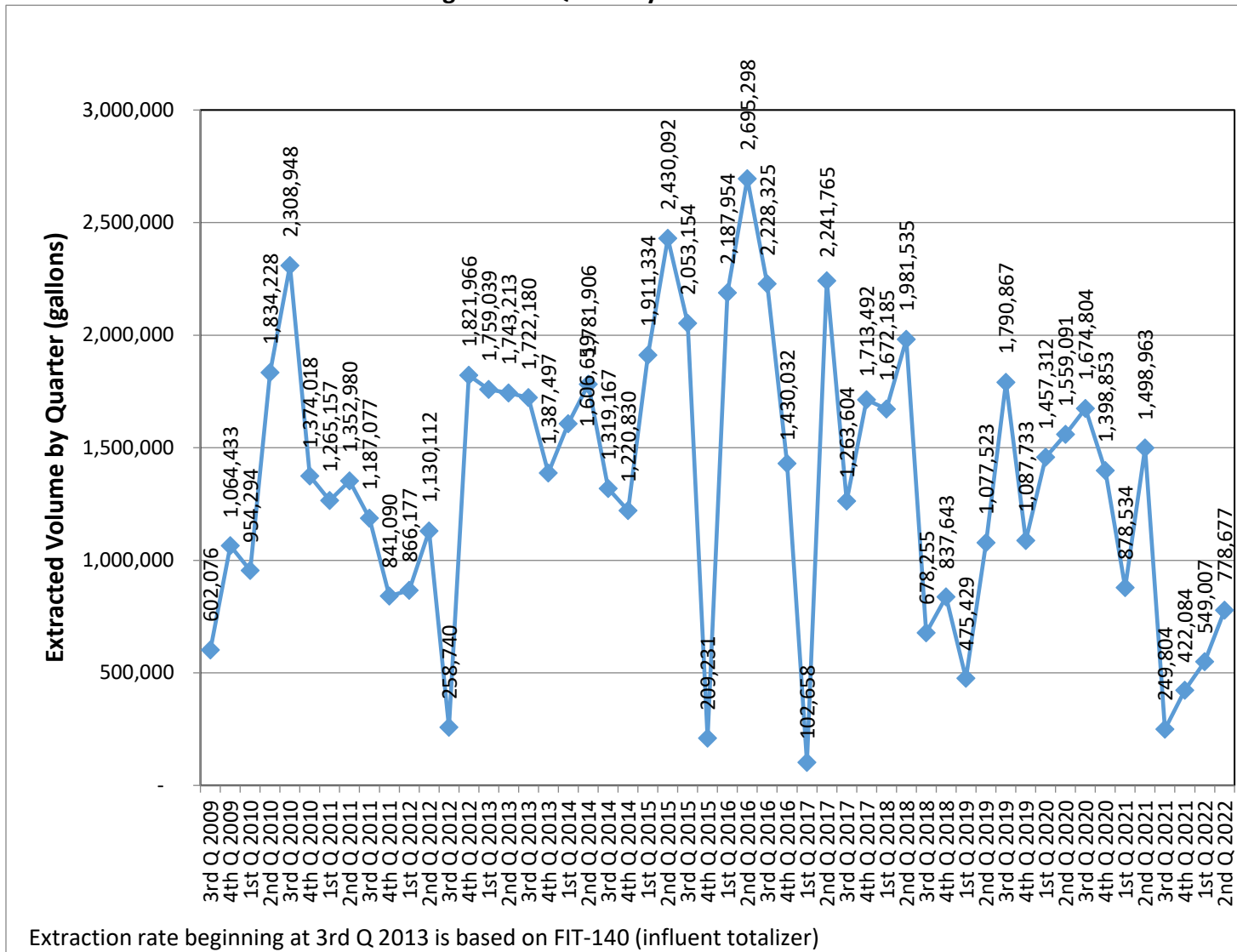
Quarterly sampling of the effluent for VOCs, anions, chemical oxygen demand (COD), oil and grease, perchlorate, and metals was conducted on 24 May 2022 during this quarter and the results were below the MCLs. **Table 10** presents the quarterly analytical results for the 2<sup>nd</sup> Quarter of 2022.

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**Figure 2-1. Quarterly Extraction Rate**



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**Table 3. Groundwater Elevations at LHAAP-18/24 Piezometers, Monitoring Wells, and Surface Water**

Location Identification	Type	Reference Elevation (ft amsl)	Depth to Water (ft) 04/28/2022	Groundwater Elevation (ft amsl) 04/28/2022	Depth to Water (ft) 05/24/2022	Groundwater Elevation (ft amsl) 05/24/2022	Depth to Water (ft) 06/29/2022	Groundwater Elevation (ft amsl) 06/29/2022
BGPZ-1	Piezometer	184.99	7.47	177.52	7.93	177.06	8.31	176.68
BGPZ-2	Piezometer	184.39	14.05	170.34	14.40	169.99	14.88	169.51
BGPZ-3	Piezometer	180.35	11.22	169.13	11.45	168.90	11.91	168.44
BGPZ-4	Piezometer	177.77	9.29	168.48	9.52	168.25	9.85	167.92
BGPZ-5	Piezometer	180.76	11.00	169.76	11.31	169.45	11.69	169.07
BGPZ-6	Piezometer	197.82	27.17	170.65	27.43	170.39	27.89	169.93
BGPZ-7	Piezometer	195.96	26.40	169.56	26.88	169.08	27.22	168.74
BGPZ-8	Piezometer	197.08	28.27	168.81	28.55	168.53	28.93	168.15
BGPZ-9	Piezometer	196.45	25.83	170.62	26.11	170.34	26.59	169.86
BGPZ-10	Piezometer	197.00	27.80	169.20	28.05	168.95	28.53	168.47
BGPZ-11	Piezometer	196.99	26.56	170.43	26.81	170.18	27.19	169.80
BGPZ-12	Piezometer	188.17	NA	Plugged	NA	Plugged	NA	Plugged
AWD-1	Monitoring Well	182.27	9.77	172.50	10.04	172.23	10.66	171.61
AWD-2	Monitoring Well	186.78	14.00	172.78	14.49	172.29	15.03	171.75
AWD-3	Monitoring Well	200.13	27.04	173.09	27.47	172.66	27.95	172.18
AWD-4	Monitoring Well	193.89	21.55	172.34	21.84	172.05	22.50	171.39
MW-1	Monitoring Well	199.22	24.34	174.88	24.57	174.65	25.07	174.15
MW-2	Monitoring Well	196.73	24.57	172.16	24.79	171.94	25.31	171.42
MW-3	Monitoring Well	196.54	25.60	170.94	25.91	170.63	26.42	170.12
MW-4	Monitoring Well	197.27	25.64	171.63	25.92	171.35	26.45	170.82

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MW-5	Monitoring Well	194.97	24.51	170.46	24.80	170.17	25.29	169.68
MW-6	Monitoring Well	192.18	21.32	170.86	21.60	170.58	22.01	170.17
MW-7	Monitoring Well	188.47	17.75	170.72	17.98	170.49	18.47	170.00
MW-8	Monitoring Well	187.13	15.82	171.31	16.12	171.01	16.67	170.46
MW-9	Monitoring Well	184.73	13.74	170.99	14.07	170.66	14.59	170.14
MW-10	Monitoring Well	178.12	8.60	169.52	9.21	168.91	10.03	168.09
MW-11	Monitoring Well	184.65	15.11	169.54	15.61	169.04	16.18	168.47
MW-12	Monitoring Well	178.33	9.22	169.11	9.54	168.79	10.11	168.22
MW-13	Monitoring Well	176.72	7.78	168.94	8.05	168.67	8.77	167.95
MW-14	Monitoring Well	186.19	13.19	173.00	13.47	172.72	13.96	172.23
MW-16	Monitoring Well	178.59	9.49	169.10	10.39	168.20	10.85	167.74
MW-17	Monitoring Well	179.03	9.80	169.23	10.06	168.97	10.55	168.48
MW-18	Monitoring Well	178.58	8.67	169.91	8.95	169.63	9.33	169.25
MW-19	Monitoring Well	178.60	8.45	170.15	8.77	169.83	9.15	169.45
MW-20	Monitoring Well	186.64	8.87	177.77	9.14	177.50	9.61	177.03
MW-21	Monitoring Well	198.70	28.27	170.43	28.59	170.11	29.08	169.62
MW-22	Monitoring Well	197.51	25.80	171.71	26.11	171.40	26.65	170.86
MW-23	Monitoring Well	198.79	26.29	172.50	26.63	172.16	27.08	171.71
101	Monitoring Well	197.53	10.45	187.08	10.92	186.61	11.51	186.02
102	Monitoring Well	193.94	19.04	174.90	19.48	174.46	20.01	173.93

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109	Monitoring Well	197.02	26.44	170.58	26.82	170.20	27.27	169.75
120	Monitoring Well	184.19	12.54	171.65	12.93	171.26	13.40	170.79
123	Monitoring Well	186.21	12.16	174.05	12.54	173.67	13.03	173.18
125	Monitoring Well	196.28	26.20	170.08	26.56	169.72	27.05	169.23
126	Monitoring Well	199.37	27.62	171.75	27.95	171.42	28.41	170.96
129	Monitoring Well	197.24	26.73	170.51	27.02	170.22	27.54	169.70
130	Monitoring Well	177.73	7.86	169.87	8.13	169.60	8.70	169.03
C-01	Monitoring Well	193.89	22.55	171.34	22.83	171.06	23.22	170.67
C-02	Monitoring Well	175.95	8.15	167.80	9.04	166.91	9.67	166.28
C-03	Monitoring Well	196.34	26.14	170.20	26.48	169.86	26.95	169.39
C-04	Monitoring Well	194.64	24.53	170.11	24.91	169.73	25.39	169.25
C-04A	Monitoring Well	194.61	24.08	170.53	24.54	170.07	25.10	169.51
C-05	Monitoring Well	180.74	12.75	167.99	13.33	167.41	14.03	166.71
C-06	Monitoring Well	192.22	24.41	167.81	24.85	167.37	25.29	166.93
C-07	Monitoring Well	196.80	27.30	169.50	27.79	169.01	28.17	168.63
C-08	Monitoring Well	193.10	22.54	170.56	22.81	170.29	23.28	169.82
C-09	Monitoring Well	202.35	31.74	170.61	31.96	170.39	32.19	170.16
C-10	Monitoring Well	201.86	32.02	169.84	32.25	169.61	32.51	169.35
17WW08	Monitoring Well	179.72	9.80	169.92	10.09	169.63	10.67	169.05
18WW01	Monitoring Well	201.31	NA	Plugged	NA	Plugged	NA	Plugged

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18WW02	Monitoring Well	179.30	8.98	170.32	9.31	169.99	9.91	169.39
18WW03	Monitoring Well	195.59	27.21	168.38	27.55	168.04	28.03	167.56
18WW04	Monitoring Well	183.74	16.60	167.14	16.97	166.77	17.41	166.33
18WW05	Monitoring Well	189.59	22.20	167.39	22.59	167.00	23.10	166.49
18WW06	Monitoring Well	179.70	9.59	170.11	9.98	169.72	10.50	169.20
18WW07	Monitoring Well	183.67	NM	NM	NM	NM	NM	NM
18WW08	Monitoring Well	177.77	10.33	167.44	10.75	167.02	11.18	166.59
18WW09	Monitoring Well	177.51	9.17	168.34	9.59	167.92	10.07	167.44
18WW10	Monitoring Well	182.26	13.87	168.39	14.20	168.06	14.63	167.63
18WW11	Monitoring Well	182.29	14.09	168.20	14.44	167.85	14.88	167.41
18WW14	Monitoring Well	186.47	15.41	171.06	15.78	170.69	16.17	170.30
18WW15	Monitoring Well	186.24	14.89	171.35	15.12	171.12	15.51	170.73
18WW16	Monitoring Well	201.88	NA	Plugged	NA	Plugged	NA	Plugged
18WW18	Monitoring Well	196.82	27.21	169.61	27.60	169.22	28.12	168.70
18WW19	Monitoring Well	179.56	11.60	167.96	11.98	167.58	12.37	167.19
18WW20	Monitoring Well	180.42	12.09	168.33	12.47	167.95	12.90	167.52
18WW21	Monitoring Well	195.20	26.18	169.02	26.58	168.62	27.07	168.13
18WW22	Monitoring Well	195.37	25.90	169.47	26.29	169.08	26.63	168.74
18WW24	Monitoring Well	176.40	9.48	166.92	9.88	166.52	10.31	166.09
18WW25	Monitoring Well	175.15	9.08	166.07	9.58	165.57	10.02	165.13

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18CPTMW01SW	Monitoring Well	198.20	24.80	173.40	25.13	173.07	25.65	172.55
18CPTMW01DW	Monitoring Well	197.92	26.85	171.07	27.19	170.73	28.61	169.31
18CPTMW03SW	Monitoring Well	198.53	27.82	170.71	28.17	170.36	28.64	169.89
18CPTMW04	Monitoring Well	196.60	23.77	172.83	24.08	172.52	24.49	172.11
18CPTMW04SW	Monitoring Well	196.42	26.57	169.85	26.94	169.48	27.40	169.02
18CPTMW06	Monitoring Well	198.12	27.70	170.42	28.03	170.09	28.56	169.56
18CPTMW07	Monitoring Well	197.32	26.88	170.44	26.25	171.07	26.79	170.53
18CPTMW08SW	Monitoring Well	196.38	26.35	170.03	26.78	169.60	27.20	169.18
18CPTMW08DW	Monitoring Well	196.59	27.04	169.55	27.45	169.14	27.93	168.66
18CPTMW10SW	Monitoring Well	186.98	16.50	170.48	16.89	170.09	17.23	169.75
18CPTMW10DW	Monitoring Well	187.38	17.80	169.58	18.15	169.23	18.61	168.77
18CPTMW12SW	Monitoring Well	190.90	20.63	170.27	20.97	169.93	21.43	169.47
18CPTMW12DW	Monitoring Well	190.25	20.25	170.00	20.63	169.62	21.08	169.17
18CPTMW14	Monitoring Well	196.69	25.15	171.54	25.46	171.23	25.98	170.71
18CPTMW15	Monitoring Well	179.79	9.94	169.85	10.30	169.49	11.05	168.74
18CPTMW16	Monitoring Well	175.37	6.82	168.55	7.67	167.70	8.37	167.00
18CPTMW18	Monitoring Well	194.53	27.96	166.57	28.31	166.22	28.88	165.65
18CPTMW19	Monitoring Well	193.59	22.50	171.09	22.92	170.67	23.39	170.20
18CPTMW19SW	Monitoring Well	193.29	23.18	170.11	23.50	169.79	23.97	169.32

GWTP QUARTERLY EVALUATION REPORT – 2<sup>ND</sup> QUARTER 2022  
LONGHORN ARMY AMMUNITION PLANT

**Table 3. Groundwater Elevations at LHAAP-18/24 Piezometers, Monitoring Wells, and Surface Water**

Location Identification	Type	Reference Elevation (ft amsl)	Depth to Water (ft) 04/28/2022	Groundwater Elevation (ft amsl) 04/28/2022	Depth to Water (ft) 05/24/2022	Groundwater Elevation (ft amsl) 05/24/2022	Depth to Water (ft) 06/29/2022	Groundwater Elevation (ft amsl) 06/29/2022
18CPTMW22SW	Monitoring Well	187.79	17.60	170.19	18.07	169.72	18.52	169.27
18CPTMW22R	Monitoring Well	187.23	9.85	177.38	10.21	177.02	11.08	176.15
18CPTMW22DW	Monitoring Well	188.00	18.42	169.58	18.80	169.20	19.27	168.73
18CPTMW23	Monitoring Well	177.47	8.29	169.18	9.10	168.37	9.69	167.78
18CPTMW23SW	Monitoring Well	177.43	8.23	169.20	9.04	168.39	9.65	167.78
18CPTMW24	Monitoring Well	194.89	22.51	172.38	22.90	171.99	23.37	171.52
18CPTMW26	Monitoring Well	182.60	17.30	165.30	17.67	164.93	18.05	164.55
18CPTMW26SW	Monitoring Well	182.00	12.57	169.43	13.05	168.95	13.62	168.38
1824HBSW7	Surface Water Sample	167.92	3.02	164.90	2.15	165.77	0.58	167.34

GWTP QUARTERLY EVALUATION REPORT – 2<sup>ND</sup> QUARTER 2022  
LONGHORN ARMY AMMUNITION PLANT

**Table 4. Treated Groundwater Discharged – April through June 2022**

DATE	Harrison Bayou Flow (gpm)	Maximum Rate Allowed (gpm)	Released From GWTP To Harrison Bayou	Released From INF Pond to Harrison Bayou	Released From GWTP to INF Pond	Combined Total Released to Harrison Bayou	INF Pond Staff Reading (6.20 = 3 ft. Freeboard)
04/01/2022	8,875	1,846	0	0	0	0	3.39
04/02/2022	8,256	1,717	0	0	0	0	3.39
04/03/2022	7,894	1,641	0	0	0	0	3.38
04/04/2022*	7,257	1,512	15,210	0	0	15,210	3.38
04/05/2022	5,947	1,239	5,067	0	0	5,067	3.57
04/06/2022	10,320	2,150	7,690	0	0	7,690	3.56
04/07/2022	9,158	1,907	5,189	0	0	5,189	3.55
04/08/2022	7,053	1,469	0	0	0	0	3.55
04/09/2022	6,235	1,278	0	0	0	0	3.54
04/10/2022	5,498	1,143	0	0	0	0	3.54
04/11/2022*	4,510	939	32,400	0	0	32,400	3.53
04/12/2022	3,559	741	3,385	0	0	3,385	3.53
04/13/2022	2,590	539	8,231	0	0	8,231	3.52
04/14/2022	6,548	1,364	15,100	0	0	15,100	3.52
04/15/2022	5,633	1,173	2,213	0	0	2,213	3.51
04/16/2022	5,298	1,101	0	0	0	0	3.51
04/17/2022	4,987	1,037	0	0	0	0	3.50
04/18/2022*	4,782	996	31,040	0	0	31,040	3.50
04/19/2022	5,437	1,132	2,707	0	0	2,707	3.49
04/20/2022	5,146	1,072	10,927	0	0	10,927	3.49
04/21/2022	4,552	948	7,162	0	0	7,162	3.48
04/22/2022	4,353	906	13,347	0	0	13,347	3.48
04/23/2022	3,987	829	0	0	0	0	3.47
04/24/2022	3,625	754	0	0	0	0	3.47
04/25/2022*	3,381	704	30,831	0	0	30,831	3.46
04/26/2022	FLOOD STAGE	MAXIMUM	9,815	0	0	9,815	3.66

GWTP QUARTERLY EVALUATION REPORT – 2<sup>ND</sup> QUARTER 2022  
LONGHORN ARMY AMMUNITION PLANT

**Table 4. Treated Groundwater Discharged – April through June 2022**

DATE	Harrison Bayou Flow (gpm)	Maximum Rate Allowed (gpm)	Released From GWTP To Harrison Bayou	Released From INF Pond to Harrison Bayou	Released From GWTP to INF Pond	Combined Total Released to Harrison Bayou	INF Pond Staff Reading (6.20 = 3 ft. Freeboard)
04/27/2022	16,627	3,464	9,920	0	0	9,920	3.66
04/28/2022	12,105	2,521	9,463	0	0	9,463	3.65
04/29/2022	7,603	1,584	9,677	0	0	9,677	3.65
04/30/2022	6,913	1,437	0	0	0	0	3.64
05/01/2022	NA	NA	0	0	0	0	3.64
05/02/2022*	6,091	1,269	26,389	0	0	26,389	3.64
05/03/2022	NA	NA	0	0	0	0	3.88
05/04/2022	NA	NA	0	0	0	0	3.87
05/05/2022	NA	NA	0	0	0	0	4.15
05/06/2022	NA	NA	0	0	0	0	4.14
05/07/2022	NA	NA	0	0	0	0	4.13
05/08/2022	NA	NA	0	0	0	0	4.12
05/09/2022	NA	NA	0	0	0	0	4.11
05/10/2022	NA	NA	0	0	0	0	4.10
05/11/2022	NA	NA	0	0	0	0	4.09
05/12/2022	9,145	1,905	10,541	0	0	10,541	4.08
05/13/2022	8,016	1,670	9,295	0	0	9,295	4.06
05/14/2022	6,958	1,447	0	0	0	0	4.04
05/15/2022	6,123	1,273	0	0	0	0	4.02
05/16/2022*	5,427	1,130	42,397	0	0	42,397	4.00
05/17/2022	4,549	947	12,268	0	0	12,268	3.98
05/18/2022	3,651	760	10,855	0	0	10,855	3.96
05/19/2022	2,743	571	6,015	0	0	6,015	3.94
05/20/2022	2,332	485	12,292	0	0	12,292	3.92
05/21/2022	2,198	457	0	0	0	0	3.90
05/22/2022	1,985	412	0	0	0	0	3.96



GWTP QUARTERLY EVALUATION REPORT – 2<sup>ND</sup> QUARTER 2022  
LONGHORN ARMY AMMUNITION PLANT

**Table 4. Treated Groundwater Discharged – April through June 2022**

DATE	Harrison Bayou Flow (gpm)	Maximum Rate Allowed (gpm)	Released From GWTP To Harrison Bayou	Released From INF Pond to Harrison Bayou	Released From GWTP to INF Pond	Combined Total Released to Harrison Bayou	INF Pond Staff Reading (6.20 = 3 ft. Freeboard)
05/23/2022*	3,514	732	33,018	0	0	33,018	3.94
05/24/2022	2,917	607	4,369	0	0	4,369	3.92
05/25/2022	6,707	1,397	14,477	0	0	14,477	3.95
05/26/2022	5,399	1,124	10,653	0	0	10,653	3.93
05/27/2022	4,310	898	571	0	0	571	3.91
05/28/2022	4,098	852	0	0	0	0	3.89
05/29/2022	3,788	787	0	0	0	0	3.87
05/30/2022	3,469	721	0	0	0	0	3.85
05/31/2022*	3,215	668	37,070	0	0	37,070	3.83
06/01/2022	2,194	457	0	0	0	0	3.81
06/02/2022	1,688	351	0	0	0	0	3.84
06/03/2022	1,381	287	9,535	0	0	9,535	3.82
06/04/2022	1,322	274	0	0	0	0	3.80
06/05/2022	1,269	263	0	0	0	0	3.78
06/06/2022*	1,225	255	32,903	0	0	32,903	3.76
06/07/2022	1,181	246	9,706	0	0	9,706	3.74
06/08/2022	1,099	229	10,272	0	0	10,272	3.72
06/09/2022	1,005	209	6,676	0	0	6,676	3.70
06/10/2022	758	158	9,650	0	0	9,650	3.68
06/11/2022	670	139	0	0	0	0	3.67
06/12/2022	589	122	0	0	0	0	3.65
06/13/2022*	504	105	27,439	0	0	27,439	3.62
06/14/2022	485	101	9,992	0	0	9,992	3.60
06/15/2022	430	89	9,029	0	0	9,029	3.57
06/16/2022	423	88	4,573	0	0	4,573	3.55
06/17/2022	403	83	12,141	0	0	12,141	3.52

GWTP QUARTERLY EVALUATION REPORT – 2<sup>ND</sup> QUARTER 2022  
LONGHORN ARMY AMMUNITION PLANT

**Table 4. Treated Groundwater Discharged – April through June 2022**

DATE	Harrison Bayou Flow (gpm)	Maximum Rate Allowed (gpm)	Released From GWTP To Harrison Bayou	Released From INF Pond to Harrison Bayou	Released From GWTP to INF Pond	Combined Total Released to Harrison Bayou	INF Pond Staff Reading (6.20 = 3 ft. Freeboard)
06/18/2022	391	81	0	0	0	0	3.49
06/19/2022	379	78	0	0	0	0	3.47
06/20/2022*	363	75	24,853	0	0	24,853	3.44
06/21/2022	323	67	9,718	0	0	9,718	3.42
06/22/2022	308	64	10,132	0	0	10,132	3.39
06/23/2022	285	59	6,421	0	0	6,421	3.37
06/24/2022	253	52	7,494	0	0	7,494	3.34
06/25/2022	226	47	0	0	0	0	3.31
06/26/2022	201	41	0	0	0	0	3.29
06/27/2022*	175	36	25,433	0	0	25,433	3.27
06/28/2022	150	31	11,050	0	0	11,050	3.25
06/29/2022	139	28	9,255	0	0	9,255	3.23
06/30/2022	120	24	8,403	0	0	8,403	3.21
Total			714,259	0	0	714,259	

Notes: The maximum discharge rate from the INF Pond is 170 gpm and the maximum discharge rate from the GWTP is 30 gpm.

NA = Not applicable

Treated groundwater volume released over the weekend is included in the total for the next working day. These dates are marked with an asterisk (\*).

**GWTP QUARTERLY EVALUATION REPORT – 2<sup>ND</sup> QUARTER 2022**  
**LONGHORN ARMY AMMUNITION PLANT**

**Table 5. Monthly Groundwater Extraction Quantities – April through June 2022**

ICT or Well Number	April 2022 (gallons)	May 2022 (gallons)	June 2022 (gallons)	Total
1	0	0	0	0
2	5,011	5,278	8,075	18,364
3	0	0	0	0
4	22,770	25,687	39,199	87,656
5	0	0	0	0
EW-01	17	18	50	85
7	5,870	6,087	5,748	17,705
8	29,562	30,688	47,674	107,924
18WW17	3,275	2,653	4,482	10,410
10	0	0	0	0
11	11,019	12,139	21,628	44,786
12A	1,157	904	1,515	3,576
12B	14,711	12,141	19,617	46,469
12C	12,204	10,647	16,574	39,425
12D	33,860	13,379	27,383	74,622
12E	14,423	15,682	16,477	46,582
13A	3,679	1,519	3,468	8,666
13B	0	0	16,039	16,039
13C	1,587	1,036	1,364	3,987
13D	12,867	10,944	11,549	35,360
13E	12,844	8,184	4,079	25,107
13F	8,073	5,452	2,082	15,607
13G	0	0	0	0
14A	659	451	627	1,737
14B	4,428	3,575	5,946	13,949
14C	15,270	16,250	26,881	58,401
14D	23,806	21,418	27,790	73,014
14E	5,692	6,071	10,169	21,932
<b>LHAAP-18/24 Total</b>	<b>242,784</b>	<b>210,203</b>	<b>318,416</b>	<b>771,403</b>
gpd	8,093	6,781	10,614	8,477

Notes:

gpd – gallons per day

ICTs 6 and 9 were converted from extraction to infiltration trenches beginning 18 September 2007.

ICTs 1, 3, 5, and 10 were deactivated on 18 February 2008 as part of a pilot study for system optimization.

Low production in EW-01 due to low water table. ICT 13G is dry and no longer active.

ICT 7 electrical issue was repaired on 6 April 2022.

ICT 13E flowmeter replaced on 6 April 2022.

ICT 13B new pump installed on 7 June 2022.

GWTP QUARTERLY EVALUATION REPORT – 2<sup>ND</sup> QUARTER 2022  
LONGHORN ARMY AMMUNITION PLANT

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Table 6. Weekly Perchlorate Sample Results  
2nd Quarter 2022 Groundwater Treatment Plant Report  
Longhorn Army Ammunition Plant

Sample Identification	Lab Package	Date Sampled	Sample Location	Harrison Bayou Maximum Allowable Daily Discharge Perchlorate Concentration (µg/L)	INF Pond Discharge Criteria for Perchlorate (µg/L)	Reporting Limit	Influent Perchlorate (6850)	Effluent Perchlorate (6850)		Does Concentration Meet Discharge Limit? (Yes/No)	No Daily Maximum Concentration		
							Result (µg/L)	Result (µg/L) BIX/AIX	DVQ		Ammonia as N (350.3) (mg/L)	Ortho- Phosphate (365.3) (mg/L)	Organic Carbon (415.1) (mg/L)
LH18/24-SP650_040522_BIX/AIX	HS22040256	4/5/2022	TK-650	589	17	0.1	NA	195/1.32		Yes	20	6.52	10.7
LH18/24-SP650_041222_AIX (monthly)	HS22040627	4/12/2022	TK-650	589	17	0.1	NA	15.70		Yes	--	--	--
LH18/24-SP140_041222 (monthly)	HS22040626	4/12/2022	TK-140	--	--	NA	6,370	NA		NA	--	--	--
LH18/24-SP650_041222_BIX/AIX	HS22040624	4/12/2022	TK-650	589	17	0.1	NA	273/11.7		Yes	22	7.04	9.64
LH18/24-SP650_042022_BIX/AIX	HS22041044	4/20/2022	TK-650	589	17	0.1	NA	92.1/0.963		Yes	40	6.88	3.30
LH18/24-SP650_042622_BIX/AIX	HS22041334	4/26/2022	TK-650	589	17	0.1	NA	37.5/1.31		Yes	24	6.96	4.93
LH18/24-SP650_051722_BIX/AIX	HS22050786	5/17/2022	TK-650	589	17	0.1	NA	68.1/0.931		Yes	28	5.90	5.74
LH18/24-SP650_052522_BIX/AIX	HS22051188	5/24/2022	TK-650	589	17	0.1	NA	56.8/0.433 J		Yes	24	5.09	10.2
LH18/24-SP650_052422_AIX (quarterly)	HS22051211	5/24/2022	TK-650	589	17	0.1	NA	0.232		Yes	--	--	--
LH18/24-SP140_052422 (quarterly)	HS22051205	5/24/2022	TK-140	--	--	NA	6,990	NA		NA	--	--	--
LH18/24-SP650_060322_BIX/AIX	HS22060246	6/3/2022	TK-650	589	17	0.1	NA	3.97/34.9*		Yes	31	6.07	9.66
LH18/24-SP650_060722_AIX (monthly)	HS22060383	6/7/2022	TK-650	589	17	0.1	NA	0.244		Yes	--	--	--
LH18/24-SP140_060722 (monthly)	HS22060385	6/7/2022	TK-140	--	--	NA	7,010	NA		NA	--	--	--
LH18/24-SP650_060722_BIX/AIX	HS22060382	6/7/2022	TK-650	589	17	0.1	NA	24.8/0.505		Yes	23	5.13	7.3
LH18/24-SP650_061422_BIX/AIX	HS22060773	6/14/2022	TK-650	589	17	0.1	NA	26.1/0.0960 J		Yes	13	8.01 J	17.8
LH18/24-SP650_062122_AIX	HS22061138	6/21/2022	TK-650	589	17	0.1	NA	0.246		Yes	17	0.308	16.6
LH18/24-SP650_062822_AIX	HS22061602	6/28/2022	TK-650	589	17	0.1	NA	< 0.0500	U	Yes	16	4.15	12.1

Notes:

Texas Risk Reduction Program (TRRP) Tier 1 Groundwater Residential Protective Concentration Level (PCL)

SP140 samples are influent samples.

µg/L - micrograms per liter

DVQ - data validation qualifier

J - Estimated concentration between the detection limit and limit of quantitation and/or due to quality control discrepancies

Detected analytes are in **bold**.

U - non detect and reported to the limit of detection

BIX - before ion exchange/AIX - after ion exchange

mg/L - milligrams per liter

\*Labels most likely switched

NA - Not applicable

Table 7. Bi-Weekly GWTP Analytical Sampling Results for April 2022  
2nd Quarter 2022 Groundwater Treatment Plant Report  
Longhorn Army Ammunition Plant

Sample Location Sample Identification Lab Package Sample Date Sample Type				EFFLUENT - Biweekly		EFFLUENT - Monthly		INFLUENT - Monthly <sup>1</sup>		EFFLUENT - Biweekly		Does Concentration Meet Effluent Discharge Limits? (Yes/No)
				LH18/24-SP650_040522		LH18/24-SP650_041222		LH18/24-SP140_041222		LH18/24-SP650_042022		
				HS22040258		HS22040627		HS22040626		HS22041050		
				4/5/2022		4/12/2022		4/12/2022		4/20/2022		
				GRAB		GRAB		GRAB		GRAB		
	Effluent Limitation for Discharge (µg/L) per Table 2 of ROD			Result	DVQ	Result	DVQ	Result	DVQ	Result	DVQ	
	Daily Average Concentration	Daily Maximum Concentration	INF Pond MCL									
VOLATILES	µg/L	µg/L	µg/L			µg/L						
1,1,1-Trichloroethane	3,417	7,230	200	< 0.50	U	< 0.50	U	NA		< 0.50	U	Yes
1,1,2-Trichloroethane	102.5	216.9	5	< 1.0	U	< 1.0	U	NA		< 0.50	U	Yes
1,1-Dichloroethane	6,633	14,032	NV	< 0.50	U	< 0.50	U	NA		< 0.50	U	Yes
1,1-Dichloroethene	119	253	7	< 0.50	U	< 0.50	U	NA		< 0.50	U	Yes
1,2-Dichloroethane	85	181	5	< 0.50	U	< 0.50	U	NA		< 0.50	U	Yes
1,2-Dichloropropane	NV	NV	5	< 1.0	U	< 1.0	U	NA		< 0.50	U	Yes
Acetone	1,132	2,395	NV	< 2.0	U	< 2.0	U	NA		< 2.0	U	Yes
Benzene	85	181	5	< 0.50	U	< 0.50	U	NA		< 0.50	U	Yes
Carbon Tetrachloride	85	181	5	< 1.0	U	< 1.0	U	NA		< 0.50	U	Yes
Chlorobenzene	22,300	47,180	100	< 1.0	U	< 1.0	U	NA		< 0.50	U	Yes
Chloroform	1,708	< 0.50	NV	< 0.50	U	< 0.50	U	NA		< 0.50	U	Yes
cis-1,2-Dichloroethene	NV	NV	70	1.6		2.0		NA		1.7		Yes
Ethylbenzene	26,954	57,025	700	< 1.0	U	< 1.0	U	NA		< 0.50	U	Yes
m,p-Xylenes	39.5	83.6	NV	< 1.0	U	< 1.0	U	NA		< 1.0	U	Yes
Methylene Chloride	803	1,699	5	< 2.0	U	< 2.0	U	NA		< 2.0	U	Yes
o-Xylene	39.5	83.6	NV	< 1.0	U	< 1.0	U	NA		< 0.50	U	Yes
Styrene	2,829	5,987	100	< 1.0	U	< 1.0	U	NA		< 0.50	U	Yes
Tetrachloroethene	85.4	180.7	5	< 1.0	U	< 1.0	U	NA		< 0.50	U	Yes
Toluene	1,980	4,189	10	< 0.50	U	< 0.50	U	NA		< 0.50	U	Yes
Trichloroethene	85	181	5	< 0.50	U	< 0.50	U	NA		< 0.50	U	Yes
Vinyl Chloride	34	72	2	< 0.50	U	< 0.50	U	NA		< 0.50	U	Yes
ANIONS	mg/L	mg/L	mg/L	mg/L		mg/L		mg/L		mg/L		
Chloride	NV	NV	NV	794		NA		NA		749		NA
Sulfate	NV	NV	NV	29.2		NA		NA		53.6		NA
PERCHLORATE	µg/L	µg/L	µg/L	µg/L		µg/L		µg/L		µg/L		
Perchlorate <sup>2</sup>	278	589	17	NA		15.7		6,370		NA		Yes
METALS	mg/L	mg/L	mg/L	mg/L		mg/L		mg/L		mg/L		
Hexavalent Chromium	0.058	0.124	NV	NA		< 0.00600	U	< 0.00600	U	NA		Yes
Barium	1	2	2	NA		0.282		NA		NA		Yes
Lead	0.0022	0.0046	0.015	NA		< 0.00125	U	NA		NA		Yes
Selenium	0.0057	0.0120	0.05	NA		< 0.00250	U	< 0.00250	U	NA		Yes
Silver	0.0014	0.0030	0.1	NA		< 0.000500	U	< 0.000500	U	NA		Yes
SEMI-VOLATILES	µg/L	µg/L	µg/L	µg/L		µg/L		µg/L		µg/L		
1,4-Dioxane <sup>3</sup>	NV	134.2	NV	NA		12		NA		NA		Yes

Notes:  
µg/L - micrograms per liter  
DVQ - data validation qualifier  
GWTP - Groundwater Treatment Plant  
U - Non detect reported to the limit of detection  
mg/L - milligrams per liter  
<sup>1</sup>Influent sample not compared to discharge limits  
<sup>2</sup>Weekly perchlorate samples are collected on the same or comparable dates and presented on Table 6 (Weekly Perchlorate Sample Results).  
<sup>3</sup>Calculated Effluent Limit  
Grab samples are compared to the daily maximum and composite samples to the daily average.  
ROD - Record of Decision  
NA - Not applicable or not analyzed  
NV - No value  
MCL - Maximum Contaminant Level(s)

**Table 8. Bi-Weekly GWTP Analytical Sampling Results for May 2022**  
**2nd Quarter 2022 Groundwater Treatment Plant Report**  
**Longhorn Army Ammunition Plant**

Sample Location Sample Identification				EFFLUENT - Bi-weekly		Does Concentration Meet Effluent Discharge Limits? (Yes/No)
Lab Package				LH18/24-SP650_051722		
Sample Date				HS22050817		
Sample Type				5/17/2022		
				GRAB		
Effluent Limitation for Discharge (µg/L) per Table 2 of ROD				Result	DVQ	
	Daily Average Concentration	Daily Maximum Concentration	INF Pond MCL			
<b>VOLATILES</b>	µg/L	µg/L	µg/L	µg/L		
1,1,1-Trichloroethane	3,417	7,230	200	< 0.50	U	Yes
1,1,2-Trichloroethane	102.5	216.9	5	< 0.50	U	Yes
1,1-Dichloroethane	6,633	14,032	NV	< 0.50	U	Yes
1,1-Dichloroethene	119	253	7	< 0.50	U	Yes
1,2-Dichloroethane	85	181	5	< 0.50	U	Yes
1,2-Dichloropropane	NV	NV	5	< 0.50	U	Yes
Acetone	1,132	2,395	NV	< 2.0	U	Yes
Benzene	85	181	5	< 0.50	U	Yes
Carbon Tetrachloride	85	181	5	< 0.50	U	Yes
Chlorobezene	22,300	47,180	100	< 0.50	U	Yes
Chloroform	1,708	3,615	NV	< 0.50	U	Yes
cis-1,2-Dichloroethene	NV	NV	70	2.2	U	Yes
Ethylbenzene	26,954	57,025	700	< 0.50	U	Yes
m,p-Xylenes	39.5	83.6	NV	< 1.0	U	Yes
Methylene Chloride	803	1,699	5	< 2.0	U	Yes
o-Xylene	39.5	83.6	NV	< 0.50	U	Yes
Styrene	2,829	5,987	100	< 0.50	U	Yes
Tetrachloroethene	85.4	180.7	5	< 0.50	U	Yes
Toluene	1,980	4,189	10	< 0.50	U	Yes
Trichloroethene	85	181	5	< 0.50	U	Yes
Vinyl Chloride	34	72	2	< 0.50	U	Yes
<b>ANIONS</b>	mg/L	mg/L	mg/L	mg/L		
Chloride	NV	NV	NV	770		NA
Sulfate	NV	NV	NV	29.7		NA
<b>PERCHLORATE</b>	µg/L	µg/L	µg/L	µg/L		
Perchlorate <sup>1</sup>	278	589	17	NA		Yes
<b>METALS</b>	mg/L	mg/L	mg/L	mg/L		
Hexavalent Chromium	0.058	0.124	NV	NA		Yes
Barium	1	2	2	NA		Yes
Lead	0.0022	0.0046	0.015	NA		Yes
Selenium	0.0057	0.0120	0.05	NA		Yes
Silver	0.0014	0.0030	0.1	NA		Yes
<b>SEMI-VOLATILES</b>	µg/L	µg/L	µg/L	µg/L		
1,4-Dioxane <sup>2</sup>	NV	134.2	NV	< 0.50		Yes

**Notes:**

µg/L - micrograms per liter	mg/L - milligrams per liter
DVQ - data validation qualifier	ROD - Record of Decision
GWTP - Groundwater Treatment Plant	
NA - not applicable or not analyzed	U - not detected and reported to the limit of detection

Grab samples are compared to the daily maximum and composite samples to the daily average.

<sup>1</sup> Weekly perchlorate samples are collected on the same or comparable dates and presented on Table 6 (W)

<sup>2</sup> Calculated Effluent Limit

NV - No Value

MCL - Maximum Contaminant Level(s)

Table 9. Bi-Weekly Analytical GWTP Sampling Results for June 2022  
2nd Quarter 2022 Groundwater Treatment Plant Report  
Longhorn Army Ammunition Plant

Sample Location Sample Identification Lab Package Sample Date Sample Type				EFFLUENT - Biweekly		EFFLUENT - Monthly		INFLUENT - Monthly <sup>1</sup>		EFFLUENT - Biweekly		EFFLUENT - Biweekly		Does Concentration Meet Effluent Discharge Limits? (Yes/No)
				LH18/24-SP650_060322		LH18/24-SP650_060722		LH18/24-SP140_060722		LH18/24-SP650_061422		LH18/24-SP650_062122		
				HS22060250		HS22060383		HS22060385		HS22060792		HS22061142		
				6/3/2022		6/7/2022		6/7/2022		6/14/2022		6/21/2022		
				GRAB		GRAB		GRAB		GRAB		GRAB		
	Effluent Limitation for Discharge (µg/L) per Table 2 of ROD			Result	DVQ	Result	DVQ	Result	DVQ	Result	DVQ	Result	DVQ	
	Daily Average Concentration	Daily Maximum Concentration	INF Pond MCL											
VOLATILES	µg/L	µg/L	µg/L											
1,1,1-Trichloroethane	3,417	7,230	200	< 0.50	U	< 0.50	U	NA		< 0.50	U	< 0.50	U	Yes
1,1,2-Trichloroethane	102.5	216.9	5	< 1.0	U	< 1.0	U	NA		< 1.0	U	< 1.0	U	Yes
1,1-Dichloroethane	6,633	14,032	NV	< 0.50	U	< 0.50	U	NA		< 0.50	U	< 0.50	U	Yes
1,1-Dichloroethene	119	253	7	< 0.50	U	< 0.50	U	NA		< 0.50	U	< 0.50	U	Yes
1,2-Dichloroethane	85	181	5	< 0.50	U	< 0.50	U	NA		< 0.50	U	< 0.50	U	Yes
1,2-Dichloropropane	NV	NV	5	< 1.0	U	< 1.0	U	NA		< 1.0	U	< 1.0	U	Yes
Acetone	1,132	2,395	NV	< 2.0	U	< 2.0	U	NA		< 2.0	U	< 2.0	U	Yes
Benzene	85	181	5	< 0.50	U	< 0.50	U	NA		< 0.50	U	< 0.50	U	Yes
Carbon Tetrachloride	85	181	5	< 1.0	U	< 1.0	U	NA		< 1.0	U	< 1.0	U	Yes
Chlorobenzene	22,300	47,180	100	< 1.0	U	< 1.0	U	NA		< 1.0	U	< 1.0	U	Yes
Chloroform	1,708	3,615	NV	< 0.50	U	< 0.50	U	NA		< 0.50	U	< 0.50	U	Yes
cis-1,2-Dichloroethene	NV	NV	70	2.4		2.5		NA		2.7		2.8		Yes
Ethylbenzene	26,954	57,025	700	< 1.0	U	< 1.0	U	NA		< 1.0	U	< 1.0	U	Yes
m,p-Xylenes	39.5	83.6	NV	< 1.0	U	< 1.0	U	NA		< 1.0	U	< 1.0	U	Yes
Methylene Chloride	803	1,699	5	< 2.0	U	< 1.0	U	NA		< 2.0	U	< 2.0	U	Yes
o-Xylene	39.5	83.6	NV	< 1.0	U	< 1.0	U	NA		< 1.0	U	< 1.0	U	Yes
Styrene	2,829	5,987	100	< 1.0	U	< 1.0	U	NA		< 1.0	U	< 1.0	U	Yes
Tetrachloroethene	85.4	180.7	5	< 1.0	U	< 1.0	U	NA		< 1.0	U	< 1.0	U	Yes
Toluene	1,980	4,189	10	< 0.50	U	< 0.50	U	NA		< 0.50	U	< 0.50	U	Yes
Trichloroethene	85	181	5	< 0.50	U	< 0.50	U	NA		< 0.50	U	< 0.50	U	Yes
Vinyl Chloride	34	72	2	< 0.50	U	< 0.50	U	NA		< 0.50	U	< 0.50	U	Yes
ANIONS	mg/L	mg/L	mg/L	mg/L		mg/L		mg/L		mg/L		mg/L		
Chloride	NV	NV	NV	840		NA		NA		842		892		NA
Sulfate	NV	NV	NV	26.9		NA		NA		22.5		18.5		NA
PERCHLORATE	µg/L	µg/L	µg/L	µg/L		µg/L		µg/L		µg/L		µg/L		
Perchlorate <sup>2</sup>	278	589	17	NA		0.244		7,010		NA		NA		Yes
METALS	mg/L	mg/L	mg/L	mg/L		mg/L		mg/L		mg/L		mg/L		
Hexavalent Chromium	0.058	0.124	NV	NA		< 0.00600	U	< 0.00600	U	NA		NA		Yes
Barium	1	2	2	NA		0.315		NA		NA		NA		Yes
Lead	0.0022	0.0046	0.015	NA		< 0.00125	U	NA		NA		NA		Yes
Selenium	0.0057	0.0120	0.05	NA		< 0.00250	U	< 0.00250	U	NA		NA		Yes
Silver	0.0014	0.0030	0.1	NA		< 0.000500	U	< 0.000500	U	NA		NA		Yes
SEMI-VOLATILES	µg/L	µg/L	µg/L	µg/L		µg/L		µg/L		µg/L		µg/L		
1,4-Dioxane <sup>3</sup>	NV	134.2	NV	NA		15		NA		NA		NA		Yes

Notes:  
µg/L - micrograms per liter  
DVQ - data validation qualifier  
GWTP - Groundwater Treatment Plant  
U - Non detect reported to the limit of detection  
mg/L - milligrams per liter  
<sup>1</sup> Influent sample not compared to discharge limits  
<sup>2</sup> Weekly perchlorate samples are collected on the same or comparable dates and presented on Table 6 (Weekly Perchlorate Sample Results).  
<sup>3</sup> Calculated Effluent Limit



## LONGHORN ARMY AMMUNITION PLANT

Table 10. Quarterly GWTP Analytical Sampling Results  
2nd Quarter 2022 Groundwater Treatment Plant Report  
Longhorn Army Ammunition Plant

Sample Location Sample Identification Lab Package Sample Date Sample Type				EFFLUENT		INFLUENT*		Does Concentration Meet Discharge Limits? (Yes/No)
				LH18/24-SP650_052422		LH18/24-SP140_052422		
				HS22051211		HS22051205		
				5/24/2022		5/24/2022		
				GRAB		GRAB		
	Effluent Limitation for Discharge (µg/L) per Protocol			Result	DVQ	Result	DVQ	
	Daily Average Concentration	Daily Maximum Concentration	INF Pond MCL					
VOLATILES	µg/L	µg/L	µg/L	µg/L		µg/L		
1,1,1-Trichloroethane	3,417	7,230	200	< 0.50	U	< 5.0	U	Yes
1,1,2-Trichloroethane	102.5	216.9	5	< 1.0	U	< 10	U	Yes
1,1-Dichloroethane	6,633	14,032	NV	< 0.50	U	9.7	J	Yes
1,1-Dichloroethene	119	253	7	< 0.50	U	< 5.0	U	Yes
1,2-Dichloroethane	85	181	5	< 0.50	U	25		Yes
1,2-Dichloropropane	NV	NV	5	< 1.0	U	< 10	U	Yes
Acetone	1,132	2,395	NV	< 2.0	U	< 20	U	Yes
Benzene	85	181	5	< 0.50	U	< 5.0	U	Yes
Carbon Tetrachloride	85	181	5	< 1.0	U	< 10	U	Yes
Chlorobenzene	22,300	47,180	100	< 1.0	U	< 10	U	Yes
Chloroform	1,708	3,615	NV	< 0.50	U	9.9	J	Yes
cis-1,2-dichloroethene	NV	NV	70	2.4		3,200		Yes
Ethylbenzene	26,954	57,025	700	< 1.0	U	< 10	U	Yes
m,p-Xylenes	39.5	83.6	NV	< 1.0	U	< 10	U	Yes
Methylene Chloride	803	1,699	5	< 2.0	U	2,400		Yes
o-Xylene	39.5	83.6	NV	< 1.0	U	< 10	U	Yes
Styrene	2,829	5,987	100	< 1.0	U	< 10	U	Yes
Tetrachloroethene	85.4	180.7	5	< 1.0	U	36		Yes
Toluene	1,980	4,189	10	< 0.50	U	< 5.0	U	Yes
Trichloroethene	85	181	5	< 0.50	U	3,900		Yes
Vinyl Chloride	34	72	2	< 0.50	U	300		Yes
ANIONS	mg/L	mg/L	mg/L	mg/L		mg/L		
Chloride	NA	NA	NV	793		290		NA
Sulfate	NA	NA	NV	31.4		26.7		NA
PERCHLORATE	µg/L	µg/L	µg/L	µg/L		µg/L		
Perchlorate	278	589	17	0.232		6,990		Yes
METALS	mg/L	mg/L	mg/L	mg/L		mg/L		
Aluminum	0.777	1.644	NV	0.0189		0.126		Yes
Antimony	NV	NV	0.006	< 0.00100	U	0.000693	J	NA
Arsenic	0.365	0.772	0.01	0.000735	J	0.00186	J	Yes

## LONGHORN ARMY AMMUNITION PLANT

Table 10. Quarterly GWTP Analytical Sampling Results  
2nd Quarter 2022 Groundwater Treatment Plant Report  
Longhorn Army Ammunition Plant

Sample Location Sample Identification Lab Package Sample Date Sample Type				EFFLUENT		INFLUENT*		Does Concentration Meet Discharge Limits? (Yes/No)
				LH18/24-SP650_052422		LH18/24-SP140_052422		
				HS22051211		HS22051205		
				5/24/2022		5/24/2022		
				GRAB		GRAB		
	Effluent Limitation for Discharge (µg/L) per Protocol			Result	DVQ	Result	DVQ	
	Daily Average Concentration	Daily Maximum Concentration	INF Pond MCL					
Barium	1	2	2	0.331		0.622		Yes
Beryllium	NV	NV	0.004	< 0.000500	U	< 0.000500	U	NA
Cadmium	0.0016	0.0034	0.005	< 0.000500	U	< 0.000500	U	Yes
Calcium	NV	NV	NV	17.3		27.5		NA
Chromium	0.355	0.752	0.1	0.000529	J	0.00200	J	Yes
Cobalt	5.433	11.495	NV	< 0.000500	U	0.00621		Yes
Iron	1.132	2.395	NV	0.0721	J	2.31		Yes
Lead	0.0022	0.0046	0.015	< 0.00100	U	<0.00100	U	Yes
Magnesium	NV	NV	NV	12.4		21.4		NA
Manganese	7.323	15.494	NV	0.0629		0.506		Yes
Nickel	0.087	0.184	NV	0.00132	J	0.0122		Yes
Potassium	NV	NV	NV	1.71	J	1.14		NA
Selenium	0.0057	0.012	0.05	0.00142	J	0.00189	J	Yes
Silver	0.0014	0.003	NV	< 0.000500	U	< 0.000500	U	Yes
Sodium	NV	NV	NV	442		178		NA
Thallium	NV	NV	NV	< 0.000500	U	< 0.000500	U	NA
Vanadium	1.698	3.592	NV	0.00149	J	0.00133	J	Yes
Zinc	0.146	0.31	NV	0.00651	UB	0.0332		Yes
Mercury	NV	NV	0.002	< 0.000100	U	0.0000330	J	NA
1,4-DIOXANE	µg/L	µg/L	µg/L	µg/L		µg/L		
1,4-Dioxane	NV	134.2	NV	8.3		13		Yes
CHEMICAL OXYGEN DEMAND (COD)	mg/L	mg/L	mg/L	mg/L		mg/L		
COD	NV	200	NV	49.0		16.0		Yes
OIL AND GREASE (O&G)	mg/L	mg/L	mg/L	mg/L		mg/L		
O&G	NV	15	NV	< 1.00	U	< 1.00	U	Yes

## Notes:

µg/L - micrograms per liter

DVQ - data validation qualifier

Grab samples are compared to the daily maximum and composite samples to the daily average.

\* only Effluent sample is compared to discharge limits

J - Estimated concentration between the detection limit and limit of quantitation and/or due to quality control discrepancy

U - non detect and reported to the limit of detection

UB - considered an artifact of blank contamination

mg/L - milligrams per liter

GWTP - Groundwater Treatment Plant

NV - No value

MCL - Maximum Contaminant Level

GWTP QUARTERLY EVALUATION REPORT – 2<sup>ND</sup> QUARTER 2022  
LONGHORN ARMY AMMUNITION PLANT

### 3 QUALITY CONTROL

This report summarizes the data for samples collected during April, May, and June 2022. The samples were reviewed and validated in accordance with the guidelines in the *USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (USEPA, January 2017); *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review* (USEPA, January 2017); and the quality control criteria specified in the *Basewide Uniform Federal Policy - Quality Assurance Project Plan Longhorn Army Ammunition Plant* which is in Appendix C of the *Final Installation-Wide Work Plan for Longhorn Army Ammunition Plant Karnack, Texas* (Bhate, May 2018).

The purpose of the sampling program is to evaluate the effectiveness of the groundwater pump and treat system, assess water quality within the ICT containment area, and assure compliance with the effluent discharge requirements of the Interim ROD. Quality control and quality assurance problems noted in the case narratives received from the laboratory are minor and do not affect the usability of the data for compliance at the GWTP. No sample results from the 2<sup>nd</sup> Quarter of 2022 were rejected due to quality control problems.

ALS Environmental analyzed the compliance samples collected from the GWTP. Independent data verification and validation was performed by the Bhate Project Chemist as described in the Quality Control Summary Report in **Appendix D**. The laboratory reports for the GWTP are included in **Appendix C**. Air monitoring data is presented in **Appendix G**.

GWTP QUARTERLY EVALUATION REPORT – 2<sup>ND</sup> QUARTER 2022  
LONGHORN ARMY AMMUNITION PLANT

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GWTP QUARTERLY EVALUATION REPORT – 2<sup>ND</sup> QUARTER 2022  
LONGHORN ARMY AMMUNITION PLANT

## 4 TREATED GROUNDWATER DISCHARGED

Reinjection of groundwater in ICT 6 and ICT 9 was discontinued as of 15 July 2012. The last reinjection occurred on 24 May 2012, immediately prior to the scrubber system malfunction which caused GWTP operation to cease temporarily.

Treated groundwater that met the Harrison Bayou Maximum Allowable Daily Discharge Perchlorate Concentration (589 µg/L) was discharged to the Harrison Bayou in accordance with the Protocol for Discharging GWTP Effluent (**Appendix F**). Although not a requirement, prior to discharge to the Harrison Bayou, treated groundwater was also processed through the IX vessels to ensure adequate perchlorate treatment. As discussed in Section 2.5, additional sample analyses were performed on the effluent samples to monitor the effectiveness of the perchlorate treatment after the FBR and IX processes to evaluate potential optimizations or maintenance requirements. Approximately, 714,259 gallons of treated groundwater was discharged from the GWTP to Harrison Bayou. **Table 4** summarizes the daily volume from the INF Pond to the Harrison Bayou, the maximum flow rate allowed by chloride and sulfate concentrations, and the approximate volumes discharged for the 2<sup>nd</sup> Quarter of 2022.

GWTP QUARTERLY EVALUATION REPORT – 2<sup>ND</sup> QUARTER 2022  
LONGHORN ARMY AMMUNITION PLANT

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## 5 AIR MONITORING

### 5.1 Summary of Air Monitoring Approach

Operation of the GWTP without air abatement was approved by the TCEQ and USEPA conditioned on collection of air monitoring data to determine the effect of GWTP operation on ambient air quality with respect to potential human health exposure risk. An Interim Air Monitoring Plan was developed by AECOM in August 2012 and used to implement the air monitoring program. The air monitoring program included sampling emission concentrations from the air stripper, ambient air at the GWTP, and ambient air downwind of the GWTP. Collection of air data occurred on a weekly basis from September 2012 through September 2013, on a monthly basis from September 2013 through September 2014, and on a quarterly basis since September 2014. The sampling program includes use of Summa canisters and a photoionization detector (PID) to measure vapor phase concentrations. The air stripper emission sample is collected as a grab sample while the ambient air samples are collected as composite samples. The GWTP sample is collected over 8 hours to represent a work day and the downwind sample is collected over 24 hours to represent potential exposure to an off-site receptor<sup>1</sup>. The downwind sample is collected at the closest downwind property boundary based on prevailing wind direction.

PID data (after system calibration) are collected each time the GWTP is operated and serve as a real-time indicator of ambient air conditions at and downwind of the GWTP. Correlations between definitive analytical air data and PID measurements were established and a means to calculate contaminant concentration from PID measurements was developed. A PID threshold of 0.4 parts per million by volume in ambient air was established, such that Summa canister measurements would occur when the PID threshold is exceeded.

The Summa canister samples are analyzed for VOCs using USEPA Method TO-15. The PID measurements are collected after instrument calibration. The air sampling results are summarized and reported to the USEPA and TCEQ in the GWTP quarterly reports; however, the air results are reviewed immediately upon receipt for the potential presence of any exceedances of ambient air concentrations. **Appendix G (Tables 1 through 3)** includes a comparison of ambient air concentrations with TCEQ Air Monitoring Comparison Values (AMCVs) or the short-term Effects Screening Levels (ESLs) for chemicals with no published AMCVs, calculations of emission rates from the emission point, and a compilation of PID results and calibration records. The air monitoring results to date indicate that all ambient air concentrations are lower than the

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<sup>1</sup> Off-site receptor - Any recreational area, residence, commercial/industrial facility, or other normally occupied structures not used solely by the owner or operator of the facilities or the owner of the site upon which the facilities are located. Measurements of distances to determine compliance with this distance restriction must be taken toward structures that are in use as of the date that a notification is filed with the commission.

## GWTP QUARTERLY EVALUATION REPORT – 2<sup>ND</sup> QUARTER 2022

### LONGHORN ARMY AMMUNITION PLANT

AMCVs or ESLs. The stripper stack sample concentrations are used to calculate emission rates in pounds per hour (lbs/hr) and tons per year (tpy). The calculated emission rates in lbs/hr are then compared to the allowable emission rates per 30 Texas Administrative Code (TAC) Section (§)106.533(f)(1). The emission rates have been lower than the allowable emission rates to the conservatively-selected off-site receptor. The calculated emission rate in tpy is compared to the allowable limit of 5 tpy per chemical. All emission rates have been lower than the allowable emission rates.

The air monitoring results from the first few months of operation between September and November 2012 were compiled and submitted in a separate report (December 2012) (along with validated data) to TCEQ to demonstrate compliance with Texas Permit by Rule emission standards. Approval of the analytical results and concurrence that the site will continue to meet Title 30 TAC §106.533 without the use of air abatement using a catalytic oxidation system was obtained from the TCEQ via email on 22 February 2013.

On 18 February 2013, AECOM presented analysis of the approach applicable to obtaining a variance for operating the GWTP without air abatement equipment to the TCEQ and USEPA. The analysis indicated that the use of an Explanation of Significant Difference (ESD) was the appropriate approach for the site. Approval of use of an ESD was obtained from the USEPA via email on 21 March 2013. The ESD was developed, reviewed, and accepted by USEPA and TCEQ. The ESD was signed by the designated parties on 3 April 2014, and concurrence from the TCEQ was obtained in a letter dated 16 April 2014.

## 5.2 Air Monitoring Results for the 2<sup>nd</sup> Quarter of 2022

During the 2<sup>nd</sup> Quarter of 2022, air sampling was completed on 6 - 7 June 2022. The laboratory data package is presented in **Appendix E**. A summary of the air sampling results is presented in **Appendix G (Tables 1, 2, and 3)**. All results met the criteria described in Section 5.1.

### 5.2.1 Summa Canister Monitoring Results

Air sampling was conducted using Summa canisters on 6 - 7 June 2022. The samples were collected and analyzed as described in Section 5.1 and per the Interim Air Monitoring Plan (AECOM, August 2012). The analytical results were then compiled in spreadsheets where calculations were completed and comparisons to applicable criteria were made as described in Section 5.1.

#### 5.2.1.1 Ambient Air Results

In June 2022, acetone; cis-1,2-dichloroethene; trichloroethene (TCE); n-hexane; toluene; propene (C<sub>3</sub>H<sub>6</sub>); dichlorodifluoromethane (CFC 12); ethanol; trichlorofluoromethane (CFC 11); trichlorotrifluoroethane (CFC 113); and alpha-pinene were detected in the ambient air at the GWTP.

Compounds originating at the GWTP would be expected to have lower concentrations in the downwind sampling location than at the GWTP sampling location. However, the fact that the compounds acetone; benzene; n-hexane; toluene; ethylbenzene; m,p-xylene; o-xylene; propene



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(C3H6); dichlorodifluoromethane (CFC 12); ethanol; trichlorofluoromethane (CFC 11); trichlorotrifluoroethane (CFC 113), alpha-pinene; and d-limonene were detected in downwind ambient air, suggests that they are present in the ambient (background) air.

The ambient air results during the quarter met the ambient air criteria, as presented in **Table 1** within **Appendix G**.

#### 5.2.1.2 Air Stripper Effluent Results

The VOCs present in groundwater that are removed via the air stripper include 1,1-dichloroethene (DCE); 1,2-dichloroethane (DCA); cis-1,2-DCE; methylene chloride (MC); TCE; tetrachloroethene (PCE); vinyl chloride (VC); and trichlorotrifluoroethane (CFC 113). These compounds are frequently reported in groundwater at the site, with the exception of trichlorotrifluoroethane (CFC 113) which is not typically a groundwater analyte at LHAAP. Trichlorotrifluoroethane (CFC 113), however, appears to be present in groundwater as indicated by limited analysis conducted in December 2013, where it was detected in several wells, and from historical accounts. Many of the chemicals that are reported in ambient air are not detected in the air stripper effluent. This is likely because the reporting limit for the air stripper effluent is higher than the reporting limit for the ambient air samples or the source for some of these chemicals are extraneous to groundwater.

In June 2022, 1,1-DCE; 1,2-DCA; cis-1,2-DCE; PCE; TCE; VC; and trichlorotrifluoroethane (CFC 113) were detected in air stripper effluent. The highest concentrations were for cis-1,2-DCE and TCE. However, the air stripper effluent concentrations were below the emission criteria, as presented in **Table 2** within **Appendix G**.

#### 5.2.2 PID Results

Along with collection of Summa canister air samples, PID measurements from the same sources/areas were collected and recorded. These simultaneous measurements allowed establishing a correlation between PID readings and VOC concentrations in the Summa canister air samples. Conversion from PID to compound concentrations was established by TCEQ in 30 TAC §106.533(h). The TCEQ equation allows use of a PID to determine individual compound concentrations if the distribution of chemicals in the ambient air is known or assumed. This allows the use of a PID as a tool to measure VOC concentrations and convert the PID results to estimates of compound concentrations. All ambient air PID measurements collected during this quarter were reported at 0.0 parts per million. No VOCs were detected at the GWTP ambient air or downwind PID locations. During 2<sup>nd</sup> Quarter 2022, VOC detections at the air stripper PID location ranged between 20.2 and 24.7 parts per million at each sampling event. The results of the PID readings collected during GWTP operations are presented in **Table 3** within **Appendix G**.

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## 6 COMMENTS AND RESPONSES

The 1<sup>st</sup> Quarter (January – March) 2022 GWTP Evaluation Report was submitted to TCEQ and USEPA on 29 June 2022. The TCEQ provided the following comments on 22 July 2022:

**TCEQ Comment 1:** Tables ES-1 and 4 of Treated Groundwater Discharge – The columns for Harrison Bayou Flow and Maximum Allowed Rate indicate NA for every day. There should be reported data for days with discharge to Harrison Bayou.

**Response to TCEQ Comment 1:** Concur. Tables ES-1 and Table 4 have been revised in the Quarterly Evaluation Report, 1<sup>st</sup> Quarter (January – March) 2022 listing the Harrison Bayou Flow and the Maximum Allowed Discharge Rates for each day groundwater was discharged directly to the Harrison Bayou. The revised tables changed pages will be issued for inclusion into the *Final Quarterly Evaluation Report, 1<sup>st</sup> Quarter (January – March) 2022, GWTP, LHAAP, Karnack Texas AR* submittal.

**TCEQ Comment 2:** Section 2.5, Appendix C, and elsewhere– Since the analytical results are included, please remove/revise these statements “The complete laboratory results are provided electronically as a separate file” or “as a separate file on the CD”.

**Response to TCEQ Comment 2:** Concur. In Section 2.5 of this Quarterly Evaluation Report 2<sup>nd</sup> Quarter (April – June) 2022 and in future reports, the text will be revised to state: “*The complete laboratory results are provided in **Appendix C.***”

**TCEQ Comment 3:** Table 6 – In January, check the “Does concentration meet discharge limit” responses. There are several “no” responses that are errors.

**Response to TCEQ Comment 3:** Concur. After review of Table 6, all effluent data should indicate a “yes” response to the question of whether the concentration meets the discharge limit. Therefore, Table 6 will be revised in the Quarterly Evaluation Report, 1<sup>st</sup> Quarter (January – March) 2022 to change Column N (Does Concentration Meet Discharge Limit) for the “no” responses. The revised table changed page will be issued for inclusion in the *Final Quarterly Evaluation Report, 1<sup>st</sup> Quarter (January – March) 2022, GWTP, LHAAP, Karnack Texas AR* submittal.

**TCEQ Comment 4:** Bi-weekly GWTP sample results tables – Please add a note that perchlorate effluent results are collected weekly and included for the same (or comparable) dates on the Weekly Perchlorate Sample Results table. It would help clarify those NAs.

**Response to TCEQ Comment 4:** Concur. The following footnote will be added to the Bi-Weekly Analytical Result Tables 7, 8 and 9 of this Quarterly Evaluation Report 2<sup>nd</sup> Quarter (April – June 2022) and in future reports: “*Weekly perchlorate samples are collected on the same or comparable dates and presented on Table 6 (Weekly Perchlorate Sample Results).*”

The USEPA provided the following comment on 2 August 2022:

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**USEPA Comment 1:** Section 2.3 – The report attributes the discrepancy to the storage capacity of the system and to a lesser extent, evaporative loss within the plant. This quarter the report included an explanation with an approximate amount volume left in the system, which is useful. Can we include more information in the next report surrounding the water levels in the system at the end of the quarter?

**Response to USEPA Comment 1:** Concur. This Quarterly Evaluation Report, 2<sup>nd</sup> Quarter (April – June) 2022, includes an explanation of the amount of water stored at the GWTP at the beginning of the reporting period. Additional text has been added to Section 2.3 to explain the volumes of water and how water is processed through the GWTP. Note that the discrepancy noted between the influent processed and the effluent discharged from the plant equals the volume of water remaining in the plant on the last day of the reporting period estimated at 119,689 gallons on June 30, 2022.

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**APPENDIX A**  
**ICT LAYOUT AND GWTP PROCESS FLOW DIAGRAM**

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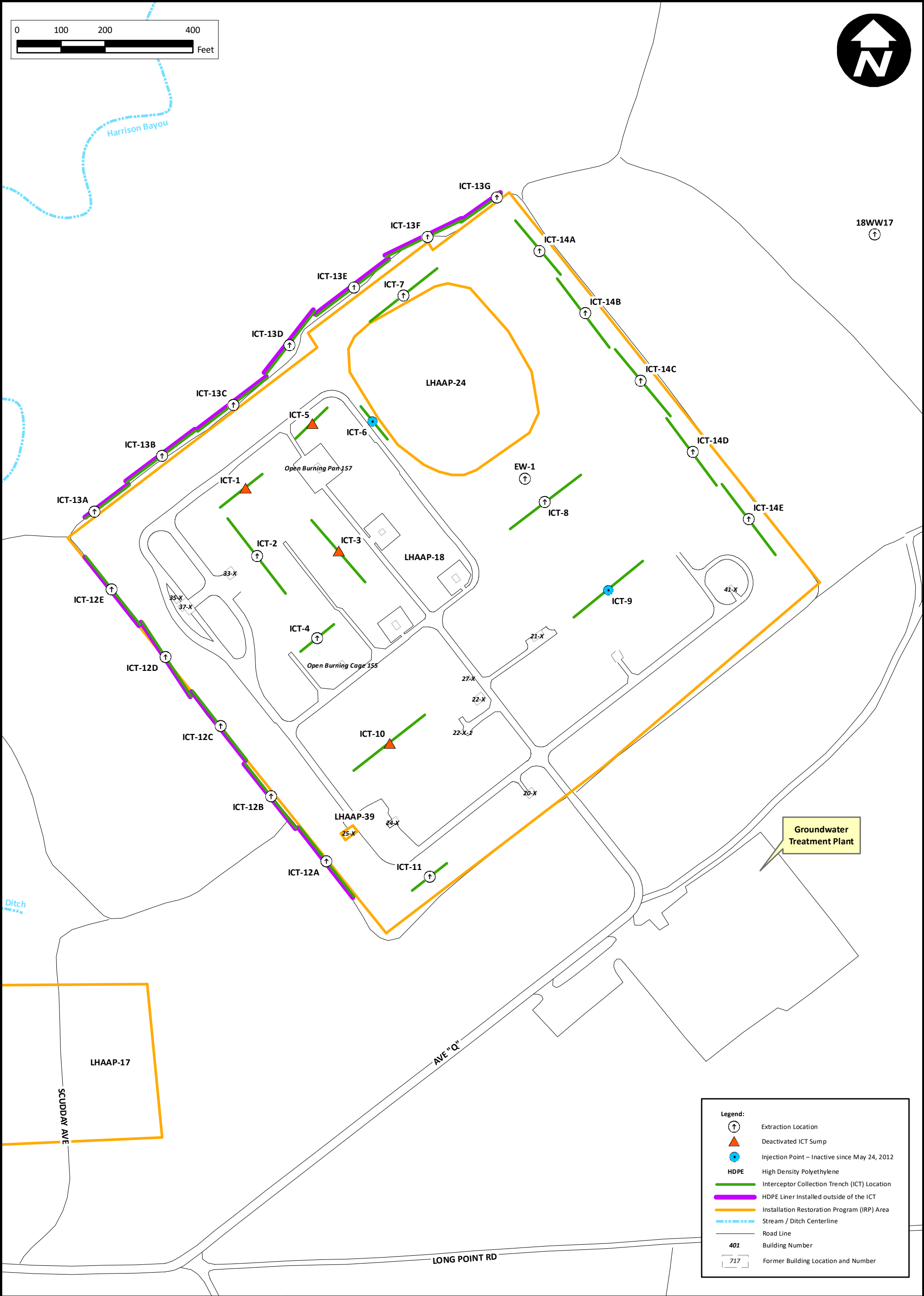






Table A-1: ICTs Completion Depths

ICT	TOC Elevation	Total Depth	Sump Elevation	Comment
1	186.07	22.5	163.57	Taken out of service in 2007.
2	185.02	29.5	155.52	
3	192.27	37.75	154.52	Taken out of service in 2007.
4	193.51	37.5	156.01	
5	192.67	35	157.67	Taken out of service in 2007.
6	197.30	40.75	156.55	Converted to infiltration in 2007. Ceased reinjection in July 2012.
7	198.03	32.33	165.7	
8	198.97	44.5	154.47	
9	197.64	45.5	152.14	Converted to infiltration in 2007. Ceased reinjection in July 2012.
10	198.07	45.42	152.65	Taken out of service in 2007.
11	198.01	43.33	154.68	
12A	189.06	31.5	157.56	Taken out of service in 2007. Reinstituted in December 2012.
12B	191.97	36.25	155.72	
12C	193.90	34.33	159.57	
12D	185.64	33.75	151.89	
12E	183.38	32.25	151.13	
13A	182.59	28.17	154.42	
13B	184.72	29.58	155.14	
13C	186.13	28.17	157.96	
13D	186.72	26.17	160.55	
13E	191.79	27.08	164.71	
13F	197.81	32.33	165.48	
13G	197.03	27.25	169.78	Taken out of service in 2008.
14A	196.8	43.00	153.8	
14B	197.61	43.42	154.19	
14C	197.86	41.33	156.53	
14D	198.47	44.25	154.22	
14E	198.47	43.08	155.39	

Note(s):

ICT - interception-collection trench

TOC - top of casing, measuring point for groundwater elevations

Elevations are reported as feet above mean sea level.

Total depths are reported as feet below TOC.

Sump elevation calculated by subtracting total depth from TOC elevation.

ICTs were installed in 1998.

ICT 12A was replaced on December 5, 2012, and extraction has resumed.

TOC Elevations and total depth measured in October 2003, 4th Quarter 2003, Groundwater Treatment Plant Report.

**Table A-2: Extraction Equipment Maintenance Since 2011****LHAAP-18/24**

<b>Well I.D.</b>	<b>Replaced Parts</b>	<b>Date</b>	<b>Contractor</b>
ICT 14E	Pump	3/15/2012	Shaw
ICT 14D	Pump, motor, level probes	3/16/2012	Shaw
ICT 14B	Pump, level probes, level probe wire	3/16/2012	Shaw
ICT 14A	Pump, motor, level probes, level probe wire	3/17/2012	Shaw
ICT 2	Pump, motor	3/17/2012	Shaw
ICT 13D	Pump	3/19/2012	Shaw
ICT 13B	Pump	3/20/2012	Shaw
ICT 14E	Pump, motor, broken piping	11/19/2012	AECOM
ICT 13C	Pump	11/20/2012	AECOM
ICT13E	Pump	11/20/2012	AECOM
ICT 12A	Pump, motor, wiring harness, level probes, level probe wire	12/5/2012	AECOM
ICT 7	Pump, motor, wiring harness, level probes	12/6/2012	AECOM
ICT2	Pump	6/10/2013	AECOM
ICT 13C	Pump	6/11/2013	AECOM
ICT 13D	Pump	6/12/2013	AECOM
ICT 14E	Pump rebuilt	6/15/2013	AECOM
ICT 14E	Replaced low level switch	6/19/2013	AECOM
ICT 13C	Pump, wiring harness, flow meter	4/15/2014	AECOM
ICT 14D	Repaired level probes	6/24/2014	AECOM
ICT 14E	Repaired level probes	6/24/2014	AECOM
ICT 14E	Pump and motor troubleshooting	6/26/2014	AECOM
ICT2, 13F, 14C, 14D, 14E	Repaired level probes	7/7/2014	AECOM
ICT 12E	Pump, motor	10/2/2014	AECOM
ICT 12E	Wiring harness, fixed leak	10/8/2014	AECOM
ICT 12E	Level probes	10/9/2014	AECOM
ICT13A	Pump, piping	10/15/2014	AECOM
ICT 12E	Repaired leaking fittings	10/16/2014	AECOM
ICT 11	1" tee and 1" elbow	1/13/2015	AECOM
ICT 12B	Flow meter	1/13/2015	AECOM
ICT 7	1" tee, repaired 1" pipe	1/13/2015	AECOM
ICT 13A	Flow meter	1/15/2015	AECOM
ICT 13B	Pump	1/15/2015	AECOM
ICT 13C	Pump	1/16/2015	AECOM
ICT 7	Low level probe	1/16/2015	AECOM
ICT 13D	Pump, level probes	1/17/2015	AECOM
ICT 14C	Low level probe	1/17/2015	AECOM
ICT 14C	Low level probe	1/29/2015	AECOM
ICT 14D	Low level probe	1/29/2015	AECOM
ICT 13D	Level probes	1/29/2015	AECOM
ICT 2	Pump	1/30/2015	AECOM
ICT 8	Fuse	3/2/2015	AECOM
ICT 8	Fuse	3/9/2015	AECOM
ICT 12E	Flow meter	3/13/2015	AECOM
ICT 13D	Union	3/13/2015	AECOM
ICT 14C	Cleaned level probes	4/1/2015	AECOM
ICT 14D	Cleaned level probes	4/1/2015	AECOM
ICT 13A	Cleaned level probes	4/21/2015	AECOM
ICT 14C	Cleaned level probes	4/21/2015	AECOM
ICT 8	Low level probe	7/24/2015	AECOM
ICT 13C	Installed New Pump	7/28/2015	AECOM

**Table A-2: Extraction Equipment Maintenance Since 2011**

<b>Well I.D.</b>	<b>Replaced Parts</b>	<b>Date</b>	<b>Contractor</b>
ICT 14C	Installed New Pump and Electric Motor	7/29/2015	AECOM
ICT 14E	Installed New Pump and Electric Motor	7/31/2015	AECOM
ICT 12E	Repaired wiring	8/12/2015	AECOM
ICT 13E	Replaced high and low level probes	8/12/2015	AECOM
ICT 2	Installed Rebuilt Pump	9/9/2015	AECOM
ICT 12 E, ICT 14E	Replaced high level probe and wiring	9/15/2015	AECOM
ICT 13A	Installed new pump	12/23/2015	AECOM
ICT 13B	Installed new pump	12/24/2015	AECOM
ICT 13D	Replaced high level probe	2/11/2016	Aerotek
ICT 14C	Replace low level probe on ICT 14C	2/15/2016	Aerotek
ICT 8	Installed new pump and electric motor	2/19/2016	Aerotek
ICT 14C	Repaired piping leak	3/10/2016	Aerotek
ICT 14E	Installed high and low level probes, level probe wire	3/22/2016	Aerotek
ICT 13D, ICT 14B	Installed high and low level probes, level probe wire	3/24/2016	Aerotek
ICT 14B	Installed new pump and electric motor	3/31/2016	Aerotek
ICT 14C	Installed new low level probe	4/20/2016	Aerotek
ICT 12B	Installed new mechanical flow meter	6/16/2016	Aerotek
ICT 13C	Installed rebuilt pump and new flow meter	8/10/2016	Aerotek
ICT 13A	Installed rebuilt pump, new flow meter, and new 1" unions	8/24/2016	Aerotek
ICT 14E	Installed new mechanical flow meter	8/26/2016	Aerotek
ICT 12C	Repair flow meter	8/30/2016	Aerotek
ICT 2	Install rebuilt pump and new flow meter	8/31/2016	Aerotek
ICT 14C	Clean and adjust level probes	9/7/2016	Aerotek
ICT 14C	Replaced level probes	9/12/2016	Aerotek
ICT 14C	Installed new level probe wire and level probes	9/21/2016	Aerotek
ICT 12C	Installed rebuilt pump, new electric motor, new wiring harness, new level probe wire, and new level probes	9/27/2016	Aerotek
ICT 14C	Cleaned and adjusted level probes	10/14/2016	Aerotek
ICT 13C	Cleaned and adjusted level probes	10/21/2016	Aerotek
ICT 13B	Installed rebuilt pump	10/25/2016	Aerotek
ICT 14D	Installed rebuilt pump	10/27/2016	Aerotek
ICT 13C	Replace low level probe	11/8/2016	Aerotek
ICT 13B	Replace relay base plate	11/8/2016	Aerotek
ICT 13E	Clean and adjust low level probe	11/15/2016	Aerotek
ICT 13B	Replace broken relay base plate and bad level probe wire	11/17/2016	Aerotek
ICT 13C	Clean & repair leaking flow meter	11/18/2016	Aerotek
ICT 13B	Clean & adjust low level probe	11/18/2016	Aerotek
ICT 13A, 13B, & 13E	Clean and adjust low level probes	12/2/2016	Aerotek
ICT 13C & 14C	Pulled piping and pumps	2/8/2017	Aerotek
ICT 14C	Installed new electric motor	2/8/2017	Aerotek
ICT 13C & 14C	Installed rebuilt grundfos pumps	2/8/2017	Aerotek
ICT 7, 13A, & 14D	Repaired sample ports	2/9/2017	Aerotek
ICT 13B & 14E	Cleaned and adjusted low level probes	3/30/2017	Aerotek
ICT 13B & 13F	Installed new flow meters	3/30/2017	Aerotek
ICT 12B	Repair flow meter	4/13/2017	Aerotek
ICT 12C	Replace broken 1" tee	5/1/2017	Aerotek
ICT 11	Installed new manual flow meter	5/5/2017	Aerotek
ICT 2	Installed new flow meter	5/9/2017	Aerotek
ICT 14C & 14D	Cleaned and adjusted low level probes	5/31/2017	Aerotek
ICT 14C	Cleaned and adjusted low level probe	6/27/2017	Aerotek
ICT 8	Clean low level probe	7/11/2017	Aerotek
ICT 2 & 14D	Cleaned and replaced level probes	7/17/2017	Aerotek
ICT 14C	Cleaned low level probe	7/24/2017	Aerotek

**Table A-2: Extraction Equipment Maintenance Since 2011**

<b>Well I.D.</b>	<b>Replaced Parts</b>	<b>Date</b>	<b>Contractor</b>
ICT 13A	Installed new pump and flow meter	8/8/2017	Aerotek
ICT 13C & 13B	Installed new pump and flow meter	8/9/2017	Aerotek
ICT 13B	Installed new low level probe	8/10/2017	Aerotek
ICT 11	Installed new pump and flow meter	8/11/2017	Aerotek
ICT 4	Replaced low level probe	8/11/2017	Aerotek
ICT 2	Installed rebuilt pump	9/19/2017	Aerotek
ICT 13D	Adjusted level probes	9/22/2017	Aerotek
ICT 14C	Cleaned level probes	10/11/2017	Bhate
ICT 13E	Clean and adjust level probes	10/24/2017	Bhate
ICT 12B	Adjust level probes	11/15/2017	Bhate
ICT 14D	Cleaned level probes	11/15/2017	Bhate
ICT 8	Clean and adjust level probes	11/28/2017	Bhate
ICT 2	Cleaned level probes	12/20/2017	Bhate
ICT 13C	Install new flow meter	1/30/2018	Bhate
ICT 14C	Cleaned level probes	1/30/2018	Bhate
ICT 13C	Cleaned & adjusted level probes	2/1/2018	Bhate
ICT 13B	Repair broken 1" union	2/1/2018	Bhate
ICT 14A	Repair 2 broken 1" elbows & lower high level probe	2/1/2018	Bhate
ICT 14B	Repair broken 1" tee & lower high level probe	2/1/2018	Bhate
ICT 14D	Install new flow meter	2/8/2018	Bhate
ICT 8	Replace broken 1" tee & cleaned level probes	2/8/2018	Bhate
ICT 14D	Cleaned level probes	2/28/2018	Bhate
ICT 14C	Replace low level probe	2/28/2018	Bhate
ICT 13B	Cleaned level probes	2/28/2018	Bhate
ICT 13A	Install new motor & replace leaking 1" union	3/14/2018	Bhate
ICT 13C	Cleaned & adjusted level probes	3/21/2018	Bhate
ICT 12B	Replace broken 1" elbow & install new flow meter	3/21/2018	Bhate
ICT 2	Install new pump	3/22/2018	Bhate
ICT 13B	Replaced level probes	3/30/2018	Bhate
ICT 14E	Lower high level probe	3/30/2018	Bhate
ICT 14C	Cleaned level probes	4/27/2018	Bhate
ICT 11	Install new breaker	4/27/2018	Bhate
ICT 14E	Cleaned level probes	6/7/2018	Bhate
ICT 12C	Cleaned level probes	6/7/2018	Bhate
EW 01	Cleaned level probes	6/7/2018	Bhate
ICT 14E	Replaced level probes	6/8/2018	Bhate
ICT 11	Install new electrical wire from breaker to well	6/14/2018	Bhate
ICT 12B	Replaced pump	6/25/2018	Bhate
ICT 14E	Cleaned level probes	6/26/2018	Bhate
ICT 8	Cleaned level probes	6/26/2018	Bhate
ICT 14C	Replaced pump	6/27/2018	Bhate
EW01	Replaced level probes	9/12/2018	Bhate
ICT 7	Cleaned level probes	9/12/2018	Bhate
ICT 12C	Replaced low level probe wire and probe	9/12/2018	Bhate
ICT 14D	Replaced high level probe wire & probe	9/13/2018	Bhate
ICT 12B	Replaced high and low level probe wires & probes	9/13/2018	Bhate
ICT 12B	Replaced electrical relay and relay base plate	9/13/2018	Bhate
ICT 14C	Cleaned level probes	9/13/2018	Bhate
ICT 13E	Replaced flow meter	9/14/2018	Bhate
ICT 14D	Replace low level probe	10/31/2018	Bhate
ICT 8	Cleaned level probes	10/31/2018	Bhate
ICT 14C	Cleaned level probes	10/31/2018	Bhate
ICT 13A	Replace broken 1" Tee	12/12/2018	Bhate
ICT 14C	Cleaned level probes	12/12/2018	Bhate
ICT 13A	Install new flow meters	2/14/2019	Bhate

**Table A-2: Extraction Equipment Maintenance Since 2011**

<b>Well I.D.</b>	<b>Replaced Parts</b>	<b>Date</b>	<b>Contractor</b>
ICT 12D	Replace pump & motor	3/6/2019	Bhate
ICT 13C	Replace pump	3/8/2019	Bhate
ICT 2	Replace pump & flow meter	3/11/2019	Bhate
ICT 14C	Replace pump & motor	3/12/2019	Bhate
ICT 14D	Replace pump	3/12/2019	Bhate
ICT 14E	Replace pump, seal plate & level probes	3/14/2019	Bhate
ICT 14A	Replace pump and repair leaking 1" pipe	3/15/2019	Bhate
ICT 13C	Lower high level probe	3/22/2019	Bhate
ICT 14A	Lower high level probe	3/22/2019	Bhate
EW-01	Replace pump	3/29/2019	Bhate
ICT 8	Clean level probes	4/1/2019	Bhate
ICT 12C	Clean level probes	4/1/2019	Bhate
ICT 13D	Clean level probes	4/1/2019	Bhate
ICT 14E	Replaced bad relay	4/2/2019	Bhate
ICT 12A	Replace flow meter	4/3/2019	Bhate
ICT 13F	Replace flow meter	4/3/2019	Bhate
ICT 13D	Replace low level probe	4/3/2019	Bhate
ICT 13C	Clean level probes	5/8/2019	Bhate
ICT 14 C	Clean level probes	5/8/2019	Bhate
ICT 12D	Replace bad relay	5/8/2019	Bhate
ICT 13A	Replace pump	7/10/2019	Bhate
ICT 13D	Replace pump	7/17/2019	Bhate
ICT 14C	Clean level probes	9/25/2019	Bhate
ICT 14D	Clean level probes	9/25/2019	Bhate
ICT 12D	Clean level probes	10/2/2019	Bhate
ICT 13B	Clean level probes	10/2/2019	Bhate
ICT 13C	Clean level probes	10/2/2019	Bhate
ICT 14E	Clean level probes	10/2/2019	Bhate
18WW17	Install double wall pipe	10/28/2019	Bhate
ICT 14C	Clean level probes	4/16/2020	Bhate
ICT 12B	Replace coil in electrical panel	5/5/2020	Bhate
ICT 14D	Replace coil in electrical panel	5/5/2020	Bhate
ICT 11	Replace broken 1" union	5/12/2020	Bhate
ICT 13E	Replace broken 1" union	5/12/2020	Bhate
ICT 14A	Replace broken 1" tee	5/12/2020	Bhate
ICT 14C	Clean level probes	5/12/2020	Bhate
ICT 14A	Clean level probes	5/12/2020	Bhate
ICT 7	Clean level probes	5/12/2020	Bhate
ICT 13C	Replace pump	5/13/2020	Bhate
ICT 13C	Replace broken 1" union and 1" nipple	5/13/2020	Bhate
ICT 13B	Replace pump	5/19/2020	Bhate
ICT 13B	Replace flow meter	5/19/2020	Bhate
ICT 2	Replace pump	5/20/2020	Bhate
ICT 4	Replace flow meter	9/29/2020	Bhate
ICT 8	Replace flow meter	9/29/2020	Bhate
ICT 12C	Repaired flow meter	9/29/2020	Bhate
ICT 13C	Replace flow meter	9/30/2020	Bhate
ICT 14B	Replace flow meter	9/30/2020	Bhate
ICT 7	Replace flow meter	9/30/2020	Bhate
ICT 14E	Replace pump	10/6/2020	Bhate
ICT 14C	Replace pump and motor	10/7/2020	Bhate
18WW17	Replace bad coil	12/9/2020	Bhate
ICT 14A	Electrical problem repaired	12/15/2020	Bhate
ICT 13F	Electrical problem repaired	12/15/2020	Bhate
ICT 8	Clean level probes	12/16/2020	Bhate

**Table A-2: Extraction Equipment Maintenance Since 2011**

<b>Well I.D.</b>	<b>Replaced Parts</b>	<b>Date</b>	<b>Contractor</b>
ICT 14C	Clean level probes	12/16/2020	Bhate
ICT 14B	Replace blown fuse	1/26/2021	Bhate
ICT 13A	Replace pump	1/27/2021	Bhate
ICT 13D	Replace Pump & motor	1/27/2021	Bhate
ICT 2	Replace pump & flowmeter	2/9/2021	Bhate
ICT 12E	Replace pump	2/9/2021	Bhate
ICT14A	Replace broken 1" tee	3/3/2021	Bhate
ICT 8	Replaced pump and repaired wiring harness	4/1/2021	Bhate
ICT 14E	Replaced pump and motor	5/1/2021	Bhate
ICT 14D	Replaced pump	5/1/2021	Bhate
ICT 14C	Replaced pump	5/1/2021	Bhate
ICT 7	Replaced blown fuse	9/7/2021	Bhate
ICT 13A	Replace breaker	10/5/2021	Bloc Design
ICT 12A	Clean level probes	10/20/2021	Bhate
ICT 8	Replace low level probe	10/20/2021	Bhate
ICT 2	Replace flow meter	2/16/2022	Bhate
ICT 7	Replace flow meter	2/16/2022	Bhate
ICT 11	Replace flow meter nipple	2/16/2022	Bhate
ICT 14E	Replace flow meter nipple	2/16/2022	Bhate
ICT 13C	Replace pump and flow meter	3/10/2022	Bhate
ICT 13A	Replacement flow meter	3/10/2022	Bhate
ICT 12B	Replace flow meter	3/15/2022	Bhate
ICT 12C	Replace flow meter	3/15/2022	Bhate
ICT 8	Replace motor and pump	3/23/2022	Bhate
ICT 14D	Replace motor and pump	3/23/2022	Bhate
ICT 14C	Replace motor	3/23/2022	Bhate
ICT 12D	Replace pump, motor, and wiring harness	3/30/2022	Bhate
ICT 7	Fix electrical issue	4/6/2022	Bhate
ICT 13E	Replace flowmeter	4/6/2022	Bhate
ICT 13B	Replace pump	6/7/2022	Bhate
<b>LHAAP-16</b>			
<b>Well I.D.</b>	<b>Replaced Parts</b>	<b>Date</b>	<b>Contractor</b>
EW08	New pump	2/28/2011	Shaw
EW01	Rebuild pump	8/25/2011	Shaw
EW06	Rebuild pump	8/25/2011	Shaw
EW02	Rebuild pump	2/12/2012	Shaw
EW03	Rebuild pump	2/12/2012	Shaw
EW08	Rebuild pump	11/8/2012	AECOM
EW01	Rebuild pump	11/8/2012	AECOM
EW04	Repair pump	11/13/2012	AECOM
EW07	Rebuild pump	11/13/2012	AECOM
EW04	Installed New Pump	11/28/2012	AECOM
EW06	Installed New Pump	11/28/2012	AECOM
EW02	Installed New Pump	12/4/2012	AECOM
EW03	Installed New Pump	12/4/2012	AECOM
EW01	Installed New Pump	12/17/2012	AECOM
EW01	Replaced Low level probe	1/17/2015	AECOM
EW01	Cleaned and adjusted level probes	10/21/2016	Aerotek

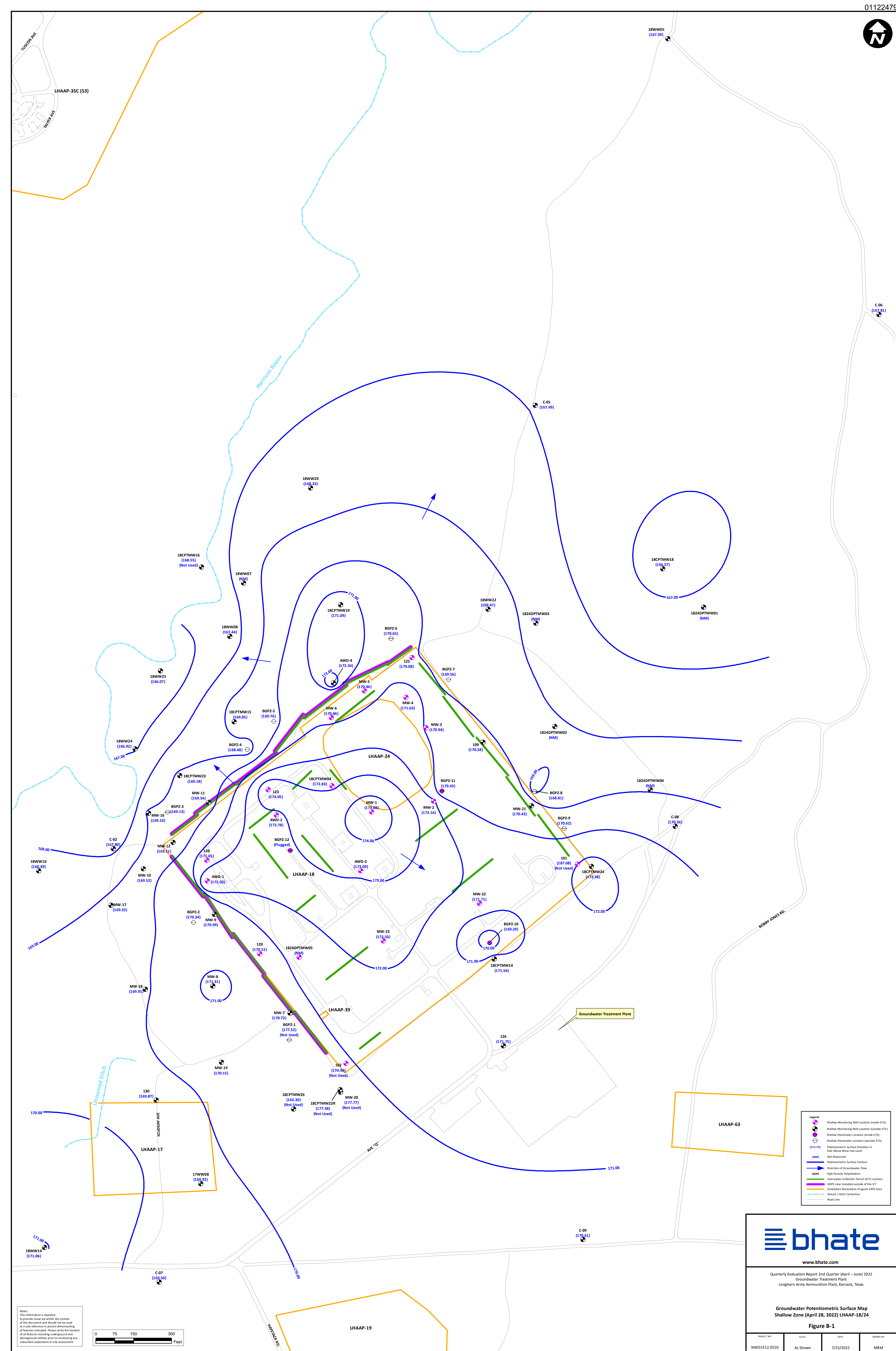
GWTP QUARTERLY EVALUATION REPORT – 2<sup>ND</sup> QUARTER 2022  
LONGHORN ARMY AMMUNITION PLANT

**APPENDIX B**  
**GROUNDWATER ELEVATION CONTOUR MAPS**

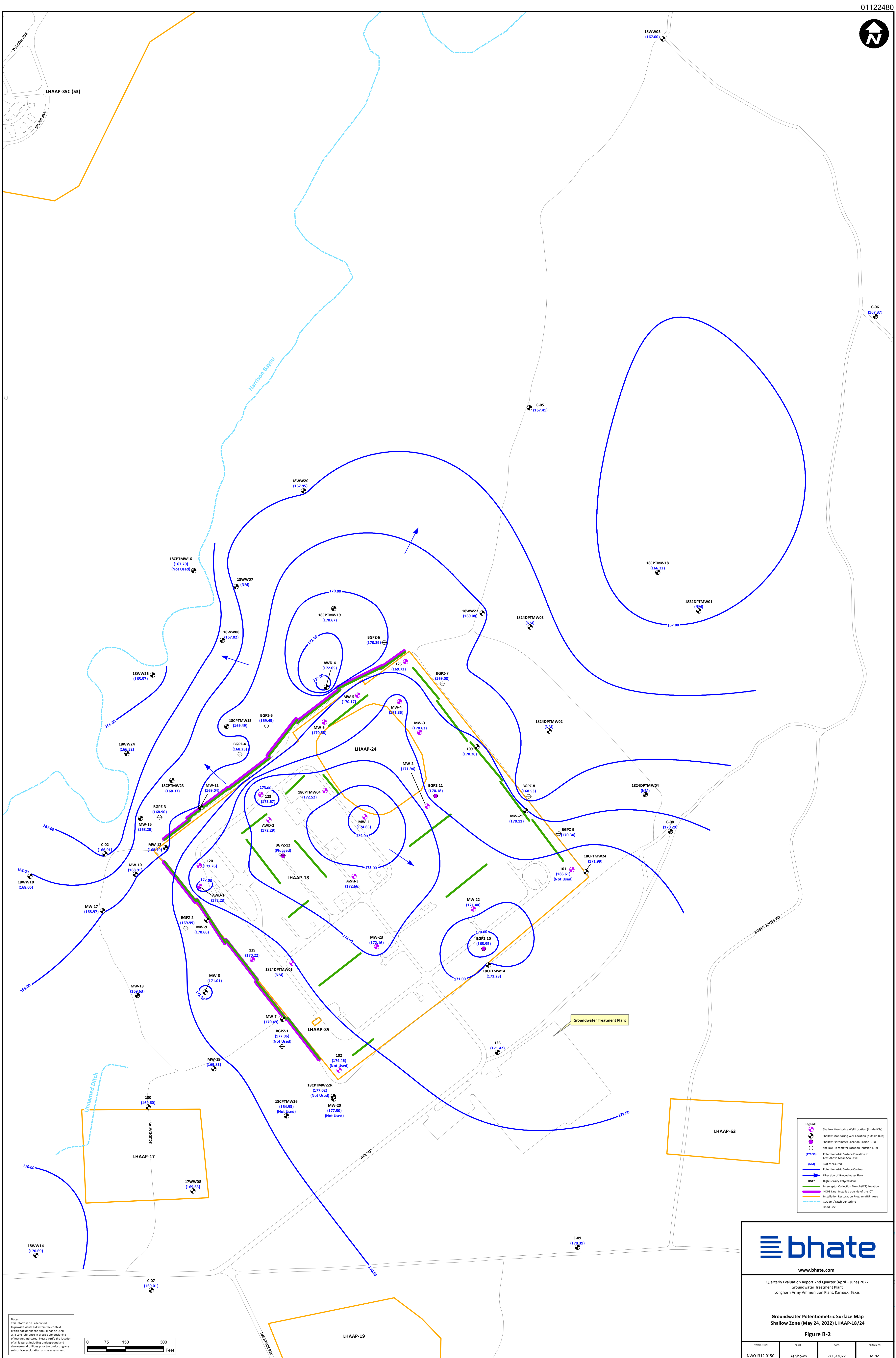
GWTP QUARTERLY EVALUATION REPORT – 2<sup>ND</sup> QUARTER 2022  
LONGHORN ARMY AMMUNITION PLANT

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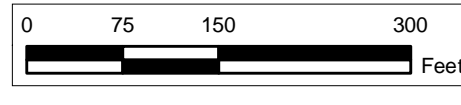








Notes:  
This information is depicted to provide visual aid within the context of this document and should not be used as a sole reference in precise dimensioning of features indicated. Please verify the location of all features including underground and aboveground utilities prior to conducting any subsurface exploration or site assessment.



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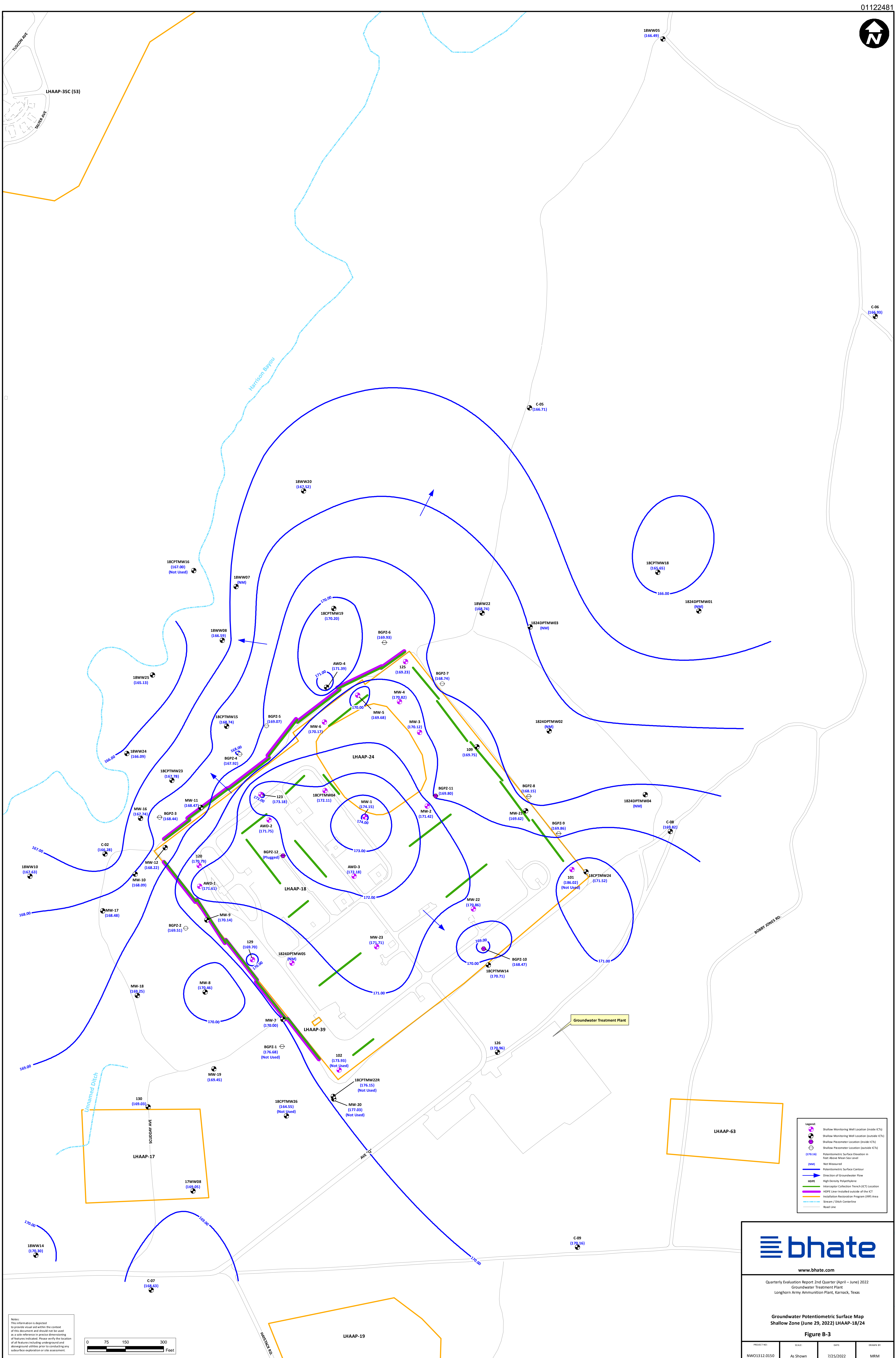
Quarterly Evaluation Report 2nd Quarter (April – June) 2022  
Groundwater Treatment Plant  
Longhorn Army Ammunition Plant, Karnack, Texas

Groundwater Potentiometric Surface Map  
Shallow Zone (May 24, 2022) LHAAP-18/24

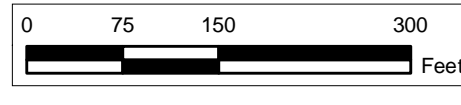
Figure B-2

PROJECT NO: NWO1312.0150	SCALE: As Shown	DATE: 7/25/2022	DRAWN BY: M/RM
-----------------------------	--------------------	--------------------	-------------------





Notes:  
This information is depicted to provide visual aid within the context of this document and should not be used as a sole reference in precise dimensioning of features indicated. Please verify the location of all features including underground and aboveground utilities prior to conducting any subsurface exploration or site assessment.



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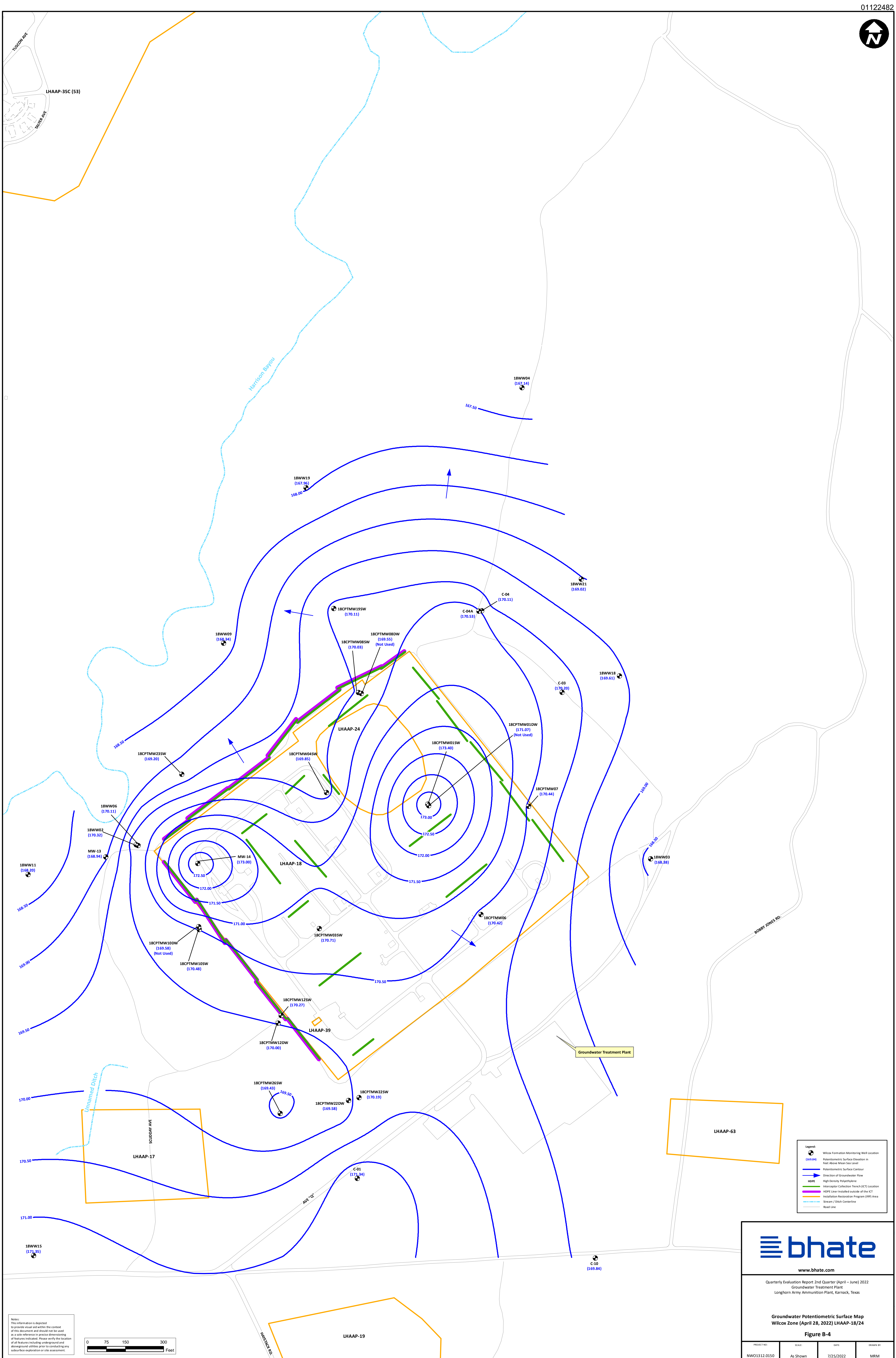
Quarterly Evaluation Report 2nd Quarter (April – June) 2022  
Groundwater Treatment Plant  
Longhorn Army Ammunition Plant, Karnack, Texas

Groundwater Potentiometric Surface Map  
Shallow Zone (June 29, 2022) LHAAP-18/24

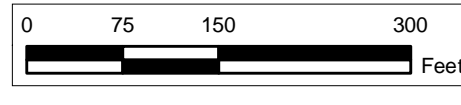
Figure B-3

PROJECT NO: NWO1312.0150	SCALE: As Shown	DATE: 7/25/2022	DRAWN BY: M/RM
-----------------------------	--------------------	--------------------	-------------------





Notes:  
This information is depicted to provide visual aid within the context of this document and should not be used as a sole reference in precise dimensioning of features indicated. Please verify the location of all features including underground and aboveground utilities prior to conducting any subsurface exploration or site assessment.



- Legend:
- Well Location
  - Potentiometric Surface Elevation in Feet Above Mean Sea Level
  - Potentiometric Surface Contour
  - Direction of Groundwater Flow
  - High Density Polyethylene
  - Interceptor Collection Trench (ICT) Location
  - HDPE Liner installed outside of the ICT
  - Installation Restoration Program (IRP) Area
  - Stream / Ditch Centerline
  - Road Line



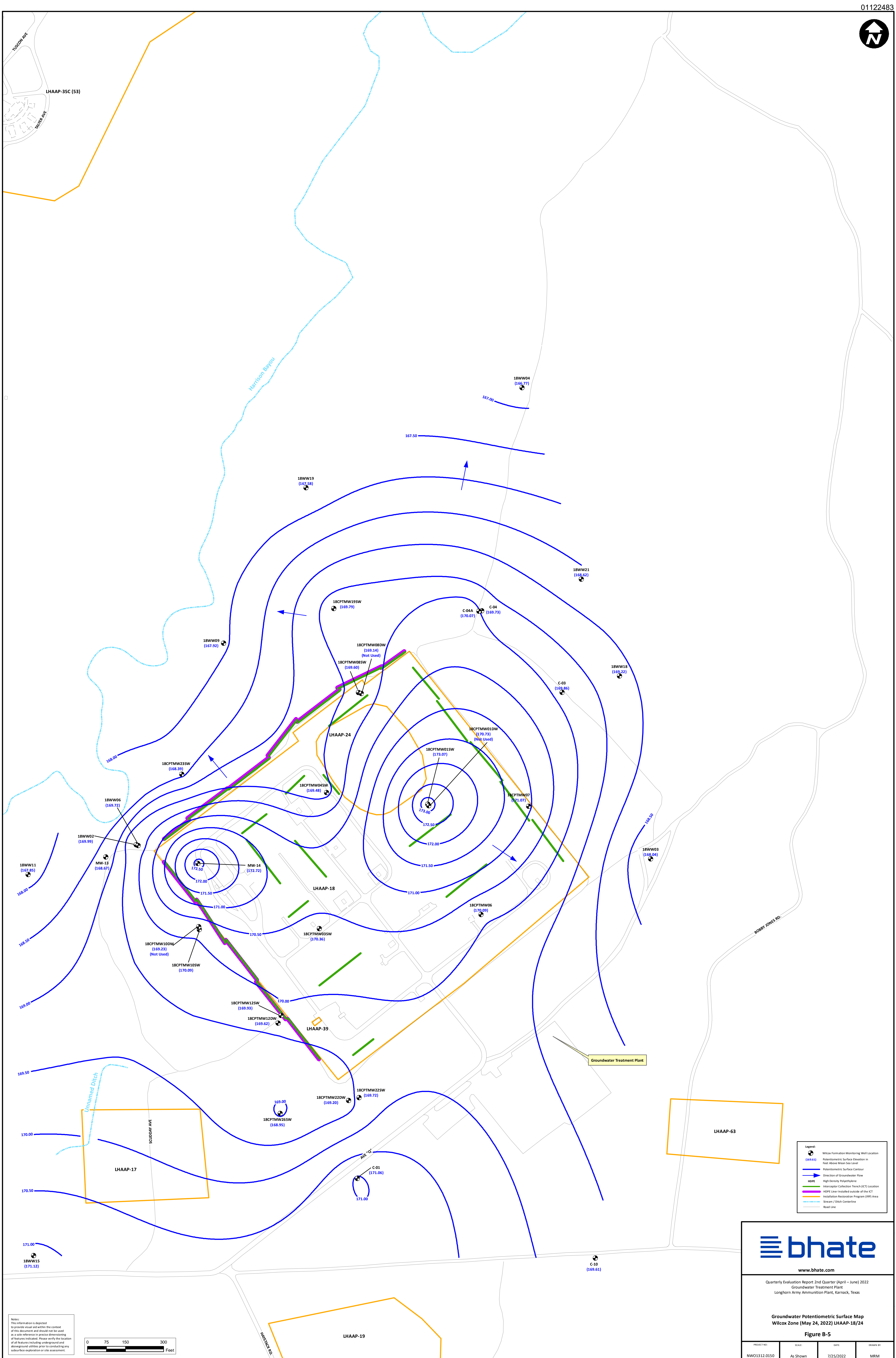
www.bhate.com

Quarterly Evaluation Report 2nd Quarter (April – June) 2022  
Groundwater Treatment Plant  
Longhorn Army Ammunition Plant, Karnack, Texas

Groundwater Potentiometric Surface Map  
Wilcox Zone (April 28, 2022) LHAAP-18/24  
Figure B-4

PROJECT NO: NWO1312.0150	SCALE: As Shown	DATE: 7/25/2022	DRAWN BY: MRM
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**Legend:**

- Wilcox Formation Monitoring Well Location
- Potentiometric Surface Elevation in Feet Above Mean Sea Level
- Potentiometric Surface Contour
- Direction of Groundwater Flow
- High Density Polyethylene Interceptor Collection Trench (ICT) Location
- IRP Area
- Stream / Ditch Centerline
- Road Line



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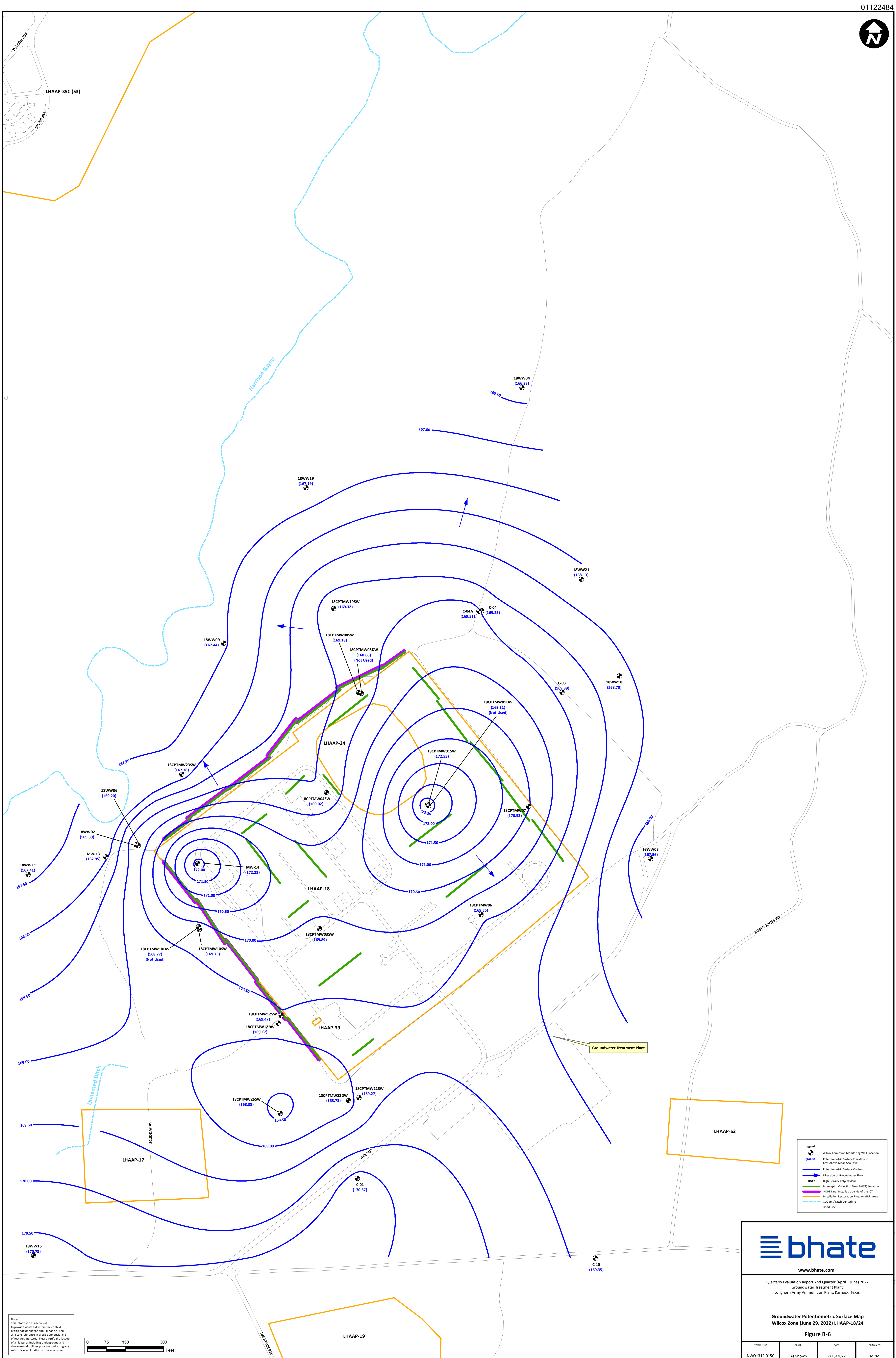
Quarterly Evaluation Report 2nd Quarter (April – June) 2022  
Groundwater Treatment Plant  
Longhorn Army Ammunition Plant, Karnack, Texas

Groundwater Potentiometric Surface Map  
Wilcox Zone (May 24, 2022) LHAAP-18/24

Figure B-5

PROJECT NO:	SCALE:	DATE:	DRAWN BY:
NW01312.0150	As Shown	7/25/2022	M/RM





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Quarterly Evaluation Report 2nd Quarter (April – June) 2022  
Groundwater Treatment Plant  
Longhorn Army Ammunition Plant, Karnack, Texas

Groundwater Potentiometric Surface Map  
Wilcox Zone (June 29, 2022) LHAAP-18/24

Figure B-6

PROJECT NO:	SCALE:	DATE:	DRAWN BY:
NW01312.0150	As Shown	7/25/2022	M/RM

GWTP QUARTERLY EVALUATION REPORT – 2<sup>ND</sup> QUARTER 2022  
LONGHORN ARMY AMMUNITION PLANT

**APPENDIX C**  
**GWTP WATER SAMPLING LABORATORY ANALYTICAL RESULTS**

GWTP QUARTERLY EVALUATION REPORT – 2<sup>ND</sup> QUARTER 2022  
LONGHORN ARMY AMMUNITION PLANT

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10450 Stancliff Rd. Suite 210  
Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887

April 11, 2022

Marcia Olive  
Bhate Environmental Associates, Inc.  
445 Union Blvd Ste 129  
Lakewood, CO 80228

Work Order: **HS22040256**

Laboratory Results for: **Longhorn GW Treatment Plant Weekly Samples**

Dear Marcia Olive,

ALS Environmental received 3 sample(s) on Apr 06, 2022 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: JUMOKE.LAWAL

Ragen Giga  
Project Manager

ALS Houston, US

Date: 11-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**Work Order:** HS22040256

**SAMPLE SUMMARY**

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS22040256-01	LH18/24-SP650_040522	Water		05-Apr-2022 14:00	06-Apr-2022 09:40	<input type="checkbox"/>
HS22040256-02	LH18/24-SP650_040522_AIX	Water		05-Apr-2022 14:00	06-Apr-2022 09:40	<input type="checkbox"/>
HS22040256-03	LH18/24-SP650_040522_BIX	Water		05-Apr-2022 14:00	06-Apr-2022 09:40	<input type="checkbox"/>

ALS Houston, US

Date: 11-Apr-22

---

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**Work Order:** HS22040256

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**CASE NARRATIVE**

---

**Work Order Comments**

- The analysis for Perchlorate was subcontracted to ALS Houston High-Res Lab. Final report attached
- 

**WetChemistry by Method E350.3****Batch ID: R406034**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**WetChemistry by Method E365.3****Batch ID: R405922**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**WetChemistry by Method E415.1****Batch ID: R405898**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

## ALS Houston, US

Date: 11-Apr-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Weekly Samples  
 Sample ID: LH18/24-SP650\_040522  
 Collection Date: 05-Apr-2022 14:00

**ANALYTICAL REPORT**

WorkOrder:HS22040256  
 Lab ID:HS22040256-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>AMMONIA AS N BY E350.3(ISE)</b>		<b>Method:E350.3</b>						Analyst: YP
Nitrogen, Ammonia (As N)	20	a	0.10	0.10	0.20	mg/L	1	08-Apr-2022 10:00
<b>ORTHO PHOSPHATE (PO4) AS P BY E365.3-1978</b>		<b>Method:E365.3</b>						Analyst: AP
Phosphorus, Total Orthophosphate (As P)	6.52	a	0.200	0.250	0.500	mg/L	20	07-Apr-2022 13:48
<b>TOTAL ORGANIC CARBON BY E415.1</b>		<b>Method:E415.1</b>						Analyst: JAC
Organic Carbon, Total	10.7	a	0.500	1.00	1.00	mg/L	1	06-Apr-2022 23:25

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 11-Apr-22

Client: Bhate Environmental Associates, Inc.  
Project: Longhorn GW Treatment Plant Weekly Samples  
Sample ID: LH18/24-SP650\_040522\_AIX  
Collection Date: 05-Apr-2022 14:00

**ANALYTICAL REPORT**

WorkOrder:HS22040256  
Lab ID:HS22040256-02  
Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>						Analyst: GR
Subcontract Analysis	See Attached		0	0		NA	1	07-Apr-2022 15:21

Note: See Qualifiers Page for a list of qualifiers and their explanation.

**ALS Houston, US**

Date: 11-Apr-22

Client: Bhate Environmental Associates, Inc.  
Project: Longhorn GW Treatment Plant Weekly Samples  
Sample ID: LH18/24-SP650\_040522\_BIX  
Collection Date: 05-Apr-2022 14:00

**ANALYTICAL REPORT**

WorkOrder:HS22040256  
Lab ID:HS22040256-03  
Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>						Analyst: GR
Subcontract Analysis	See Attached		0	0		NA	1	07-Apr-2022 15:21

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US

Date: 11-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22040256

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> R405898 ( 0 )		<b>Test Name :</b> TOTAL ORGANIC CARBON BY E415.1			<b>Matrix:</b> Water	
HS22040256-01	LH18/24-SP650_040522	05 Apr 2022 14:00			06 Apr 2022 23:25	1
<b>Batch ID:</b> R405921 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			<b>Matrix:</b> Water	
HS22040256-02	LH18/24-SP650_040522_AIX	05 Apr 2022 14:00			07 Apr 2022 15:21	1
HS22040256-03	LH18/24-SP650_040522_BIX	05 Apr 2022 14:00			07 Apr 2022 15:21	1
<b>Batch ID:</b> R405922 ( 0 )		<b>Test Name :</b> ORTHO PHOSPHATE (PO4) AS P BY E365.3-1978			<b>Matrix:</b> Water	
HS22040256-01	LH18/24-SP650_040522	05 Apr 2022 14:00			07 Apr 2022 13:48	20
<b>Batch ID:</b> R406034 ( 0 )		<b>Test Name :</b> AMMONIA AS N BY E350.3(ISE)			<b>Matrix:</b> Water	
HS22040256-01	LH18/24-SP650_040522	05 Apr 2022 14:00			08 Apr 2022 10:00	1

## ALS Houston, US

Date: 11-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22040256

**QC BATCH REPORT**

Batch ID: R405898 ( 0 )		Instrument: TOC_04		Method: TOTAL ORGANIC CARBON BY E415.1						
<b>MBLK</b>	Sample ID: MBLK-04052022	Units: mg/L		Analysis Date: 06-Apr-2022 21:59						
Client ID:	Run ID: TOC_04_405898	SeqNo: 6584762		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	1.00	1.00								U
<b>LCS</b>	Sample ID: LCS-04052022	Units: mg/L		Analysis Date: 06-Apr-2022 22:14						
Client ID:	Run ID: TOC_04_405898	SeqNo: 6584763		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	9.288	1.00	10	0	92.9	85 - 115				
<b>LCSD</b>	Sample ID: LCSD-04052022	Units: mg/L		Analysis Date: 06-Apr-2022 22:29						
Client ID:	Run ID: TOC_04_405898	SeqNo: 6584764		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	9.341	1.00	10	0	93.4	85 - 115	9.288	0.569	20	
<b>MS</b>	Sample ID: HS22031286-01MS	Units: mg/L		Analysis Date: 06-Apr-2022 22:58						
Client ID:	Run ID: TOC_04_405898	SeqNo: 6584766		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	24.57	1.00	10	12.87	117	80 - 120				
The following samples were analyzed in this batch: HS22040256-01										



## ALS Houston, US

Date: 11-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22040256

**QC BATCH REPORT**

Batch ID: R405922 ( 0 )		Instrument: UV-2450		Method: ORTHO PHOSPHATE (PO4) AS P BY E365.3-1978					
<b>MBLK</b>	Sample ID: MBLK-R405922	Units: mg/L		Analysis Date: 07-Apr-2022 13:48					
Client ID:	Run ID: UV-2450_405922	SeqNo: 6585529		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.0125	0.0250							U
<b>LCS</b>	Sample ID: LCS-R405922	Units: mg/L		Analysis Date: 07-Apr-2022 13:48					
Client ID:	Run ID: UV-2450_405922	SeqNo: 6585528		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.245	0.0250	0.25	0	98.0	85 - 115			
<b>MS</b>	Sample ID: HS22040256-01MS	Units: mg/L		Analysis Date: 07-Apr-2022 13:48					
Client ID: LH18/24-SP650_040522	Run ID: UV-2450_405922	SeqNo: 6585523		PrepDate:		DF: 20			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	11.2	0.500	5	6.52	93.6	80 - 120			
<b>MSD</b>	Sample ID: HS22040256-01MSD	Units: mg/L		Analysis Date: 07-Apr-2022 13:48					
Client ID: LH18/24-SP650_040522	Run ID: UV-2450_405922	SeqNo: 6585522		PrepDate:		DF: 20			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	11.18	0.500	5	6.52	93.2	80 - 120	11.2	0.179	20
The following samples were analyzed in this batch: HS22040256-01									

ALS Houston, US

Date: 11-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22040256

**QC BATCH REPORT**

Batch ID: R406034 ( 0 )		Instrument: WetChem_HS		Method: AMMONIA AS N BY E350.3(ISE)						
<b>MBLK</b>	Sample ID: MBLK-R406034	Units: mg/L		Analysis Date: 08-Apr-2022 10:00						
Client ID:	Run ID: WetChem_HS_406034		SeqNo: 6588152		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	0.10	0.20								U
<b>LCS</b>	Sample ID: LCS-R406034	Units: mg/L		Analysis Date: 08-Apr-2022 10:00						
Client ID:	Run ID: WetChem_HS_406034		SeqNo: 6588151		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	10.12	0.20	10	0	101	80 - 120				
<b>MS</b>	Sample ID: HS22040256-01MS	Units: mg/L		Analysis Date: 08-Apr-2022 10:00						
Client ID: LH18/24-SP650_040522	Run ID: WetChem_HS_406034		SeqNo: 6588154		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	31.12	0.20	10	20.28	108	80 - 120				
<b>MSD</b>	Sample ID: HS22040256-01MSD	Units: mg/L		Analysis Date: 08-Apr-2022 10:00						
Client ID: LH18/24-SP650_040522	Run ID: WetChem_HS_406034		SeqNo: 6588153		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	30.51	0.20	10	20.28	102	80 - 120	31.12	1.98	20	
The following samples were analyzed in this batch: HS22040256-01										

**ALS Houston, US**

Date: 11-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22040256

**QUALIFIERS,  
ACRONYMS, UNITS**

<b>Qualifier</b>	<b>Description</b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

<b>Acronym</b>	<b>Description</b>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

---

**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

---

Agency	Number	Expire Date
Florida	E87611-34	30-Jun-2022
Illinois	2000322021-7	09-May-2022
Kansas	E-10352 2021-2022	31-Jul-2022
Kentucky	123043, 2021-2022	30-Apr-2022
Louisiana	03087, 2021-2022	30-Jun-2022
Texas	T104704231-21-28	30-Apr-2022

ALS Houston, US

Date: 11-Apr-22

## Sample Receipt Checklist

Work Order ID: HS22040256

Date/Time Received: 06-Apr-2022 09:40

Client Name: Bhate Environmental

Received by: Nelson D. Dusara

Completed By: /S/ Niles D. Ranchod

06-Apr-2022 13:11

Reviewed by: /S/ Ragen Giga

07-Apr-2022 12:47

eSignature

Date/Time

eSignature

Date/Time

Matrices: **WATER**Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?

Yes ☒No ☐Not Present ☐

Custody seals intact on shipping container/cooler?

Yes ☒No ☐Not Present ☐

Custody seals intact on sample bottles?

Yes ☐No ☐Not Present ☒

VOA/TX1005/TX1006 Solids in hermetically sealed vials?

Yes ☐No ☐Not Present ☒

Chain of custody present?

Yes ☒No ☐

1 Page(s)

Chain of custody signed when relinquished and received?

Yes ☒No ☐

COC IDs: CLIENT

Samplers name present on COC?

Yes ☒No ☐

Chain of custody agrees with sample labels?

Yes ☒No ☐

Samples in proper container/bottle?

Yes ☒No ☐

Sample containers intact?

Yes ☒No ☐

Sufficient sample volume for indicated test?

Yes ☒No ☐

All samples received within holding time?

Yes ☒No ☐

Container/Temp Blank temperature in compliance?

Yes ☒No ☐

Temperature(s)/Thermometer(s):

2.2°C/2.7°C UC/C

IR 31

Cooler(s)/Kit(s):

48093

Date/Time sample(s) sent to storage:

04/06/22 13:20

Water - VOA vials have zero headspace?

Yes ☒No ☐No VOA vials submitted ☐

Water - pH acceptable upon receipt?

Yes ☒No ☐N/A ☐

pH adjusted?

Yes ☐No ☒N/A ☐

pH adjusted by:

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:


Corrective Action:

## CHAIN OF CUSTODY

Name Of Lab Shipping To: ALS 10450 Stancliff Rd. Suite 210 Houston, TX. 77099 (281) 530-5656 ATTN: Ragen GigiPage 1 of 1

<b>Project:</b> BHATE LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS			<b>Project No.</b> NWO1312.0150.0 16.0001			<b>Analyses</b>										<b>Remarks</b> (Preservatives, etc.)	<b>Lab I.D.#</b>
<b>Job:</b> <b>GROUNDWATER TREATMENT PLANT WEEKLY SAMPLES</b>																	
<b>Prepared By:</b> Scott Beesinger			<b>P.O. Number</b>														
<b>Field Sample I.D.</b>	<b>Sample Matrix</b>	<b>Date / Time</b>	<b>MS / MSD</b>	<b>No. OF CONTAINERS</b>	<b>AMMONIA-N</b>	<b>TOTAL ORGANIC CARBON</b>	<b>ORTHO-PHOSPHATE</b>	<b>PERCHLORATE</b>									
LH18/24-SP650_040522	Water	04/05/22 / 14:00		3	X	X										H2SO4	
LH18/24-SP650_040522	Water	04/05/22 / 14:00		1			X									NONE	
LH18/24-SP650_040522_AIX	Water	04/05/22 / 14:00		1				X								NONE	
LH18/24-SP650_040522_BIX	Water	04/05/22 / 14:00		1				X								NONE	
<b>Additional Remarks: 24 HOUR TAT on PERCHLORATE. Standard TAT on all other parameters</b>																	
<b>Relinquished By:</b> <i>Scott Beesinger</i>	<b>Date</b> 04/05/22	<b>Time</b> 14:30	<b>Received By:</b> <i>Nelson</i>	<b>Date</b> 04/06/22	<b>Time</b> 9:40	<b>Relinquished By:</b>	<b>Date</b>	<b>Time</b>	<b>Received By:</b>	<b>Date</b>	<b>Time</b>						
<b>For Lab Use Only</b>																	
<b>Received At Lab By:</b>	<b>Date</b>	<b>Time</b>	<b>Airbill No.</b>	<b>Opened By:</b>	<b>Date</b>	<b>Time</b>	<b>Temp of Container</b>	<b>Seal No.</b>	<b>Condition</b>								
<b>Remarks:</b>  48093 202 C/F + 6-5 IP231																	
<b>HS22040256</b> Bhate Environmental Associates, Inc. Longhorn GW Treatment Plant Weekly Samples																	



 <b>ALS</b> 10450 Stancliff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5856 Fax. +1 281 530 5887	<b>CUSTODY SEAL</b> Date: <u>4/5/22</u> Time: <u>1430</u> Name: <u>Shirley</u> Company: <u>ABSGRA</u>		Seal Broken By: <u>SM</u> Date: <u>04/06/22</u>
	48093		

48093

Must Deliver Next Business Day  
 Time and Temperature Sensitive!



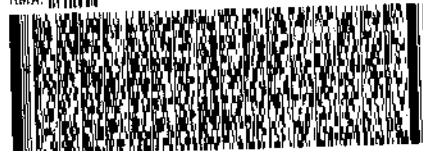
48093

ORIGIN ID: SGRA (903) 930-8193  
 ATT: MIKE MARTINEZ  
 APIM ENVIRONMENTAL & INFRASTR. INC  
 1203-B EAST GRAND AVE PHB202  
 MARSHALL, TX 75670  
 UNITED STATES US

SHIP DATE: 01JUN20  
 ACTWGT: 1.00 LB MAN  
 CAD: 300130/CAFE3211  
 DIMS: 26x14x14 IN

TO **CLIENT SERVICES**  
**ALS LABORATORY GROUP**  
**10450 STANCLIFF ROAD**  
**SUITE 210**  
**HOUSTON TX 77099**  
 (281) 530-5888

RMA: 01111111



FedEx Express



FedEx  
 TRK# 1891 8877 1467  
 0221

WED - 06 APR 10:30A  
 PRIORITY OVERNIGHT

AB SGRA

77099  
 TX-US IAH



RT 917 10:30 1467 04.06



April 07, 2022

Service Request No:E2200287

Ragen Giga  
ALS Environmental - US  
10450 Stancliff Rd Suite 210  
Houston, TX 77099

**Laboratory Results for: HS22040256**

Dear Ragen,

Enclosed are the results of the sample(s) submitted to our laboratory April 06, 2022  
For your reference, these analyses have been assigned our service request number **E2200287**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current TNI standards, where applicable, and except as noted in the laboratory case narrative provided. All results are intended to be considered in their entirety and ALS Environmental is not responsible for use of less than the complete final report. Results apply only to the items submitted to the laboratory, as received for analysis. In accordance with the current TNI Standard, a statement on the estimated uncertainty of measurement of any quantitative analysis will be supplied upon request.

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Corey Grandits  
Project Manager

ADDRESS 10450 Stancliff Rd., Suite 210, Houston, TX 77099  
PHONE +1 281 530 5656 | FAX +1 281 530 5887  
ALS Group USA, Corp.  
dba ALS Environmental





# Certificate of Analysis

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

**ALS Environmental**

**Client:** ALS-Houston  
**Project:** HS22040256  
**Sample Matrix:** W

**Service Request No.:** E2200287  
**Date Received:** 04/06/22

**CASE NARRATIVE**

All analyses were performed in adherence to the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II. When appropriate to the method, method blank results have been reported with each analytical test.

**Sample Receipt**

Two samples were received for analysis at ALS Environmental in Houston on 04/06/22.

The samples were received in good condition and are consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

**Data Validation Notes and Discussion****Precision and Accuracy:**

EQ2200135: Laboratory Control Spike/Duplicate Laboratory Control Spike (LCS/DLCS) samples were analyzed and reported in lieu of a MS/MSD for this extraction batch. The LCS-DLCS recoveries met acceptance criteria.

DoD Certification is held for the method/matrix/analytes provided in this report.

*The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.*

*Use of ALS group USA Corp dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.*

**Client:** ALS Environmental - US  
**Project:** HS22040256

**Service Request:**E2200287

**SAMPLE CROSS-REFERENCE**

<u>SAMPLE #</u>	<u>CLIENT SAMPLE ID</u>	<u>DATE</u>	<u>TIME</u>
E2200287-001	LH18/24-SP650_040522_AIX	4/5/2022	1400
E2200287-002	LH18/24-SP650_040522_BIX	4/5/2022	1400

**Service Request Summary**

**Folder #:** E2200287  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22040256  
**Project Number:**  
  
**Report To:** Ragen Giga  
 ALS Environmental - US  
 10450 Standliff Rd Suite 210  
 Houston, TX 77099  
 USA  
  
**Phone Number:**  
**Cell Number:**  
**Fax Number:**  
**E-mail:** ragenp.giga@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 04/06/22  
**Internal Due Date:** 4/7/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22040256  
**EDD:** No EDD Specified

2 120 mL-Plastic Bottle Natural WM Unpreserved  
**Location:** EHRMS-AirArch 1  
**Pressure Gas:**  
**Rush**

				HOUSTON
Lab Samp No.	Client Samp No	Matrix	Collected	CIO4 DOD/6850
E2200287-001	LH18/24-SP650_040522_AIX	Water	04/05/22 1400	IV
E2200287-002	LH18/24-SP650_040522_BIX	Water	04/05/22 1400	IV

**Service Request Summary**

**Folder #:** E2200287  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22040256  
**Project Number:**  
  
**Report To:** Ragen Giga  
 ALS Environmental - US  
 10450 Standliff Rd Suite 210  
 Houston, TX 77099  
 USA  
  
**Phone Number:**  
**Cell Number:**  
**Fax Number:**  
**E-mail:** ragenp.giga@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 04/06/22  
**Internal Due Date:** 4/7/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22040256  
**EDD:** No EDD Specified

2 120 mL-Plastic Bottle Natural WM Unpreserved  
**Location:** EHRMS-AirArch 1  
**Pressure Gas:**  
**Rush**

**Test Comments:**

Group	Test/Method	Samples	Comments
Semivola GCMS	CIO4 DOD/6850	2	IV DUE 4/27

## Data Qualifiers

### Lab Standard

- + Possible Tedlar bag artifact.
- A TIC is a suspected aldol-condensation product
- B Analyte found in the associated method blank as well as in the sample.
- BC Reported results are not blank corrected.
- BH The back section of the tube yielded higher results than the front.
- BT Results indicated possible breakthrough; back section  $\geq 10\%$  front section.
- C Result identification confirmed.
- D Compound identified in an analysis at a secondary dilution factor
- D Spike was diluted out
- DE Reported results are corrected for desorption efficiency.
- E Estimated value. Concentration above calibration range
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- H1 Sample analysis performed past holding time. See case narrative.
- H2 Initial analysis within holding time. Reanalysis for the required dilution was past holding time.
- H3 Sample was received and analyzed past holding time.
- H4 Sample was extracted past required extraction holding time, but analyzed within analysis holding time. See case narrative.
- I Internal standard not within the specified limits. See case narrative.
- J Estimated Value. Concentration found below MRL.
- K (Auto) The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- K A deflection in the QC ion may indicate interference with the quantitation of this ion. The concentration of this analyte should be considered as an estimate.
- K Analyte was detected above the method reporting limit prior to normalization.
- K The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- L1 Laboratory control sample recovery outside the specified limits; results may be biased high.
- L2 Laboratory control sample recovery outside the specified limits; results may be biased low.
- L3 Laboratory control sample recovery outside the specified limits.
- M Matrix interference; results may be biased high.
- M The duplicate injection precision not met.
- M1 Matrix interference due to coelution with a non-target compound; results may be biased high.

## Data Qualifiers

### Lab Standard

- N Presumptive evidence of a compound for TICs that have been identified based on a mass spectral library search.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- P Indicates chlorodiphenyl ether interference present at the retention time of the target compound.
- P Pesticide/Aroclor target analyte > 40% difference for detected concentrations between GC columns
- Q Indicates as estimated value because the P and P + 2 theoretical abundance ratio does not meet method criteria.
- R Duplicate Precision not met.
- R1 Duplicate precision not within the specified limits; however, the results are below the MRL and considered estimated.
- S Surrogate recovery not within specified limits.
- S The reported value was determined by the Method of Standard Additions (MSA).
- T Analyte is a tentatively identified compound, result is estimated.
- U Compound was analyzed for, but was not detected (ND).
- V1 The continuing calibration verification standard was outside (biased high) the specified limits for this compound.
- V2 The continuing calibration verification standard was outside (biased low) the specified limits for this compound.
- W Result quantified, but the corresponding peak was detected outside the generated retention time window.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- X See case narrative.
- Y Recovery outside limits
- Y The chromatogram resembles a petroleum product but does not match the calibration standard.
- Z The chromatogram does not resemble a petroleum product.
- i The MRL/MDL has been elevated due to a matrix interference.

## ALS Laboratory Group

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### Acronyms

Cal	Calibration
Conc	CONCEntration
Dioxin(s)	Polychlorinated dibenzo-p-dioxin(s)
EDL	Estimated Detection Limit
EMPC	Estimated Maximum Possible Concentration
Flags	Data qualifiers
Furan(s)	Polychlorinated dibenzofuran(s)
g	Grams
ICAL	Initial CALibration
ID	IDentifier
Ions	Masses monitored for the analyte during data acquisition
L	Liter (s)
LCS	Laboratory Control Sample
DLCS	Duplicate Laboratory Control Sample
MB	Method Blank
MCL	Method Calibration Limit
MDL	Method Detection Limit
mL	Milliliters
MS	Matrix Spiked sample
DMS	Duplicate Matrix Spiked sample
NO	Number of peaks meeting all identification criteria
PCDD(s)	Polychlorinated dibenzo-p-dioxin(s)
PCDF(s)	Polychlorinated dibenzofuran(s)
ppb	Parts per billion
ppm	Parts per million
ppq	Parts per quadrillion
ppt	Parts per trillion
QA	Quality Assurance
QC	Quality Control
Ratio	Ratio of areas from monitored ions for an analyte
% Rec.	Percent recovery
RPD	Relative Percent Difference
RRF	Relative Response Factor
RT	Retention Time
SDG	Sample Delivery Group
S/N	Signal-to-noise ratio
TEF	Toxicity Equivalence Factor
TEQ	Toxicity Equivalence Quotient





## State Certifications, Accreditations, and Licenses

Agency	Number	Expire Date
Arizona Department of Health Services	AZ0793-2022	5/27/2022
California Department of Health Services	2919	4/30/2022
California Department of Health Services	2919-2022	4/30/2022
Florida Department of Health	E87611-34	6/30/2022
Hawaii Department of Health	2021-2022	4/30/2022
Illinois Environmental Protection Agency	2000322021-7	5/9/2022
Kansas Department of Health and Environment	E-10352 2022	7/31/2022
Louisiana Department of Environmental Quality	03087-2021	6/30/2022
Louisiana Department of Environmental Quality	03087-2020	6/30/2022
Louisiana Department of Health and Hospitals	LA028	12/31/2022
Maine Department of Health and Human Services	2020016	6/5/2022
Maryland Department of the Environment	343	6/30/2022
Michigan Department of Environmental Quality	9971	4/30/2022
Minnesota Department of Health	2228443	12/31/2022
Nebraska Department of Health and Human Services	NE-OS-25-13	4/30/2022
Nevada Department of Conservation and Natural Resources	TX026932022-1	7/31/2022
New Hampshire Environmental Laboratory Accreditation Program	209421	4/24/2022
New Hampshire Environmental Laboratory Accreditation Program	209419	4/24/2022
New Jersey Department of Environmental Protection	TX008	6/30/2022
New York Department of Health	11707	3/31/2023
Oklahoma Department of Environmental Quality	2021-080	8/31/2022
Pennsylvania Department of Environmental Protection	68-03441-015	6/30/2022
Tennessee Department of Environment and Conservation	04016	4/30/2022
Tennessee Department of Environment and Conservation	04016-2021	4/30/2022
Texas Commission on Environmental Quality	T104704231-21-28	4/30/2022
Texas Commission on Environmental Quality	T104704231-21-27	4/30/2022
United States Department of Agriculture	P330-19-00299	10/10/2022
Utah Department of Health Environmental Laboratory Certification	TX026932021-12	7/31/2022
Washington Department of Health	C819-2022	11/14/2022



## Chain of Custody

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)



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F: +1 281 530 5887  
[www.alsglobal.com](http://www.alsglobal.com)

## Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 18502

**SUBCONTRACT TO:**

ALS Environmental  
10450 Stancliff Road Suite 210  
Houston, TX 77084

**Phone:** +1 281 530 5656

**CUSTOMER INFORMATION:**

**Company:** ALS Houston  
**Contact:** Ragen Giga  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Email:** RagenP.Giga@ALSGlobal.com  
**Alternate Contact:** Jumoke M. Lawal  
**Email:** jumoke.lawal@alsglobal.com

**INVOICE INFORMATION:**

**Company:** ALS Houston  
**Contact:** Accounts Payable  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Reference:** HS22040256  
**TSR:** Houston House Acct

	LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
	ANALYSIS REQUESTED			DUE DATE
1.	HS22040256-02	LH18/24-SP650_040522_AIX	Water	05 Apr 2022 14:00
	6850-Perch. DOD Level II & Level IV in separate pdf			07 Apr 2022
2.	HS22040256-03	LH18/24-SP650_040522_BIX	Water	05 Apr 2022 14:00
	6850-Perch. DOD Level II & Level IV in separate pdf			07 Apr 2022

**Comments:** Please analyze for the analysis listed above.  
Send report to the emails shown above.  
**24 HR TAT**

**QC Level:** DOD IV (DoD Data Package)

Relinquished By: \_\_\_\_\_

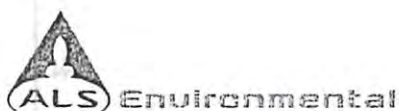
Date/Time: \_\_\_\_\_

Received By: \_\_\_\_\_

Date/Time: \_\_\_\_\_

Cooler ID(s): \_\_\_\_\_

Temperature(s): \_\_\_\_\_



## Cooler Receipt Form

Project Chemist

CH

Client/Project

AU-H

Thermometer ID

1021

Date/Time Received:

4-6-22

Initials:

Date/Time Logged in:

4-6-22

Initials

CH

1. Method of delivery: ☐ US Mail ☐ Fed Ex ☐ UPS ☐ DHL ☒ Courier ☐ Client2. Samples received in: ☒ Cooler ☐ Box ☐ Envelope ☐ Other

3. Were custody seals on coolers? ☐ Yes ☒ No

Were they intact? ☐ Yes ☐ No ☒ N/A

Were they signed and dated? ☐ Yes ☐ No ☒ N/A

If yes, how many and where?

4. Packing Material: ☐ Inserts ☒ Baggies ☐ Bubble Wrap ☐ Gel Packs ☒ Wet Ice ☐ Sleeves ☐ Other5. Foreign or Regulated Soil? ☐ Yes ☐ No Location of Sampling:

Cooler Tracking Number	COC ID	Date Opened	Time Opened	Opened By	Temp. °C	Temp Blank?
NA		4-6-22	1332	CH	2.7	<input checked="" type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>

6. Were custody papers properly filled out (ink, signed, dated, etc)? ☒ Yes ☐ No7. Did all bottles arrive in good condition (not broken, no signs of leakage)? ☒ Yes ☐ No8. Were all sample labels complete (i.e., sample ID, analysis, preservation, etc)? ☒ Yes ☐ No9. Were appropriate bottles/containers and volumes received for the requested tests? ☒ Yes ☐ No10. Did sample labels and tags agree with custody documents? ☒ Yes ☐ No

Notes, Discrepancies, &amp; Resolutions:

Service request Label:

237



10450 Stancliff Rd., Suite 210  
Houston, TX 77099  
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F: +1 713 266 1599  
[www.alsglobal.com](http://www.alsglobal.com)

## SAMPLE ACCEPTANCE POLICY

This policy outlines the criteria samples must meet to be accepted by ALS Environmental – Houston HRMS.

### **Cooler Custody Seals (desirable, mandatory if specified in SAP):**

- ✓ Intact on outside of cooler, signed and dated

### **Chain-of-Custody (COC) documentation (mandatory):**

The following is required on each COC:

- ✓ Sample ID, the location, date and time of collection, collector's name, preservation type, sample type, and any other special remarks concerning the sample. The COC must be completed in ink.
- ✓ Signature and date of relinquishing party.

In the absence of a COC at sample receipt, the COC will be requested from the client.

### **Sample Integrity (mandatory):**

Samples are inspected upon arrival to ensure that sample integrity was not compromised during transfer to the laboratory.

- ✓ Sample containers must arrive in good condition (not broken or leaking).
- ✓ Samples must be labeled appropriately, including Sample IDs, and requested test using durable labels and indelible ink.
- ✓ The correct type of sample bottle must be used for the method requested.
- ✓ An appropriate sample volume, or weight, must be received.
- ✓ Sample IDs and number of containers must reconcile with the COC.
- ✓ Samples must be received within the method defined holding time.

### **Temperature Requirement (varies by sample matrix):**

- ✓ Aqueous and Non-aqueous samples must be shipped and stored cold, at 0 to 6°C.
- ✓ Tissue samples must be shipped and stored frozen, at -20 to -10°C.
- ✓ Air samples are shipped and stored cold, at 0 to 6°C
- ✓ The sample temperature must be recorded on the COC

All cooler inspections are documented on the Cooler Receipt Form (CRF). A separate CRF is completed for each service request. Any samples not meeting the above criteria are noted on the CRF and the Project Manager notified. The Project Manager must resolve any sample integrity issues with the client prior to proceeding with the analysis. Such resolutions are documented in writing and filed with the project folder. Data associated with samples received outside of this acceptance policy will be qualified on the case narrative of the final report.



## Preparation Information Benchsheets

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

# Preparation Information Benchsheet

01122517

Prep Run#: 397703  
Team: Semivoa GCMS/GRIVERA

Prep WorkFlow: GenExt28Day  
Prep Method: Method

Status: Prepped  
Prep Date/Time: 4/6/22 13:40

#	Lab Code	Client ID	B#	Method /Test	pH	Cl	Matrix	Amt. Ext.	Sample Description
1	E2200287-001	LH18/24-SP650_040522_AIX	.01	6850/ClO4 DOD			Water	10mL	
2	E2200287-002	LH18/24-SP650_040522_BIX	.01	6850/ClO4 DOD			Water	10mL	
3	EQ2200135-01	MB		6850/ClO4 DOD			Liquid	10mL	
4	EQ2200135-02	LCS		6850/ClO4 DOD			Liquid	10mL	
5	EQ2200135-03	DLCS		6850/ClO4 DOD			Liquid	10mL	

## Spiking Solutions

Name:	Perchlorate Internal Standard 1ug/mL			Inventory ID	221408		Logbook Ref:	Perchlorate Internal Standard			Expires On:	04/30/2022		
E2200287-001	100.00µL		E2200287-002	100.00µL		EQ2200135-01	100.00µL		EQ2200135-02	100.00µL		EQ2200135-03	100.00µL	
Name:	Perchlorate Intermediate Stock1			Inventory ID	221456		Logbook Ref:	Perchlorate			Expires On:	04/30/2022		
EQ2200135-02	1.00µL		EQ2200135-03	1.00µL										

## Preparation Materials

Water HPLC Grade	08/03/2021 Water (218532)	6850 Amber Glass screw vial	2mL Screw Top Vial (221894)	537M Glass Culture Tubes	537M Glass Tubes (218064)
6850 0.45um syringe filters	6850 Syringe Filters (219639)	6850 Luer-Lok Syringes	Luer-Lok Syringes (221305)	6850 Pipette Tips 50-1000 uL	6850 Pipette Tips (221929)

## Preparation Steps

Step: Preparation  
Started: 4/6/22 13:40  
Finished: 4/6/22 14:00  
By: GRIVERA  
Comments

Comments: \_\_\_\_\_

Reviewed By: GR Date: 4/6/22

## Chain of Custody

Relinquished By: _____	Date: _____	<u>Extracts Examined</u> Yes No
Received By: _____	Date: _____	



# Analytical Results

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)



## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22040256  
**Sample Matrix:** Water  
**Sample Name:** LH18/24-SP650\_040522\_AIX  
**Lab Code:** E2200287-001

**Service Request:** E2200287  
**Date Collected:** 4/ 5/22 1400  
**Date Received:** 4/ 6/22  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	1.32		0.100	0.0500	0.0250	1	4/ 6/22	4/7/22 11:17	397703	759892	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22040256  
**Sample Matrix:** Water  
**Sample Name:** LH18/24-SP650\_040522\_BIX  
**Lab Code:** E2200287-002

**Service Request:** E2200287  
**Date Collected:** 4/ 5/22 1400  
**Date Received:** 4/ 6/22  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	195		2.00	1.00	0.500	20	4/ 6/22	4/7/22 13:48	397703	759892	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22040256  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** EQ2200135-01

**Service Request:** E2200287  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	0.100	0.0500	0.0250	1	4/ 6/22	4/7/22 10:54	397703	759892	



## Accuracy & Precision

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS22040256  
**Sample Matrix:** Water

**Service Request:** E2200287**Date Analyzed:** 4/ 7/22

## Lab Control Sample Summary

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

**Units:** µg/L**Basis:** NA**Extraction Lot:** 397703

Analyte Name	Lab Control Sample EQ2200135-02			Duplicate Lab Control Sample EQ2200135-03			% Rec Limits	RPD	RPD Limit
	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Perchlorate	0.101	0.100	101	0.111	0.100	111	84 - 119	9	15

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22040256  
**Sample Matrix:** Water  
**Sample Name:** Lab Control Sample  
**Lab Code:** EQ2200135-02

**Service Request:** E2200287  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.101		0.100	0.0500	0.0250	1	4/ 6/22	4/7/22 11:02	397703	759892	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22040256  
**Sample Matrix:** Water  
**Sample Name:** Duplicate Lab Control Sample  
**Lab Code:** EQ2200135-03

**Service Request:** E2200287  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.111		0.100	0.0500	0.0250	1	4/ 6/22	4/7/22 11:10	397703	759892	



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10450 Stancliff Rd. Suite 210  
Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887

April 20, 2022

Marcia Olive  
Bhate Environmental Associates, Inc.  
445 Union Blvd Ste 129  
Lakewood, CO 80228

Work Order: **HS22040258**

Laboratory Results for: **Longhorn GW Treatment Plant Bi-Weekly Samples**

Dear Marcia Olive,

ALS Environmental received 2 sample(s) on Apr 06, 2022 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: JUMOKE.LAWAL

Ragen Giga  
Project Manager



ALS Houston, US

Date: 20-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**Work Order:** HS22040258

**SAMPLE SUMMARY**

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS22040258-01	LH18/24-SP650_040522	Water		05-Apr-2022 14:00	06-Apr-2022 09:40	<input type="checkbox"/>
HS22040258-02	Trip Blank	Water		05-Apr-2022 14:00	06-Apr-2022 09:40	<input type="checkbox"/>

**ALS Houston, US**

Date: 20-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**Work Order:** HS22040258

**CASE NARRATIVE****Work Order Comments**

- The analysis for Perchlorate was subcontracted to ALS Houston High-Res Lab. Final report attached

**GCMS Volatiles by Method SW8260****Batch ID: R406317****Sample ID: LH18/24-SP650\_040522(HS22040258-01MSD)**

- The RPD between the MS and MSD was outside of the control limit. Naphthalene

**WetChemistry by Method SW9056****Batch ID: R406832**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

## ALS Houston, US

Date: 20-Apr-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Bi-Weekly Samples  
 Sample ID: LH18/24-SP650\_040522  
 Collection Date: 05-Apr-2022 14:00

## ANALYTICAL REPORT

WorkOrder: HS22040258  
 Lab ID: HS22040258-01  
 Matrix: Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD</b>		<b>Method: SW8260</b>						Analyst: PC
<b>8260C</b>								
1,1,1,2-Tetrachloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 15:07
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 15:07
1,1,2,2-Tetrachloroethane	1.0	U	0.50	1.0	1.0	ug/L	1	12-Apr-2022 15:07
1,1,2-Trichloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 15:07
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 15:07
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 15:07
1,1-Dichloropropene	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 15:07
1,2,3-Trichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	12-Apr-2022 15:07
1,2,3-Trichloropropane	1.0	U	0.50	1.0	1.0	ug/L	1	12-Apr-2022 15:07
1,2,4-Trichlorobenzene	1.0	U	0.50	1.0	1.0	ug/L	1	12-Apr-2022 15:07
1,2,4-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 15:07
1,2-Dibromo-3-chloropropane	1.0	U	0.20	1.0	1.0	ug/L	1	12-Apr-2022 15:07
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 15:07
1,2-Dichlorobenzene	1.0	U	0.50	1.0	1.0	ug/L	1	12-Apr-2022 15:07
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 15:07
1,2-Dichloropropane	1.0	U	0.50	1.0	1.0	ug/L	1	12-Apr-2022 15:07
1,3,5-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 15:07
1,3-Dichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	12-Apr-2022 15:07
1,3-Dichloropropane	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 15:07
1,4-Dichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	12-Apr-2022 15:07
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 15:07
2-Butanone	1.0	U	0.50	1.0	2.0	ug/L	1	12-Apr-2022 15:07
2-Chlorotoluene	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 15:07
2-Hexanone	2.0	U	1.0	2.0	2.0	ug/L	1	12-Apr-2022 15:07
4-Chlorotoluene	1.0	U	0.40	1.0	1.0	ug/L	1	12-Apr-2022 15:07
4-Isopropyltoluene	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 15:07
4-Methyl-2-pentanone	2.0	U	0.70	2.0	2.0	ug/L	1	12-Apr-2022 15:07
Acetone	2.0	U	0.40	2.0	2.0	ug/L	1	12-Apr-2022 15:07
Benzene	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 15:07
Bromobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	12-Apr-2022 15:07
Bromochloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 15:07
Bromodichloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 15:07
Bromoform	1.0	U	0.40	1.0	1.0	ug/L	1	12-Apr-2022 15:07
Bromomethane	1.0	U	0.40	1.0	1.0	ug/L	1	12-Apr-2022 15:07
Carbon disulfide	2.0	U	0.60	2.0	2.0	ug/L	1	12-Apr-2022 15:07
Carbon tetrachloride	1.0	U	0.50	1.0	1.0	ug/L	1	12-Apr-2022 15:07
Chlorobenzene	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 15:07
Chloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 15:07
Chloroform	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 15:07

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 20-Apr-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Bi-Weekly Samples  
 Sample ID: LH18/24-SP650\_040522  
 Collection Date: 05-Apr-2022 14:00

## ANALYTICAL REPORT

WorkOrder:HS22040258  
 Lab ID:HS22040258-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD 8260C</b>		<b>Method:SW8260</b>						Analyst: PC
Chloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 15:07
<b>cis-1,2-Dichloroethene</b>	<b>1.6</b>		<b>0.20</b>	<b>0.50</b>	<b>1.0</b>	<b>ug/L</b>	1	12-Apr-2022 15:07
cis-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 15:07
Dibromochloromethane	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 15:07
Dibromomethane	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 15:07
Dichlorodifluoromethane	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 15:07
Ethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 15:07
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	ug/L	1	12-Apr-2022 15:07
Isopropylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 15:07
m,p-Xylene	1.0	U	0.50	1.0	2.0	ug/L	1	12-Apr-2022 15:07
Methylene chloride	2.0	U	0.40	2.0	2.0	ug/L	1	12-Apr-2022 15:07
n-Butylbenzene	1.0	U	0.40	1.0	1.0	ug/L	1	12-Apr-2022 15:07
n-Propylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 15:07
Naphthalene	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 15:07
o-Xylene	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 15:07
sec-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 15:07
Styrene	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 15:07
tert-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 15:07
Tetrachloroethene	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 15:07
Toluene	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 15:07
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 15:07
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 15:07
Trichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 15:07
Trichlorofluoromethane	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 15:07
Vinyl chloride	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 15:07
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>99.5</i>			<b>0</b>	<i>81-118</i>	<b>%REC</b>	<i>1</i>	<i>12-Apr-2022 15:07</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>102</i>			<b>0</b>	<i>85-114</i>	<b>%REC</b>	<i>1</i>	<i>12-Apr-2022 15:07</i>
<i>Surr: Dibromofluoromethane</i>	<i>93.8</i>			<b>0</b>	<i>80-119</i>	<b>%REC</b>	<i>1</i>	<i>12-Apr-2022 15:07</i>
<i>Surr: Toluene-d8</i>	<i>106</i>			<b>0</b>	<i>89-112</i>	<b>%REC</b>	<i>1</i>	<i>12-Apr-2022 15:07</i>
<b>ANIONS BY SW9056A</b>		<b>Method:SW9056</b>						Analyst: YP
<b>Chloride</b>	<b>794</b>		<b>4.00</b>	<b>10.0</b>	<b>10.0</b>	<b>mg/L</b>	20	18-Apr-2022 19:48
<b>Sulfate</b>	<b>29.2</b>		<b>0.200</b>	<b>0.500</b>	<b>0.500</b>	<b>mg/L</b>	1	18-Apr-2022 19:42

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 20-Apr-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Bi-Weekly Samples  
 Sample ID: Trip Blank  
 Collection Date: 05-Apr-2022 14:00

## ANALYTICAL REPORT

WorkOrder:HS22040258  
 Lab ID:HS22040258-02  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD</b>		<b>Method:SW8260</b>						Analyst: PC
<b>8260C</b>								
1,1,1,2-Tetrachloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 18:37
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 18:37
1,1,2,2-Tetrachloroethane	1.0	U	0.50	1.0	1.0	ug/L	1	12-Apr-2022 18:37
1,1,2-Trichloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 18:37
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 18:37
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 18:37
1,1-Dichloropropene	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 18:37
1,2,3-Trichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	12-Apr-2022 18:37
1,2,3-Trichloropropane	1.0	U	0.50	1.0	1.0	ug/L	1	12-Apr-2022 18:37
1,2,4-Trichlorobenzene	1.0	U	0.50	1.0	1.0	ug/L	1	12-Apr-2022 18:37
1,2,4-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 18:37
1,2-Dibromo-3-chloropropane	1.0	U	0.20	1.0	1.0	ug/L	1	12-Apr-2022 18:37
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 18:37
1,2-Dichlorobenzene	1.0	U	0.50	1.0	1.0	ug/L	1	12-Apr-2022 18:37
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 18:37
1,2-Dichloropropane	1.0	U	0.50	1.0	1.0	ug/L	1	12-Apr-2022 18:37
1,3,5-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 18:37
1,3-Dichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	12-Apr-2022 18:37
1,3-Dichloropropane	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 18:37
1,4-Dichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	12-Apr-2022 18:37
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 18:37
2-Butanone	1.0	U	0.50	1.0	2.0	ug/L	1	12-Apr-2022 18:37
2-Chlorotoluene	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 18:37
2-Hexanone	2.0	U	1.0	2.0	2.0	ug/L	1	12-Apr-2022 18:37
4-Chlorotoluene	1.0	U	0.40	1.0	1.0	ug/L	1	12-Apr-2022 18:37
4-Isopropyltoluene	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 18:37
4-Methyl-2-pentanone	2.0	U	0.70	2.0	2.0	ug/L	1	12-Apr-2022 18:37
Acetone	2.0	U	0.40	2.0	2.0	ug/L	1	12-Apr-2022 18:37
Benzene	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 18:37
Bromobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	12-Apr-2022 18:37
Bromochloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 18:37
Bromodichloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 18:37
Bromoform	1.0	U	0.40	1.0	1.0	ug/L	1	12-Apr-2022 18:37
Bromomethane	1.0	U	0.40	1.0	1.0	ug/L	1	12-Apr-2022 18:37
Carbon disulfide	2.0	U	0.60	2.0	2.0	ug/L	1	12-Apr-2022 18:37
Carbon tetrachloride	1.0	U	0.50	1.0	1.0	ug/L	1	12-Apr-2022 18:37
Chlorobenzene	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 18:37
Chloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 18:37
Chloroform	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 18:37

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 20-Apr-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Bi-Weekly Samples  
 Sample ID: Trip Blank  
 Collection Date: 05-Apr-2022 14:00

## ANALYTICAL REPORT

WorkOrder: HS22040258  
 Lab ID: HS22040258-02  
 Matrix: Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD</b>		<b>Method: SW8260</b>						Analyst: PC
<b>8260C</b>								
Chloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 18:37
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 18:37
cis-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 18:37
Dibromochloromethane	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 18:37
Dibromomethane	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 18:37
Dichlorodifluoromethane	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 18:37
Ethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 18:37
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	ug/L	1	12-Apr-2022 18:37
Isopropylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 18:37
m,p-Xylene	1.0	U	0.50	1.0	2.0	ug/L	1	12-Apr-2022 18:37
Methylene chloride	2.0	U	0.40	2.0	2.0	ug/L	1	12-Apr-2022 18:37
n-Butylbenzene	1.0	U	0.40	1.0	1.0	ug/L	1	12-Apr-2022 18:37
n-Propylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 18:37
Naphthalene	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 18:37
o-Xylene	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 18:37
sec-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 18:37
Styrene	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 18:37
tert-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 18:37
Tetrachloroethene	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 18:37
Toluene	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 18:37
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 18:37
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 18:37
Trichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 18:37
Trichlorofluoromethane	1.0	U	0.30	1.0	1.0	ug/L	1	12-Apr-2022 18:37
Vinyl chloride	0.50	U	0.20	0.50	1.0	ug/L	1	12-Apr-2022 18:37
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>100</i>			<b>0</b>	<i>81-118</i>	<b>%REC</b>	<i>1</i>	<i>12-Apr-2022 18:37</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>100</i>			<b>0</b>	<i>85-114</i>	<b>%REC</b>	<i>1</i>	<i>12-Apr-2022 18:37</i>
<i>Surr: Dibromofluoromethane</i>	<i>94.7</i>			<b>0</b>	<i>80-119</i>	<b>%REC</b>	<i>1</i>	<i>12-Apr-2022 18:37</i>
<i>Surr: Toluene-d8</i>	<i>108</i>			<b>0</b>	<i>89-112</i>	<b>%REC</b>	<i>1</i>	<i>12-Apr-2022 18:37</i>

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US

Date: 20-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22040258

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> R406317 ( 0 )		<b>Test Name :</b> VOLATILES ORGANICS BY METHOD 8260C			<b>Matrix:</b> Water	
HS22040258-01	LH18/24-SP650_040522	05 Apr 2022 14:00			12 Apr 2022 15:07	1
HS22040258-02	Trip Blank	05 Apr 2022 14:00			12 Apr 2022 18:37	1
<b>Batch ID:</b> R406832 ( 0 )		<b>Test Name :</b> ANIONS BY SW9056A			<b>Matrix:</b> Water	
HS22040258-01	LH18/24-SP650_040522	05 Apr 2022 14:00			18 Apr 2022 19:48	20
HS22040258-01	LH18/24-SP650_040522	05 Apr 2022 14:00			18 Apr 2022 19:42	1

## ALS Houston, US

Date: 20-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22040258

## QC BATCH REPORT

Batch ID: R406317 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
<b>MBLK</b>	Sample ID: VBLKW-220412	Units: ug/L		Analysis Date: 12-Apr-2022 14:46					
Client ID:	Run ID: VOA6_406317	SeqNo: 6594675		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	1.0	1.0							U
1,1,1-Trichloroethane	0.50	1.0							U
1,1,2,2-Tetrachloroethane	1.0	1.0							U
1,1,2-Trichloroethane	1.0	1.0							U
1,1-Dichloroethane	0.50	1.0							U
1,1-Dichloroethene	0.50	1.0							U
1,1-Dichloropropene	1.0	1.0							U
1,2,3-Trichlorobenzene	1.0	1.0							U
1,2,3-Trichloropropane	1.0	1.0							U
1,2,4-Trichlorobenzene	1.0	1.0							U
1,2,4-Trimethylbenzene	1.0	1.0							U
1,2-Dibromo-3-chloropropane	1.0	1.0							U
1,2-Dibromoethane	0.50	1.0							U
1,2-Dichlorobenzene	1.0	1.0							U
1,2-Dichloroethane	0.50	1.0							U
1,2-Dichloropropane	1.0	1.0							U
1,3,5-Trimethylbenzene	1.0	1.0							U
1,3-Dichlorobenzene	1.0	1.0							U
1,3-Dichloropropane	1.0	1.0							U
1,4-Dichlorobenzene	1.0	1.0							U
2,2-Dichloropropane	0.50	1.0							U
2-Butanone	1.0	2.0							U
2-Chlorotoluene	1.0	1.0							U
2-Hexanone	2.0	2.0							U
4-Chlorotoluene	1.0	1.0							U
4-Isopropyltoluene	1.0	1.0							U
4-Methyl-2-pentanone	2.0	2.0							U
Acetone	2.0	2.0							U
Benzene	0.50	1.0							U
Bromobenzene	1.0	1.0							U
Bromochloromethane	0.50	1.0							U
Bromodichloromethane	0.50	1.0							U
Bromoform	1.0	1.0							U
Bromomethane	1.0	1.0							U



## ALS Houston, US

Date: 20-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22040258

## QC BATCH REPORT

Batch ID: R406317 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
<b>MBLK</b>	Sample ID: VBLKW-220412	Units: ug/L		Analysis Date: 12-Apr-2022 14:46					
Client ID:	Run ID: VOA6_406317	SeqNo: 6594675		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	2.0	2.0							U
Carbon tetrachloride	1.0	1.0							U
Chlorobenzene	1.0	1.0							U
Chloroethane	1.0	1.0							U
Chloroform	0.50	1.0							U
Chloromethane	0.50	1.0							U
cis-1,2-Dichloroethene	0.50	1.0							U
cis-1,3-Dichloropropene	0.50	1.0							U
Dibromochloromethane	1.0	1.0							U
Dibromomethane	0.50	1.0							U
Dichlorodifluoromethane	1.0	1.0							U
Ethylbenzene	1.0	1.0							U
Hexachlorobutadiene	1.0	1.0							U
Isopropylbenzene	1.0	1.0							U
m,p-Xylene	1.0	2.0							U
Methylene chloride	2.0	2.0							U
Naphthalene	1.0	1.0							U
n-Butylbenzene	1.0	1.0							U
n-Propylbenzene	1.0	1.0							U
o-Xylene	1.0	1.0							U
sec-Butylbenzene	1.0	1.0							U
Styrene	1.0	1.0							U
tert-Butylbenzene	1.0	1.0							U
Tetrachloroethene	1.0	1.0							U
Toluene	0.50	1.0							U
trans-1,2-Dichloroethene	0.50	1.0							U
trans-1,3-Dichloropropene	0.50	1.0							U
Trichloroethene	0.50	1.0							U
Trichlorofluoromethane	1.0	1.0							U
Vinyl chloride	0.50	1.0							U
Surr: 1,2-Dichloroethane-d4	51.87	1.0	50	0	104	81 - 118			
Surr: 4-Bromofluorobenzene	50.43	1.0	50	0	101	85 - 114			
Surr: Dibromofluoromethane	46.95	1.0	50	0	93.9	80 - 119			
Surr: Toluene-d8	52.56	1.0	50	0	105	89 - 112			

## ALS Houston, US

Date: 20-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22040258

## QC BATCH REPORT

Batch ID: R406317 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
LCS		Sample ID: VLCSW-220412		Units: ug/L		Analysis Date: 12-Apr-2022 14:03			
Client ID:		Run ID: VOA6_406317		SeqNo: 6594673		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	19.45	1.0	20	0	97.3	78 - 124			
1,1,1-Trichloroethane	20.61	1.0	20	0	103	74 - 131			
1,1,2,2-Tetrachloroethane	20.65	1.0	20	0	103	71 - 121			
1,1,2-Trichloroethane	21.04	1.0	20	0	105	80 - 119			
1,1-Dichloroethane	21.99	1.0	20	0	110	77 - 125			
1,1-Dichloroethene	19.36	1.0	20	0	96.8	71 - 131			
1,1-Dichloropropene	19.38	1.0	20	0	96.9	78 - 125			
1,2,3-Trichlorobenzene	21.71	1.0	20	0	109	69 - 129			
1,2,3-Trichloropropane	21.08	1.0	20	0	105	73 - 122			
1,2,4-Trichlorobenzene	20.84	1.0	20	0	104	69 - 130			
1,2,4-Trimethylbenzene	19.78	1.0	20	0	98.9	76 - 124			
1,2-Dibromo-3-chloropropane	19.4	1.0	20	0	97.0	62 - 128			
1,2-Dibromoethane	20.72	1.0	20	0	104	77 - 121			
1,2-Dichlorobenzene	19.44	1.0	20	0	97.2	80 - 119			
1,2-Dichloroethane	20.99	1.0	20	0	105	73 - 128			
1,2-Dichloropropane	21.06	1.0	20	0	105	78 - 122			
1,3,5-Trimethylbenzene	19.51	1.0	20	0	97.5	75 - 124			
1,3-Dichlorobenzene	19.78	1.0	20	0	98.9	80 - 119			
1,3-Dichloropropane	21.69	1.0	20	0	108	80 - 119			
1,4-Dichlorobenzene	19.46	1.0	20	0	97.3	79 - 118			
2,2-Dichloropropane	22.46	1.0	20	0	112	60 - 139			
2-Butanone	48.73	2.0	40	0	122	56 - 143			
2-Chlorotoluene	19.62	1.0	20	0	98.1	79 - 122			
2-Hexanone	51.76	2.0	40	0	129	57 - 139			
4-Chlorotoluene	19.86	1.0	20	0	99.3	78 - 122			
4-Isopropyltoluene	20.19	1.0	20	0	101	77 - 127			
4-Methyl-2-pentanone	49.24	2.0	40	0	123	67 - 130			
Acetone	48.95	2.0	40	0	122	39 - 160			
Benzene	20.57	1.0	20	0	103	79 - 120			
Bromobenzene	19.41	1.0	20	0	97.1	80 - 120			
Bromochloromethane	20.58	1.0	20	0	103	78 - 123			
Bromodichloromethane	21	1.0	20	0	105	79 - 125			
Bromoform	20.15	1.0	20	0	101	66 - 130			
Bromomethane	21.46	1.0	20	0	107	53 - 141			

## ALS Houston, US

Date: 20-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22040258

## QC BATCH REPORT

Batch ID: R406317 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
LCS		Sample ID: VLCSW-220412		Units: ug/L		Analysis Date: 12-Apr-2022 14:03			
Client ID:		Run ID: VOA6_406317		SeqNo: 6594673		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	41.56	2.0	40	0	104	64 - 133			
Carbon tetrachloride	18.07	1.0	20	0	90.3	72 - 136			
Chlorobenzene	19.95	1.0	20	0	99.8	82 - 118			
Chloroethane	21.55	1.0	20	0	108	60 - 138			
Chloroform	20.78	1.0	20	0	104	79 - 124			
Chloromethane	21.09	1.0	20	0	105	50 - 139			
cis-1,2-Dichloroethene	21.27	1.0	20	0	106	78 - 123			
cis-1,3-Dichloropropene	22.08	1.0	20	0	110	75 - 124			
Dibromochloromethane	20.34	1.0	20	0	102	74 - 126			
Dibromomethane	19.39	1.0	20	0	96.9	79 - 123			
Dichlorodifluoromethane	16.45	1.0	20	0	82.2	32 - 152			
Ethylbenzene	19.6	1.0	20	0	98.0	79 - 121			
Hexachlorobutadiene	19.76	1.0	20	0	98.8	66 - 134			
Isopropylbenzene	19.72	1.0	20	0	98.6	72 - 131			
m,p-Xylene	39.33	2.0	40	0	98.3	80 - 121			
Methylene chloride	20.14	2.0	20	0	101	74 - 124			
Naphthalene	20.66	1.0	20	0	103	61 - 128			
n-Butylbenzene	19.88	1.0	20	0	99.4	75 - 128			
n-Propylbenzene	20.02	1.0	20	0	100	76 - 126			
o-Xylene	19.51	1.0	20	0	97.6	78 - 122			
sec-Butylbenzene	19.05	1.0	20	0	95.3	77 - 126			
Styrene	20.71	1.0	20	0	104	78 - 123			
tert-Butylbenzene	18.79	1.0	20	0	94.0	78 - 124			
Tetrachloroethene	19.03	1.0	20	0	95.2	74 - 129			
Toluene	20.59	1.0	20	0	103	80 - 121			
trans-1,2-Dichloroethene	21.59	1.0	20	0	108	75 - 124			
trans-1,3-Dichloropropene	22.67	1.0	20	0	113	73 - 127			
Trichloroethene	18.53	1.0	20	0	92.7	79 - 123			
Trichlorofluoromethane	18.72	1.0	20	0	93.6	65 - 141			
Vinyl chloride	20.7	1.0	20	0	103	58 - 137			
Surr: 1,2-Dichloroethane-d4	57.12	1.0	50	0	114	81 - 118			
Surr: 4-Bromofluorobenzene	51.35	1.0	50	0	103	85 - 114			
Surr: Dibromofluoromethane	51.38	1.0	50	0	103	80 - 119			
Surr: Toluene-d8	51.56	1.0	50	0	103	89 - 112			

## ALS Houston, US

Date: 20-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22040258

## QC BATCH REPORT

Batch ID: R406317 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MS		Sample ID: HS22040258-01MS		Units: ug/L		Analysis Date: 12-Apr-2022 16:10			
Client ID: LH18/24-SP650_040522		Run ID: VOA6_406317		SeqNo: 6594679		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	20.08	1.0	20	0	100	78 - 124			
1,1,1-Trichloroethane	20.68	1.0	20	0	103	74 - 131			
1,1,2,2-Tetrachloroethane	19.88	1.0	20	0	99.4	71 - 121			
1,1,2-Trichloroethane	20.49	1.0	20	0	102	80 - 119			
1,1-Dichloroethane	21.42	1.0	20	0	107	77 - 125			
1,1-Dichloroethene	20.09	1.0	20	0	100	71 - 131			
1,1-Dichloropropene	20.78	1.0	20	0	104	78 - 125			
1,2,3-Trichlorobenzene	19.06	1.0	20	0	95.3	69 - 129			
1,2,3-Trichloropropane	21.8	1.0	20	0	109	73 - 122			
1,2,4-Trichlorobenzene	19.23	1.0	20	0	96.1	69 - 130			
1,2,4-Trimethylbenzene	20.12	1.0	20	0	101	76 - 124			
1,2-Dibromo-3-chloropropane	18.13	1.0	20	0	90.6	62 - 128			
1,2-Dibromoethane	20.59	1.0	20	0	103	77 - 121			
1,2-Dichlorobenzene	19.44	1.0	20	0	97.2	80 - 119			
1,2-Dichloroethane	20.9	1.0	20	0	105	73 - 128			
1,2-Dichloropropane	21.31	1.0	20	0	107	78 - 122			
1,3,5-Trimethylbenzene	20.27	1.0	20	0	101	75 - 124			
1,3-Dichlorobenzene	20.01	1.0	20	0	100	80 - 119			
1,3-Dichloropropane	21.71	1.0	20	0	109	80 - 119			
1,4-Dichlorobenzene	18.56	1.0	20	0	92.8	79 - 118			
2,2-Dichloropropane	22.07	1.0	20	0	110	60 - 139			
2-Butanone	41.96	2.0	40	0	105	56 - 143			
2-Chlorotoluene	19.65	1.0	20	0	98.2	79 - 122			
2-Hexanone	50.93	2.0	40	0	127	57 - 139			
4-Chlorotoluene	20.21	1.0	20	0	101	78 - 122			
4-Isopropyltoluene	21.28	1.0	20	0	106	77 - 127			
4-Methyl-2-pentanone	50.64	2.0	40	0	127	67 - 130			
Acetone	39.12	2.0	40	0	97.8	39 - 160			
Benzene	21.04	1.0	20	0	105	79 - 120			
Bromobenzene	19.1	1.0	20	0	95.5	80 - 120			
Bromochloromethane	18.41	1.0	20	0	92.0	78 - 123			
Bromodichloromethane	21.31	1.0	20	0	107	79 - 125			
Bromoform	20.14	1.0	20	0	101	66 - 130			
Bromomethane	17.6	1.0	20	0	88.0	53 - 141			

## ALS Houston, US

Date: 20-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22040258

## QC BATCH REPORT

Batch ID: R406317 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MS		Sample ID: HS22040258-01MS		Units: ug/L		Analysis Date: 12-Apr-2022 16:10			
Client ID: LH18/24-SP650_040522		Run ID: VOA6_406317		SeqNo: 6594679		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	41.91	2.0	40	0	105	64 - 133			
Carbon tetrachloride	20.21	1.0	20	0	101	72 - 136			
Chlorobenzene	20.1	1.0	20	0	101	82 - 118			
Chloroethane	21.06	1.0	20	0	105	60 - 138			
Chloroform	19.87	1.0	20	0	99.3	79 - 124			
Chloromethane	20.67	1.0	20	0	103	50 - 139			
cis-1,2-Dichloroethene	20.98	1.0	20	1.614	96.8	78 - 123			
cis-1,3-Dichloropropene	21.79	1.0	20	0	109	75 - 124			
Dibromochloromethane	20.61	1.0	20	0	103	74 - 126			
Dibromomethane	19.61	1.0	20	0	98.0	79 - 123			
Dichlorodifluoromethane	19.81	1.0	20	0	99.0	32 - 152			
Ethylbenzene	20.87	1.0	20	0	104	79 - 121			
Hexachlorobutadiene	21.36	1.0	20	0	107	66 - 134			
Isopropylbenzene	20.93	1.0	20	0	105	72 - 131			
m,p-Xylene	42.36	2.0	40	0	106	80 - 121			
Methylene chloride	18.59	2.0	20	0	93.0	74 - 124			
Naphthalene	17.48	1.0	20	0	87.4	61 - 128			
n-Butylbenzene	21.79	1.0	20	0	109	75 - 128			
n-Propylbenzene	20.94	1.0	20	0	105	76 - 126			
o-Xylene	20.42	1.0	20	0	102	78 - 122			
sec-Butylbenzene	20.73	1.0	20	0	104	77 - 126			
Styrene	21.11	1.0	20	0	106	78 - 123			
tert-Butylbenzene	20.31	1.0	20	0	102	78 - 124			
Tetrachloroethene	20.91	1.0	20	0	105	74 - 129			
Toluene	21.43	1.0	20	0	107	80 - 121			
trans-1,2-Dichloroethene	21.06	1.0	20	0	105	75 - 124			
trans-1,3-Dichloropropene	22.15	1.0	20	0	111	73 - 127			
Trichloroethene	20.87	1.0	20	0	104	79 - 123			
Trichlorofluoromethane	19.52	1.0	20	0	97.6	65 - 141			
Vinyl chloride	21.63	1.0	20	0	108	58 - 137			
Surr: 1,2-Dichloroethane-d4	51.6	1.0	50	0	103	81 - 118			
Surr: 4-Bromofluorobenzene	51.49	1.0	50	0	103	85 - 114			
Surr: Dibromofluoromethane	47.1	1.0	50	0	94.2	80 - 119			
Surr: Toluene-d8	53.81	1.0	50	0	108	89 - 112			

ALS Houston, US

Date: 20-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22040258

**QC BATCH REPORT**

Batch ID: R406317 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
<b>MSD</b>		Sample ID: HS22040258-01MSD		Units: ug/L		Analysis Date: 12-Apr-2022 16:31			
Client ID: LH18/24-SP650_040522		Run ID: VOA6_406317		SeqNo: 6594680		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	19.31	1.0	20	0	96.5	78 - 124	20.08	3.9	20
1,1,1-Trichloroethane	19.86	1.0	20	0	99.3	74 - 131	20.68	4.09	20
1,1,2,2-Tetrachloroethane	20.91	1.0	20	0	105	71 - 121	19.88	5.09	20
1,1,2-Trichloroethane	20.97	1.0	20	0	105	80 - 119	20.49	2.3	20
1,1-Dichloroethane	20.11	1.0	20	0	101	77 - 125	21.42	6.3	20
1,1-Dichloroethene	19.04	1.0	20	0	95.2	71 - 131	20.09	5.34	20
1,1-Dichloropropene	19.6	1.0	20	0	98.0	78 - 125	20.78	5.82	20
1,2,3-Trichlorobenzene	21.72	1.0	20	0	109	69 - 129	19.06	13	20
1,2,3-Trichloropropane	23.01	1.0	20	0	115	73 - 122	21.8	5.37	20
1,2,4-Trichlorobenzene	21.54	1.0	20	0	108	69 - 130	19.23	11.3	20
1,2,4-Trimethylbenzene	20.44	1.0	20	0	102	76 - 124	20.12	1.57	20
1,2-Dibromo-3-chloropropane	19.96	1.0	20	0	99.8	62 - 128	18.13	9.64	20
1,2-Dibromoethane	20.28	1.0	20	0	101	77 - 121	20.59	1.52	20
1,2-Dichlorobenzene	19.91	1.0	20	0	99.6	80 - 119	19.44	2.42	20
1,2-Dichloroethane	19.83	1.0	20	0	99.1	73 - 128	20.9	5.29	20
1,2-Dichloropropane	20.24	1.0	20	0	101	78 - 122	21.31	5.17	20
1,3,5-Trimethylbenzene	19.81	1.0	20	0	99.0	75 - 124	20.27	2.3	20
1,3-Dichlorobenzene	20.61	1.0	20	0	103	80 - 119	20.01	2.94	20
1,3-Dichloropropane	21.25	1.0	20	0	106	80 - 119	21.71	2.14	20
1,4-Dichlorobenzene	20.15	1.0	20	0	101	79 - 118	18.56	8.22	20
2,2-Dichloropropane	20.56	1.0	20	0	103	60 - 139	22.07	7.1	20
2-Butanone	41.14	2.0	40	0	103	56 - 143	41.96	1.99	20
2-Chlorotoluene	20.42	1.0	20	0	102	79 - 122	19.65	3.88	20
2-Hexanone	50.22	2.0	40	0	126	57 - 139	50.93	1.41	20
4-Chlorotoluene	20	1.0	20	0	100.0	78 - 122	20.21	1.05	20
4-Isopropyltoluene	21.65	1.0	20	0	108	77 - 127	21.28	1.71	20
4-Methyl-2-pentanone	50.58	2.0	40	0	126	67 - 130	50.64	0.111	20
Acetone	37.05	2.0	40	0	92.6	39 - 160	39.12	5.45	20
Benzene	20.15	1.0	20	0	101	79 - 120	21.04	4.29	20
Bromobenzene	19.69	1.0	20	0	98.5	80 - 120	19.1	3.05	20
Bromochloromethane	19.07	1.0	20	0	95.4	78 - 123	18.41	3.53	20
Bromodichloromethane	20.04	1.0	20	0	100	79 - 125	21.31	6.14	20
Bromoform	21.2	1.0	20	0	106	66 - 130	20.14	5.12	20
Bromomethane	16.79	1.0	20	0	84.0	53 - 141	17.6	4.7	20

## ALS Houston, US

Date: 20-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22040258

## QC BATCH REPORT

Batch ID: R406317 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MSD		Sample ID: HS22040258-01MSD		Units: ug/L		Analysis Date: 12-Apr-2022 16:31			
Client ID: LH18/24-SP650_040522		Run ID: VOA6_406317		SeqNo: 6594680		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	38.93	2.0	40	0	97.3	64 - 133	41.91	7.38	20
Carbon tetrachloride	18.86	1.0	20	0	94.3	72 - 136	20.21	6.91	20
Chlorobenzene	19.71	1.0	20	0	98.5	82 - 118	20.1	1.99	20
Chloroethane	20.75	1.0	20	0	104	60 - 138	21.06	1.47	20
Chloroform	19.08	1.0	20	0	95.4	79 - 124	19.87	4.03	20
Chloromethane	22.39	1.0	20	0	112	50 - 139	20.67	8.01	20
cis-1,2-Dichloroethene	20.78	1.0	20	1.614	95.8	78 - 123	20.98	0.967	20
cis-1,3-Dichloropropene	20.48	1.0	20	0	102	75 - 124	21.79	6.16	20
Dibromochloromethane	19.85	1.0	20	0	99.2	74 - 126	20.61	3.76	20
Dibromomethane	18.93	1.0	20	0	94.6	79 - 123	19.61	3.52	20
Dichlorodifluoromethane	17.61	1.0	20	0	88.1	32 - 152	19.81	11.7	20
Ethylbenzene	20.71	1.0	20	0	104	79 - 121	20.87	0.758	20
Hexachlorobutadiene	21.84	1.0	20	0	109	66 - 134	21.36	2.2	20
Isopropylbenzene	21.04	1.0	20	0	105	72 - 131	20.93	0.541	20
m,p-Xylene	41.38	2.0	40	0	103	80 - 121	42.36	2.32	20
Methylene chloride	17.65	2.0	20	0	88.3	74 - 124	18.59	5.2	20
Naphthalene	21.66	1.0	20	0	108	61 - 128	17.48	21.4	20 R
n-Butylbenzene	21.86	1.0	20	0	109	75 - 128	21.79	0.35	20
n-Propylbenzene	20.84	1.0	20	0	104	76 - 126	20.94	0.496	20
o-Xylene	20.25	1.0	20	0	101	78 - 122	20.42	0.859	20
sec-Butylbenzene	20.54	1.0	20	0	103	77 - 126	20.73	0.914	20
Styrene	21.2	1.0	20	0	106	78 - 123	21.11	0.423	20
tert-Butylbenzene	20.02	1.0	20	0	100	78 - 124	20.31	1.46	20
Tetrachloroethene	20.55	1.0	20	0	103	74 - 129	20.91	1.75	20
Toluene	20.7	1.0	20	0	103	80 - 121	21.43	3.48	20
trans-1,2-Dichloroethene	19.9	1.0	20	0	99.5	75 - 124	21.06	5.7	20
trans-1,3-Dichloropropene	21.18	1.0	20	0	106	73 - 127	22.15	4.46	20
Trichloroethene	19.14	1.0	20	0	95.7	79 - 123	20.87	8.61	20
Trichlorofluoromethane	18.67	1.0	20	0	93.3	65 - 141	19.52	4.47	20
Vinyl chloride	21.09	1.0	20	0	105	58 - 137	21.63	2.52	20
Surr: 1,2-Dichloroethane-d4	51.24	1.0	50	0	102	81 - 118	51.6	0.695	20
Surr: 4-Bromofluorobenzene	52.29	1.0	50	0	105	85 - 114	51.49	1.53	20
Surr: Dibromofluoromethane	46.54	1.0	50	0	93.1	80 - 119	47.1	1.19	20
Surr: Toluene-d8	54.36	1.0	50	0	109	89 - 112	53.81	1.02	20

ALS Houston, US

Date: 20-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22040258

**QC BATCH REPORT****Batch ID:** R406317 ( 0 )**Instrument:** VOA6**Method:** VOLATILES ORGANICS BY METHOD  
8260C

The following samples were analyzed in this batch:

HS22040258-01	HS22040258-02
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## ALS Houston, US

Date: 20-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22040258

**QC BATCH REPORT**

Batch ID: R406832 ( 0 )		Instrument: ICS-Integrion		Method: ANIONS BY SW9056A					
<b>MBLK</b>	Sample ID: <b>MBLK</b>	Units: <b>mg/L</b>		Analysis Date: <b>18-Apr-2022 19:21</b>					
Client ID:	Run ID: <b>ICS-Integrion_406832</b>		SeqNo: <b>6606517</b>		PrepDate:		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	0.500	0.500							U
Sulfate	0.500	0.500							U
<b>LCS</b>	Sample ID: <b>LCS</b>	Units: <b>mg/L</b>		Analysis Date: <b>18-Apr-2022 19:26</b>					
Client ID:	Run ID: <b>ICS-Integrion_406832</b>		SeqNo: <b>6606518</b>		PrepDate:		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	19.77	0.500	20	0	98.8	80 - 120			
Sulfate	19.57	0.500	20	0	97.9	80 - 120			
<b>MS</b>	Sample ID: <b>HS22040515-51MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>18-Apr-2022 18:44</b>					
Client ID:	Run ID: <b>ICS-Integrion_406832</b>		SeqNo: <b>6606511</b>		PrepDate:		DF: <b>20</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	815.3	10.0	200	653.3	81.0	80 - 120			
Sulfate	190.3	10.0	200	0	95.1	80 - 120			
<b>MSD</b>	Sample ID: <b>HS22040515-51MSD</b>	Units: <b>mg/L</b>		Analysis Date: <b>18-Apr-2022 18:50</b>					
Client ID:	Run ID: <b>ICS-Integrion_406832</b>		SeqNo: <b>6606525</b>		PrepDate:		DF: <b>20</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	820.9	10.0	200	653.3	83.8	80 - 120	815.3	0.682	20
Sulfate	190.1	10.0	200	0	95.0	80 - 120	190.3	0.101	20
The following samples were analyzed in this batch: HS22040258-01									

## ALS Houston, US

Date: 20-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22040258

**QUALIFIERS,  
ACRONYMS, UNITS**

<b>Qualifier</b>	<b>Description</b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

<b>Acronym</b>	<b>Description</b>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

<b>Unit Reported</b>	<b>Description</b>
mg/L	Milligrams per Liter

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**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

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Agency	Number	Expire Date
Florida	E87611-34	30-Jun-2022
Illinois	2000322021-7	09-May-2022
Kansas	E-10352 2021-2022	31-Jul-2022
Kentucky	123043, 2021-2022	30-Apr-2022
Louisiana	03087, 2021-2022	30-Jun-2022
Texas	T104704231-21-28	30-Apr-2022

ALS Houston, US

Date: 20-Apr-22

## Sample Receipt Checklist

Work Order ID: HS22040258  
 Client Name: Bhate Environmental

Date/Time Received: **06-Apr-2022 09:40**  
 Received by: **Nelson D. Dusara**

Completed By: <u>/S/ Niles D. Ranchod</u>	06-Apr-2022 13:49	Reviewed by: <u>/S/ Ragen Giga</u>	07-Apr-2022 13:16
eSignature	Date/Time	eSignature	Date/Time

Matrices: **WATER**Carrier name: **ALS.HS**

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	1 Page(s)
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	COC IDs: CLIENT
Samplers name present on COC?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	

Temperature(s)/Thermometer(s):

2.2°C/2.7°C UC/C

IR 31

Cooler(s)/Kit(s):

48093

Date/Time sample(s) sent to storage:

04/6/22 14:10

Water - VOA vials have zero headspace?

Yes ☒No ☐

No VOA vials submitted

☐

Water - pH acceptable upon receipt?

Yes ☒No ☐

N/A

☐

pH adjusted?

Yes ☐No ☒

N/A

☐

pH adjusted by:

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:


Contacted By:

Regarding:

Comments:

Corrective Action:



 <b>ALS</b> 10450 Stancliff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5656 Fax. +1 281 530 5887	<b>CUSTODY SEAL</b>		Seal Broken By: <i>gms</i>
	Date: <i>4/5/22</i>	Time: <i>1430</i>	Date: <i>04/06/22</i>
	Name: <i>Shirley</i>		
	Company: <i>ALS</i>		

48093

Must Deliver Next Business Day  
Time and Tempature Sensitive!



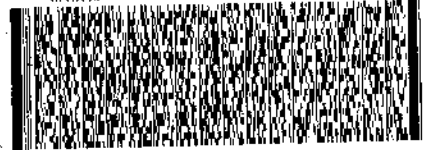
48093

ORIGIN ID: SGRA (903) 990-8193  
 ATT: MIKE MARTINEZ  
 ARTIS ENVIRONMENTAL & INFRASTR. INC  
 1203-B EAST GRAND AVE PMB202  
 MARSHALL, TX 75670  
 UNITED STATES US

SHIP DATE: 01 JUN20  
 ACTWGT: 1.00 LB HAN  
 CAD: 300130/CAFE3211  
 DIMS: 28x14x14 IN

TO CLIENT SERVICES  
 ALS LABORATORY GROUP  
 10450 STANCLIFF ROAD  
 SUITE 210  
 HOUSTON TX 77099  
 (281) 530-5656

RMA: 11111111



FedEx Express



FedEx  
 TRACK 1891 8877 1467  
 0221

WED - 06 APR 10:30A  
 PRIORITY OVERNIGHT

AB SGRA

77099  
 TX-US IAH



RT 917  
 10:30  
 1467  
 04.06



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10450 Stancliff Rd. Suite 210  
Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887

April 19, 2022

Marcia Olive  
Bhate Environmental Associates, Inc.  
445 Union Blvd Ste 129  
Lakewood, CO 80228

Work Order: **HS22040624**

Laboratory Results for: **Longhorn GW Treatment Plant Weekly Samples**

Dear Marcia Olive,

ALS Environmental received 3 sample(s) on Apr 13, 2022 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: JUMOKE.LAWAL

Ragen Giga  
Project Manager

ALS Houston, US

Date: 19-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**Work Order:** HS22040624

**SAMPLE SUMMARY**

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS22040624-01	LH18/24-SP650_041222	Water		12-Apr-2022 14:00	13-Apr-2022 10:00	<input type="checkbox"/>
HS22040624-02	LH18/24-SP650_041222_AIX	Water		12-Apr-2022 14:00	13-Apr-2022 10:00	<input type="checkbox"/>
HS22040624-03	LH18/24-SP650_041222_BIX	Water		12-Apr-2022 14:00	13-Apr-2022 10:00	<input type="checkbox"/>



**ALS Houston, US**

Date: 19-Apr-22

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**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**Work Order:** HS22040624

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**CASE NARRATIVE**

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**Work Order Comments**

- The analysis for Perchlorate was subcontracted to ALS Houston High-Res Lab. Final report attached
- 

**WetChemistry by Method E350.3****Batch ID: R406755**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**WetChemistry by Method E365.3****Batch ID: R406581**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**WetChemistry by Method E415.1****Batch ID: R406500**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

## ALS Houston, US

Date: 19-Apr-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Weekly Samples  
 Sample ID: LH18/24-SP650\_041222  
 Collection Date: 12-Apr-2022 14:00

**ANALYTICAL REPORT**

WorkOrder:HS22040624  
 Lab ID:HS22040624-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>AMMONIA AS N BY E350.3(ISE)</b>		<b>Method:E350.3</b>						Analyst: YP
Nitrogen, Ammonia (As N)	22	a	0.10	0.10	0.20	mg/L	1	18-Apr-2022 14:52
<b>ORTHO PHOSPHATE (PO4) AS P BY E365.3-1978</b>		<b>Method:E365.3</b>						Analyst: MZD
Phosphorus, Total Orthophosphate (As P)	7.04	a	0.200	0.250	0.500	mg/L	20	14-Apr-2022 11:39
<b>TOTAL ORGANIC CARBON BY E415.1</b>		<b>Method:E415.1</b>						Analyst: JAC
Organic Carbon, Total	9.64	a	0.500	1.00	1.00	mg/L	1	13-Apr-2022 19:28

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 19-Apr-22

Client: Bhate Environmental Associates, Inc.  
Project: Longhorn GW Treatment Plant Weekly Samples  
Sample ID: LH18/24-SP650\_041222\_AIX  
Collection Date: 12-Apr-2022 14:00

**ANALYTICAL REPORT**

WorkOrder:HS22040624  
Lab ID:HS22040624-02  
Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>						Analyst: GR
Subcontract Analysis	See Attached		0	0		NA	1	14-Apr-2022 14:57

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 19-Apr-22

Client: Bhate Environmental Associates, Inc.  
Project: Longhorn GW Treatment Plant Weekly Samples  
Sample ID: LH18/24-SP650\_041222\_BIX  
Collection Date: 12-Apr-2022 14:00

**ANALYTICAL REPORT**

WorkOrder: HS22040624  
Lab ID: HS22040624-03  
Matrix: Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method: NA</b>						Analyst: GR
Subcontract Analysis	See Attached		0	0		NA	1	14-Apr-2022 14:57

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US

Date: 19-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22040624

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> R406500 ( 0 )		<b>Test Name :</b> TOTAL ORGANIC CARBON BY E415.1			<b>Matrix:</b> Water	
HS22040624-01	LH18/24-SP650_041222	12 Apr 2022 14:00			13 Apr 2022 19:28	1
<b>Batch ID:</b> R406517 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			<b>Matrix:</b> Water	
HS22040624-02	LH18/24-SP650_041222_AIX	12 Apr 2022 14:00			14 Apr 2022 14:57	1
HS22040624-03	LH18/24-SP650_041222_BIX	12 Apr 2022 14:00			14 Apr 2022 14:57	1
<b>Batch ID:</b> R406581 ( 0 )		<b>Test Name :</b> ORTHO PHOSPHATE (PO4) AS P BY E365.3-1978			<b>Matrix:</b> Water	
HS22040624-01	LH18/24-SP650_041222	12 Apr 2022 14:00			14 Apr 2022 11:39	20
<b>Batch ID:</b> R406755 ( 0 )		<b>Test Name :</b> AMMONIA AS N BY E350.3(ISE)			<b>Matrix:</b> Water	
HS22040624-01	LH18/24-SP650_041222	12 Apr 2022 14:00			18 Apr 2022 14:52	1

ALS Houston, US

Date: 19-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22040624

**QC BATCH REPORT**

Batch ID: R406500 ( 0 )		Instrument: TOC_04		Method: TOTAL ORGANIC CARBON BY E415.1						
<b>MBLK</b>	Sample ID: MBLK-04132022	Units: mg/L		Analysis Date: 13-Apr-2022 16:24						
Client ID:	Run ID: TOC_04_406500		SeqNo: 6598872		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	1.00	1.00								U
<b>LCS</b>	Sample ID: LCS-04132022	Units: mg/L		Analysis Date: 13-Apr-2022 16:39						
Client ID:	Run ID: TOC_04_406500		SeqNo: 6598873		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	9.567	1.00	10	0	95.7	85 - 115				
<b>LCSD</b>	Sample ID: LCSD-04132022	Units: mg/L		Analysis Date: 13-Apr-2022 16:53						
Client ID:	Run ID: TOC_04_406500		SeqNo: 6598874		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	9.71	1.00	10	0	97.1	85 - 115	9.567	1.48	20	
<b>MS</b>	Sample ID: HS22040330-01MS	Units: mg/L		Analysis Date: 13-Apr-2022 19:56						
Client ID:	Run ID: TOC_04_406500		SeqNo: 6598890		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	16.59	1.00	10	5.241	113	80 - 120				
The following samples were analyzed in this batch: HS22040624-01										

## ALS Houston, US

Date: 19-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22040624

**QC BATCH REPORT**

Batch ID: R406581 ( 0 )		Instrument: UV-2450		Method: ORTHO PHOSPHATE (PO4) AS P BY E365.3-1978					
<b>MBLK</b>	Sample ID: MBLK-R406581	Units: mg/L		Analysis Date: 14-Apr-2022 11:39					
Client ID:	Run ID: UV-2450_406581	SeqNo: 6601098		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.0125	0.0250							U
<b>LCS</b>	Sample ID: LCS-R406581	Units: mg/L		Analysis Date: 14-Apr-2022 11:39					
Client ID:	Run ID: UV-2450_406581	SeqNo: 6601097		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.25	0.0250	0.25	0	100	85 - 115			
<b>MS</b>	Sample ID: HS22040624-01MS	Units: mg/L		Analysis Date: 14-Apr-2022 11:39					
Client ID: LH18/24-SP650_041222	Run ID: UV-2450_406581	SeqNo: 6601100		PrepDate:		DF: 20			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	11.72	0.500	5	7.04	93.6	80 - 120			
<b>MSD</b>	Sample ID: HS22040624-01MSD	Units: mg/L		Analysis Date: 14-Apr-2022 11:39					
Client ID: LH18/24-SP650_041222	Run ID: UV-2450_406581	SeqNo: 6601099		PrepDate:		DF: 20			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	11.78	0.500	5	7.04	94.8	80 - 120	11.72	0.511	20
The following samples were analyzed in this batch: HS22040624-01									

ALS Houston, US

Date: 19-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22040624

**QC BATCH REPORT**

Batch ID: R406755 ( 0 )		Instrument: WetChem_HS		Method: AMMONIA AS N BY E350.3(ISE)						
<b>MBLK</b>	Sample ID: MBLK-R406755	Units: mg/L		Analysis Date: 18-Apr-2022 14:52						
Client ID:	Run ID: WetChem_HS_406755		SeqNo: 6604757		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	0.10	0.20								U
<b>LCS</b>	Sample ID: LCS-R406755	Units: mg/L		Analysis Date: 18-Apr-2022 14:52						
Client ID:	Run ID: WetChem_HS_406755		SeqNo: 6604756		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	10.14	0.20	10	0	101	80 - 120				
<b>MS</b>	Sample ID: HS22040586-01MS	Units: mg/L		Analysis Date: 18-Apr-2022 14:52						
Client ID:	Run ID: WetChem_HS_406755		SeqNo: 6604759		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	20.45	0.20	10	11.62	88.3	80 - 120				
<b>MSD</b>	Sample ID: HS22040586-01MSD	Units: mg/L		Analysis Date: 18-Apr-2022 14:52						
Client ID:	Run ID: WetChem_HS_406755		SeqNo: 6604758		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	20.53	0.20	10	11.62	89.1	80 - 120	20.45	0.39	20	
The following samples were analyzed in this batch: HS22040624-01										



**ALS Houston, US**

Date: 19-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22040624

**QUALIFIERS,  
ACRONYMS, UNITS**

<b>Qualifier</b>	<b>Description</b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

<b>Acronym</b>	<b>Description</b>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

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**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

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Agency	Number	Expire Date
Florida	E87611-34	30-Jun-2022
Illinois	2000322021-7	09-May-2022
Kansas	E-10352 2021-2022	31-Jul-2022
Kentucky	123043, 2021-2022	30-Apr-2022
Louisiana	03087, 2021-2022	30-Jun-2022
Texas	T104704231-21-28	30-Apr-2022

ALS Houston, US

Date: 19-Apr-22

## Sample Receipt Checklist

Work Order ID: HS22040624

Date/Time Received: **13-Apr-2022 10:00**

Client Name: Bhate Environmental

Received by: **Paresh M. Giga**

<b>Completed By:</b> <u>/S/ Niles D. Ranchod</u>	<u>13-Apr-2022 11:44</u>	<b>Reviewed by:</b> <u>/S/ Ragen Giga</u>	<u>13-Apr-2022 19:47</u>
eSignature	Date/Time	eSignature	Date/Time

Matrices: **WATER**Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	1 Page(s)
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	COC IDs: CLIENT
Samplers name present on COC?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	

Temperature(s)/Thermometer(s):

1.6°C/2.1°C UC/C

IR 31

Cooler(s)/Kit(s):

47814

Date/Time sample(s) sent to storage:

04/13/22 11:55

Water - VOA vials have zero headspace?

Yes ☒No ☐No VOA vials submitted ☐

Water - pH acceptable upon receipt?

Yes ☒No ☐N/A ☐

pH adjusted?

Yes ☐No ☒N/A ☐

pH adjusted by:

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:


Regarding:



Comments:

Corrective Action:

## CHAIN OF CUSTODY

Name Of Lab Shipping To: ALS 10450 Stanciliff Rd. Suite 210 Houston, TX. 77099 (281) 530-5656 ATTN: Ragen GigiPage 1 of 1

<b>Project:</b> BHATE LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS			<b>Project No.</b> NWO1312.0150.0 16.0001			<b>Analyses</b>										<b>HS22040624</b> Bhate Environmental Associates, Inc. Longhorn GW Treatment Plant Weekly Samples 											
<b>Job:</b> <b>GROUNDWATER TREATMENT PLANT WEEKLY SAMPLES</b>																											
<b>Prepared By:</b> Scott Beesinger			<b>P.O. Number</b>																								
<b>Field Sample I.D.</b>			<b>Sample Matrix</b>			<b>Date / Time</b>			MS / MSD	No. OF CONTAINERS	AMMONIA-N	TOTAL ORGANIC CARBON	ORTHO-PHOSPHATE	PERCHLORATE											Remarks (Preservatives, etc.)	Lab I.D.#	
LH18/24-SP650_041222			Water			04/12/22 / 14:00				3	X	X														H2SO4	
LH18/24-SP650_041222			Water			04/12/22 / 14:00				1			X													NONE	
LH18/24-SP650_041222_AIX			Water			04/12/22 / 14:00				1				X												NONE	
LH18/24-SP650_041222_BIX			Water			04/12/22 / 14:00				1				X												NONE	

 <b>ALS</b> 10450 Stancliff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5656 Fax. +1 281 530 5887	<b>CUSTODY SEAL</b>		Seal Broken By:  Date: 04/13/22
	Date: 4/12/22	Time: 1450	
	Name: Sean B. [unclear]		
	Company: BHA [unclear]		

47814



47814

ORIGIN 10:SGRA (903) 930-6193  
 SCOTT BEESINGER  
 APTIM ENVIRONMENTAL & INFRASTRUCTURE  
 12013-B EAST GRAND AVE  
 PMB 202  
 MARSHALL, TX 75670  
 UNITED STATES US

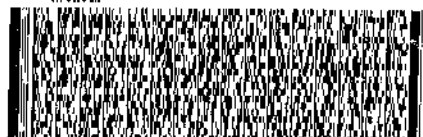
SHIP DATE: 28 JUN 21  
 ACTWT: 1.00 LB MAX  
 CAD: 0221247, CAKES3504  
 DIMS: 26x14x14 IN

TO SHIPPING DEPT  
 ALS LABORATORY GROUP  
 10450 STANCLIFF RD  
 SUITE 210  
 HOUSTON TX 77099

(281) 530-5656

REF: LHAAP-16-B0 79249-RG

RMA: [unclear]



FedEx Express



FedEx  
 TRK# 9473 0845 1405  
 0221

WED - 13 APR 10:30A  
 PRIORITY OVERNIGHT

AB SGRA

77099

TX-US IAH





April 14, 2022

Service Request No:E2200325

Ragen Giga  
ALS Environmental - US  
10450 Stancliff Rd Suite 210  
Houston, TX 77099

**Laboratory Results for: HS22040624**

Dear Ragen,

Enclosed are the results of the sample(s) submitted to our laboratory April 13, 2022  
For your reference, these analyses have been assigned our service request number **E2200325**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current TNI standards, where applicable, and except as noted in the laboratory case narrative provided. All results are intended to be considered in their entirety and ALS Environmental is not responsible for use of less than the complete final report. Results apply only to the items submitted to the laboratory, as received for analysis. In accordance with the current TNI Standard, a statement on the estimated uncertainty of measurement of any quantitative analysis will be supplied upon request.

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Corey Grandits  
Project Manager

ADDRESS 10450 Stancliff Rd., Suite 210, Houston, TX 77099  
PHONE +1 281 530 5656 | FAX +1 281 530 5887  
ALS Group USA, Corp.  
dba ALS Environmental



# Certificate of Analysis

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

**ALS Environmental**

**Client:** ALS-Houston  
**Project:** HS22040624  
**Sample Matrix:** W

**Service Request No.:** E2200325  
**Date Received:** 04/13/22

**CASE NARRATIVE**

All analyses were performed in adherence to the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II. When appropriate to the method, method blank results have been reported with each analytical test.

**Sample Receipt**

Two samples were received for analysis at ALS Environmental in Houston on 04/13/22.

The samples were received in good condition and are consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

**Data Validation Notes and Discussion****Precision and Accuracy:**

EQ2200146: Laboratory Control Spike/Duplicate Laboratory Control Spike (LCS/DLCS) samples were analyzed and reported in addition to a MS/MSD for this extraction batch. The LCS-DLCS recoveries met acceptance criteria; MS/MSD performed on an unrelated sample.

DoD Certification is held for the method/matrix/analytes provided in this report.

*The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.*

*Use of ALS group USA Corp dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.*



**Client:** ALS Environmental - US  
**Project:** HS22040624

**Service Request:**E2200325

### SAMPLE CROSS-REFERENCE

<u>SAMPLE #</u>	<u>CLIENT SAMPLE ID</u>	<u>DATE</u>	<u>TIME</u>
E2200325-001	LH18/24-SP650_041222_AIX	4/12/2022	1400
E2200325-002	LH18/24-SP650_041222_BIX	4/12/2022	1400

**Service Request Summary**

**Folder #:** E2200325  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22040624  
**Project Number:**  
  
**Report To:** Ragen Giga  
 ALS Environmental - US  
 10450 Standliff Rd Suite 210  
 Houston, TX 77099  
 USA  
  
**Phone Number:**  
**Cell Number:**  
**Fax Number:**  
**E-mail:** ragenp.giga@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 04/13/22  
**Internal Due Date:** 4/14/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22040624  
**EDD:** No EDD Specified

2 120 mL-Plastic Bottle Natural WM Unpreserved  
**Location:** EHRMS-AirArch 1  
**Pressure Gas:**  
**Rush**

				HOUSTON
Lab Samp No.	Client Samp No	Matrix	Collected	CIO4 DOD/6850
E2200325-001	LH18/24-SP650_041222_AIX	Water	04/12/22 1400	IV
E2200325-002	LH18/24-SP650_041222_BIX	Water	04/12/22 1400	IV

**Service Request Summary**

**Folder #:** E2200325  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22040624  
**Project Number:**  
  
**Report To:** Ragen Giga  
 ALS Environmental - US  
 10450 Standliff Rd Suite 210  
 Houston, TX 77099  
 USA  
  
**Phone Number:**  
**Cell Number:**  
**Fax Number:**  
**E-mail:** ragenp.giga@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 04/13/22  
**Internal Due Date:** 4/14/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22040624  
**EDD:** No EDD Specified

2 120 mL-Plastic Bottle Natural WM Unpreserved  
**Location:** EHRMS-AirArch 1  
**Pressure Gas:**  
**Rush**

**Test Comments:**

Group	Test/Method	Samples	Comments
Semivola GCMS	CIO4 DOD/6850	2	IV DUE 5/4

## Data Qualifiers

### Lab Standard

- + Possible Tedlar bag artifact.
- A TIC is a suspected aldol-condensation product
- B Analyte found in the associated method blank as well as in the sample.
- BC Reported results are not blank corrected.
- BH The back section of the tube yielded higher results than the front.
- BT Results indicated possible breakthrough; back section  $\geq 10\%$  front section.
- C Result identification confirmed.
- D Compound identified in an analysis at a secondary dilution factor
- D Spike was diluted out
- DE Reported results are corrected for desorption efficiency.
- E Estimated value. Concentration above calibration range
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- H1 Sample analysis performed past holding time. See case narrative.
- H2 Initial analysis within holding time. Reanalysis for the required dilution was past holding time.
- H3 Sample was received and analyzed past holding time.
- H4 Sample was extracted past required extraction holding time, but analyzed within analysis holding time. See case narrative.
- I Internal standard not within the specified limits. See case narrative.
- J Estimated Value. Concentration found below MRL.
- K (Auto) The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- K A deflection in the QC ion may indicate interference with the quantitation of this ion. The concentration of this analyte should be considered as an estimate.
- K Analyte was detected above the method reporting limit prior to normalization.
- K The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- L1 Laboratory control sample recovery outside the specified limits; results may be biased high.
- L2 Laboratory control sample recovery outside the specified limits; results may be biased low.
- L3 Laboratory control sample recovery outside the specified limits.
- M Matrix interference; results may be biased high.
- M The duplicate injection precision not met.
- M1 Matrix interference due to coelution with a non-target compound; results may be biased high.

## Data Qualifiers

### Lab Standard

- N Presumptive evidence of a compound for TICs that have been identified based on a mass spectral library search.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- P Indicates chlorodiphenyl ether interference present at the retention time of the target compound.
- P Pesticide/Aroclor target analyte > 40% difference for detected concentrations between GC columns
- Q Indicates as estimated value because the P and P + 2 theoretical abundance ratio does not meet method criteria.
- R Duplicate Precision not met.
- R1 Duplicate precision not within the specified limits; however, the results are below the MRL and considered estimated.
- S Surrogate recovery not within specified limits.
- S The reported value was determined by the Method of Standard Additions (MSA).
- T Analyte is a tentatively identified compound, result is estimated.
- U Compound was analyzed for, but was not detected (ND).
- V1 The continuing calibration verification standard was outside (biased high) the specified limits for this compound.
- V2 The continuing calibration verification standard was outside (biased low) the specified limits for this compound.
- W Result quantified, but the corresponding peak was detected outside the generated retention time window.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- X See case narrative.
- Y Recovery outside limits
- Y The chromatogram resembles a petroleum product but does not match the calibration standard.
- Z The chromatogram does not resemble a petroleum product.
- i The MRL/MDL has been elevated due to a matrix interference.

## ALS Laboratory Group

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### Acronyms

Cal	Calibration
Conc	CONCetration
Dioxin(s)	Polychlorinated dibenzo-p-dioxin(s)
EDL	Estimated Detection Limit
EMPC	Estimated Maximum Possible Concentration
Flags	Data qualifiers
Furan(s)	Polychlorinated dibenzofuran(s)
g	Grams
ICAL	Initial CALibration
ID	IDentifier
Ions	Masses monitored for the analyte during data acquisition
L	Liter (s)
LCS	Laboratory Control Sample
DLCS	Duplicate Laboratory Control Sample
MB	Method Blank
MCL	Method Calibration Limit
MDL	Method Detection Limit
mL	Milliliters
MS	Matrix Spiked sample
DMS	Duplicate Matrix Spiked sample
NO	Number of peaks meeting all identification criteria
PCDD(s)	Polychlorinated dibenzo-p-dioxin(s)
PCDF(s)	Polychlorinated dibenzofuran(s)
ppb	Parts per billion
ppm	Parts per million
ppq	Parts per quadrillion
ppt	Parts per trillion
QA	Quality Assurance
QC	Quality Control
Ratio	Ratio of areas from monitored ions for an analyte
% Rec.	Percent recovery
RPD	Relative Percent Difference
RRF	Relative Response Factor
RT	Retention Time
SDG	Sample Delivery Group
S/N	Signal-to-noise ratio
TEF	Toxicity Equivalence Factor
TEQ	Toxicity Equivalence Quotient



## State Certifications, Accreditations, and Licenses

Agency	Number	Expire Date
Arizona Department of Health Services	AZ0793-2022	5/27/2022
California Department of Health Services	2919	4/30/2022
California Department of Health Services	2919-2022	4/30/2022
Florida Department of Health	E87611-34	6/30/2022
Hawaii Department of Health	2021-2022	4/30/2022
Illinois Environmental Protection Agency	2000322021-7	5/9/2022
Kansas Department of Health and Environment	E-10352 2022	7/31/2022
Louisiana Department of Environmental Quality	03087-2021	6/30/2022
Louisiana Department of Environmental Quality	03087-2020	6/30/2022
Louisiana Department of Health and Hospitals	LA028	12/31/2022
Maine Department of Health and Human Services	2020016	6/5/2022
Maryland Department of the Environment	343	6/30/2022
Michigan Department of Environmental Quality	9971	4/30/2022
Minnesota Department of Health	2228443	12/31/2022
Nebraska Department of Health and Human Services	NE-OS-25-13	4/30/2022
Nevada Department of Conservation and Natural Resources	TX026932022-1	7/31/2022
New Hampshire Environmental Laboratory Accreditation Program	209421	4/24/2022
New Hampshire Environmental Laboratory Accreditation Program	209419	4/24/2022
New Jersey Department of Environmental Protection	TX008	6/30/2022
New York Department of Health	11707	3/31/2023
Oklahoma Department of Environmental Quality	2021-080	8/31/2022
Pennsylvania Department of Environmental Protection	68-03441-015	6/30/2022
Tennessee Department of Environment and Conservation	04016	4/30/2022
Tennessee Department of Environment and Conservation	04016-2021	4/30/2022
Texas Commission on Environmental Quality	T104704231-21-28	4/30/2022
Texas Commission on Environmental Quality	T104704231-21-27	4/30/2022
United States Department of Agriculture	P330-19-00299	10/10/2022
Utah Department of Health Environmental Laboratory Certification	TX026932021-12	7/31/2022
Washington Department of Health	C819-2022	11/14/2022



## Chain of Custody

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)





Raisu

10450 Stancliff Rd, Ste 210  
Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887  
www.alsglobal.com

## Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 18563

**SUBCONTRACT TO:**

ALS Environmental  
10450 Stancliff Road Suite 210  
Houston, TX 77084

**Phone:** +1 281 530 5656

**CUSTOMER INFORMATION:**

**Company:** ALS Houston  
**Contact:** Ragen Giga  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Email:** RagenP.Giga@ALSGlobal.com  
**Alternate Contact:** Jumoke M. Lawal  
**Email:** jumoke.lawal@alsglobal.com

**INVOICE INFORMATION:**

**Company:** ALS Houston  
**Contact:** Accounts Payable  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Reference:** HS22040624  
**TSR:** Houston House Acct

	LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
	ANALYSIS REQUESTED			DUE DATE
1.	HS22040624-02	LH18/24-SP650_041222_AIX	Water	12 Apr 2022 14:00
	6850-Perch. DOD Level II & Level IV in separate pdf			14 Apr 2022
2.	HS22040624-03	LH18/24-SP650_041222_BIX	Water	12 Apr 2022 14:00
	6850-Perch. DOD Level II & Level IV in separate pdf			14 Apr 2022

**Comments:** Please analyze for the analysis listed above.  
Send report to the emails shown above.

**QC Level:** DOD IV (DoD Data Package)

Relinquished By: \_\_\_\_\_

Date/Time: \_\_\_\_\_

Received By: \_\_\_\_\_

Date/Time: \_\_\_\_\_

Cooler ID(s): \_\_\_\_\_

Temperature(s): \_\_\_\_\_

RIGHT SOLUTIONS / RIGHT PARTNER



## Cooler Receipt Form

Project Chemist LAClient/Project ALH-H Thermometer ID 1041Date/Time Received: 9-13-22 Initials: LA Date/Time Logged in: 9-13-22 Initials: LA1. Method of delivery: ☐ US Mail ☐ Fed Ex ☐ UPS ☐ DHL ☒ <sup>ALS</sup> Courier ☐ Client2. Samples received in: ☒ Cooler ☐ Box ☐ Envelope ☐ Other

3. Were custody seals on coolers? ☐ Yes ☒ No

Were they intact? ☐ Yes ☐ No ☒ N/A

Were they signed and dated? ☐ Yes ☐ No ☒ N/A

If yes, how many and where?

--

4. Packing Material: ☐ Inserts ☒ Baggies ☐ Bubble Wrap ☐ Gel Packs ☒ Wet Ice ☐ Sleeves ☐ Other5. Foreign or Regulated Soil? ☐ Yes ☐ No Location of Sampling:

Cooler Tracking Number	COC ID	Date Opened	Time Opened	Opened By	Temp. °C	Temp Blank?
<u>NA</u>		<u>9-13-22</u>	<u>13:14</u>	<u>LA</u>	<u>3.7</u>	<input checked="" type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>

6. Were custody papers properly filled out (ink, signed, dated, etc)? ☒ Yes ☐ No7. Did all bottles arrive in good condition (not broken, no signs of leakage)? ☒ Yes ☐ No8. Were all sample labels complete (i.e., sample ID, analysis, preservation, etc)? ☒ Yes ☐ No9. Were appropriate bottles/containers and volumes received for the requested tests? ☒ Yes ☐ No10. Did sample labels and tags agree with custody documents? ☒ Yes ☐ No

Notes, Discrepancies, &amp; Resolutions:

--

Service request Label:



10450 Stancliff Rd., Suite 210  
Houston, TX 77099  
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F: +1 713 266 1599  
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## SAMPLE ACCEPTANCE POLICY

This policy outlines the criteria samples must meet to be accepted by ALS Environmental – Houston HRMS.

### **Cooler Custody Seals (desirable, mandatory if specified in SAP):**

- ✓ Intact on outside of cooler, signed and dated

### **Chain-of-Custody (COC) documentation (mandatory):**

The following is required on each COC:

- ✓ Sample ID, the location, date and time of collection, collector's name, preservation type, sample type, and any other special remarks concerning the sample. The COC must be completed in ink.
- ✓ Signature and date of relinquishing party.

In the absence of a COC at sample receipt, the COC will be requested from the client.

### **Sample Integrity (mandatory):**

Samples are inspected upon arrival to ensure that sample integrity was not compromised during transfer to the laboratory.

- ✓ Sample containers must arrive in good condition (not broken or leaking).
- ✓ Samples must be labeled appropriately, including Sample IDs, and requested test using durable labels and indelible ink.
- ✓ The correct type of sample bottle must be used for the method requested.
- ✓ An appropriate sample volume, or weight, must be received.
- ✓ Sample IDs and number of containers must reconcile with the COC.
- ✓ Samples must be received within the method defined holding time.

### **Temperature Requirement (varies by sample matrix):**

- ✓ Aqueous and Non-aqueous samples must be shipped and stored cold, at 0 to 6°C.
- ✓ Tissue samples must be shipped and stored frozen, at -20 to -10°C.
- ✓ Air samples are shipped and stored cold, at 0 to 6°C
- ✓ The sample temperature must be recorded on the COC

All cooler inspections are documented on the Cooler Receipt Form (CRF). A separate CRF is completed for each service request. Any samples not meeting the above criteria are noted on the CRF and the Project Manager notified. The Project Manager must resolve any sample integrity issues with the client prior to proceeding with the analysis. Such resolutions are documented in writing and filed with the project folder. Data associated with samples received outside of this acceptance policy will be qualified on the case narrative of the final report



# Preparation Information Benchsheets

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

**Preparation Information Benchsheet****Prep Run#:** 398034**Prep WorkFlow:** GenExt28Day**Status:** Prepped**Team:** Semivoa GCMS/GRIVERA**Prep Method:** Method**Prep Date/Time:** 4/13/22 16:00

#	Lab Code	Client ID	B#	Method /Test	pH	Cl	Matrix	Amt. Ext.	Sample Description
1	E2200322-001	OBOD-30-QC	.01	6850/ClO4 DOD			Ground Water	10mL	
2	E2200322-002	OBOD-L-GW	.01	6850/ClO4 DOD			Ground Water	10mL	
3	E2200322-003	OBOD-11-QC	.01	6850/ClO4 DOD			Ground Water	10mL	
4	E2200322-004	OBOD-21-EB	.01	6850/ClO4 DOD			Water	10mL	
5	E2200322-005	OBOD-06-GW	.01	6850/ClO4 DOD			Ground Water	10mL	
6	E2200322-006	OBOD-11-GW	.01	6850/ClO4 DOD			Ground Water	10mL	
7	E2200322-007	OBOD-15-GW	.01	6850/ClO4 DOD			Ground Water	10mL	
8	E2200322-008	OBOD-18-GW	.01	6850/ClO4 DOD			Ground Water	10mL	
9	E2200322-009	OBOD-19-QC	.01	6850/ClO4 DOD			Ground Water	10mL	
10	E2200322-010	OBOD-20-GW	.01	6850/ClO4 DOD			Ground Water	10mL	
11	E2200322-011	OBOD-21-GW	.01	6850/ClO4 DOD			Ground Water	10mL	
12	E2200322-012	OBOD-22-GW	.01	6850/ClO4 DOD			Ground Water	10mL	
13	E2200322-013	OBOD-25-GW	.01	6850/ClO4 DOD			Ground Water	10mL	
14	E2200322-014	OBOD-29-GW	.01	6850/ClO4 DOD			Ground Water	10mL	
15	E2200322-015	OBOD-30-GW	.01	6850/ClO4 DOD			Ground Water	10mL	
16	E2200322-016	OBOD-31-GW	.01	6850/ClO4 DOD			Ground Water	10mL	
17	E2200322-017	OBOD-J-GW	.01	6850/ClO4 DOD			Ground Water	10mL	
18	E2200322-018	OBOD-K-GW	.01	6850/ClO4 DOD			Ground Water	10mL	
19	E2200325-001	LH18/24-SP650_041222_AIX	.01	6850/ClO4 DOD			Water	10mL	
20	E2200325-002	LH18/24-SP650_041222_BIX	.01	6850/ClO4 DOD			Water	10mL	
21	EQ2200146-01	MB		6850/ClO4 DOD			Liquid	10mL	
22	EQ2200146-02	LCS		6850/ClO4 DOD			Liquid	10mL	
23	EQ2200146-03	DLCS		6850/ClO4 DOD			Liquid	10mL	
24	EQ2200146-04	OBOD-L-GW MS	.01	6850/ClO4 DOD			Liquid	10mL	
25	EQ2200146-05	OBOD-L-GW DMS	.01	6850/ClO4 DOD			Liquid	10mL	

**Spiking Solutions**

Name: Perchlorate Internal Standard 1ug/mL		Inventory ID 221408		Logbook Ref: Perchlorate Internal Standard				Expires On: 04/30/2022			
E2200322-001	100.00µL	E2200322-002	100.00µL	E2200322-003	100.00µL	E2200322-004	100.00µL	E2200322-005	100.00µL	E2200322-006	100.00µL
E2200322-007	100.00µL	E2200322-008	100.00µL	E2200322-009	100.00µL	E2200322-010	100.00µL	E2200322-011	100.00µL	E2200322-012	100.00µL
E2200322-013	100.00µL	E2200322-014	100.00µL	E2200322-015	100.00µL	E2200322-016	100.00µL	E2200322-017	100.00µL	E2200322-018	100.00µL
E2200325-001	100.00µL	E2200325-002	100.00µL	EQ2200146-01	100.00µL	EQ2200146-02	100.00µL	EQ2200146-03	100.00µL	EQ2200146-04	100.00µL
EQ2200146-05	100.00µL										

***Preparation Information Benchsheet***

**Prep Run#:** 398034  
**Team:** Semivoa GCMS/GRIVERA

**Prep Workflow:** GenExt28Day  
**Prep Method:** Method

**Status:** Prepped  
**Prep Date/Time:** 4/13/22 16:00

Name:	Perchlorate Intermediate Stock1	Inventory ID	221456	Logbook Ref:	Perchlorate	Expires On:	04/30/2022
-------	---------------------------------	--------------	--------	--------------	-------------	-------------	------------

EQ2200146-02 1.00µL EQ2200146-03 1.00µL EQ2200146-04 1.00µL EQ2200146-05 1.00µL

**Preparation Materials**

Water HPLC Grade	08/03/2021 Water (218532)	6850 Amber Glass screw vial	2mL Screw Top Vial (221894)	537M Glass Culture Tubes	537M Glass Tubes (218064)
6850 0.45um syringe filters	6850 Syringe Filters (219639)	6850 Luer-Lok Syringes	Luer-Lok Syringes (221305)	6850 Pipette Tips 50-1000 uL	6850 Pipette Tips (221929)

**Preparation Steps**

Step: Preparation  
 Started: 4/13/22 16:00  
 Finished: 4/13/22 16:35  
 By: GRIVERA  
 Comments

Comments: \_\_\_\_\_

Reviewed By: GR Date: 4/13/22

**Chain of Custody**

Relinquished By: _____	Date: _____	<u>Extracts Examined</u>
Received By: _____	Date: _____	Yes No



# Analytical Results

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22040624  
**Sample Matrix:** Water  
**Sample Name:** LH18/24-SP650\_041222\_AIX  
**Lab Code:** E2200325-001

**Service Request:** E2200325  
**Date Collected:** 4/12/22 1400  
**Date Received:** 4/13/22  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	11.7		0.100	0.0500	0.0250	1	4/13/22	4/14/22 12:16	398034	760549	



## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22040624  
**Sample Matrix:** Water  
**Sample Name:** LH18/24-SP650\_041222\_BIX  
**Lab Code:** E2200325-002

**Service Request:** E2200325  
**Date Collected:** 4/12/22 1400  
**Date Received:** 4/13/22  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	273		1.00	0.500	0.250	10	4/13/22	4/14/22 12:44	398034	760549	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22040624  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** EQ2200146-01

**Service Request:** E2200325  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	0.100	0.0500	0.0250	1	4/13/22	4/14/22 11:21	398034	760549	



## Accuracy & Precision

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS22040624  
**Sample Matrix:** Water

**Service Request:** E2200325**Date Analyzed:** 4/14/22

## Lab Control Sample Summary

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

**Units:** µg/L**Basis:** NA**Extraction Lot:** 398034

Analyte Name	Lab Control Sample EQ2200146-02			Duplicate Lab Control Sample EQ2200146-03			% Rec Limits	RPD	RPD Limit
	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Perchlorate	0.101	0.100	101	0.108	0.100	108	84 - 119	7	15

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22040624  
**Sample Matrix:** Water  
**Sample Name:** Lab Control Sample  
**Lab Code:** EQ2200146-02

**Service Request:** E2200325  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.101		0.100	0.0500	0.0250	1	4/13/22	4/14/22 11:45	398034	760549	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22040624  
**Sample Matrix:** Water  
**Sample Name:** Duplicate Lab Control Sample  
**Lab Code:** EQ2200146-03

**Service Request:** E2200325  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.108		0.100	0.0500	0.0250	1	4/13/22	4/14/22 11:52	398034	760549	



---

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April 27, 2022

Marcia Olive  
Bhate Environmental Associates, Inc.  
445 Union Blvd Ste 129  
Lakewood, CO 80228

Work Order: **HS22040626**

Laboratory Results for: **Longhorn GW Treatment Plant Monthly Influent Samples**

Dear Marcia Olive,

ALS Environmental received 1 sample(s) on Apr 13, 2022 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: JUMOKE.LAWAL

Ragen Giga  
Project Manager

ALS Houston, US

Date: 27-Apr-22

Client:

Project:

Work Order:

Bhate Environmental Associates, Inc.

Longhorn GW Treatment Plant Monthly Influent Samples

HS22040626

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS22040626-01	LH18/24-SP140_041222	Water		12-Apr-2022 14:00	13-Apr-2022 10:00	<input type="checkbox"/>



**ALS Houston, US**

Date: 27-Apr-22

---

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Influent Samples  
**Work Order:** HS22040626

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**CASE NARRATIVE**

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**Work Order Comments**

- The analysis for Perchlorate was subcontracted to ALS Houston High-Res Lab. Final report attached
- 

**Metals by Method SW6020A****Batch ID: 178078**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**WetChemistry by Method SW7196****Batch ID: R406414**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

## ALS Houston, US

Date: 27-Apr-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Monthly Influent Samples  
 Sample ID: LH18/24-SP140\_041222  
 Collection Date: 12-Apr-2022 14:00

**ANALYTICAL REPORT**

WorkOrder:HS22040626  
 Lab ID:HS22040626-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>METALS BY ICPMS BY SW6020A</b>		<b>Method:SW6020A</b>				Prep:SW3010A / 26-Apr-2022		Analyst: JC
Selenium	0.00250	U	0.00110	0.00250	0.00500	mg/L	1	27-Apr-2022 12:23
Silver	0.000500	U	0.000200	0.000500	0.00500	mg/L	1	27-Apr-2022 12:23
<b>HEXAVALENT CHROMIUM BY SW7196A</b>		<b>Method:SW7196</b>						Analyst: AP
Chromium, Hexavalent	0.00600	U	0.00600	0.00600	0.0100	mg/L	1	13-Apr-2022 13:28
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>						Analyst: GR
Subcontract Analysis	See Attached		0	0		NA	1	20-Apr-2022 17:07

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## Weight / Prep Log

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Influent Samples  
**WorkOrder:** HS22040626

<b>Batch ID:</b> 178078	<b>Start Date:</b> 26 Apr 2022 09:00	<b>End Date:</b> 26 Apr 2022 14:00
<b>Method:</b> WATER - SW3010A	<b>Prep Code:</b> 3010A	

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor	
HS22040626-01		10 (mL)	10 (mL)	1	120 plastic HNO3

ALS Houston, US

Date: 27-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Influent Samples  
**WorkOrder:** HS22040626

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> 178078 ( 0 )		<b>Test Name :</b> METALS BY ICPMS BY SW6020A			<b>Matrix:</b> Water	
HS22040626-01	LH18/24-SP140_041222	12 Apr 2022 14:00		26 Apr 2022 09:00	27 Apr 2022 12:23	1
<b>Batch ID:</b> R406414 ( 0 )		<b>Test Name :</b> HEXAVALENT CHROMIUM BY SW7196A			<b>Matrix:</b> Water	
HS22040626-01	LH18/24-SP140_041222	12 Apr 2022 14:00			13 Apr 2022 13:28	1
<b>Batch ID:</b> R406996 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			<b>Matrix:</b> Water	
HS22040626-01	LH18/24-SP140_041222	12 Apr 2022 14:00			20 Apr 2022 17:07	1

## ALS Houston, US

Date: 27-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Influent Samples  
**WorkOrder:** HS22040626

**QC BATCH REPORT**

Batch ID: 178078 ( 0 )		Instrument: ICPMS06		Method: METALS BY ICPMS BY SW6020A					
<b>MBLK</b>	Sample ID: <b>MBLK-178078</b>	Units: <b>mg/L</b>		Analysis Date: <b>27-Apr-2022 12:10</b>					
Client ID:	Run ID: <b>ICPMS06_407432</b>	SeqNo: <b>6620473</b>		PrepDate: <b>26-Apr-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Selenium	0.00250	0.00500							U
Silver	0.000500	0.00500							U
<b>LCS</b>	Sample ID: <b>LCS-178078</b>	Units: <b>mg/L</b>		Analysis Date: <b>27-Apr-2022 12:12</b>					
Client ID:	Run ID: <b>ICPMS06_407432</b>	SeqNo: <b>6620474</b>		PrepDate: <b>26-Apr-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Selenium	0.04887	0.00500	0.05	0	97.7	80 - 120			
Silver	0.05037	0.00500	0.05	0	101	85 - 116			
<b>MS</b>	Sample ID: <b>HS22041125-06MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>27-Apr-2022 12:18</b>					
Client ID:	Run ID: <b>ICPMS06_407432</b>	SeqNo: <b>6620477</b>		PrepDate: <b>26-Apr-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Selenium	0.04705	0.00500	0.05	-0.000517	95.1	80 - 120			
Silver	0.04895	0.00500	0.05	0.000018	97.9	85 - 116			
<b>MSD</b>	Sample ID: <b>HS22041125-06MSD</b>	Units: <b>mg/L</b>		Analysis Date: <b>27-Apr-2022 12:20</b>					
Client ID:	Run ID: <b>ICPMS06_407432</b>	SeqNo: <b>6620478</b>		PrepDate: <b>26-Apr-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Selenium	0.0471	0.00500	0.05	-0.000517	95.2	80 - 120	0.04705	0.119	20
Silver	0.04711	0.00500	0.05	0.000018	94.2	85 - 116	0.04895	3.84	20
<b>PDS</b>	Sample ID: <b>HS22041125-06PDS</b>	Units: <b>mg/L</b>		Analysis Date: <b>27-Apr-2022 12:21</b>					
Client ID:	Run ID: <b>ICPMS06_407432</b>	SeqNo: <b>6620479</b>		PrepDate: <b>26-Apr-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Selenium	0.09878	0.00500	0.1	-0.000517	99.3	80 - 120			
Silver	0.1008	0.00500	0.1	0.000018	101	80 - 120			

ALS Houston, US

Date: 27-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Influent Samples  
**WorkOrder:** HS22040626

**QC BATCH REPORT**

Batch ID: 178078 ( 0 )		Instrument: ICPMS06		Method: METALS BY ICPMS BY SW6020A						
<b>SD</b>	Sample ID: <b>HS22041125-06SD</b>	Units: <b>mg/L</b>		Analysis Date: <b>27-Apr-2022 12:16</b>						
Client ID:	Run ID: <b>ICPMS06_407432</b>		SeqNo: <b>6620476</b>		PrepDate: <b>26-Apr-2022</b>		DF: <b>5</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%D	Limit	Qual
Selenium	0.0125	0.0250					-0.000517	0	10	U
Silver	0.00250	0.0250					0.000018	0	10	U

The following samples were analyzed in this batch: HS22040626-01

## ALS Houston, US

Date: 27-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Influent Samples  
**WorkOrder:** HS22040626

**QC BATCH REPORT**

Batch ID: R406414 ( 0 )		Instrument: UV-2450		Method: HEXAVALENT CHROMIUM BY SW7196A						
<b>MBLK</b>	Sample ID: <b>MBLK-R406414</b>	Units: <b>mg/L</b>		Analysis Date: <b>13-Apr-2022 13:28</b>						
Client ID:	Run ID: <b>UV-2450_406414</b>		SeqNo: <b>6596794</b>		PrepDate:		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.00600	0.0100								U
<b>LCS</b>	Sample ID: <b>LCS-R406414</b>	Units: <b>mg/L</b>		Analysis Date: <b>13-Apr-2022 13:28</b>						
Client ID:	Run ID: <b>UV-2450_406414</b>		SeqNo: <b>6596793</b>		PrepDate:		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.248	0.0100	0.25	0	99.2	90 - 111				
<b>MS</b>	Sample ID: <b>HS22040627-01MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>13-Apr-2022 13:28</b>						
Client ID:	Run ID: <b>UV-2450_406414</b>		SeqNo: <b>6596792</b>		PrepDate:		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.242	0.0100	0.25	0	96.8	90 - 111				
<b>MSD</b>	Sample ID: <b>HS22040627-01MSD</b>	Units: <b>mg/L</b>		Analysis Date: <b>13-Apr-2022 13:28</b>						
Client ID:	Run ID: <b>UV-2450_406414</b>		SeqNo: <b>6596791</b>		PrepDate:		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.246	0.0100	0.25	0	98.4	90 - 111	0.242	1.64	20	
The following samples were analyzed in this batch: HS22040626-01										

## ALS Houston, US

Date: 27-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Influent Samples  
**WorkOrder:** HS22040626

**QUALIFIERS,  
ACRONYMS, UNITS**

<b>Qualifier</b>	<b>Description</b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

<b>Acronym</b>	<b>Description</b>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program



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**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

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Agency	Number	Expire Date
Florida	E87611-34	30-Jun-2022
Illinois	2000322021-7	09-May-2022
Kansas	E-10352 2021-2022	31-Jul-2022
Kentucky	123043, 2021-2022	30-Apr-2022
Louisiana	03087, 2021-2022	30-Jun-2022
Texas	T104704231-21-28	30-Apr-2022

ALS Houston, US

Date: 27-Apr-22

## Sample Receipt Checklist

Work Order ID: HS22040626

Date/Time Received: **13-Apr-2022 10:00**

Client Name: Bhate Environmental

Received by: **Paresh M. Giga**Completed By: /S/ Niles D. Ranchod

13-Apr-2022 11:51

Reviewed by: /S/ Ragen Giga

13-Apr-2022 19:59

eSignature

Date/Time

eSignature

Date/Time

Matrices: **WATER**Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?

Yes ☒No ☐Not Present ☐

Custody seals intact on shipping container/cooler?

Yes ☒No ☐Not Present ☐

Custody seals intact on sample bottles?

Yes ☐No ☐Not Present ☒

VOA/TX1005/TX1006 Solids in hermetically sealed vials?

Yes ☐No ☐Not Present ☒

Chain of custody present?

Yes ☒No ☐

1 Page(s)

Chain of custody signed when relinquished and received?

Yes ☒No ☐

COC IDs: CLIENT

Samplers name present on COC?

Yes ☒No ☐

Chain of custody agrees with sample labels?

Yes ☒No ☐

Samples in proper container/bottle?

Yes ☒No ☐

Sample containers intact?

Yes ☒No ☐

Sufficient sample volume for indicated test?

Yes ☒No ☐

All samples received within holding time?

Yes ☒No ☐

Container/Temp Blank temperature in compliance?

Yes ☒No ☐

Temperature(s)/Thermometer(s):

1.6°C/2.1°C UC/C

IR 31

Cooler(s)/Kit(s):

47814

Date/Time sample(s) sent to storage:

04/13/22 12:15

Water - VOA vials have zero headspace?

Yes ☐No ☐No VOA vials submitted ☒

Water - pH acceptable upon receipt?

Yes ☒No ☐N/A ☐

pH adjusted?

Yes ☐No ☒N/A ☐

pH adjusted by:

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:


Contacted By:

Regarding:

Comments:

Corrective Action:



 <b>ALS</b> 10450 Standliff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5856 Fax. +1 281 530 5887	<b>CUSTODY SEAL</b>		Seal Broken By: <i>SM</i>
	Date: <i>4/12/22</i>	Time: <i>1430</i>	Date: <i>04/13/22</i>
	Name: <i>Scott Beesinger</i>		
	Company: <i>BH&amp;P</i>		

47814



ORIGIN ID: SGRA (503) 930-6193  
 SCOTT BEESINGER  
 APTIM ENVIRONMENTAL & INFRASTRUCTURE  
 1009-B EAST GRAND AVE  
 PMB 202  
 MARSHALL, TX 75670  
 UNITED STATES US

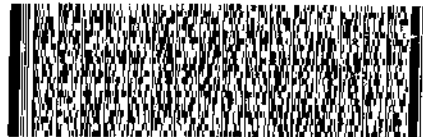
SHIP DATE: 28 JUN 21  
 ACTWGT: 1.00 LB MAX  
 CAD: 022124/CAFE9534  
 DIMS: 26x14x14 IN

TO SHIPPING DEPT  
 ALS LABORATORY GROUP  
 10450 STANCLIFF RD  
 SUITE 210  
 HOUSTON TX 77099

(281) 530-5856

REF: LHAAP-15-BD 79249-RG

RMA: 111111

FedEx  
Express

FedEx  
 TRX# 9473 0845 1405  
 0221

WED - 13 APR 10:30A  
 PRIORITY OVERNIGHT

AB SGRA

77099  
 TX-US IAH





April 20, 2022

Service Request No:E2200326

Ragen Giga  
ALS Environmental - US  
10450 Stancliff Rd Suite 210  
Houston, TX 77099

**Laboratory Results for: HS22040626**

Dear Ragen,

Enclosed are the results of the sample(s) submitted to our laboratory April 13, 2022  
For your reference, these analyses have been assigned our service request number **E2200326**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current TNI standards, where applicable, and except as noted in the laboratory case narrative provided. All results are intended to be considered in their entirety and ALS Environmental is not responsible for use of less than the complete final report. Results apply only to the items submitted to the laboratory, as received for analysis. In accordance with the current TNI Standard, a statement on the estimated uncertainty of measurement of any quantitative analysis will be supplied upon request.

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Corey Grandits  
Project Manager

ADDRESS 10450 Stancliff Rd., Suite 210, Houston, TX 77099  
PHONE +1 281 530 5656 | FAX +1 281 530 5887  
ALS Group USA, Corp.  
dba ALS Environmental



# Certificate of Analysis

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

**ALS Environmental**

**Client:** ALS-Houston  
**Project:** HS22040627  
**Sample Matrix:** W

**Service Request No.:** E2200327  
**Date Received:** 04/13/22

**CASE NARRATIVE**

All analyses were performed in adherence to the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier IV. When appropriate to the method, method blank results have been reported with each analytical test.

**Sample Receipt**

One sample was received for analysis at ALS Environmental in Houston on 04/13/22.

The sample was received in good condition and is consistent with the accompanying chain of custody form. The sample was stored in a refrigerator at 4°C upon receipt at the laboratory.

**Data Validation Notes and Discussion****Precision and Accuracy:**

EQ2200152: Laboratory Control Spike/Duplicate Laboratory Control Spike (LCS/DLCS) samples were analyzed and reported in addition to a MS/MSD for this extraction batch. The LCS-DLCS recoveries met acceptance criteria; MS/MSD performed on an unrelated sample.

DoD Certification is held for the method/matrix/analytes provided in this report.

*The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.*

*Use of ALS group USA Corp dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.*

**ALS Environmental**

**Client:** ALS-Houston  
**Project:** HS22040626  
**Sample Matrix:** W

**Service Request No.:** E2200326  
**Date Received:** 04/13/22

**CASE NARRATIVE**

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**Client:** ALS Environmental - US  
**Project:** HS22040626

**Service Request:**E2200326

**SAMPLE CROSS-REFERENCE**

<u>SAMPLE #</u>	<u>CLIENT SAMPLE ID</u>	<u>DATE</u>	<u>TIME</u>
E2200326-001	LH18/24-SP140_041222	4/12/2022	1400

**Service Request Summary**

**Folder #:** E2200326  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22040626  
**Project Number:**  
  
**Report To:** Ragen Giga  
 ALS Environmental - US  
 10450 Standliff Rd Suite 210  
 Houston, TX 77099  
 USA  
  
**Phone Number:**  
**Cell Number:**  
**Fax Number:**  
**E-mail:** ragenp.giga@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 04/13/22  
**Internal Due Date:** 4/27/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22040626  
**EDD:** No EDD Specified

1 120 mL-Plastic Bottle Natural WM Unpreserved

**Location:** EHRMS-AirArch 1

**Pressure Gas:**

				HOUSTON
Lab Samp No.	Client Samp No	Matrix	Collected	CIO4 DOD/6850
E2200326-001	LH18/24-SP140_041222	Water	04/12/22 1400	IV

**Service Request Summary**

**Folder #:** E2200326  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22040626  
**Project Number:**  
  
**Report To:** Ragen Giga  
 ALS Environmental - US  
 10450 Standliff Rd Suite 210  
 Houston, TX 77099  
 USA  
  
**Phone Number:**  
**Cell Number:**  
**Fax Number:**  
**E-mail:** ragenp.giga@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 04/13/22  
**Internal Due Date:** 4/27/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22040626  
**EDD:** No EDD Specified

1 120 mL-Plastic Bottle Natural WM Unpreserved  
**Location:** EHRMS-AirArch 1  
**Pressure Gas:**

**Test Comments:**

Group	Test/Method	Samples	Comments
Semivola GCMS	CIO4 DOD/6850	1	IV DUE 5/4

## Data Qualifiers

### Lab Standard

- + Possible Tedlar bag artifact.
- A TIC is a suspected aldol-condensation product
- B Analyte found in the associated method blank as well as in the sample.
- BC Reported results are not blank corrected.
- BH The back section of the tube yielded higher results than the front.
- BT Results indicated possible breakthrough; back section  $\geq 10\%$  front section.
- C Result identification confirmed.
- D Compound identified in an analysis at a secondary dilution factor
- D Spike was diluted out
- DE Reported results are corrected for desorption efficiency.
- E Estimated value. Concentration above calibration range
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- H1 Sample analysis performed past holding time. See case narrative.
- H2 Initial analysis within holding time. Reanalysis for the required dilution was past holding time.
- H3 Sample was received and analyzed past holding time.
- H4 Sample was extracted past required extraction holding time, but analyzed within analysis holding time. See case narrative.
- I Internal standard not within the specified limits. See case narrative.
- J Estimated Value. Concentration found below MRL.
- K (Auto) The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- K A deflection in the QC ion may indicate interference with the quantitation of this ion. The concentration of this analyte should be considered as an estimate.
- K Analyte was detected above the method reporting limit prior to normalization.
- K The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- L1 Laboratory control sample recovery outside the specified limits; results may be biased high.
- L2 Laboratory control sample recovery outside the specified limits; results may be biased low.
- L3 Laboratory control sample recovery outside the specified limits.
- M Matrix interference; results may be biased high.
- M The duplicate injection precision not met.
- M1 Matrix interference due to coelution with a non-target compound; results may be biased high.

## Data Qualifiers

### Lab Standard

- N Presumptive evidence of a compound for TICs that have been identified based on a mass spectral library search.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- P Indicates chlorodiphenyl ether interference present at the retention time of the target compound.
- P Pesticide/Aroclor target analyte > 40% difference for detected concentrations between GC columns
- Q Indicates as estimated value because the P and P + 2 theoretical abundance ratio does not meet method criteria.
- R Duplicate Precision not met.
- R1 Duplicate precision not within the specified limits; however, the results are below the MRL and considered estimated.
- S Surrogate recovery not within specified limits.
- S The reported value was determined by the Method of Standard Additions (MSA).
- T Analyte is a tentatively identified compound, result is estimated.
- U Compound was analyzed for, but was not detected (ND).
- V1 The continuing calibration verification standard was outside (biased high) the specified limits for this compound.
- V2 The continuing calibration verification standard was outside (biased low) the specified limits for this compound.
- W Result quantified, but the corresponding peak was detected outside the generated retention time window.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- X See case narrative.
- Y Recovery outside limits
- Y The chromatogram resembles a petroleum product but does not match the calibration standard.
- Z The chromatogram does not resemble a petroleum product.
- i The MRL/MDL has been elevated due to a matrix interference.

## ALS Laboratory Group

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### Acronyms

Cal	Calibration
Conc	CONCetration
Dioxin(s)	Polychlorinated dibenzo-p-dioxin(s)
EDL	Estimated Detection Limit
EMPC	Estimated Maximum Possible Concentration
Flags	Data qualifiers
Furan(s)	Polychlorinated dibenzofuran(s)
g	Grams
ICAL	Initial CALibration
ID	IDentifier
Ions	Masses monitored for the analyte during data acquisition
L	Liter (s)
LCS	Laboratory Control Sample
DLCS	Duplicate Laboratory Control Sample
MB	Method Blank
MCL	Method Calibration Limit
MDL	Method Detection Limit
mL	Milliliters
MS	Matrix Spiked sample
DMS	Duplicate Matrix Spiked sample
NO	Number of peaks meeting all identification criteria
PCDD(s)	Polychlorinated dibenzo-p-dioxin(s)
PCDF(s)	Polychlorinated dibenzofuran(s)
ppb	Parts per billion
ppm	Parts per million
ppq	Parts per quadrillion
ppt	Parts per trillion
QA	Quality Assurance
QC	Quality Control
Ratio	Ratio of areas from monitored ions for an analyte
% Rec.	Percent recovery
RPD	Relative Percent Difference
RRF	Relative Response Factor
RT	Retention Time
SDG	Sample Delivery Group
S/N	Signal-to-noise ratio
TEF	Toxicity Equivalence Factor
TEQ	Toxicity Equivalence Quotient



## State Certifications, Accreditations, and Licenses

Agency	Number	Expire Date
Arizona Department of Health Services	AZ0793-2022	5/27/2022
California Department of Health Services	2919	4/30/2022
California Department of Health Services	2919-2022	4/30/2022
Florida Department of Health	E87611-34	6/30/2022
Hawaii Department of Health	2021-2022	4/30/2022
Illinois Environmental Protection Agency	2000322021-7	5/9/2022
Kansas Department of Health and Environment	E-10352 2022	7/31/2022
Louisiana Department of Environmental Quality	03087-2021	6/30/2022
Louisiana Department of Environmental Quality	03087-2020	6/30/2022
Louisiana Department of Health and Hospitals	LA028	12/31/2022
Maine Department of Health and Human Services	2020016	6/5/2022
Maryland Department of the Environment	343	6/30/2022
Michigan Department of Environmental Quality	9971	4/30/2022
Minnesota Department of Health	2228443	12/31/2022
Nebraska Department of Health and Human Services	NE-OS-25-13	4/30/2022
Nevada Department of Conservation and Natural Resources	TX026932022-1	7/31/2022
New Hampshire Environmental Laboratory Accreditation Program	209421	4/24/2022
New Hampshire Environmental Laboratory Accreditation Program	209419	4/24/2022
New Jersey Department of Environmental Protection	TX008	6/30/2022
New York Department of Health	11707	3/31/2023
Oklahoma Department of Environmental Quality	2021-080	8/31/2022
Pennsylvania Department of Environmental Protection	68-03441-015	6/30/2022
Tennessee Department of Environment and Conservation	04016	4/30/2022
Tennessee Department of Environment and Conservation	04016-2021	4/30/2022
Texas Commission on Environmental Quality	T104704231-21-28	4/30/2022
Texas Commission on Environmental Quality	T104704231-21-27	4/30/2022
United States Department of Agriculture	P330-19-00299	10/10/2022
Utah Department of Health Environmental Laboratory Certification	TX026932021-12	7/31/2022
Washington Department of Health	C819-2022	11/14/2022



## Chain of Custody

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)





10450 Standcliff Rd, Ste 210  
Houston, TX 77099  
**T:** +1 281 530 5656  
**F:** +1 281 530 5887  
**www.alsglobal.com**

## Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 18565

**SUBCONTRACT TO:**

ALS Environmental  
10450 Standcliff Road Suite 210  
Houston, TX 77084

**Phone:** +1 281 530 5656

**CUSTOMER  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Ragen Giga  
**Address:** 10450 Standcliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Email:** RagenP.Giga@ALSGlobal.com  
**Alternate  
Contact:** Jumoke M. Lawal  
**Email:** jumoke.lawal@alsglobal.com

**INVOICE  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Accounts Payable  
**Address:** 10450 Standcliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Reference:** HS22040626  
**TSR:** Houston House Acct

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS22040626-01	LH18/24-SP140_041222	Water	12 Apr 2022 14:00
6850-Perch. DOD Level II & Level IV in separate pdf			27 Apr 2022

**Comments:** Please analyze for the analysis listed above.  
Send report to the emails shown above.

**QC Level:** DOD IV (DoD Data Package)

Relinquished By: \_\_\_\_\_

Date/Time: \_\_\_\_\_

Received By: \_\_\_\_\_

Date/Time: 4-13-22 13:14

Cooler ID(s): \_\_\_\_\_

Temperature(s): \_\_\_\_\_



## Cooler Receipt Form

Project Chemist LAClient/Project ALH-H Thermometer ID 1041Date/Time Received: 9-13-22 Initials: LA Date/Time Logged in: 9-13-22 Initials: LA1. Method of delivery: ☐ US Mail ☐ Fed Ex ☐ UPS ☐ DHL ☒ <sup>ALS</sup> Courier ☐ Client2. Samples received in: ☒ Cooler ☐ Box ☐ Envelope ☐ Other

3. Were custody seals on coolers? ☐ Yes ☒ No

Were they intact? ☐ Yes ☐ No ☒ N/A

Were they signed and dated? ☐ Yes ☐ No ☒ N/A

If yes, how many and where?

--

4. Packing Material: ☐ Inserts ☒ Baggies ☐ Bubble Wrap ☐ Gel Packs ☒ Wet Ice ☐ Sleeves ☐ Other5. Foreign or Regulated Soil? ☐ Yes ☐ No Location of Sampling:

Cooler Tracking Number	COC ID	Date Opened	Time Opened	Opened By	Temp. °C	Temp Blank?
<u>NA</u>		<u>9-13-22</u>	<u>13:14</u>	<u>LA</u>	<u>3.7</u>	<input checked="" type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>

6. Were custody papers properly filled out (ink, signed, dated, etc)? ☒ Yes ☐ No7. Did all bottles arrive in good condition (not broken, no signs of leakage)? ☒ Yes ☐ No8. Were all sample labels complete (i.e., sample ID, analysis, preservation, etc)? ☒ Yes ☐ No9. Were appropriate bottles/containers and volumes received for the requested tests? ☒ Yes ☐ No10. Did sample labels and tags agree with custody documents? ☒ Yes ☐ No

Notes, Discrepancies, &amp; Resolutions:

--

Service request Label:



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F: +1 713 266 1599  
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## SAMPLE ACCEPTANCE POLICY

This policy outlines the criteria samples must meet to be accepted by ALS Environmental – Houston HRMS.

### **Cooler Custody Seals (desirable, mandatory if specified in SAP):**

- ✓ Intact on outside of cooler, signed and dated

### **Chain-of-Custody (COC) documentation (mandatory):**

The following is required on each COC:

- ✓ Sample ID, the location, date and time of collection, collector's name, preservation type, sample type, and any other special remarks concerning the sample. The COC must be completed in ink.
- ✓ Signature and date of relinquishing party.

In the absence of a COC at sample receipt, the COC will be requested from the client.

### **Sample Integrity (mandatory):**

Samples are inspected upon arrival to ensure that sample integrity was not compromised during transfer to the laboratory.

- ✓ Sample containers must arrive in good condition (not broken or leaking).
- ✓ Samples must be labeled appropriately, including Sample IDs, and requested test using durable labels and indelible ink.
- ✓ The correct type of sample bottle must be used for the method requested.
- ✓ An appropriate sample volume, or weight, must be received.
- ✓ Sample IDs and number of containers must reconcile with the COC.
- ✓ Samples must be received within the method defined holding time.

### **Temperature Requirement (varies by sample matrix):**

- ✓ Aqueous and Non-aqueous samples must be shipped and stored cold, at 0 to 6°C.
- ✓ Tissue samples must be shipped and stored frozen, at -20 to -10°C.
- ✓ Air samples are shipped and stored cold, at 0 to 6°C
- ✓ The sample temperature must be recorded on the COC

All cooler inspections are documented on the Cooler Receipt Form (CRF). A separate CRF is completed for each service request. Any samples not meeting the above criteria are noted on the CRF and the Project Manager notified. The Project Manager must resolve any sample integrity issues with the client prior to proceeding with the analysis. Such resolutions are documented in writing and filed with the project folder. Data associated with samples received outside of this acceptance policy will be qualified on the case narrative of the final report.



## Preparation Information Benchsheets

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

**Preparation Information Benchsheet**

**Prep Run#:** 398281  
**Team:** Semivoa GCMS/GRIVERA

**Prep WorkFlow:** GenExt28Day  
**Prep Method:** Method

**Status:** Prepped  
**Prep Date/Time:** 4/18/22 09:48

#	Lab Code	Client ID	B#	Method /Test	pH	Cl	Matrix	Amt. Ext.	Sample Description
1	E2200326-001	LH18/24-SP140_041222	.01	6850/ClO4 DOD			Water	10mL	
2	E2200327-001	LH18/24-SP650_041222_AIX	.01	6850/ClO4 DOD			Water	10mL	
3	E2200328-001	43MW01	.01	6850/ClO4 DOD			Water	10mL	
4	E2200328-002	43MW03	.01	6850/ClO4 DOD			Water	10mL	
5	E2200328-003	43MW03-Dup	.01	6850/ClO4 DOD			Water	10mL	
6	E2200328-004	43MW04	.01	6850/ClO4 DOD			Water	10mL	
7	E2200328-005	43MW05	.01	6850/ClO4 DOD			Water	10mL	
8	E2200328-006	43MW06	.01	6850/ClO4 DOD			Water	10mL	
9	E2200328-007	43MW03	.01	6850/ClO4 DOD			Water	10mL	
10	E2200337-001	HBW7_041322	.01	6850/ClO4 DOD			Water	10mL	
11	E2200337-002	HBW10_041322	.01	6850/ClO4 DOD			Water	10mL	
12	E2200337-003	HBW10_041322	.01	6850/ClO4 DOD			Water	10mL	
13	E2200337-004	HBW1_041322	.01	6850/ClO4 DOD			Water	10mL	
14	E2200337-005	GPW1_041322	.01	6850/ClO4 DOD			Water	10mL	
15	E2200337-006	GPW3_041322	.01	6850/ClO4 DOD			Water	10mL	
16	EQ2200152-01	MB		6850/ClO4 DOD			Liquid	10mL	
17	EQ2200152-02	LCS		6850/ClO4 DOD			Liquid	10mL	
18	EQ2200152-03	DLCS		6850/ClO4 DOD			Liquid	10mL	
19	EQ2200152-04	43MW01 MS	.02	6850/ClO4 DOD			Liquid	10mL	
20	EQ2200152-05	43MW01 DMS	.03	6850/ClO4 DOD			Liquid	10mL	
21	R2202890-005	2204010934A JP-1-424	.01	6850/ClO4			Water	10mL	

**Spiking Solutions**

Name: Perchlorate Internal Standard 1ug/mL				Inventory ID 221408		Logbook Ref: Perchlorate Internal Standard				Expires On: 04/30/2022	
E2200326-001	100.00µL	E2200327-001	100.00µL	E2200328-001	100.00µL	E2200328-002	100.00µL	E2200328-003	100.00µL	E2200328-004	100.00µL
E2200328-005	100.00µL	E2200328-006	100.00µL	E2200328-007	100.00µL	E2200337-001	100.00µL	E2200337-002	100.00µL	E2200337-003	100.00µL
E2200337-004	100.00µL	E2200337-005	100.00µL	E2200337-006	100.00µL	EQ2200152-01	100.00µL	EQ2200152-02	100.00µL	EQ2200152-03	100.00µL
EQ2200152-04	100.00µL	EQ2200152-05	100.00µL	R2202890-005	100.00µL						

Name: Perchlorate Intermediate Stock I				Inventory ID 221456		Logbook Ref: Perchlorate				Expires On: 04/30/2022	
EQ2200152-02	1.00µL	EQ2200152-03	1.00µL	EQ2200152-04	1.00µL	EQ2200152-05	1.00µL				

Preparation Information Benchsheet

Prep Run#: 398281  
Team: Semivoa GCMS/GRIVERA

Prep Workflow: GenExt28Day  
Prep Method: Method

Status: Prepped  
Prep Date/Time: 4/18/22 09:48

Preparation Materials

Water HPLC Grade	08/03/2021 Water (218532)	6850 Amber Glass screw vial	2mL Screw Top Vial (221894)	537M Glass Culture Tubes	537M Glass Tubes (218064)
6850 0.45um syringe filters	6850 Syringe Filters (219639)	6850 Luer-Lok Syringes	Luer-Lok Syringes (221305)	6850 Pipette Tips 50-1000 uL	6850 Pipette Tips (221929)

Preparation Steps

Step: Preparation  
Started: 4/18/22 09:48  
Finished: 4/18/22 10:48  
By: GRIVERA  
Comments

Comments:

Reviewed By: GR Date: 4/18/22

Chain of Custody

Relinquished By:	Date:	<u>Extracts Examined</u> Yes No
Received By:	Date:	



# Analytical Results

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22040626  
**Sample Matrix:** Water  
**Sample Name:** LH18/24-SP140\_041222  
**Lab Code:** E2200326-001

**Service Request:** E2200326  
**Date Collected:** 4/12/22 1400  
**Date Received:** 4/13/22  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	6370		20.0	5.00	200	4/18/22	4/18/22 18:06	398281	761134	



## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22040626  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** EQ2200152-01

**Service Request:** E2200326  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	0.100	0.0250	1	4/18/22	4/18/22 13:53	398281	761134	



## Accuracy & Precision

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS22040626  
**Sample Matrix:** Water

**Service Request:** E2200326  
**Date Analyzed:** 4/18/22

**Lab Control Sample Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**Analytical Method:** 6850  
**Prep Method:** Method

**Units:** µg/L  
**Basis:** NA

**Extraction Lot:** 398281

Analyte Name	Lab Control Sample EQ2200152-02			Duplicate Lab Control Sample EQ2200152-03			% Rec Limits	RPD	RPD Limit
	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Perchlorate	0.0926	0.100	93	0.105	0.100	105	84 - 119	13	15

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22040626  
**Sample Matrix:** Water  
**Sample Name:** Lab Control Sample  
**Lab Code:** EQ2200152-02

**Service Request:** E2200326  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.0926	J	0.100	0.0250	1	4/18/22	4/18/22 14:01	398281	761134	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22040626  
**Sample Matrix:** Water  
**Sample Name:** Duplicate Lab Control Sample  
**Lab Code:** EQ2200152-03

**Service Request:** E2200326  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.105		0.100	0.0250	1	4/18/22	4/18/22 14:09	398281	761134	



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April 27, 2022

Marcia Olive  
Bhate Environmental Associates, Inc.  
445 Union Blvd Ste 129  
Lakewood, CO 80228

Work Order: **HS22040627**

Laboratory Results for: **Longhorn GW Treatment Plant Monthly Effluent Samples**

Dear Marcia Olive,

ALS Environmental received 3 sample(s) on Apr 13, 2022 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: JUMOKE.LAWAL

Ragen Giga  
Project Manager

ALS Houston, US

Date: 27-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**Work Order:** HS22040627

**SAMPLE SUMMARY**

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS22040627-01	LH18/24-SP650_041222	Water		12-Apr-2022 14:00	13-Apr-2022 10:00	<input type="checkbox"/>
HS22040627-02	LH18/24-SP650_041222_AIX	Water		12-Apr-2022 14:00	13-Apr-2022 10:00	<input type="checkbox"/>
HS22040627-03	Trip Blank	Water		12-Apr-2022 14:00	13-Apr-2022 10:00	<input type="checkbox"/>

ALS Houston, US

Date: 27-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**Work Order:** HS22040627

**CASE NARRATIVE**

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**Work Order Comments**

- The analysis for Perchlorate was subcontracted to ALS Houston High-Res Lab. Final report attached

---

**GCMS Semivolatiles by Method SW8270SIM****Batch ID: 177622****Sample ID: LH18/24-SP650\_041222 (HS22040627-01)**

- The surrogate recoveries could not be determined due to dilution below the calibration range.

---

**GCMS Volatiles by Method SW8260****Batch ID: R406685****Sample ID: LH18/24-SP650\_041222(HS22040627-01MSD)**

- The RPD between the MS and MSD was outside of the control limit.

---

**Metals by Method SW6020A****Batch ID: 178078****Sample ID: HS22041125-06MS**

- MS and MSD are for an unrelated sample

---

**WetChemistry by Method SW7196****Batch ID: R406414**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-



## ALS Houston, US

Date: 27-Apr-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Monthly Effluent Samples  
 Sample ID: LH18/24-SP650\_041222  
 Collection Date: 12-Apr-2022 14:00

## ANALYTICAL REPORT

WorkOrder:HS22040627  
 Lab ID:HS22040627-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD</b>		<b>Method:SW8260</b>						Analyst: PC
<b>8260C</b>								
1,1,1,2-Tetrachloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 13:35
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 13:35
1,1,2,2-Tetrachloroethane	1.0	U	0.50	1.0	1.0	ug/L	1	16-Apr-2022 13:35
1,1,2-Trichloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 13:35
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 13:35
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 13:35
1,1-Dichloropropene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 13:35
1,2,3-Trichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	16-Apr-2022 13:35
1,2,3-Trichloropropane	1.0	U	0.50	1.0	1.0	ug/L	1	16-Apr-2022 13:35
1,2,4-Trichlorobenzene	1.0	U	0.50	1.0	1.0	ug/L	1	16-Apr-2022 13:35
1,2,4-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 13:35
1,2-Dibromo-3-chloropropane	1.0	U	0.20	1.0	1.0	ug/L	1	16-Apr-2022 13:35
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 13:35
1,2-Dichlorobenzene	1.0	U	0.50	1.0	1.0	ug/L	1	16-Apr-2022 13:35
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 13:35
1,2-Dichloropropane	1.0	U	0.50	1.0	1.0	ug/L	1	16-Apr-2022 13:35
1,3,5-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 13:35
1,3-Dichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	16-Apr-2022 13:35
1,3-Dichloropropane	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 13:35
1,4-Dichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	16-Apr-2022 13:35
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 13:35
2-Butanone	1.0	U	0.50	1.0	2.0	ug/L	1	16-Apr-2022 13:35
2-Chlorotoluene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 13:35
2-Hexanone	2.0	U	1.0	2.0	2.0	ug/L	1	16-Apr-2022 13:35
4-Chlorotoluene	1.0	U	0.40	1.0	1.0	ug/L	1	16-Apr-2022 13:35
4-Isopropyltoluene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 13:35
4-Methyl-2-pentanone	2.0	U	0.70	2.0	2.0	ug/L	1	16-Apr-2022 13:35
Acetone	2.0	U	0.40	2.0	2.0	ug/L	1	16-Apr-2022 13:35
Benzene	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 13:35
Bromobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	16-Apr-2022 13:35
Bromochloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 13:35
Bromodichloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 13:35
Bromoform	1.0	U	0.40	1.0	1.0	ug/L	1	16-Apr-2022 13:35
Bromomethane	1.0	U	0.40	1.0	1.0	ug/L	1	16-Apr-2022 13:35
Carbon disulfide	2.0	U	0.60	2.0	2.0	ug/L	1	16-Apr-2022 13:35
Carbon tetrachloride	1.0	U	0.50	1.0	1.0	ug/L	1	16-Apr-2022 13:35
Chlorobenzene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 13:35
Chloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 13:35
Chloroform	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 13:35

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 27-Apr-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Monthly Effluent Samples  
 Sample ID: LH18/24-SP650\_041222  
 Collection Date: 12-Apr-2022 14:00

## ANALYTICAL REPORT

WorkOrder: HS22040627  
 Lab ID: HS22040627-01  
 Matrix: Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD 8260C</b>			<b>Method: SW8260</b>					Analyst: PC
Chloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 13:35
<b>cis-1,2-Dichloroethene</b>	<b>2.0</b>		<b>0.20</b>	<b>0.50</b>	<b>1.0</b>	<b>ug/L</b>	1	16-Apr-2022 13:35
cis-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 13:35
Dibromochloromethane	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 13:35
Dibromomethane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 13:35
Dichlorodifluoromethane	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 13:35
Ethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 13:35
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	ug/L	1	16-Apr-2022 13:35
Isopropylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 13:35
m,p-Xylene	1.0	U	0.50	1.0	2.0	ug/L	1	16-Apr-2022 13:35
Methylene chloride	2.0	U	0.40	2.0	2.0	ug/L	1	16-Apr-2022 13:35
n-Butylbenzene	1.0	U	0.40	1.0	1.0	ug/L	1	16-Apr-2022 13:35
n-Propylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 13:35
Naphthalene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 13:35
o-Xylene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 13:35
sec-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 13:35
Styrene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 13:35
tert-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 13:35
Tetrachloroethene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 13:35
Toluene	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 13:35
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 13:35
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 13:35
Trichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 13:35
Trichlorofluoromethane	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 13:35
Vinyl chloride	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 13:35
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>92.2</i>			<b>0</b>	<i>81-118</i>	<b>%REC</b>	<i>1</i>	<i>16-Apr-2022 13:35</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>98.3</i>			<b>0</b>	<i>85-114</i>	<b>%REC</b>	<i>1</i>	<i>16-Apr-2022 13:35</i>
<i>Surr: Dibromofluoromethane</i>	<i>94.1</i>			<b>0</b>	<i>80-119</i>	<b>%REC</b>	<i>1</i>	<i>16-Apr-2022 13:35</i>
<i>Surr: Toluene-d8</i>	<i>105</i>			<b>0</b>	<i>89-112</i>	<b>%REC</b>	<i>1</i>	<i>16-Apr-2022 13:35</i>
<b>SEMIVOLATILES SIM</b>			<b>Method: SW8270SIM</b>					Prep: SW3510 / 14-Apr-2022 Analyst: JLJ
<b>1,4-Dioxane</b>	<b>12</b>	a	<b>1.0</b>	<b>0</b>	<b>1.0</b>	<b>ug/L</b>	100	27-Apr-2022 14:32
<i>Surr: 2-Fluorobiphenyl</i>	<i>0</i>	S		0	<i>40-140</i>	<b>%REC</b>	<i>100</i>	<i>27-Apr-2022 14:32</i>
<i>Surr: 4-Terphenyl-d14</i>	<i>0</i>	S		0	<i>40-140</i>	<b>%REC</b>	<i>100</i>	<i>27-Apr-2022 14:32</i>
<i>Surr: Nitrobenzene-d5</i>	<i>0</i>	S		0	<i>40-140</i>	<b>%REC</b>	<i>100</i>	<i>27-Apr-2022 14:32</i>
<b>METALS BY ICPMS BY SW6020A</b>			<b>Method: SW6020A</b>					Prep: SW3010A / 26-Apr-2022 Analyst: JC
<b>Barium</b>	<b>0.282</b>		<b>0.00190</b>	<b>0.00250</b>	<b>0.00500</b>	<b>mg/L</b>	1	27-Apr-2022 12:25
Lead	0.00125	U	0.000600	0.00125	0.00500	mg/L	1	27-Apr-2022 12:25
Selenium	0.00250	U	0.00110	0.00250	0.00500	mg/L	1	27-Apr-2022 12:25
Silver	0.000500	U	0.000200	0.000500	0.00500	mg/L	1	27-Apr-2022 12:25

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 27-Apr-22

Client: Bhate Environmental Associates, Inc.  
Project: Longhorn GW Treatment Plant Monthly Effluent Samples  
Sample ID: LH18/24-SP650\_041222  
Collection Date: 12-Apr-2022 14:00

**ANALYTICAL REPORT**

WorkOrder:HS22040627  
Lab ID:HS22040627-01  
Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>HEXAVALENT CHROMIUM BY SW7196A</b>		<b>Method:SW7196</b>						Analyst: AP
Chromium, Hexavalent	0.00600	U	0.00600	0.00600	0.0100	mg/L	1	13-Apr-2022 13:28

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 27-Apr-22

Client: Bhate Environmental Associates, Inc.  
Project: Longhorn GW Treatment Plant Monthly Effluent Samples  
Sample ID: LH18/24-SP650\_041222\_AIX  
Collection Date: 12-Apr-2022 14:00

**ANALYTICAL REPORT**

WorkOrder:HS22040627  
Lab ID:HS22040627-02  
Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>						Analyst: GR
Subcontract Analysis	See Attached		0	0		NA	1	20-Apr-2022 17:07

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 27-Apr-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Monthly Effluent Samples  
 Sample ID: Trip Blank  
 Collection Date: 12-Apr-2022 14:00

## ANALYTICAL REPORT

WorkOrder:HS22040627  
 Lab ID:HS22040627-03  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD 8260C</b>		<b>Method:SW8260</b>						Analyst: PC
1,1,1,2-Tetrachloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 12:53
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 12:53
1,1,2,2-Tetrachloroethane	1.0	U	0.50	1.0	1.0	ug/L	1	16-Apr-2022 12:53
1,1,2-Trichloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 12:53
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 12:53
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 12:53
1,1-Dichloropropene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 12:53
1,2,3-Trichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	16-Apr-2022 12:53
1,2,3-Trichloropropane	1.0	U	0.50	1.0	1.0	ug/L	1	16-Apr-2022 12:53
1,2,4-Trichlorobenzene	1.0	U	0.50	1.0	1.0	ug/L	1	16-Apr-2022 12:53
1,2,4-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 12:53
1,2-Dibromo-3-chloropropane	1.0	U	0.20	1.0	1.0	ug/L	1	16-Apr-2022 12:53
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 12:53
1,2-Dichlorobenzene	1.0	U	0.50	1.0	1.0	ug/L	1	16-Apr-2022 12:53
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 12:53
1,2-Dichloropropane	1.0	U	0.50	1.0	1.0	ug/L	1	16-Apr-2022 12:53
1,3,5-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 12:53
1,3-Dichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	16-Apr-2022 12:53
1,3-Dichloropropane	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 12:53
1,4-Dichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	16-Apr-2022 12:53
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 12:53
2-Butanone	1.0	U	0.50	1.0	2.0	ug/L	1	16-Apr-2022 12:53
2-Chlorotoluene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 12:53
2-Hexanone	2.0	U	1.0	2.0	2.0	ug/L	1	16-Apr-2022 12:53
4-Chlorotoluene	1.0	U	0.40	1.0	1.0	ug/L	1	16-Apr-2022 12:53
4-Isopropyltoluene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 12:53
4-Methyl-2-pentanone	2.0	U	0.70	2.0	2.0	ug/L	1	16-Apr-2022 12:53
Acetone	2.0	U	0.40	2.0	2.0	ug/L	1	16-Apr-2022 12:53
Benzene	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 12:53
Bromobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	16-Apr-2022 12:53
Bromochloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 12:53
Bromodichloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 12:53
Bromoform	1.0	U	0.40	1.0	1.0	ug/L	1	16-Apr-2022 12:53
Bromomethane	1.0	U	0.40	1.0	1.0	ug/L	1	16-Apr-2022 12:53
Carbon disulfide	2.0	U	0.60	2.0	2.0	ug/L	1	16-Apr-2022 12:53
Carbon tetrachloride	1.0	U	0.50	1.0	1.0	ug/L	1	16-Apr-2022 12:53
Chlorobenzene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 12:53
Chloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 12:53
Chloroform	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 12:53

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 27-Apr-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Monthly Effluent Samples  
 Sample ID: Trip Blank  
 Collection Date: 12-Apr-2022 14:00

## ANALYTICAL REPORT

WorkOrder: HS22040627  
 Lab ID: HS22040627-03  
 Matrix: Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD</b>		<b>Method: SW8260</b>						Analyst: PC
<b>8260C</b>								
Chloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 12:53
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 12:53
cis-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 12:53
Dibromochloromethane	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 12:53
Dibromomethane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 12:53
Dichlorodifluoromethane	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 12:53
Ethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 12:53
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	ug/L	1	16-Apr-2022 12:53
Isopropylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 12:53
m,p-Xylene	1.0	U	0.50	1.0	2.0	ug/L	1	16-Apr-2022 12:53
Methylene chloride	2.0	U	0.40	2.0	2.0	ug/L	1	16-Apr-2022 12:53
n-Butylbenzene	1.0	U	0.40	1.0	1.0	ug/L	1	16-Apr-2022 12:53
n-Propylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 12:53
Naphthalene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 12:53
o-Xylene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 12:53
sec-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 12:53
Styrene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 12:53
tert-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 12:53
Tetrachloroethene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 12:53
Toluene	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 12:53
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 12:53
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 12:53
Trichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 12:53
Trichlorofluoromethane	1.0	U	0.30	1.0	1.0	ug/L	1	16-Apr-2022 12:53
Vinyl chloride	0.50	U	0.20	0.50	1.0	ug/L	1	16-Apr-2022 12:53
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>91.6</i>			<i>0</i>	<i>81-118</i>	<i>%REC</i>	<i>1</i>	<i>16-Apr-2022 12:53</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>99.2</i>			<i>0</i>	<i>85-114</i>	<i>%REC</i>	<i>1</i>	<i>16-Apr-2022 12:53</i>
<i>Surr: Dibromofluoromethane</i>	<i>92.2</i>			<i>0</i>	<i>80-119</i>	<i>%REC</i>	<i>1</i>	<i>16-Apr-2022 12:53</i>
<i>Surr: Toluene-d8</i>	<i>104</i>			<i>0</i>	<i>89-112</i>	<i>%REC</i>	<i>1</i>	<i>16-Apr-2022 12:53</i>

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## Weight / Prep Log

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS22040627

<b>Batch ID:</b> 177622	<b>Start Date:</b> 14 Apr 2022 08:18	<b>End Date:</b> 14 Apr 2022 14:00
<b>Method:</b> SV AQ SEP FUN EXTRACT-LOWLEV - 3510C	<b>Prep Code:</b> 3510_B_SIM	

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor	
HS22040627-01		1000 (mL)	1 (mL)	0.001	1-liter amber glass, Neat

<b>Batch ID:</b> 178078	<b>Start Date:</b> 26 Apr 2022 09:00	<b>End Date:</b> 26 Apr 2022 14:00
<b>Method:</b> WATER - SW3010A	<b>Prep Code:</b> 3010A	

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor	
HS22040627-01		10 (mL)	10 (mL)	1	120 plastic HNO3

ALS Houston, US

Date: 27-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS22040627

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> 177622 ( 0 )		<b>Test Name :</b> SEMIVOLATILES SIM			<b>Matrix:</b> Water	
HS22040627-01	LH18/24-SP650_041222	12 Apr 2022 14:00		14 Apr 2022 08:18	27 Apr 2022 14:32	100
<b>Batch ID:</b> 178078 ( 0 )		<b>Test Name :</b> METALS BY ICPMS BY SW6020A			<b>Matrix:</b> Water	
HS22040627-01	LH18/24-SP650_041222	12 Apr 2022 14:00		26 Apr 2022 09:00	27 Apr 2022 12:25	1
<b>Batch ID:</b> R406414 ( 0 )		<b>Test Name :</b> HEXAVALENT CHROMIUM BY SW7196A			<b>Matrix:</b> Water	
HS22040627-01	LH18/24-SP650_041222	12 Apr 2022 14:00			13 Apr 2022 13:28	1
<b>Batch ID:</b> R406685 ( 0 )		<b>Test Name :</b> VOLATILES ORGANICS BY METHOD 8260C			<b>Matrix:</b> Water	
HS22040627-01	LH18/24-SP650_041222	12 Apr 2022 14:00			16 Apr 2022 13:35	1
HS22040627-03	Trip Blank	12 Apr 2022 14:00			16 Apr 2022 12:53	1
<b>Batch ID:</b> R406996 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			<b>Matrix:</b> Water	
HS22040627-02	LH18/24-SP650_041222_AIX	12 Apr 2022 14:00			20 Apr 2022 17:07	1



## ALS Houston, US

Date: 27-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS22040627

**QC BATCH REPORT**

Batch ID: 178078 ( 0 )		Instrument: ICPMS06		Method: METALS BY ICPMS BY SW6020A					
<b>MBLK</b>	Sample ID: <b>MBLK-178078</b>	Units: <b>mg/L</b>		Analysis Date: <b>27-Apr-2022 12:10</b>					
Client ID:	Run ID: <b>ICPMS06_407432</b>	SeqNo: <b>6620473</b>		PrepDate: <b>26-Apr-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Barium	0.00250	0.00500							U
Lead	0.00125	0.00500							U
Selenium	0.00250	0.00500							U
Silver	0.000500	0.00500							U

<b>LCS</b>	Sample ID: <b>LCS-178078</b>	Units: <b>mg/L</b>		Analysis Date: <b>27-Apr-2022 12:12</b>					
Client ID:	Run ID: <b>ICPMS06_407432</b>	SeqNo: <b>6620474</b>		PrepDate: <b>26-Apr-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Barium	0.04825	0.00500	0.05	0	96.5	86 - 114			
Lead	0.04822	0.00500	0.05	0	96.4	88 - 115			
Selenium	0.04887	0.00500	0.05	0	97.7	80 - 120			
Silver	0.05037	0.00500	0.05	0	101	85 - 116			

<b>MS</b>	Sample ID: <b>HS22041125-06MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>27-Apr-2022 12:18</b>					
Client ID:	Run ID: <b>ICPMS06_407432</b>	SeqNo: <b>6620477</b>		PrepDate: <b>26-Apr-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Barium	0.2853	0.00500	0.05	0.2244	122	86 - 114			SO
Lead	0.05124	0.00500	0.05	0.000764	101	88 - 115			
Selenium	0.04705	0.00500	0.05	-0.000517	95.1	80 - 120			
Silver	0.04895	0.00500	0.05	0.000018	97.9	85 - 116			

<b>MSD</b>	Sample ID: <b>HS22041125-06MSD</b>	Units: <b>mg/L</b>		Analysis Date: <b>27-Apr-2022 12:20</b>					
Client ID:	Run ID: <b>ICPMS06_407432</b>	SeqNo: <b>6620478</b>		PrepDate: <b>26-Apr-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Barium	0.2816	0.00500	0.05	0.2244	114	86 - 114	0.2853	1.3	20 SO
Lead	0.04989	0.00500	0.05	0.000764	98.3	88 - 115	0.05124	2.67	20
Selenium	0.0471	0.00500	0.05	-0.000517	95.2	80 - 120	0.04705	0.119	20
Silver	0.04711	0.00500	0.05	0.000018	94.2	85 - 116	0.04895	3.84	20

ALS Houston, US

Date: 27-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS22040627

**QC BATCH REPORT**

Batch ID: 178078 ( 0 )		Instrument: ICPMS06		Method: METALS BY ICPMS BY SW6020A					
<b>PDS</b>		Sample ID: HS22041125-06PDS		Units: mg/L		Analysis Date: 27-Apr-2022 12:21			
Client ID:		Run ID: ICPMS06_407432		SeqNo: 6620479		PrepDate: 26-Apr-2022		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Barium	0.3396	0.00500	0.1	0.2244	115	80 - 120			
Lead	0.09961	0.00500	0.1	0.000764	98.8	80 - 120			
Selenium	0.09878	0.00500	0.1	-0.000517	99.3	80 - 120			
Silver	0.1008	0.00500	0.1	0.000018	101	80 - 120			

<b>SD</b>		Sample ID: HS22041125-06SD		Units: mg/L		Analysis Date: 27-Apr-2022 12:16			
Client ID:		Run ID: ICPMS06_407432		SeqNo: 6620476		PrepDate: 26-Apr-2022		DF: 5	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%D	%D Limit Qual
Barium	0.216	0.0250					0.2244	3.76	10
Lead	0.00625	0.0250					0.000764	0	10 U
Selenium	0.0125	0.0250					-0.000517	0	10 U
Silver	0.00250	0.0250					0.000018	0	10 U

The following samples were analyzed in this batch: HS22040627-01

## ALS Houston, US

Date: 27-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS22040627

**QC BATCH REPORT**

Batch ID: 177622 ( 0 )		Instrument: SV-6		Method: SEMIVOLATILES SIM					
<b>MBLK</b>	Sample ID: <b>MBLK-177622</b>	Units: <b>ug/L</b>		Analysis Date: <b>27-Apr-2022 12:40</b>					
Client ID:	Run ID: <b>SV-6_407450</b>	SeqNo: <b>6620759</b>		PrepDate: <b>14-Apr-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,4-Dioxane	0	0.010							U
Surr: 2-Fluorobiphenyl	0.06647	0	0.08	0	83.1	40 - 140			
Surr: 4-Terphenyl-d14	0.04234	0	0.08	0	52.9	40 - 140			
Surr: Nitrobenzene-d5	0.1039	0	0.08	0	130	40 - 140			

<b>LCS</b>	Sample ID: <b>LCS-177622</b>	Units: <b>ug/L</b>		Analysis Date: <b>27-Apr-2022 12:58</b>					
Client ID:	Run ID: <b>SV-6_407450</b>	SeqNo: <b>6620760</b>		PrepDate: <b>14-Apr-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,4-Dioxane	0.1093	0.010	0.08	0	137	40 - 140			
Surr: 2-Fluorobiphenyl	0.07427	0	0.08	0	92.8	40 - 140			
Surr: 4-Terphenyl-d14	0.04598	0	0.08	0	57.5	40 - 140			
Surr: Nitrobenzene-d5	0.07556	0	0.08	0	94.5	40 - 140			

<b>LCSD</b>	Sample ID: <b>LCSD-177622</b>	Units: <b>ug/L</b>		Analysis Date: <b>27-Apr-2022 13:16</b>					
Client ID:	Run ID: <b>SV-6_407450</b>	SeqNo: <b>6620761</b>		PrepDate: <b>14-Apr-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,4-Dioxane	0.1036	0.010	0.08	0	129	40 - 140	0.1093	5.39	20
Surr: 2-Fluorobiphenyl	0.07041	0	0.08	0	88.0	40 - 140	0.07427	5.33	20
Surr: 4-Terphenyl-d14	0.04581	0	0.08	0	57.3	40 - 140	0.04598	0.375	20
Surr: Nitrobenzene-d5	0.0736	0	0.08	0	92.0	40 - 140	0.07556	2.63	20

The following samples were analyzed in this batch: HS22040627-01

## ALS Houston, US

Date: 27-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS22040627

## QC BATCH REPORT

Batch ID: R406685 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
<b>MBLK</b>	Sample ID: VBLKW-220416	Units: ug/L		Analysis Date: 16-Apr-2022 12:32					
Client ID:	Run ID: VOA6_406685	SeqNo: 6603307		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	1.0	1.0							U
1,1,1-Trichloroethane	0.50	1.0							U
1,1,2,2-Tetrachloroethane	1.0	1.0							U
1,1,2-Trichloroethane	1.0	1.0							U
1,1-Dichloroethane	0.50	1.0							U
1,1-Dichloroethene	0.50	1.0							U
1,1-Dichloropropene	1.0	1.0							U
1,2,3-Trichlorobenzene	1.0	1.0							U
1,2,3-Trichloropropane	1.0	1.0							U
1,2,4-Trichlorobenzene	1.0	1.0							U
1,2,4-Trimethylbenzene	1.0	1.0							U
1,2-Dibromo-3-chloropropane	1.0	1.0							U
1,2-Dibromoethane	0.50	1.0							U
1,2-Dichlorobenzene	1.0	1.0							U
1,2-Dichloroethane	0.50	1.0							U
1,2-Dichloropropane	1.0	1.0							U
1,3,5-Trimethylbenzene	1.0	1.0							U
1,3-Dichlorobenzene	1.0	1.0							U
1,3-Dichloropropane	1.0	1.0							U
1,4-Dichlorobenzene	1.0	1.0							U
2,2-Dichloropropane	0.50	1.0							U
2-Butanone	1.0	2.0							U
2-Chlorotoluene	1.0	1.0							U
2-Hexanone	2.0	2.0							U
4-Chlorotoluene	1.0	1.0							U
4-Isopropyltoluene	1.0	1.0							U
4-Methyl-2-pentanone	2.0	2.0							U
Acetone	2.0	2.0							U
Benzene	0.50	1.0							U
Bromobenzene	1.0	1.0							U
Bromochloromethane	0.50	1.0							U
Bromodichloromethane	0.50	1.0							U
Bromoform	1.0	1.0							U
Bromomethane	1.0	1.0							U

## ALS Houston, US

Date: 27-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS22040627

## QC BATCH REPORT

Batch ID: R406685 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
<b>MBLK</b>	Sample ID: VBLKW-220416	Units: ug/L		Analysis Date: 16-Apr-2022 12:32					
Client ID:	Run ID: VOA6_406685	SeqNo: 6603307		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	2.0	2.0							U
Carbon tetrachloride	1.0	1.0							U
Chlorobenzene	1.0	1.0							U
Chloroethane	1.0	1.0							U
Chloroform	0.50	1.0							U
Chloromethane	0.50	1.0							U
cis-1,2-Dichloroethene	0.50	1.0							U
cis-1,3-Dichloropropene	0.50	1.0							U
Dibromochloromethane	1.0	1.0							U
Dibromomethane	0.50	1.0							U
Dichlorodifluoromethane	1.0	1.0							U
Ethylbenzene	1.0	1.0							U
Hexachlorobutadiene	1.0	1.0							U
Isopropylbenzene	1.0	1.0							U
m,p-Xylene	1.0	2.0							U
Methylene chloride	2.0	2.0							U
Naphthalene	1.0	1.0							U
n-Butylbenzene	1.0	1.0							U
n-Propylbenzene	1.0	1.0							U
o-Xylene	1.0	1.0							U
sec-Butylbenzene	1.0	1.0							U
Styrene	1.0	1.0							U
tert-Butylbenzene	1.0	1.0							U
Tetrachloroethene	1.0	1.0							U
Toluene	0.50	1.0							U
trans-1,2-Dichloroethene	0.50	1.0							U
trans-1,3-Dichloropropene	0.50	1.0							U
Trichloroethene	0.50	1.0							U
Trichlorofluoromethane	1.0	1.0							U
Vinyl chloride	0.50	1.0							U
Surr: 1,2-Dichloroethane-d4	44.67	1.0	50	0	89.3	81 - 118			
Surr: 4-Bromofluorobenzene	48.83	1.0	50	0	97.7	85 - 114			
Surr: Dibromofluoromethane	44.89	1.0	50	0	89.8	80 - 119			
Surr: Toluene-d8	53.44	1.0	50	0	107	89 - 112			

## ALS Houston, US

Date: 27-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS22040627

## QC BATCH REPORT

Batch ID: R406685 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
LCS		Sample ID: VLCSW-220416		Units: ug/L		Analysis Date: 16-Apr-2022 11:50			
Client ID:		Run ID: VOA6_406685		SeqNo: 6603306		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	20.79	1.0	20	0	104	78 - 124			
1,1,1-Trichloroethane	20.78	1.0	20	0	104	74 - 131			
1,1,2,2-Tetrachloroethane	19.69	1.0	20	0	98.4	71 - 121			
1,1,2-Trichloroethane	20.48	1.0	20	0	102	80 - 119			
1,1-Dichloroethane	21.45	1.0	20	0	107	77 - 125			
1,1-Dichloroethene	19.79	1.0	20	0	99.0	71 - 131			
1,1-Dichloropropene	20.08	1.0	20	0	100	78 - 125			
1,2,3-Trichlorobenzene	18.92	1.0	20	0	94.6	69 - 129			
1,2,3-Trichloropropane	21.54	1.0	20	0	108	73 - 122			
1,2,4-Trichlorobenzene	18.66	1.0	20	0	93.3	69 - 130			
1,2,4-Trimethylbenzene	21.72	1.0	20	0	109	76 - 124			
1,2-Dibromo-3-chloropropane	18.03	1.0	20	0	90.2	62 - 128			
1,2-Dibromoethane	20.52	1.0	20	0	103	77 - 121			
1,2-Dichlorobenzene	20.5	1.0	20	0	103	80 - 119			
1,2-Dichloroethane	20.61	1.0	20	0	103	73 - 128			
1,2-Dichloropropane	22.08	1.0	20	0	110	78 - 122			
1,3,5-Trimethylbenzene	21.75	1.0	20	0	109	75 - 124			
1,3-Dichlorobenzene	21.37	1.0	20	0	107	80 - 119			
1,3-Dichloropropane	21.71	1.0	20	0	109	80 - 119			
1,4-Dichlorobenzene	20.94	1.0	20	0	105	79 - 118			
2,2-Dichloropropane	21.88	1.0	20	0	109	60 - 139			
2-Butanone	39.67	2.0	40	0	99.2	56 - 143			
2-Chlorotoluene	21.32	1.0	20	0	107	79 - 122			
2-Hexanone	43.44	2.0	40	0	109	57 - 139			
4-Chlorotoluene	21.5	1.0	20	0	107	78 - 122			
4-Isopropyltoluene	22.67	1.0	20	0	113	77 - 127			
4-Methyl-2-pentanone	41.98	2.0	40	0	105	67 - 130			
Acetone	45.38	2.0	40	0	113	39 - 160			
Benzene	22.13	1.0	20	0	111	79 - 120			
Bromobenzene	21.45	1.0	20	0	107	80 - 120			
Bromochloromethane	20.63	1.0	20	0	103	78 - 123			
Bromodichloromethane	21.96	1.0	20	0	110	79 - 125			
Bromoform	19.75	1.0	20	0	98.8	66 - 130			
Bromomethane	20.19	1.0	20	0	101	53 - 141			

## ALS Houston, US

Date: 27-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS22040627

## QC BATCH REPORT

Batch ID: R406685 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
LCS		Sample ID: VLCSW-220416		Units: ug/L		Analysis Date: 16-Apr-2022 11:50			
Client ID:		Run ID: VOA6_406685		SeqNo: 6603306		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	40.71	2.0	40	0	102	64 - 133			
Carbon tetrachloride	19.64	1.0	20	0	98.2	72 - 136			
Chlorobenzene	20.72	1.0	20	0	104	82 - 118			
Chloroethane	19.76	1.0	20	0	98.8	60 - 138			
Chloroform	20.69	1.0	20	0	103	79 - 124			
Chloromethane	21.36	1.0	20	0	107	50 - 139			
cis-1,2-Dichloroethene	21.23	1.0	20	0	106	78 - 123			
cis-1,3-Dichloropropene	22.47	1.0	20	0	112	75 - 124			
Dibromochloromethane	20.46	1.0	20	0	102	74 - 126			
Dibromomethane	20.32	1.0	20	0	102	79 - 123			
Dichlorodifluoromethane	16.76	1.0	20	0	83.8	32 - 152			
Ethylbenzene	21.66	1.0	20	0	108	79 - 121			
Hexachlorobutadiene	21.67	1.0	20	0	108	66 - 134			
Isopropylbenzene	21.8	1.0	20	0	109	72 - 131			
m,p-Xylene	44.32	2.0	40	0	111	80 - 121			
Methylene chloride	19.88	2.0	20	0	99.4	74 - 124			
Naphthalene	19.26	1.0	20	0	96.3	61 - 128			
n-Butylbenzene	22.22	1.0	20	0	111	75 - 128			
n-Propylbenzene	22.24	1.0	20	0	111	76 - 126			
o-Xylene	21.51	1.0	20	0	108	78 - 122			
sec-Butylbenzene	21.61	1.0	20	0	108	77 - 126			
Styrene	22.57	1.0	20	0	113	78 - 123			
tert-Butylbenzene	21.47	1.0	20	0	107	78 - 124			
Tetrachloroethene	21.64	1.0	20	0	108	74 - 129			
Toluene	22.03	1.0	20	0	110	80 - 121			
trans-1,2-Dichloroethene	21.34	1.0	20	0	107	75 - 124			
trans-1,3-Dichloropropene	22.68	1.0	20	0	113	73 - 127			
Trichloroethene	20.93	1.0	20	0	105	79 - 123			
Trichlorofluoromethane	18.48	1.0	20	0	92.4	65 - 141			
Vinyl chloride	20.84	1.0	20	0	104	58 - 137			
Surr: 1,2-Dichloroethane-d4	50.18	1.0	50	0	100	81 - 118			
Surr: 4-Bromofluorobenzene	50.61	1.0	50	0	101	85 - 114			
Surr: Dibromofluoromethane	47.72	1.0	50	0	95.4	80 - 119			
Surr: Toluene-d8	51.03	1.0	50	0	102	89 - 112			

## ALS Houston, US

Date: 27-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS22040627

## QC BATCH REPORT

Batch ID: R406685 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MS		Sample ID: HS22040627-01MS		Units: ug/L		Analysis Date: 16-Apr-2022 14:39			
Client ID: LH18/24-SP650_041222		Run ID: VOA6_406685		SeqNo: 6603313		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	18.9	1.0	20	0	94.5	78 - 124			
1,1,1-Trichloroethane	18.94	1.0	20	0	94.7	74 - 131			
1,1,2,2-Tetrachloroethane	19.42	1.0	20	0	97.1	71 - 121			
1,1,2-Trichloroethane	18.77	1.0	20	0	93.9	80 - 119			
1,1-Dichloroethane	18.99	1.0	20	0	94.9	77 - 125			
1,1-Dichloroethene	17.71	1.0	20	0	88.6	71 - 131			
1,1-Dichloropropene	19.69	1.0	20	0	98.5	78 - 125			
1,2,3-Trichlorobenzene	14.55	1.0	20	0	72.8	69 - 129			
1,2,3-Trichloropropane	18.4	1.0	20	0	92.0	73 - 122			
1,2,4-Trichlorobenzene	16.4	1.0	20	0	82.0	69 - 130			
1,2,4-Trimethylbenzene	20.79	1.0	20	0	104	76 - 124			
1,2-Dibromo-3-chloropropane	14.6	1.0	20	0	73.0	62 - 128			
1,2-Dibromoethane	18.64	1.0	20	0	93.2	77 - 121			
1,2-Dichlorobenzene	20.04	1.0	20	0	100	80 - 119			
1,2-Dichloroethane	18.2	1.0	20	0	91.0	73 - 128			
1,2-Dichloropropane	19.98	1.0	20	0	99.9	78 - 122			
1,3,5-Trimethylbenzene	21.52	1.0	20	0	108	75 - 124			
1,3-Dichlorobenzene	20.73	1.0	20	0	104	80 - 119			
1,3-Dichloropropane	20.36	1.0	20	0	102	80 - 119			
1,4-Dichlorobenzene	19.38	1.0	20	0	96.9	79 - 118			
2,2-Dichloropropane	19.94	1.0	20	0	99.7	60 - 139			
2-Butanone	34.07	2.0	40	0	85.2	56 - 143			
2-Chlorotoluene	20.71	1.0	20	0	104	79 - 122			
2-Hexanone	42.21	2.0	40	0	106	57 - 139			
4-Chlorotoluene	20.75	1.0	20	0	104	78 - 122			
4-Isopropyltoluene	22.87	1.0	20	0	114	77 - 127			
4-Methyl-2-pentanone	42.37	2.0	40	0	106	67 - 130			
Acetone	32.97	2.0	40	0	82.4	39 - 160			
Benzene	19.82	1.0	20	0	99.1	79 - 120			
Bromobenzene	20.53	1.0	20	0	103	80 - 120			
Bromochloromethane	17.46	1.0	20	0	87.3	78 - 123			
Bromodichloromethane	18.92	1.0	20	0	94.6	79 - 125			
Bromoform	18.63	1.0	20	0	93.1	66 - 130			
Bromomethane	15.65	1.0	20	0	78.2	53 - 141			



## ALS Houston, US

Date: 27-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS22040627

## QC BATCH REPORT

Batch ID: R406685 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MS		Sample ID: HS22040627-01MS		Units: ug/L		Analysis Date: 16-Apr-2022 14:39			
Client ID: LH18/24-SP650_041222		Run ID: VOA6_406685		SeqNo: 6603313		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	39.27	2.0	40	0	98.2	64 - 133			
Carbon tetrachloride	19.48	1.0	20	0	97.4	72 - 136			
Chlorobenzene	19.4	1.0	20	0	97.0	82 - 118			
Chloroethane	15.98	1.0	20	0	79.9	60 - 138			
Chloroform	17.95	1.0	20	0	89.8	79 - 124			
Chloromethane	20.42	1.0	20	0	102	50 - 139			
cis-1,2-Dichloroethene	20.59	1.0	20	1.969	93.1	78 - 123			
cis-1,3-Dichloropropene	19.73	1.0	20	0	98.6	75 - 124			
Dibromochloromethane	19.29	1.0	20	0	96.4	74 - 126			
Dibromomethane	18.07	1.0	20	0	90.3	79 - 123			
Dichlorodifluoromethane	14.24	1.0	20	0	71.2	32 - 152			
Ethylbenzene	20.7	1.0	20	0	103	79 - 121			
Hexachlorobutadiene	22.65	1.0	20	0	113	66 - 134			
Isopropylbenzene	20.78	1.0	20	0	104	72 - 131			
m,p-Xylene	41.48	2.0	40	0	104	80 - 121			
Methylene chloride	17.17	2.0	20	0	85.9	74 - 124			
Naphthalene	13.32	1.0	20	0	66.6	61 - 128			
n-Butylbenzene	22.44	1.0	20	0	112	75 - 128			
n-Propylbenzene	21.76	1.0	20	0	109	76 - 126			
o-Xylene	19.85	1.0	20	0	99.3	78 - 122			
sec-Butylbenzene	21.76	1.0	20	0	109	77 - 126			
Styrene	20.79	1.0	20	0	104	78 - 123			
tert-Butylbenzene	21.28	1.0	20	0	106	78 - 124			
Tetrachloroethene	21.19	1.0	20	0	106	74 - 129			
Toluene	20.67	1.0	20	0	103	80 - 121			
trans-1,2-Dichloroethene	19.54	1.0	20	0	97.7	75 - 124			
trans-1,3-Dichloropropene	19.69	1.0	20	0	98.4	73 - 127			
Trichloroethene	19.92	1.0	20	0	99.6	79 - 123			
Trichlorofluoromethane	17.65	1.0	20	0	88.2	65 - 141			
Vinyl chloride	19.31	1.0	20	0	96.6	58 - 137			
Surr: 1,2-Dichloroethane-d4	46.49	1.0	50	0	93.0	81 - 118			
Surr: 4-Bromofluorobenzene	50.27	1.0	50	0	101	85 - 114			
Surr: Dibromofluoromethane	45.74	1.0	50	0	91.5	80 - 119			
Surr: Toluene-d8	53.7	1.0	50	0	107	89 - 112			

ALS Houston, US

Date: 27-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS22040627

**QC BATCH REPORT**

Batch ID: R406685 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
<b>MSD</b>		Sample ID: HS22040627-01MSD		Units: ug/L		Analysis Date: 16-Apr-2022 15:00			
Client ID: LH18/24-SP650_041222		Run ID: VOA6_406685		SeqNo: 6603314		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	18.57	1.0	20	0	92.8	78 - 124	18.9	1.79	20
1,1,1-Trichloroethane	18.73	1.0	20	0	93.6	74 - 131	18.94	1.1	20
1,1,2,2-Tetrachloroethane	19.41	1.0	20	0	97.0	71 - 121	19.42	0.0983	20
1,1,2-Trichloroethane	19.16	1.0	20	0	95.8	80 - 119	18.77	2.05	20
1,1-Dichloroethane	19.28	1.0	20	0	96.4	77 - 125	18.99	1.5	20
1,1-Dichloroethene	17.88	1.0	20	0	89.4	71 - 131	17.71	0.922	20
1,1-Dichloropropene	18.65	1.0	20	0	93.2	78 - 125	19.69	5.44	20
1,2,3-Trichlorobenzene	19.32	1.0	20	0	96.6	69 - 129	14.55	28.2	20 R
1,2,3-Trichloropropane	21.08	1.0	20	0	105	73 - 122	18.4	13.6	20
1,2,4-Trichlorobenzene	18.26	1.0	20	0	91.3	69 - 130	16.4	10.7	20
1,2,4-Trimethylbenzene	19.9	1.0	20	0	99.5	76 - 124	20.79	4.38	20
1,2-Dibromo-3-chloropropane	17.01	1.0	20	0	85.1	62 - 128	14.6	15.3	20
1,2-Dibromoethane	19.15	1.0	20	0	95.7	77 - 121	18.64	2.7	20
1,2-Dichlorobenzene	19.18	1.0	20	0	95.9	80 - 119	20.04	4.41	20
1,2-Dichloroethane	18.39	1.0	20	0	91.9	73 - 128	18.2	1.03	20
1,2-Dichloropropane	19.54	1.0	20	0	97.7	78 - 122	19.98	2.24	20
1,3,5-Trimethylbenzene	20.18	1.0	20	0	101	75 - 124	21.52	6.41	20
1,3-Dichlorobenzene	19.95	1.0	20	0	99.8	80 - 119	20.73	3.8	20
1,3-Dichloropropane	19.78	1.0	20	0	98.9	80 - 119	20.36	2.91	20
1,4-Dichlorobenzene	18.52	1.0	20	0	92.6	79 - 118	19.38	4.58	20
2,2-Dichloropropane	19.83	1.0	20	0	99.1	60 - 139	19.94	0.586	20
2-Butanone	36.63	2.0	40	0	91.6	56 - 143	34.07	7.25	20
2-Chlorotoluene	19.83	1.0	20	0	99.1	79 - 122	20.71	4.38	20
2-Hexanone	43.55	2.0	40	0	109	57 - 139	42.21	3.11	20
4-Chlorotoluene	19.68	1.0	20	0	98.4	78 - 122	20.75	5.3	20
4-Isopropyltoluene	21.34	1.0	20	0	107	77 - 127	22.87	6.89	20
4-Methyl-2-pentanone	43.69	2.0	40	0	109	67 - 130	42.37	3.07	20
Acetone	34.31	2.0	40	0	85.8	39 - 160	32.97	4	20
Benzene	19.53	1.0	20	0	97.6	79 - 120	19.82	1.49	20
Bromobenzene	19.4	1.0	20	0	97.0	80 - 120	20.53	5.67	20
Bromochloromethane	17.7	1.0	20	0	88.5	78 - 123	17.46	1.33	20
Bromodichloromethane	18.79	1.0	20	0	93.9	79 - 125	18.92	0.723	20
Bromoform	18.85	1.0	20	0	94.3	66 - 130	18.63	1.19	20
Bromomethane	16.04	1.0	20	0	80.2	53 - 141	15.65	2.48	20

## ALS Houston, US

Date: 27-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS22040627

## QC BATCH REPORT

Batch ID: R406685 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
<b>MSD</b>		Sample ID: HS22040627-01MSD		Units: ug/L		Analysis Date: 16-Apr-2022 15:00			
Client ID: LH18/24-SP650_041222		Run ID: VOA6_406685		SeqNo: 6603314		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	39.18	2.0	40	0	97.9	64 - 133	39.27	0.24	20
Carbon tetrachloride	18.76	1.0	20	0	93.8	72 - 136	19.48	3.79	20
Chlorobenzene	18.92	1.0	20	0	94.6	82 - 118	19.4	2.52	20
Chloroethane	16.23	1.0	20	0	81.2	60 - 138	15.98	1.57	20
Chloroform	18.15	1.0	20	0	90.7	79 - 124	17.95	1.09	20
Chloromethane	20.39	1.0	20	0	102	50 - 139	20.42	0.122	20
cis-1,2-Dichloroethene	20.27	1.0	20	1.969	91.5	78 - 123	20.59	1.54	20
cis-1,3-Dichloropropene	19.21	1.0	20	0	96.0	75 - 124	19.73	2.66	20
Dibromochloromethane	18.96	1.0	20	0	94.8	74 - 126	19.29	1.72	20
Dibromomethane	18.63	1.0	20	0	93.1	79 - 123	18.07	3.04	20
Dichlorodifluoromethane	13.33	1.0	20	0	66.6	32 - 152	14.24	6.64	20
Ethylbenzene	20.31	1.0	20	0	102	79 - 121	20.7	1.92	20
Hexachlorobutadiene	21.59	1.0	20	0	108	66 - 134	22.65	4.79	20
Isopropylbenzene	20.22	1.0	20	0	101	72 - 131	20.78	2.75	20
m,p-Xylene	40.04	2.0	40	0	100	80 - 121	41.48	3.55	20
Methylene chloride	17.34	2.0	20	0	86.7	74 - 124	17.17	0.978	20
Naphthalene	17.26	1.0	20	0	86.3	61 - 128	13.32	25.8	20 R
n-Butylbenzene	21.13	1.0	20	0	106	75 - 128	22.44	6.02	20
n-Propylbenzene	20.78	1.0	20	0	104	76 - 126	21.76	4.6	20
o-Xylene	19.9	1.0	20	0	99.5	78 - 122	19.85	0.233	20
sec-Butylbenzene	20.35	1.0	20	0	102	77 - 126	21.76	6.67	20
Styrene	20.58	1.0	20	0	103	78 - 123	20.79	1.03	20
tert-Butylbenzene	19.77	1.0	20	0	98.8	78 - 124	21.28	7.36	20
Tetrachloroethene	19.43	1.0	20	0	97.1	74 - 129	21.19	8.66	20
Toluene	20.24	1.0	20	0	101	80 - 121	20.67	2.12	20
trans-1,2-Dichloroethene	19.13	1.0	20	0	95.7	75 - 124	19.54	2.11	20
trans-1,3-Dichloropropene	19.88	1.0	20	0	99.4	73 - 127	19.69	0.976	20
Trichloroethene	19.23	1.0	20	0	96.1	79 - 123	19.92	3.52	20
Trichlorofluoromethane	17.36	1.0	20	0	86.8	65 - 141	17.65	1.62	20
Vinyl chloride	18.68	1.0	20	0	93.4	58 - 137	19.31	3.36	20
Surr: 1,2-Dichloroethane-d4	46.16	1.0	50	0	92.3	81 - 118	46.49	0.706	20
Surr: 4-Bromofluorobenzene	51.15	1.0	50	0	102	85 - 114	50.27	1.72	20
Surr: Dibromofluoromethane	46.35	1.0	50	0	92.7	80 - 119	45.74	1.34	20
Surr: Toluene-d8	52.45	1.0	50	0	105	89 - 112	53.7	2.34	20

ALS Houston, US

Date: 27-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS22040627

**QC BATCH REPORT****Batch ID:** R406685 ( 0 )**Instrument:** VOA6**Method:** VOLATILES ORGANICS BY METHOD  
8260C

The following samples were analyzed in this batch:

HS22040627-01	HS22040627-03
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## ALS Houston, US

Date: 27-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS22040627

**QC BATCH REPORT**

Batch ID: R406414 ( 0 )		Instrument: UV-2450		Method: HEXAVALENT CHROMIUM BY SW7196A						
<b>MBLK</b>	Sample ID: MBLK-R406414	Units: mg/L		Analysis Date: 13-Apr-2022 13:28						
Client ID:	Run ID: UV-2450_406414		SeqNo: 6596794		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.00600	0.0100								U
<b>LCS</b>	Sample ID: LCS-R406414	Units: mg/L		Analysis Date: 13-Apr-2022 13:28						
Client ID:	Run ID: UV-2450_406414		SeqNo: 6596793		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.248	0.0100	0.25	0	99.2	90 - 111				
<b>MS</b>	Sample ID: HS22040627-01MS	Units: mg/L		Analysis Date: 13-Apr-2022 13:28						
Client ID: LH18/24-SP650_041222	Run ID: UV-2450_406414		SeqNo: 6596792		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.242	0.0100	0.25	0	96.8	90 - 111				
<b>MSD</b>	Sample ID: HS22040627-01MSD	Units: mg/L		Analysis Date: 13-Apr-2022 13:28						
Client ID: LH18/24-SP650_041222	Run ID: UV-2450_406414		SeqNo: 6596791		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.246	0.0100	0.25	0	98.4	90 - 111	0.242	1.64	20	
The following samples were analyzed in this batch: HS22040627-01										

**ALS Houston, US**

Date: 27-Apr-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS22040627

**QUALIFIERS,  
ACRONYMS, UNITS**

<b>Qualifier</b>	<b>Description</b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

<b>Acronym</b>	<b>Description</b>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

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**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

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Agency	Number	Expire Date
Florida	E87611-34	30-Jun-2022
Illinois	2000322021-7	09-May-2022
Kansas	E-10352 2021-2022	31-Jul-2022
Kentucky	123043, 2021-2022	30-Apr-2022
Louisiana	03087, 2021-2022	30-Jun-2022
Texas	T104704231-21-28	30-Apr-2022

ALS Houston, US

Date: 27-Apr-22

## Sample Receipt Checklist

Work Order ID: HS22040627

Date/Time Received: **13-Apr-2022 10:00**

Client Name: Bhate Environmental

Received by: **Paresh M. Giga**Completed By: /S/ Niles D. Ranchod

13-Apr-2022 11:58

Reviewed by: /S/ Ragen Giga

13-Apr-2022 19:52

eSignature

Date/Time

eSignature

Date/Time

Matrices: **WATER**Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?

Yes ☒No ☐Not Present ☐

Custody seals intact on shipping container/cooler?

Yes ☒No ☐Not Present ☐

Custody seals intact on sample bottles?

Yes ☐No ☐Not Present ☒

VOA/TX1005/TX1006 Solids in hermetically sealed vials?

Yes ☐No ☐Not Present ☒

Chain of custody present?

Yes ☒No ☐

1 Page(s)

Chain of custody signed when relinquished and received?

Yes ☒No ☐

COC IDs: CLIENT

Samplers name present on COC?

Yes ☒No ☐

Chain of custody agrees with sample labels?

Yes ☒No ☐

Samples in proper container/bottle?

Yes ☒No ☐

Sample containers intact?

Yes ☒No ☐

Sufficient sample volume for indicated test?

Yes ☒No ☐

All samples received within holding time?

Yes ☒No ☐

Container/Temp Blank temperature in compliance?

Yes ☒No ☐

Temperature(s)/Thermometer(s):

0.6°C/2.1°C UC/C

IR 31

Cooler(s)/Kit(s):

47814

Date/Time sample(s) sent to storage:

04/13/22 12:20

Water - VOA vials have zero headspace?

Yes ☒No ☐No VOA vials submitted ☐

Water - pH acceptable upon receipt?

Yes ☒No ☐N/A ☐

pH adjusted?

Yes ☐No ☒N/A ☐

pH adjusted by:

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:


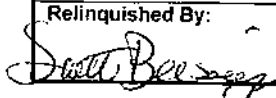
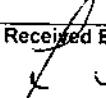
Comments:


Corrective Action:



## CHAIN OF CUSTODY

Name Of Lab Shipping To: ALS 10450 Stancliff Rd., Suite 210 Houston, TX 77099 (281) 530-5656 ATTN: Ragen GigiPage 1 of 1

<b>Project:</b> BHATE LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS			<b>Project No.</b> NWO1312.0150.0 16.0001			<b>Analyses</b>										<b>Remarks</b> (Preservatives, etc.)	 Bhat Environmental Associates, Inc. Longhorn GW Treatment Plant Monthly Effluent Sam									
<b>Job:</b> <b>GROUNDWATER TREATMENT PLANT</b> <b>MONTHLY EFFLUENT SAMPLES</b>																										
<b>Prepared By:</b> Scott Beesinger			<b>P.O. Number</b>																							
<b>Field Sample I.D.</b>			<b>Sample Matrix</b>			<b>Date / Time</b>			<b>MS / MSD</b>	<b>No. OF CONTAINERS</b>	<b>VOLATILES</b>	<b>SILVER, SELENIUM, LEAD, BARIUM</b>	<b>HEXAVALENT CHROMIUM</b>	<b>1, 4 - DIOXANE</b>	<b>PERCHLORATE</b>											
LH18/24-SP650_041222			Water			04/12/22 / 14:00				3	X												HCL			
LH18/24-SP650_041222			Water			04/12/22 / 14:00				2			X	X										NONE		
LH18/24-SP650_041222_AIX			Water			04/12/22 / 14:00				1					X									NONE		
LH18/24-SP650_041222			Water			04/12/22 / 14:00				1		X												HNO3		
Trip Blank			Water			04/12/22				2	X													HCL		
<b>Additional Remarks:</b> <u>Standard TAT on all parameters</u>																										
<b>Relinquished By:</b> 		<b>Date</b> 04/12/22	<b>Time</b> 14:30	<b>Received By:</b> 		<b>Date</b> 4/13/2022	<b>Time</b> 10:00	<b>Relinquished By:</b>		<b>Date</b>	<b>Time</b>	<b>Received By:</b>		<b>Date</b>	<b>Time</b>											
<b>Received At Lab By:</b>																<b>Date</b>	<b>Time</b>	<b>Airbill No.</b>	<b>For Lab Use Only</b>		<b>Opened By:</b>	<b>Date</b>	<b>Time</b>	<b>Temp of Container</b>	<b>Seal No.</b>	<b>Condition</b>
<b>Remarks:</b> 47814 UIC: 1-6- #31 C11-0-0																										

 <b>ALS</b> 10450 Stancliff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5656 Fax. +1 281 530 5887	<b>CUSTODY SEAL</b> Date: <u>4/12/22</u> Time: <u>15:30</u> Name: <u>Subo B. B. B.</u> Company: <u>BH&amp;T</u>		Seal Broken By: <u>SM</u> Date: <u>04/13/22</u>
	47814		

47814



47814

ORIGIN ID: SGRA (903) 930-6193  
 SCOTT BEESINGER  
 APTIM ENVIRONMENTAL & INFRASTRUCTURE  
 1203-B EAST GRAND AVE  
 PMB 202  
 MARSHALL, TX 75670  
 UNITED STATES US

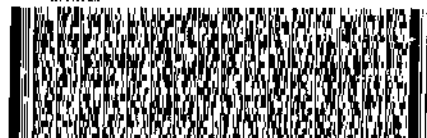
SHIP DATE: 28JUN21  
 ACTWGT: 1.00 LB MAN  
 DAD: 0221247/CAFE3504  
 DIMS: 26x14x14 IN

TO SHIPPING DEPT  
 ALS LABORATORY GROUP  
 10450 STANCLIFF RD  
 SUITE 210  
 HOUSTON TX 77099

(281) 630-6658

REF: LHAAP-16-B0 79249-RG

RMA: 11111111



FedEx Express



FedEx  
 TRK# 9473 0845 1405  
 0221

WED - 13 APR 10:30A  
 PRIORITY OVERNIGHT

AB SGRA

77099

TX-US

IAH





April 20, 2022

Service Request No:E2200327

Ragen Giga  
ALS Environmental - US  
10450 Stancliff Rd Suite 210  
Houston, TX 77099

**Laboratory Results for: HS22040627**

Dear Ragen,

Enclosed are the results of the sample(s) submitted to our laboratory April 13, 2022  
For your reference, these analyses have been assigned our service request number **E2200327**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current TNI standards, where applicable, and except as noted in the laboratory case narrative provided. All results are intended to be considered in their entirety and ALS Environmental is not responsible for use of less than the complete final report. Results apply only to the items submitted to the laboratory, as received for analysis. In accordance with the current TNI Standard, a statement on the estimated uncertainty of measurement of any quantitative analysis will be supplied upon request.

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Corey Grandits  
Project Manager

ADDRESS 10450 Stancliff Rd., Suite 210, Houston, TX 77099  
PHONE +1 281 530 5656 | FAX +1 281 530 5887  
ALS Group USA, Corp.  
dba ALS Environmental



# Certificate of Analysis

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

**Client:** ALS Environmental - US  
**Project:** HS22040627

**Service Request:**E2200327

**SAMPLE CROSS-REFERENCE**

<u>SAMPLE #</u>	<u>CLIENT SAMPLE ID</u>	<u>DATE</u>	<u>TIME</u>
E2200327-001	LH18/24-SP650_041222_AIX	4/12/2022	1400

**Service Request Summary**

**Folder #:** E2200327  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22040627  
**Project Number:**  
  
**Report To:** Ragen Giga  
 ALS Environmental - US  
 10450 Standliff Rd Suite 210  
 Houston, TX 77099  
 USA  
  
**Phone Number:**  
**Cell Number:**  
**Fax Number:**  
**E-mail:** ragenp.giga@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 04/13/22  
**Internal Due Date:** 4/27/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22040627  
**EDD:** No EDD Specified

1 120 mL-Plastic Bottle Natural WM Unpreserved

**Location:** EHRMS-AirArch 1

**Pressure Gas:**

				HOUSTON
Lab Samp No.	Client Samp No	Matrix	Collected	CIO4 DOD/6850
E2200327-001	LH18/24-SP650_041222_AIX	Water	04/12/22 1400	IV

**Service Request Summary**

**Folder #:** E2200327  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22040627  
**Project Number:**  
  
**Report To:** Ragen Giga  
 ALS Environmental - US  
 10450 Standliff Rd Suite 210  
 Houston, TX 77099  
 USA  
  
**Phone Number:**  
**Cell Number:**  
**Fax Number:**  
**E-mail:** ragenp.giga@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 04/13/22  
**Internal Due Date:** 4/27/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22040627  
**EDD:** No EDD Specified

1 120 mL-Plastic Bottle Natural WM Unpreserved

**Location:** EHRMS-AirArch 1

**Pressure Gas:**

**Test Comments:**

Group	Test/Method	Samples	Comments
Semivoa GCMS	CIO4 DOD/6850	1	IV DUE 5/4

## Data Qualifiers

### Lab Standard

- + Possible Tedlar bag artifact.
- A TIC is a suspected aldol-condensation product
- B Analyte found in the associated method blank as well as in the sample.
- BC Reported results are not blank corrected.
- BH The back section of the tube yielded higher results than the front.
- BT Results indicated possible breakthrough; back section  $\geq 10\%$  front section.
- C Result identification confirmed.
- D Compound identified in an analysis at a secondary dilution factor
- D Spike was diluted out
- DE Reported results are corrected for desorption efficiency.
- E Estimated value. Concentration above calibration range
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- H1 Sample analysis performed past holding time. See case narrative.
- H2 Initial analysis within holding time. Reanalysis for the required dilution was past holding time.
- H3 Sample was received and analyzed past holding time.
- H4 Sample was extracted past required extraction holding time, but analyzed within analysis holding time. See case narrative.
- I Internal standard not within the specified limits. See case narrative.
- J Estimated Value. Concentration found below MRL.
- K (Auto) The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- K A deflection in the QC ion may indicate interference with the quantitation of this ion. The concentration of this analyte should be considered as an estimate.
- K Analyte was detected above the method reporting limit prior to normalization.
- K The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- L1 Laboratory control sample recovery outside the specified limits; results may be biased high.
- L2 Laboratory control sample recovery outside the specified limits; results may be biased low.
- L3 Laboratory control sample recovery outside the specified limits.
- M Matrix interference; results may be biased high.
- M The duplicate injection precision not met.
- M1 Matrix interference due to coelution with a non-target compound; results may be biased high.



## Data Qualifiers

### Lab Standard

- N Presumptive evidence of a compound for TICs that have been identified based on a mass spectral library search.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- P Indicates chlorodiphenyl ether interference present at the retention time of the target compound.
- P Pesticide/Aroclor target analyte > 40% difference for detected concentrations between GC columns
- Q Indicates as estimated value because the P and P + 2 theoretical abundance ratio does not meet method criteria.
- R Duplicate Precision not met.
- R1 Duplicate precision not within the specified limits; however, the results are below the MRL and considered estimated.
- S Surrogate recovery not within specified limits.
- S The reported value was determined by the Method of Standard Additions (MSA).
- T Analyte is a tentatively identified compound, result is estimated.
- U Compound was analyzed for, but was not detected (ND).
- V1 The continuing calibration verification standard was outside (biased high) the specified limits for this compound.
- V2 The continuing calibration verification standard was outside (biased low) the specified limits for this compound.
- W Result quantified, but the corresponding peak was detected outside the generated retention time window.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- X See case narrative.
- Y Recovery outside limits
- Y The chromatogram resembles a petroleum product but does not match the calibration standard.
- Z The chromatogram does not resemble a petroleum product.
- i The MRL/MDL has been elevated due to a matrix interference.

## ALS Laboratory Group

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### Acronyms

Cal	Calibration
Conc	CONCEntration
Dioxin(s)	Polychlorinated dibenzo-p-dioxin(s)
EDL	Estimated Detection Limit
EMPC	Estimated Maximum Possible Concentration
Flags	Data qualifiers
Furan(s)	Polychlorinated dibenzofuran(s)
g	Grams
ICAL	Initial CALibration
ID	IDentifier
Ions	Masses monitored for the analyte during data acquisition
L	Liter (s)
LCS	Laboratory Control Sample
DLCS	Duplicate Laboratory Control Sample
MB	Method Blank
MCL	Method Calibration Limit
MDL	Method Detection Limit
mL	Milliliters
MS	Matrix Spiked sample
DMS	Duplicate Matrix Spiked sample
NO	Number of peaks meeting all identification criteria
PCDD(s)	Polychlorinated dibenzo-p-dioxin(s)
PCDF(s)	Polychlorinated dibenzofuran(s)
ppb	Parts per billion
ppm	Parts per million
ppq	Parts per quadrillion
ppt	Parts per trillion
QA	Quality Assurance
QC	Quality Control
Ratio	Ratio of areas from monitored ions for an analyte
% Rec.	Percent recovery
RPD	Relative Percent Difference
RRF	Relative Response Factor
RT	Retention Time
SDG	Sample Delivery Group
S/N	Signal-to-noise ratio
TEF	Toxicity Equivalence Factor
TEQ	Toxicity Equivalence Quotient



## State Certifications, Accreditations, and Licenses

Agency	Number	Expire Date
Arizona Department of Health Services	AZ0793-2022	5/27/2022
California Department of Health Services	2919	4/30/2022
California Department of Health Services	2919-2022	4/30/2022
Florida Department of Health	E87611-34	6/30/2022
Hawaii Department of Health	2021-2022	4/30/2022
Illinois Environmental Protection Agency	2000322021-7	5/9/2022
Kansas Department of Health and Environment	E-10352 2022	7/31/2022
Louisiana Department of Environmental Quality	03087-2021	6/30/2022
Louisiana Department of Environmental Quality	03087-2020	6/30/2022
Louisiana Department of Health and Hospitals	LA028	12/31/2022
Maine Department of Health and Human Services	2020016	6/5/2022
Maryland Department of the Environment	343	6/30/2022
Michigan Department of Environmental Quality	9971	4/30/2022
Minnesota Department of Health	2228443	12/31/2022
Nebraska Department of Health and Human Services	NE-OS-25-13	4/30/2022
Nevada Department of Conservation and Natural Resources	TX026932022-1	7/31/2022
New Hampshire Environmental Laboratory Accreditation Program	209421	4/24/2022
New Hampshire Environmental Laboratory Accreditation Program	209419	4/24/2022
New Jersey Department of Environmental Protection	TX008	6/30/2022
New York Department of Health	11707	3/31/2023
Oklahoma Department of Environmental Quality	2021-080	8/31/2022
Pennsylvania Department of Environmental Protection	68-03441-015	6/30/2022
Tennessee Department of Environment and Conservation	04016	4/30/2022
Tennessee Department of Environment and Conservation	04016-2021	4/30/2022
Texas Commission on Environmental Quality	T104704231-21-28	4/30/2022
Texas Commission on Environmental Quality	T104704231-21-27	4/30/2022
United States Department of Agriculture	P330-19-00299	10/10/2022
Utah Department of Health Environmental Laboratory Certification	TX026932021-12	7/31/2022
Washington Department of Health	C819-2022	11/14/2022



## Chain of Custody

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)



10450 Stancliff Rd, Ste 210  
Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887  
www.alsglobal.com

## Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 18564

**SUBCONTRACT TO:**

ALS Environmental  
10450 Stancliff Road Suite 210  
Houston, TX 77084

**Phone:** +1 281 530 5656

**CUSTOMER  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Ragen Giga  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Email:** RagenP.Giga@ALSGlobal.com  
**Alternate  
Contact:** Jumoke M. Lawal  
**Email:** jumoke.lawal@alsglobal.com

**INVOICE  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Accounts Payable  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Reference:** HS22040627  
**TSR:** Houston House Acct

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS22040627-02	LH18/24-SP650_041222_AIX	Water	12 Apr 2022 14:00
Provide Level II and Level IV reports in separate pdf			27 Apr 2022

**Comments:** Please analyze for the analysis listed above.  
Send report to the emails shown above.

**QC Level:** DOD IV (DoD Data Package)

Relinquished By: \_\_\_\_\_

Date/Time: \_\_\_\_\_

Received By: \_\_\_\_\_

Date/Time: 4-13-22 8/14

Cooler ID(s): \_\_\_\_\_

Temperature(s): \_\_\_\_\_



## Cooler Receipt Form

Project Chemist LAClient/Project ALH-H Thermometer ID 1041Date/Time Received: 9-13-22 Initials: LA Date/Time Logged in: 9-13-22 Initials: LA1. Method of delivery: ☐ US Mail ☐ Fed Ex ☐ UPS ☐ DHL ☒ <sup>ALS</sup> Courier ☐ Client2. Samples received in: ☒ Cooler ☐ Box ☐ Envelope ☐ Other

3. Were custody seals on coolers? ☐ Yes ☒ No

Were they intact? ☐ Yes ☐ No ☒ N/A

Were they signed and dated? ☐ Yes ☐ No ☒ N/A

If yes, how many and where?

--

4. Packing Material: ☐ Inserts ☒ Baggies ☐ Bubble Wrap ☐ Gel Packs ☒ Wet Ice ☐ Sleeves ☐ Other5. Foreign or Regulated Soil? ☐ Yes ☐ No Location of Sampling:

Cooler Tracking Number	COC ID	Date Opened	Time Opened	Opened By	Temp. °C	Temp Blank?
<u>NA</u>		<u>9-13-22</u>	<u>13:14</u>	<u>LA</u>	<u>3.7</u>	<input checked="" type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>

6. Were custody papers properly filled out (ink, signed, dated, etc)? ☒ Yes ☐ No7. Did all bottles arrive in good condition (not broken, no signs of leakage)? ☒ Yes ☐ No8. Were all sample labels complete (i.e., sample ID, analysis, preservation, etc)? ☒ Yes ☐ No9. Were appropriate bottles/containers and volumes received for the requested tests? ☒ Yes ☐ No10. Did sample labels and tags agree with custody documents? ☒ Yes ☐ No

Notes, Discrepancies, &amp; Resolutions:

--

Service request Label:



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Houston, TX 77099  
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F: +1 713 266 1599  
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## SAMPLE ACCEPTANCE POLICY

This policy outlines the criteria samples must meet to be accepted by ALS Environmental – Houston HRMS.

### **Cooler Custody Seals (desirable, mandatory if specified in SAP):**

- ✓ Intact on outside of cooler, signed and dated

### **Chain-of-Custody (COC) documentation (mandatory):**

The following is required on each COC:

- ✓ Sample ID, the location, date and time of collection, collector's name, preservation type, sample type, and any other special remarks concerning the sample. The COC must be completed in ink.
- ✓ Signature and date of relinquishing party.

In the absence of a COC at sample receipt, the COC will be requested from the client.

### **Sample Integrity (mandatory):**

Samples are inspected upon arrival to ensure that sample integrity was not compromised during transfer to the laboratory.

- ✓ Sample containers must arrive in good condition (not broken or leaking).
- ✓ Samples must be labeled appropriately, including Sample IDs, and requested test using durable labels and indelible ink.
- ✓ The correct type of sample bottle must be used for the method requested.
- ✓ An appropriate sample volume, or weight, must be received.
- ✓ Sample IDs and number of containers must reconcile with the COC.
- ✓ Samples must be received within the method defined holding time.

### **Temperature Requirement (varies by sample matrix):**

- ✓ Aqueous and Non-aqueous samples must be shipped and stored cold, at 0 to 6°C.
- ✓ Tissue samples must be shipped and stored frozen, at -20 to -10°C.
- ✓ Air samples are shipped and stored cold, at 0 to 6°C
- ✓ The sample temperature must be recorded on the COC

All cooler inspections are documented on the Cooler Receipt Form (CRF). A separate CRF is completed for each service request. Any samples not meeting the above criteria are noted on the CRF and the Project Manager notified. The Project Manager must resolve any sample integrity issues with the client prior to proceeding with the analysis. Such resolutions are documented in writing and filed with the project folder. Data associated with samples received outside of this acceptance policy will be qualified on the case narrative of the final report



# Preparation Information Benchsheets

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)



**Preparation Information Benchsheet**

**Prep Run#:** 398281  
**Team:** Semivoa GCMS/GRIVERA

**Prep WorkFlow:** GenExt28Day  
**Prep Method:** Method

**Status:** Prepped  
**Prep Date/Time:** 4/18/22 09:48

#	Lab Code	Client ID	B#	Method /Test	pH	Cl	Matrix	Amt. Ext.	Sample Description
1	E2200326-001	LH18/24-SP140_041222	.01	6850/ClO4 DOD			Water	10mL	
2	E2200327-001	LH18/24-SP650_041222_AIX	.01	6850/ClO4 DOD			Water	10mL	
3	E2200328-001	43MW01	.01	6850/ClO4 DOD			Water	10mL	
4	E2200328-002	43MW03	.01	6850/ClO4 DOD			Water	10mL	
5	E2200328-003	43MW03-Dup	.01	6850/ClO4 DOD			Water	10mL	
6	E2200328-004	43MW04	.01	6850/ClO4 DOD			Water	10mL	
7	E2200328-005	43MW05	.01	6850/ClO4 DOD			Water	10mL	
8	E2200328-006	43MW06	.01	6850/ClO4 DOD			Water	10mL	
9	E2200328-007	43MW03	.01	6850/ClO4 DOD			Water	10mL	
10	E2200337-001	HBW7_041322	.01	6850/ClO4 DOD			Water	10mL	
11	E2200337-002	HBW10_041322	.01	6850/ClO4 DOD			Water	10mL	
12	E2200337-003	HBW10_041322	.01	6850/ClO4 DOD			Water	10mL	
13	E2200337-004	HBW1_041322	.01	6850/ClO4 DOD			Water	10mL	
14	E2200337-005	GPW1_041322	.01	6850/ClO4 DOD			Water	10mL	
15	E2200337-006	GPW3_041322	.01	6850/ClO4 DOD			Water	10mL	
16	EQ2200152-01	MB		6850/ClO4 DOD			Liquid	10mL	
17	EQ2200152-02	LCS		6850/ClO4 DOD			Liquid	10mL	
18	EQ2200152-03	DLCS		6850/ClO4 DOD			Liquid	10mL	
19	EQ2200152-04	43MW01 MS	.02	6850/ClO4 DOD			Liquid	10mL	
20	EQ2200152-05	43MW01 DMS	.03	6850/ClO4 DOD			Liquid	10mL	
21	R2202890-005	2204010934A JP-1-424	.01	6850/ClO4			Water	10mL	

**Spiking Solutions**

Name: Perchlorate Internal Standard 1ug/mL				Inventory ID 221408		Logbook Ref: Perchlorate Internal Standard				Expires On: 04/30/2022	
E2200326-001	100.00µL	E2200327-001	100.00µL	E2200328-001	100.00µL	E2200328-002	100.00µL	E2200328-003	100.00µL	E2200328-004	100.00µL
E2200328-005	100.00µL	E2200328-006	100.00µL	E2200328-007	100.00µL	E2200337-001	100.00µL	E2200337-002	100.00µL	E2200337-003	100.00µL
E2200337-004	100.00µL	E2200337-005	100.00µL	E2200337-006	100.00µL	EQ2200152-01	100.00µL	EQ2200152-02	100.00µL	EQ2200152-03	100.00µL
EQ2200152-04	100.00µL	EQ2200152-05	100.00µL	R2202890-005	100.00µL						
Name: Perchlorate Intermediate Stock I				Inventory ID 221456		Logbook Ref: Perchlorate				Expires On: 04/30/2022	
EQ2200152-02	1.00µL	EQ2200152-03	1.00µL	EQ2200152-04	1.00µL	EQ2200152-05	1.00µL				

Preparation Information Benchsheet

Prep Run#: 398281  
Team: Semivoa GCMS/GRIVERA

Prep WorkFlow: GenExt28Day  
Prep Method: Method

Status: Prepped  
Prep Date/Time: 4/18/22 09:48

Preparation Materials

Water HPLC Grade	08/03/2021 Water (218532)	6850 Amber Glass screw vial	2mL Screw Top Vial (221894)	537M Glass Culture Tubes	537M Glass Tubes (218064)
6850 0.45um syringe filters	6850 Syringe Filters (219639)	6850 Luer-Lok Syringes	Luer-Lok Syringes (221305)	6850 Pipette Tips 50-1000 uL	6850 Pipette Tips (221929)

Preparation Steps

Step: Preparation  
Started: 4/18/22 09:48  
Finished: 4/18/22 10:48  
By: GRIVERA  
Comments

Comments:

Reviewed By: GR Date: 4/18/22

Chain of Custody

Relinquished By:	Date:	<u>Extracts Examined</u> Yes No
Received By:	Date:	



# Analytical Results

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22040627  
**Sample Matrix:** Water  
**Sample Name:** LH18/24-SP650\_041222\_AIX  
**Lab Code:** E2200327-001

**Service Request:** E2200327  
**Date Collected:** 4/12/22 1400  
**Date Received:** 4/13/22  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	15.7		0.200	0.100	0.0500	2	4/18/22	4/18/22 18:14	398281	761134	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22040627  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** EQ2200152-01

**Service Request:** E2200327  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	0.100	0.0500	0.0250	1	4/18/22	4/18/22 13:53	398281	761134	



## Accuracy & Precision

**ALS Environmental - Houston HRMS**  
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## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS22040627  
**Sample Matrix:** Water

**Service Request:** E2200327  
**Date Analyzed:** 4/18/22

**Lab Control Sample Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**Analytical Method:** 6850  
**Prep Method:** Method

**Units:** µg/L  
**Basis:** NA

**Extraction Lot:** 398281

Analyte Name	Lab Control Sample EQ2200152-02			Duplicate Lab Control Sample EQ2200152-03			% Rec Limits	RPD	RPD Limit
	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Perchlorate	0.0926	0.100	93	0.105	0.100	105	84 - 119	13	15

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22040627  
**Sample Matrix:** Water  
**Sample Name:** Lab Control Sample  
**Lab Code:** EQ2200152-02

**Service Request:** E2200327  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.0926	J	0.100	0.0500	0.0250	1	4/18/22	4/18/22 14:01	398281	761134	



## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22040627  
**Sample Matrix:** Water  
**Sample Name:** Duplicate Lab Control Sample  
**Lab Code:** EQ2200152-03

**Service Request:** E2200327  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.105		0.100	0.0500	0.0250	1	4/18/22	4/18/22 14:09	398281	761134	



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May 02, 2022

Marcia Olive  
Bhate Environmental Associates, Inc.  
445 Union Blvd Ste 129  
Lakewood, CO 80228

Work Order: **HS22041044**

Laboratory Results for: **Longhorn GW Treatment Plant Weekly Samples**

Dear Marcia Olive,

ALS Environmental received 3 sample(s) on Apr 21, 2022 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: DAYNA.FISHER

Ragen Giga  
Project Manager

ALS Houston, US

Date: 02-May-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**Work Order:** HS22041044

**SAMPLE SUMMARY**

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS22041044-01	LH18/24-SP650_042022	Water		20-Apr-2022 14:00	21-Apr-2022 09:30	<input type="checkbox"/>
HS22041044-02	LH18/24-SP650_042022_AIX	Water		20-Apr-2022 14:00	21-Apr-2022 09:30	<input type="checkbox"/>
HS22041044-03	LH18/24-SP650_042022_BIX	Water		20-Apr-2022 14:00	21-Apr-2022 09:30	<input type="checkbox"/>

ALS Houston, US

Date: 02-May-22

---

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**Work Order:** HS22041044

---

**CASE NARRATIVE**

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**Work Order Comments**

- The analysis for Perchlorate was subcontracted to ALS Houston High-Res Lab. Final report attached
- 

**WetChemistry by Method E350.3****Batch ID: R407739**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**WetChemistry by Method E415.1****Batch ID: R407117**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**WetChemistry by Method E365.3****Batch ID: R407044**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

## ALS Houston, US

Date: 02-May-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Weekly Samples  
 Sample ID: LH18/24-SP650\_042022  
 Collection Date: 20-Apr-2022 14:00

**ANALYTICAL REPORT**

WorkOrder:HS22041044  
 Lab ID:HS22041044-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>AMMONIA AS N BY E350.3(ISE)</b>		<b>Method:E350.3</b>					Analyst: MZD	
Nitrogen, Ammonia (As N)	40	a	0.10	0.10	0.20	mg/L	1	02-May-2022 12:07
<b>ORTHO PHOSPHATE (PO4) AS P BY E365.3-1978</b>		<b>Method:E365.3</b>					Analyst: AP	
Phosphorus, Total Orthophosphate (As P)	6.88	a	0.250	0.312	0.625	mg/L	25	21-Apr-2022 16:03
<b>TOTAL ORGANIC CARBON BY E415.1</b>		<b>Method:E415.1</b>					Analyst: JAC	
Organic Carbon, Total	3.30	a	0.500	1.00	1.00	mg/L	1	22-Apr-2022 00:01

ALS Houston, US

Date: 02-May-22

Client:	Bhate Environmental Associates, Inc.	<b>ANALYTICAL REPORT</b>
Project:	Longhorn GW Treatment Plant Weekly Samples	WorkOrder:HS22041044
Sample ID:	LH18/24-SP650_042022_AIX	Lab ID:HS22041044-02
Collection Date:	20-Apr-2022 14:00	Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		Method:NA						Analyst: GR
Subcontract Analysis	See Attached		0	0		NA	1	22-Apr-2022 16:08

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US

Date: 02-May-22

Client:	Bhate Environmental Associates, Inc.	<b>ANALYTICAL REPORT</b>
Project:	Longhorn GW Treatment Plant Weekly Samples	WorkOrder:HS22041044
Sample ID:	LH18/24-SP650_042022_BIX	Lab ID:HS22041044-03
Collection Date:	20-Apr-2022 14:00	Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		Method:NA						Analyst: GR
Subcontract Analysis	See Attached		0	0		NA	1	22-Apr-2022 16:08

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US

Date: 02-May-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22041044

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> R407044 ( 0 )		<b>Test Name :</b> ORTHO PHOSPHATE (PO4) AS P BY E365.3-1978			<b>Matrix:</b> Water	
HS22041044-01	LH18/24-SP650_042022	20 Apr 2022 14:00			21 Apr 2022 16:03	25
<b>Batch ID:</b> R407117 ( 0 )		<b>Test Name :</b> TOTAL ORGANIC CARBON BY E415.1			<b>Matrix:</b> Water	
HS22041044-01	LH18/24-SP650_042022	20 Apr 2022 14:00			22 Apr 2022 00:01	1
<b>Batch ID:</b> R407184 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			<b>Matrix:</b> Water	
HS22041044-02	LH18/24-SP650_042022_AIX	20 Apr 2022 14:00			22 Apr 2022 16:08	1
HS22041044-03	LH18/24-SP650_042022_BIX	20 Apr 2022 14:00			22 Apr 2022 16:08	1
<b>Batch ID:</b> R407739 ( 0 )		<b>Test Name :</b> AMMONIA AS N BY E350.3(ISE)			<b>Matrix:</b> Water	
HS22041044-01	LH18/24-SP650_042022	20 Apr 2022 14:00			02 May 2022 12:07	1









**ALS Houston, US**

Date: 02-May-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** **HS22041044**

**QUALIFIERS,  
ACRONYMS, UNITS**

<b>Qualifier</b>	<b>Description</b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

<b>Acronym</b>	<b>Description</b>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

ALS Houston, US

Date: 02-May-22

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**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

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Agency	Number	Expire Date
Florida	E87611-34	30-Jun-2022
Illinois	2000322021-7	09-May-2022
Kansas	E-10352 2021-2022	31-Jul-2022
Louisiana	03087, 2021-2022	30-Jun-2022

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ALS Houston, US

Date: 02-May-22

## Sample Receipt Checklist

Work Order ID: HS22041044

Date/Time Received: **21-Apr-2022 09:30**

Client Name: Bhate Environmental

Received by: **Paresh M. Giga**

Completed By: <u>/S/ Paresh M. Giga</u>	21-Apr-2022 11:23	Reviewed by: <u>/S/ Ragen Giga</u>	21-Apr-2022 21:16
eSignature	Date/Time	eSignature	Date/Time

Matrices: **Water**Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	1 Page(s)
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	COC IDs:none
Samplers name present on COC?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Temperature(s)/Thermometer(s):	1.3C/1.8C U/C IR31		
Cooler(s)/Kit(s):	46743		
Date/Time sample(s) sent to storage:	4/21/2022 11:30		
Water - VOA vials have zero headspace?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted by:			

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:


Comments:


Corrective Action:

## CHAIN OF CUSTODY

Name Of Lab Shipping To: ALS 10450 Stancliff Rd, Suite 210 Houston, TX, 77099 (281) 530-5656 ATTN: Ragen Gigi

Page 1 of 1

<b>Project:</b> BHATE LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS			<b>Project No.</b> NWO1312.0150.0 16.0001			<b>Analyses</b>																											
<b>Job:</b> <b>GROUNDWATER TREATMENT PLANT</b> <b>WEEKLY SAMPLES</b>						<b>HS22041044</b> Bhate Environmental Associates, Inc. Longhorn GW Treatment Plant Weekly Samples																											
<b>Prepared By:</b> Scott Beesinger			<b>P.O. Number</b>																														
<b>Field Sample I.D.</b>						<b>Sample Matrix</b>						<b>Date / Time</b>						<b>MS / MSD</b>		<b>No. OF CONTAINERS</b>		<b>AMMONIA-N</b>		<b>TOTAL ORGANIC CARBON</b>		<b>ORTHO-PHOSPHATE</b>		<b>PERCHLORATE</b>		<b>Remarks (Preservatives, etc.)</b>		<b>Lab I.D.#</b>	
LH18/24-SP650_042022						Water						04/20/22 / 14:00						3		X		X						H2SO4					
LH18/24-SP650_042022						Water						04/20/22 / 14:00						1				X						NONE					
LH18/24-SP650_042022_AIX						Water						04/20/22 / 14:00						1						X				NONE					
LH18/24-SP650_042022_BIX						Water						04/20/22 / 14:00						1						X				NONE					
46743																																	
24 HOUR TAT on PERCHLORATE. Standard TAT on all other parameters																																	
<b>Relinquished By:</b> Scott Beesinger		<b>Date:</b> 04/20/22		<b>Time:</b> 14:30		<b>Received By:</b> [Signature]		<b>Date:</b> 4/21/2022		<b>Time:</b> 09:30		<b>Relinquished By:</b>		<b>Date:</b>		<b>Time:</b>		<b>Received By:</b>		<b>Date:</b>		<b>Time:</b>											
<b>For Lab Use Only</b>																																	
<b>Received At Lab By:</b>						<b>Date:</b>		<b>Time:</b>		<b>Airbill No.</b>		<b>Opened By:</b>				<b>Date:</b>		<b>Time:</b>		<b>Temp of Container:</b>		<b>Seal No.</b>		<b>Condition:</b>									
<b>Remarks:</b>																																	

 <b>ALS</b> 10450 Strandliff Rd. Suite 210 Houston, Texas 77099 Tel. +1 281 530 5656 Fax. +1 281 530 5887	<b>CUSTODY SEAL</b>		Seal Broken By: <i>[Signature]</i>
	Date: <i>4/20</i> Name: <i>[Signature]</i> Company: <i>[Signature]</i>	Title: <i>[Signature]</i> Name: <i>[Signature]</i> Company: <i>[Signature]</i>	Date: <i>4/21/2008</i>

FedEx  
 5300 5230 2678

**AB SGRA**

THU - 21 APR AA  
 PRIORITY OVERNIGHT

*46743* 77099  
 TX US  
 IAH



47306371 70hp7372 CUSA 50002/0019/C001





April 22, 2022

Service Request No:E2200352

Ragen Giga  
ALS Environmental - US  
10450 Stancliff Rd Suite 210  
Houston, TX 77099

**Laboratory Results for: HS22041044**

Dear Ragen,

Enclosed are the results of the sample(s) submitted to our laboratory April 21, 2022  
For your reference, these analyses have been assigned our service request number **E2200352**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current TNI standards, where applicable, and except as noted in the laboratory case narrative provided. All results are intended to be considered in their entirety and ALS Environmental is not responsible for use of less than the complete final report. Results apply only to the items submitted to the laboratory, as received for analysis. In accordance with the current TNI Standard, a statement on the estimated uncertainty of measurement of any quantitative analysis will be supplied upon request.

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Corey Grandits  
Project Manager

ADDRESS 10450 Stancliff Rd., Suite 210, Houston, TX 77099  
PHONE +1 281 530 5656 | FAX +1 281 530 5887  
ALS Group USA, Corp.  
dba ALS Environmental



# Certificate of Analysis

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

**ALS Environmental**

**Client:** ALS-Houston  
**Project:** HS22041044  
**Sample Matrix:** W

**Service Request No.:** E2200352  
**Date Received:** 04/21/22

**CASE NARRATIVE**

All analyses were performed in adherence to the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier IV. When appropriate to the method, method blank results have been reported with each analytical test.

**Sample Receipt**

Two samples were received for analysis at ALS Environmental in Houston on 04/21/22.

The samples were received in good condition and are consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

**Data Validation Notes and Discussion****Precision and Accuracy:**

EQ2200161: Laboratory Control Spike/Duplicate Laboratory Control Spike (LCS/DLCS) samples were analyzed and reported in lieu of a MS/MSD for this extraction batch. The LCS-DLCS RPD recoveries met acceptance criteria.

DoD Certification is held for the method/matrix/analytes provided in this report.

*The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.*

*Use of ALS group USA Corp dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.*

**Client:** ALS Environmental - US  
**Project:** HS22041044

**Service Request:**E2200352

**SAMPLE CROSS-REFERENCE**

<u>SAMPLE #</u>	<u>CLIENT SAMPLE ID</u>	<u>DATE</u>	<u>TIME</u>
E2200352-001	LH18/24-SP650_042022_AIX	4/20/2022	1400
E2200352-002	LH18/24-SP650_042022_BIX	4/20/2022	1400

**Service Request Summary**

**Folder #:** E2200352  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22041044  
**Project Number:**  
  
**Report To:** Ragen Giga  
 ALS Environmental - US  
 10450 Standliff Rd Suite 210  
 Houston, TX 77099  
 USA  
  
**Phone Number:**  
**Cell Number:**  
**Fax Number:**  
**E-mail:** ragenp.giga@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 04/21/22  
**Internal Due Date:** 4/22/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22041044  
**EDD:** No EDD Specified

2 120 mL-Plastic Bottle Natural WM Unpreserved  
**Location:** EHRMS-AirArch 1  
**Pressure Gas:**  
**Rush**

				HOUSTON
Lab Samp No.	Client Samp No	Matrix	Collected	CIO4 DOD/6850
E2200352-001	LH18/24-SP650_042022_AIX	Water	04/20/22 1400	IV
E2200352-002	LH18/24-SP650_042022_BIX	Water	04/20/22 1400	IV

**Service Request Summary**

**Folder #:** E2200352  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22041044  
**Project Number:**  
  
**Report To:** Ragen Giga  
 ALS Environmental - US  
 10450 Standliff Rd Suite 210  
 Houston, TX 77099  
 USA  
  
**Phone Number:**  
**Cell Number:**  
**Fax Number:**  
**E-mail:** ragenp.giga@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 04/21/22  
**Internal Due Date:** 4/22/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22041044  
**EDD:** No EDD Specified

2 120 mL-Plastic Bottle Natural WM Unpreserved  
**Location:** EHRMS-AirArch 1  
**Pressure Gas:**  
**Rush**

**Test Comments:**

Group	Test/Method	Samples	Comments
Semivola GCMS	CIO4 DOD/6850	2	IV DUE 5/12

## Data Qualifiers

### Lab Standard

- + Possible Tedlar bag artifact.
- A TIC is a suspected aldol-condensation product
- B Analyte found in the associated method blank as well as in the sample.
- BC Reported results are not blank corrected.
- BH The back section of the tube yielded higher results than the front.
- BT Results indicated possible breakthrough; back section  $\geq 10\%$  front section.
- C Result identification confirmed.
- D Compound identified in an analysis at a secondary dilution factor
- D Spike was diluted out
- DE Reported results are corrected for desorption efficiency.
- E Estimated value. Concentration above calibration range
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- H1 Sample analysis performed past holding time. See case narrative.
- H2 Initial analysis within holding time. Reanalysis for the required dilution was past holding time.
- H3 Sample was received and analyzed past holding time.
- H4 Sample was extracted past required extraction holding time, but analyzed within analysis holding time. See case narrative.
- I Internal standard not within the specified limits. See case narrative.
- J Estimated Value. Concentration found below MRL.
- K (Auto) The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- K A deflection in the QC ion may indicate interference with the quantitation of this ion. The concentration of this analyte should be considered as an estimate.
- K Analyte was detected above the method reporting limit prior to normalization.
- K The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- L1 Laboratory control sample recovery outside the specified limits; results may be biased high.
- L2 Laboratory control sample recovery outside the specified limits; results may be biased low.
- L3 Laboratory control sample recovery outside the specified limits.
- M Matrix interference; results may be biased high.
- M The duplicate injection precision not met.
- M1 Matrix interference due to coelution with a non-target compound; results may be biased high.

## Data Qualifiers

### Lab Standard

- N Presumptive evidence of a compound for TICs that have been identified based on a mass spectral library search.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- P Indicates chlorodiphenyl ether interference present at the retention time of the target compound.
- P Pesticide/Aroclor target analyte > 40% difference for detected concentrations between GC columns
- Q Indicates as estimated value because the P and P + 2 theoretical abundance ratio does not meet method criteria.
- R Duplicate Precision not met.
- R1 Duplicate precision not within the specified limits; however, the results are below the MRL and considered estimated.
- S Surrogate recovery not within specified limits.
- S The reported value was determined by the Method of Standard Additions (MSA).
- T Analyte is a tentatively identified compound, result is estimated.
- U Compound was analyzed for, but was not detected (ND).
- V1 The continuing calibration verification standard was outside (biased high) the specified limits for this compound.
- V2 The continuing calibration verification standard was outside (biased low) the specified limits for this compound.
- W Result quantified, but the corresponding peak was detected outside the generated retention time window.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- X See case narrative.
- Y Recovery outside limits
- Y The chromatogram resembles a petroleum product but does not match the calibration standard.
- Z The chromatogram does not resemble a petroleum product.
- i The MRL/MDL has been elevated due to a matrix interference.



## ALS Laboratory Group

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### Acronyms

Cal	Calibration
Conc	CONCetration
Dioxin(s)	Polychlorinated dibenzo-p-dioxin(s)
EDL	Estimated Detection Limit
EMPC	Estimated Maximum Possible Concentration
Flags	Data qualifiers
Furan(s)	Polychlorinated dibenzofuran(s)
g	Grams
ICAL	Initial CALibration
ID	IDentifier
Ions	Masses monitored for the analyte during data acquisition
L	Liter (s)
LCS	Laboratory Control Sample
DLCS	Duplicate Laboratory Control Sample
MB	Method Blank
MCL	Method Calibration Limit
MDL	Method Detection Limit
mL	Milliliters
MS	Matrix Spiked sample
DMS	Duplicate Matrix Spiked sample
NO	Number of peaks meeting all identification criteria
PCDD(s)	Polychlorinated dibenzo-p-dioxin(s)
PCDF(s)	Polychlorinated dibenzofuran(s)
ppb	Parts per billion
ppm	Parts per million
ppq	Parts per quadrillion
ppt	Parts per trillion
QA	Quality Assurance
QC	Quality Control
Ratio	Ratio of areas from monitored ions for an analyte
% Rec.	Percent recovery
RPD	Relative Percent Difference
RRF	Relative Response Factor
RT	Retention Time
SDG	Sample Delivery Group
S/N	Signal-to-noise ratio
TEF	Toxicity Equivalence Factor
TEQ	Toxicity Equivalence Quotient



## State Certifications, Accreditations, and Licenses

Agency	Number	Expire Date
Arizona Department of Health Services	AZ0793-2022	5/27/2022
California Department of Health Services	2919	4/30/2022
California Department of Health Services	2919-2022	4/30/2022
Florida Department of Health	E87611-34	6/30/2022
Hawaii Department of Health	2021-2022	4/30/2022
Illinois Environmental Protection Agency	2000322021-7	5/9/2022
Kansas Department of Health and Environment	E-10352 2022	7/31/2022
Louisiana Department of Environmental Quality	03087-2021	6/30/2022
Louisiana Department of Environmental Quality	03087-2020	6/30/2022
Louisiana Department of Health and Hospitals	LA028	12/31/2022
Maine Department of Health and Human Services	2020016	6/5/2022
Maryland Department of the Environment	343	6/30/2022
Michigan Department of Environmental Quality	9971	4/30/2022
Minnesota Department of Health	2228443	12/31/2022
Nebraska Department of Health and Human Services	NE-OS-25-13	4/30/2022
Nevada Department of Conservation and Natural Resources	TX026932022-1	7/31/2022
New Hampshire Environmental Laboratory Accreditation Program	209421	4/24/2022
New Hampshire Environmental Laboratory Accreditation Program	209419	4/24/2022
New Jersey Department of Environmental Protection	TX008	6/30/2022
New York Department of Health	11707	3/31/2023
Oklahoma Department of Environmental Quality	2021-080	8/31/2022
Pennsylvania Department of Environmental Protection	68-03441-015	6/30/2022
Tennessee Department of Environment and Conservation	04016	4/30/2022
Tennessee Department of Environment and Conservation	04016-2021	4/30/2022
Texas Commission on Environmental Quality	T104704231-21-28	4/30/2022
Texas Commission on Environmental Quality	T104704231-21-27	4/30/2022
United States Department of Agriculture	P330-19-00299	10/10/2022
Utah Department of Health Environmental Laboratory Certification	TX026932021-12	7/31/2022
Washington Department of Health	C819-2022	11/14/2022



## Chain of Custody

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)



10450 Stancliff Rd, Ste 210  
Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887  
www.alsglobal.com

## Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 18602

**SUBCONTRACT TO:**

ALS Environmental  
10450 Stancliff Road Suite 210  
Houston, TX 77084

**Phone:** +1 281 530 5656

**RUSH**

**CUSTOMER INFORMATION:**

**Company:** ALS Houston  
**Contact:** Ragen Giga  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Email:** RagenP.Giga@ALSGlobal.com  
**Alternate Contact:** Jumoke M. Lawal  
**Email:** jumoke.lawal@alsglobal.com

**INVOICE INFORMATION:**

**Company:** ALS Houston  
**Contact:** Accounts Payable  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Reference:** HS22041044  
**TSR:** Houston House Acct

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS22041044-02	LH18/24-SP650_042022_AIX	Water	20 Apr 2022 14:00
	6850-Perch. DOD Level II & Level IV	in separate pdf	22 Apr 2022
2. HS22041044-03	LH18/24-SP650_042022_BIX	Water	20 Apr 2022 14:00
	6850-Perch. DOD Level II & Level IV	in separate pdf	22 Apr 2022

**Comments:** Please analyze for the analysis listed above.  
Send report to the emails shown above.  
RUSH 24Hr.TAT

**QC Level:** DOD IV (DoD Data Package)

Relinquished By: \_\_\_\_\_

Date/Time: \_\_\_\_\_

Received By: \_\_\_\_\_

Date/Time: \_\_\_\_\_

Cooler ID(s): \_\_\_\_\_

Temperature(s): \_\_\_\_\_

RIGHT SOLUTIONS | RIGHT PARTNER



## Cooler Receipt Form

Project Chemist LA

Client/Project

AL4-H

Thermometer ID

1821

Date/Time Received:

4-21-22

Initials:

LA

Date/Time Logged in:

4-21-22

Initials

LA1. Method of delivery: ☐ US Mail ☐ Fed Ex ☐ UPS ☐ DHL ☒ <sup>ALJ</sup> Courier ☐ Client2. Samples received in: ☒ Cooler ☐ Box ☐ Envelope ☐ Other3. Were custody seals on coolers? ☐ Yes ☒ No

If yes, how many and where?

Were they intact? ☐ Yes ☐ No ☒ N/AWere they signed and dated? ☐ Yes ☐ No ☒ N/A4. Packing Material: ☐ Inserts ☒ Baggies ☐ Bubble Wrap ☐ Gel Packs ☒ Wet Ice ☐ Sleeves ☐ Other

5. Foreign or Regulated Soil?

☐ Yes ☐ No

Location of Sampling:

Cooler Tracking Number	COC ID	Date Opened	Time Opened	Opened By	Temp. °C	Temp Blank?
<u>NA</u>		<u>4-21-22</u>	<u>1254</u>	<u>LA</u>	<u>2.5</u>	<input checked="" type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>

6. Were custody papers properly filled out (ink, signed, dated, etc)?

☒ Yes ☐ No

7. Did all bottles arrive in good condition (not broken, no signs of leakage)?

☒ Yes ☐ No

8. Were all sample labels complete (i.e., sample ID, analysis, preservation, etc)?

☒ Yes ☐ No

9. Were appropriate bottles/containers and volumes received for the requested tests?

☒ Yes ☐ No

10. Did sample labels and tags agree with custody documents?

☒ Yes ☐ No

Notes, Discrepancies, &amp; Resolutions:

Service request Label:



10450 Stancliff Rd., Suite 210  
Houston, TX 77099  
T: +1 713 266 1599  
F: +1 713 266 1599  
[www.alsglobal.com](http://www.alsglobal.com)

## SAMPLE ACCEPTANCE POLICY

This policy outlines the criteria samples must meet to be accepted by ALS Environmental – Houston HRMS.

### **Cooler Custody Seals (desirable, mandatory if specified in SAP):**

- ✓ Intact on outside of cooler, signed and dated

### **Chain-of-Custody (COC) documentation (mandatory):**

The following is required on each COC:

- ✓ Sample ID, the location, date and time of collection, collector's name, preservation type, sample type, and any other special remarks concerning the sample. The COC must be completed in ink.
- ✓ Signature and date of relinquishing party.

In the absence of a COC at sample receipt, the COC will be requested from the client.

### **Sample Integrity (mandatory):**

Samples are inspected upon arrival to ensure that sample integrity was not compromised during transfer to the laboratory.

- ✓ Sample containers must arrive in good condition (not broken or leaking).
- ✓ Samples must be labeled appropriately, including Sample IDs, and requested test using durable labels and indelible ink.
- ✓ The correct type of sample bottle must be used for the method requested.
- ✓ An appropriate sample volume, or weight, must be received.
- ✓ Sample IDs and number of containers must reconcile with the COC.
- ✓ Samples must be received within the method defined holding time.

### **Temperature Requirement (varies by sample matrix):**

- ✓ Aqueous and Non-aqueous samples must be shipped and stored cold, at 0 to 6°C.
- ✓ Tissue samples must be shipped and stored frozen, at -20 to -10°C.
- ✓ Air samples are shipped and stored cold, at 0 to 6°C
- ✓ The sample temperature must be recorded on the COC

All cooler inspections are documented on the Cooler Receipt Form (CRF). A separate CRF is completed for each service request. Any samples not meeting the above criteria are noted on the CRF and the Project Manager notified. The Project Manager must resolve any sample integrity issues with the client prior to proceeding with the analysis. Such resolutions are documented in writing and filed with the project folder. Data associated with samples received outside of this acceptance policy will be qualified on the case narrative of the final report.



# Preparation Information Benchsheets

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

**Preparation Information Benchsheet**

**Prep Run#:** 398579  
**Team:** Semivoa GCMS/GRIVERA

**Prep WorkFlow:** GenExt28Day  
**Prep Method:** Method

**Status:** Prepped  
**Prep Date/Time:** 4/21/22 14:05

#	Lab Code	Client ID	B#	Method /Test	pH	Cl	Matrix	Amt. Ext.	Sample Description
1	E2200352-001	LH18/24-SP650_042022_AIX	.01	6850/CIO4 DOD			Water	10mL	
2	E2200352-002	LH18/24-SP650_042022_BIX	.01	6850/CIO4 DOD			Water	10mL	
3	E2200355-001	146-RS1720-190422	.01	6850/CIO4 DOD			Water	10mL	
4	E2200355-002	095-RS2142-190422	.01	6850/CIO4 DOD			Water	10mL	
5	E2200355-003	095-RS2140-190422	.01	6850/CIO4 DOD			Water	10mL	
6	E2200356-001	095-RS2136-200422	.01	6850/CIO4 DOD			Water	10mL	
7	E2200356-002	095-RS2662-200422	.01	6850/CIO4 DOD			Water	10mL	
8	E2200356-003	095-RS2132-200422	.01	6850/CIO4 DOD			Water	10mL	
9	E2200356-004	095-RS1723-200422	.01	6850/CIO4 DOD			Water	10mL	
10	E2200356-005	K95-RS1475-200422	.01	6850/CIO4 DOD			Water	10mL	
11	E2200356-006	146-RS1719-200422	.01	6850/CIO4 DOD			Water	10mL	
12	E2200356-007	146-RS1721-200422	.01	6850/CIO4 DOD			Water	10mL	
13	E2200356-008	RSA-FD-01-200422	.01	6850/CIO4 DOD			Water	10mL	
14	E2200356-009	095-RS2138-200422	.01	6850/CIO4 DOD			Water	10mL	
15	E2200356-010	095-RS2134-200422	.01	6850/CIO4 DOD			Water	10mL	
16	E2200356-011	095-RS2141-200422	.01	6850/CIO4 DOD			Water	10mL	
17	EQ2200161-01	MB		6850/CIO4 DOD			Liquid	10mL	
18	EQ2200161-02	LCS		6850/CIO4 DOD			Liquid	10mL	
19	EQ2200161-03	DLCS		6850/CIO4 DOD			Liquid	10mL	

**Spiking Solutions**

Name:	Perchlorate Internal Standard 1ug/mL	Inventory ID	221408	Logbook Ref:	Perchlorate Internal Standard	Expires On:	04/30/2022
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E2200352-001	100.00µL	E2200352-002	100.00µL	E2200355-001	100.00µL	E2200355-002	100.00µL	E2200355-003	100.00µL	E2200356-001	100.00µL
E2200356-002	100.00µL	E2200356-003	100.00µL	E2200356-004	100.00µL	E2200356-005	100.00µL	E2200356-006	100.00µL	E2200356-007	100.00µL
E2200356-008	100.00µL	E2200356-009	100.00µL	E2200356-010	100.00µL	E2200356-011	100.00µL	EQ2200161-01	100.00µL	EQ2200161-02	100.00µL
EQ2200161-03	100.00µL										

Name:	Perchlorate Intermediate Stock1	Inventory ID	221456	Logbook Ref:	Perchlorate	Expires On:	04/30/2022
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EQ2200161-02	1.00µL	EQ2200161-03	1.00µL
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**Preparation Materials**

Water HPLC Grade	08/03/2021 Water (218532)	6850 Amber Glass screw vial	2mL Screw Top Vial (221894)	537M Glass Culture Tubes	537M Glass Tubes (218064)
6850 0.45um syringe filters	6850 Syringe Filters (222410)	6850 Luer-Lok Syringes	Luer-Lok Syringes (221305)	6850 Pipette Tips 50-1000 uL	6850 Pipette Tips (221929)



Preparation Information Benchsheet

Prep Run#: 398579  
Team: Semivoa GCMS/GRIVERA

Prep WorkFlow: GenExt28Day  
Prep Method: Method

Status: Prepped  
Prep Date/Time: 4/21/22 14:05

Preparation Steps

Step: Preparation  
Started: 4/21/22 14:05  
Finished: 4/21/22 14:45  
By: GRIVERA  
Comments

Comments:

Reviewed By: GR Date: 4/21/22

Chain of Custody

Relinquished By:	Date:	<u>Extracts Examined</u> Yes No
Received By:	Date:	



## Analytical Results

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22041044  
**Sample Matrix:** Water  
**Sample Name:** LH18/24-SP650\_042022\_AIX  
**Lab Code:** E2200352-001

**Service Request:** E2200352  
**Date Collected:** 4/20/22 1400  
**Date Received:** 4/21/22  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.963		0.200	0.100	0.0500	2	4/21/22	4/22/22 12:03	398579	761552	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22041044  
**Sample Matrix:** Water  
**Sample Name:** LH18/24-SP650\_042022\_BIX  
**Lab Code:** E2200352-002

**Service Request:** E2200352  
**Date Collected:** 4/20/22 1400  
**Date Received:** 4/21/22  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	92.1		1.00	0.500	0.250	10	4/21/22	4/21/22 17:00	398579	761454	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22041044  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** EQ2200161-01

**Service Request:** E2200352  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	0.100	0.0500	0.0250	1	4/21/22	4/21/22 14:54	398579	761454	



## Accuracy & Precision

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS22041044  
**Sample Matrix:** Water

**Service Request:** E2200352  
**Date Analyzed:** 4/21/22

**Lab Control Sample Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**Analytical Method:** 6850  
**Prep Method:** Method

**Units:** µg/L  
**Basis:** NA

**Extraction Lot:** 398579

Analyte Name	Lab Control Sample EQ2200161-02			Duplicate Lab Control Sample EQ2200161-03			% Rec Limits	RPD	RPD Limit
	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Perchlorate	0.106	0.100	106	0.101	0.100	101	84 - 119	4	15

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22041044  
**Sample Matrix:** Water  
**Sample Name:** Lab Control Sample  
**Lab Code:** EQ2200161-02

**Service Request:** E2200352  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.106		0.100	0.0500	0.0250	1	4/21/22	4/21/22 15:01	398579	761454	



## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US**Project:** HS22041044**Sample Matrix:** Water**Sample Name:** Duplicate Lab Control Sample**Lab Code:** EQ2200161-03**Service Request:** E2200352**Date Collected:** NA**Date Received:** NA**Units:** µg/L**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.101		0.100	0.0500	0.0250	1	4/21/22	4/21/22 15:25	398579	761454	



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10450 Stancliff Rd. Suite 210  
Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887

May 02, 2022

Marcia Olive  
Bhate Environmental Associates, Inc.  
445 Union Blvd Ste 129  
Lakewood, CO 80228

Work Order: **HS22041050**

Laboratory Results for: **Longhorn GW Treatment Plant Bi-Weekly Samples**

Dear Marcia Olive,

ALS Environmental received 2 sample(s) on Apr 21, 2022 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: JUMOKE.LAWAL

Ragen Giga  
Project Manager

ALS Houston, US

Date: 02-May-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**Work Order:** HS22041050

**SAMPLE SUMMARY**

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS22041050-01	LH18/24-SP650_042022	Water		20-Apr-2022 14:00	21-Apr-2022 09:30	<input type="checkbox"/>
HS22041050-02	Trip Blank	Water	CG-101321 -156	20-Apr-2022 00:00	21-Apr-2022 09:30	<input type="checkbox"/>

ALS Houston, US

Date: 02-May-22

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**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**Work Order:** HS22041050

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**CASE NARRATIVE**

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**GCMS Volatiles by Method SW8260****Batch ID: R407392****Sample ID: HS22041001-01MS**

- MS and MSD are for an unrelated sample

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**WetChemistry by Method SW9056****Batch ID: R407733****Sample ID: LH18/24-SP650\_042022 (HS22041050-01MS)**

- The MS and/or MSD recovery was outside of the control limits; however, the result in the parent sample is greater than 4x the spike amount. (Chloride)
-

## ALS Houston, US

Date: 02-May-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Bi-Weekly Samples  
 Sample ID: LH18/24-SP650\_042022  
 Collection Date: 20-Apr-2022 14:00

## ANALYTICAL REPORT

WorkOrder: HS22041050  
 Lab ID: HS22041050-01  
 Matrix: Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD 8260C</b>		<b>Method: SW8260</b>						Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	ug/L	1	26-Apr-2022 14:13
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 14:13
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	ug/L	1	26-Apr-2022 14:13
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	ug/L	1	26-Apr-2022 14:13
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 14:13
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 14:13
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	ug/L	1	26-Apr-2022 14:13
1,2,3-Trichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	26-Apr-2022 14:13
1,2,3-Trichloropropane	1.0	U	0.50	1.0	1.0	ug/L	1	26-Apr-2022 14:13
1,2,4-Trichlorobenzene	1.0	U	0.50	1.0	1.0	ug/L	1	26-Apr-2022 14:13
1,2,4-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	26-Apr-2022 14:13
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 14:13
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 14:13
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	ug/L	1	26-Apr-2022 14:13
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 14:13
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	ug/L	1	26-Apr-2022 14:13
1,3,5-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	26-Apr-2022 14:13
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	ug/L	1	26-Apr-2022 14:13
1,3-Dichloropropane	1.0	U	0.30	1.0	1.0	ug/L	1	26-Apr-2022 14:13
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	ug/L	1	26-Apr-2022 14:13
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 14:13
2-Butanone	1.0	U	0.50	1.0	2.0	ug/L	1	26-Apr-2022 14:13
2-Chlorotoluene	1.0	U	0.30	1.0	1.0	ug/L	1	26-Apr-2022 14:13
2-Hexanone	2.0	U	1.0	2.0	2.0	ug/L	1	26-Apr-2022 14:13
4-Chlorotoluene	1.0	U	0.40	1.0	1.0	ug/L	1	26-Apr-2022 14:13
4-Isopropyltoluene	1.0	U	0.30	1.0	1.0	ug/L	1	26-Apr-2022 14:13
4-Methyl-2-pentanone	2.0	U	0.70	2.0	2.0	ug/L	1	26-Apr-2022 14:13
Acetone	2.0	U	0.40	2.0	2.0	ug/L	1	26-Apr-2022 14:13
Benzene	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 14:13
Bromobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	26-Apr-2022 14:13
Bromochloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 14:13
Bromodichloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 14:13
Bromoform	0.50	U	0.40	0.50	1.0	ug/L	1	26-Apr-2022 14:13
Bromomethane	1.0	U	0.40	1.0	1.0	ug/L	1	26-Apr-2022 14:13
Carbon disulfide	2.0	U	0.60	2.0	2.0	ug/L	1	26-Apr-2022 14:13
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	ug/L	1	26-Apr-2022 14:13
Chlorobenzene	0.50	U	0.30	0.50	1.0	ug/L	1	26-Apr-2022 14:13
Chloroethane	0.50	U	0.30	0.50	1.0	ug/L	1	26-Apr-2022 14:13
Chloroform	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 14:13

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 02-May-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Bi-Weekly Samples  
 Sample ID: LH18/24-SP650\_042022  
 Collection Date: 20-Apr-2022 14:00

## ANALYTICAL REPORT

WorkOrder:HS22041050  
 Lab ID:HS22041050-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD 8260C</b>		<b>Method:SW8260</b>						Analyst: PC
Chloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 14:13
<b>cis-1,2-Dichloroethene</b>	<b>1.7</b>		<b>0.20</b>	<b>0.50</b>	<b>1.0</b>	<b>ug/L</b>	1	26-Apr-2022 14:13
cis-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 14:13
Dibromochloromethane	0.50	U	0.30	0.50	1.0	ug/L	1	26-Apr-2022 14:13
Dibromomethane	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 14:13
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	ug/L	1	26-Apr-2022 14:13
Ethylbenzene	0.50	U	0.30	0.50	1.0	ug/L	1	26-Apr-2022 14:13
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	ug/L	1	26-Apr-2022 14:13
Isopropylbenzene	0.50	U	0.30	0.50	1.0	ug/L	1	26-Apr-2022 14:13
m,p-Xylene	1.0	U	0.50	1.0	2.0	ug/L	1	26-Apr-2022 14:13
Methylene chloride	2.0	U	0.40	2.0	2.0	ug/L	1	26-Apr-2022 14:13
n-Butylbenzene	1.0	U	0.40	1.0	1.0	ug/L	1	26-Apr-2022 14:13
n-Propylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	26-Apr-2022 14:13
Naphthalene	1.0	U	0.30	1.0	1.0	ug/L	1	26-Apr-2022 14:13
o-Xylene	0.50	U	0.30	0.50	1.0	ug/L	1	26-Apr-2022 14:13
sec-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	26-Apr-2022 14:13
Styrene	0.50	U	0.30	0.50	1.0	ug/L	1	26-Apr-2022 14:13
tert-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	26-Apr-2022 14:13
Tetrachloroethene	0.50	U	0.30	0.50	1.0	ug/L	1	26-Apr-2022 14:13
Toluene	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 14:13
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 14:13
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 14:13
Trichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 14:13
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	ug/L	1	26-Apr-2022 14:13
Vinyl chloride	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 14:13
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>92.1</i>			<b>0</b>	<i>81-118</i>	<b>%REC</b>	<i>1</i>	26-Apr-2022 14:13
<i>Surr: 4-Bromofluorobenzene</i>	<i>95.9</i>			<b>0</b>	<i>85-114</i>	<b>%REC</b>	<i>1</i>	26-Apr-2022 14:13
<i>Surr: Dibromofluoromethane</i>	<i>88.6</i>			<b>0</b>	<i>80-119</i>	<b>%REC</b>	<i>1</i>	26-Apr-2022 14:13
<i>Surr: Toluene-d8</i>	<i>109</i>			<b>0</b>	<i>89-112</i>	<b>%REC</b>	<i>1</i>	26-Apr-2022 14:13
<b>ANIONS BY SW9056A</b>		<b>Method:SW9056</b>						Analyst: YP
<b>Chloride</b>	<b>749</b>		<b>4.00</b>	<b>10.0</b>	<b>10.0</b>	<b>mg/L</b>	20	29-Apr-2022 20:07
<b>Sulfate</b>	<b>53.6</b>		<b>0.200</b>	<b>0.500</b>	<b>0.500</b>	<b>mg/L</b>	1	29-Apr-2022 19:51

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 02-May-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Bi-Weekly Samples  
 Sample ID: Trip Blank  
 Collection Date: 20-Apr-2022 00:00

## ANALYTICAL REPORT

WorkOrder:HS22041050  
 Lab ID:HS22041050-02  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD</b>		<b>Method:SW8260</b>						Analyst: PC
<b>8260C</b>								
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	ug/L	1	26-Apr-2022 13:50
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 13:50
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	ug/L	1	26-Apr-2022 13:50
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	ug/L	1	26-Apr-2022 13:50
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 13:50
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 13:50
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	ug/L	1	26-Apr-2022 13:50
1,2,3-Trichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	26-Apr-2022 13:50
1,2,3-Trichloropropane	1.0	U	0.50	1.0	1.0	ug/L	1	26-Apr-2022 13:50
1,2,4-Trichlorobenzene	1.0	U	0.50	1.0	1.0	ug/L	1	26-Apr-2022 13:50
1,2,4-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	26-Apr-2022 13:50
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 13:50
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 13:50
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	ug/L	1	26-Apr-2022 13:50
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 13:50
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	ug/L	1	26-Apr-2022 13:50
1,3,5-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	26-Apr-2022 13:50
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	ug/L	1	26-Apr-2022 13:50
1,3-Dichloropropane	1.0	U	0.30	1.0	1.0	ug/L	1	26-Apr-2022 13:50
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	ug/L	1	26-Apr-2022 13:50
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 13:50
2-Butanone	1.0	U	0.50	1.0	2.0	ug/L	1	26-Apr-2022 13:50
2-Chlorotoluene	1.0	U	0.30	1.0	1.0	ug/L	1	26-Apr-2022 13:50
2-Hexanone	2.0	U	1.0	2.0	2.0	ug/L	1	26-Apr-2022 13:50
4-Chlorotoluene	1.0	U	0.40	1.0	1.0	ug/L	1	26-Apr-2022 13:50
4-Isopropyltoluene	1.0	U	0.30	1.0	1.0	ug/L	1	26-Apr-2022 13:50
4-Methyl-2-pentanone	2.0	U	0.70	2.0	2.0	ug/L	1	26-Apr-2022 13:50
Acetone	2.0	U	0.40	2.0	2.0	ug/L	1	26-Apr-2022 13:50
Benzene	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 13:50
Bromobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	26-Apr-2022 13:50
Bromochloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 13:50
Bromodichloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 13:50
Bromoform	0.50	U	0.40	0.50	1.0	ug/L	1	26-Apr-2022 13:50
Bromomethane	1.0	U	0.40	1.0	1.0	ug/L	1	26-Apr-2022 13:50
Carbon disulfide	2.0	U	0.60	2.0	2.0	ug/L	1	26-Apr-2022 13:50
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	ug/L	1	26-Apr-2022 13:50
Chlorobenzene	0.50	U	0.30	0.50	1.0	ug/L	1	26-Apr-2022 13:50
Chloroethane	0.50	U	0.30	0.50	1.0	ug/L	1	26-Apr-2022 13:50
Chloroform	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 13:50

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 02-May-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Bi-Weekly Samples  
 Sample ID: Trip Blank  
 Collection Date: 20-Apr-2022 00:00

## ANALYTICAL REPORT

WorkOrder: HS22041050  
 Lab ID: HS22041050-02  
 Matrix: Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD</b>		<b>Method: SW8260</b>						Analyst: PC
<b>8260C</b>								
Chloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 13:50
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 13:50
cis-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 13:50
Dibromochloromethane	0.50	U	0.30	0.50	1.0	ug/L	1	26-Apr-2022 13:50
Dibromomethane	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 13:50
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	ug/L	1	26-Apr-2022 13:50
Ethylbenzene	0.50	U	0.30	0.50	1.0	ug/L	1	26-Apr-2022 13:50
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	ug/L	1	26-Apr-2022 13:50
Isopropylbenzene	0.50	U	0.30	0.50	1.0	ug/L	1	26-Apr-2022 13:50
m,p-Xylene	1.0	U	0.50	1.0	2.0	ug/L	1	26-Apr-2022 13:50
Methylene chloride	2.0	U	0.40	2.0	2.0	ug/L	1	26-Apr-2022 13:50
n-Butylbenzene	1.0	U	0.40	1.0	1.0	ug/L	1	26-Apr-2022 13:50
n-Propylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	26-Apr-2022 13:50
Naphthalene	1.0	U	0.30	1.0	1.0	ug/L	1	26-Apr-2022 13:50
o-Xylene	0.50	U	0.30	0.50	1.0	ug/L	1	26-Apr-2022 13:50
sec-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	26-Apr-2022 13:50
Styrene	0.50	U	0.30	0.50	1.0	ug/L	1	26-Apr-2022 13:50
tert-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	26-Apr-2022 13:50
Tetrachloroethene	0.50	U	0.30	0.50	1.0	ug/L	1	26-Apr-2022 13:50
Toluene	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 13:50
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 13:50
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 13:50
Trichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 13:50
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	ug/L	1	26-Apr-2022 13:50
Vinyl chloride	0.50	U	0.20	0.50	1.0	ug/L	1	26-Apr-2022 13:50
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>91.1</i>			<b>0</b>	<i>81-118</i>	<b>%REC</b>	<i>1</i>	<i>26-Apr-2022 13:50</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>94.6</i>			<b>0</b>	<i>85-114</i>	<b>%REC</b>	<i>1</i>	<i>26-Apr-2022 13:50</i>
<i>Surr: Dibromofluoromethane</i>	<i>87.0</i>			<b>0</b>	<i>80-119</i>	<b>%REC</b>	<i>1</i>	<i>26-Apr-2022 13:50</i>
<i>Surr: Toluene-d8</i>	<i>109</i>			<b>0</b>	<i>89-112</i>	<b>%REC</b>	<i>1</i>	<i>26-Apr-2022 13:50</i>

Note: See Qualifiers Page for a list of qualifiers and their explanation.



ALS Houston, US

Date: 02-May-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22041050

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> R407392 ( 0 )		<b>Test Name :</b> VOLATILES ORGANICS BY METHOD 8260C			<b>Matrix:</b> Water	
HS22041050-01	LH18/24-SP650_042022	20 Apr 2022 14:00			26 Apr 2022 14:13	1
HS22041050-02	Trip Blank	20 Apr 2022 00:00			26 Apr 2022 13:50	1
<b>Batch ID:</b> R407733 ( 0 )		<b>Test Name :</b> ANIONS BY SW9056A			<b>Matrix:</b> Water	
HS22041050-01	LH18/24-SP650_042022	20 Apr 2022 14:00			29 Apr 2022 20:07	20
HS22041050-01	LH18/24-SP650_042022	20 Apr 2022 14:00			29 Apr 2022 19:51	1

## ALS Houston, US

Date: 02-May-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22041050

## QC BATCH REPORT

Batch ID: R407392 ( 0 )		Instrument: VOA9		Method: VOLATILES ORGANICS BY METHOD 8260C					
<b>MBLK</b>	Sample ID: VBLKW-220426	Units: ug/L		Analysis Date: 26-Apr-2022 13:06					
Client ID:	Run ID: VOA9_407392	SeqNo: 6619360		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	0.50	1.0							U
1,1,1-Trichloroethane	0.50	1.0							U
1,1,2,2-Tetrachloroethane	0.50	1.0							U
1,1,2-Trichloroethane	0.50	1.0							U
1,1-Dichloroethane	0.50	1.0							U
1,1-Dichloroethene	0.50	1.0							U
1,1-Dichloropropene	0.50	1.0							U
1,2,3-Trichlorobenzene	1.0	1.0							U
1,2,3-Trichloropropane	1.0	1.0							U
1,2,4-Trichlorobenzene	1.0	1.0							U
1,2,4-Trimethylbenzene	1.0	1.0							U
1,2-Dibromo-3-chloropropane	0.50	1.0							U
1,2-Dibromoethane	0.50	1.0							U
1,2-Dichlorobenzene	0.50	1.0							U
1,2-Dichloroethane	0.50	1.0							U
1,2-Dichloropropane	0.50	1.0							U
1,3,5-Trimethylbenzene	1.0	1.0							U
1,3-Dichlorobenzene	0.50	1.0							U
1,3-Dichloropropane	1.0	1.0							U
1,4-Dichlorobenzene	0.50	1.0							U
2,2-Dichloropropane	0.50	1.0							U
2-Butanone	1.0	2.0							U
2-Chlorotoluene	1.0	1.0							U
2-Hexanone	2.0	2.0							U
4-Chlorotoluene	1.0	1.0							U
4-Isopropyltoluene	1.0	1.0							U
4-Methyl-2-pentanone	2.0	2.0							U
Acetone	2.0	2.0							U
Benzene	0.50	1.0							U
Bromobenzene	1.0	1.0							U
Bromochloromethane	0.50	1.0							U
Bromodichloromethane	0.50	1.0							U
Bromoform	0.50	1.0							U
Bromomethane	1.0	1.0							U

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**WorkOrder:** HS22041050

## QC BATCH REPORT

Batch ID: R407392 ( 0 )		Instrument: VOA9		Method: VOLATILES ORGANICS BY METHOD 8260C					
<b>MBLK</b>	Sample ID: VBLKW-220426	Units: ug/L		Analysis Date: 26-Apr-2022 13:06					
Client ID:	Run ID: VOA9_407392		SeqNo: 6619360		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	2.0	2.0							U
Carbon tetrachloride	0.50	1.0							U
Chlorobenzene	0.50	1.0							U
Chloroethane	0.50	1.0							U
Chloroform	0.50	1.0							U
Chloromethane	0.50	1.0							U
cis-1,2-Dichloroethene	0.50	1.0							U
cis-1,3-Dichloropropene	0.50	1.0							U
Dibromochloromethane	0.50	1.0							U
Dibromomethane	0.50	1.0							U
Dichlorodifluoromethane	0.50	1.0							U
Ethylbenzene	0.50	1.0							U
Hexachlorobutadiene	1.0	1.0							U
Isopropylbenzene	0.50	1.0							U
m,p-Xylene	1.0	2.0							U
Methylene chloride	2.0	2.0							U
Naphthalene	1.0	1.0							U
n-Butylbenzene	1.0	1.0							U
n-Propylbenzene	1.0	1.0							U
o-Xylene	0.50	1.0							U
sec-Butylbenzene	1.0	1.0							U
Styrene	0.50	1.0							U
tert-Butylbenzene	1.0	1.0							U
Tetrachloroethene	0.50	1.0							U
Toluene	0.50	1.0							U
trans-1,2-Dichloroethene	0.50	1.0							U
trans-1,3-Dichloropropene	0.50	1.0							U
Trichloroethene	0.50	1.0							U
Trichlorofluoromethane	0.50	1.0							U
Vinyl chloride	0.50	1.0							U
Surr: 1,2-Dichloroethane-d4	45.54	1.0	50	0	91.1	81 - 118			
Surr: 4-Bromofluorobenzene	47.85	1.0	50	0	95.7	85 - 114			
Surr: Dibromofluoromethane	43.25	1.0	50	0	86.5	80 - 119			
Surr: Toluene-d8	54.75	1.0	50	0	110	89 - 112			

## ALS Houston, US

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**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22041050

## QC BATCH REPORT

Batch ID: R407392 ( 0 )		Instrument: VOA9		Method: VOLATILES ORGANICS BY METHOD 8260C						
LCS		Sample ID: VLCSW-220426		Units: ug/L		Analysis Date: 26-Apr-2022 12:21				
Client ID:		Run ID: VOA9_407392		SeqNo: 6619359		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	19.15	1.0	20	0	95.8	78 - 124				
1,1,1-Trichloroethane	19.75	1.0	20	0	98.7	74 - 131				
1,1,2,2-Tetrachloroethane	19.81	1.0	20	0	99.0	71 - 121				
1,1,2-Trichloroethane	20.08	1.0	20	0	100	80 - 119				
1,1-Dichloroethane	19.07	1.0	20	0	95.3	77 - 125				
1,1-Dichloroethene	19.45	1.0	20	0	97.2	71 - 131				
1,1-Dichloropropene	20	1.0	20	0	100.0	78 - 125				
1,2,3-Trichlorobenzene	20.31	1.0	20	0	102	69 - 129				
1,2,3-Trichloropropane	19.85	1.0	20	0	99.2	73 - 122				
1,2,4-Trichlorobenzene	20.44	1.0	20	0	102	69 - 130				
1,2,4-Trimethylbenzene	22.12	1.0	20	0	111	76 - 124				
1,2-Dibromo-3-chloropropane	17.74	1.0	20	0	88.7	62 - 128				
1,2-Dibromoethane	20.76	1.0	20	0	104	77 - 121				
1,2-Dichlorobenzene	20.35	1.0	20	0	102	80 - 119				
1,2-Dichloroethane	19.91	1.0	20	0	99.6	73 - 128				
1,2-Dichloropropane	19.82	1.0	20	0	99.1	78 - 122				
1,3,5-Trimethylbenzene	22.28	1.0	20	0	111	75 - 124				
1,3-Dichlorobenzene	20.84	1.0	20	0	104	80 - 119				
1,3-Dichloropropane	20.13	1.0	20	0	101	80 - 119				
1,4-Dichlorobenzene	19.58	1.0	20	0	97.9	79 - 118				
2,2-Dichloropropane	20.55	1.0	20	0	103	60 - 139				
2-Butanone	36.66	2.0	40	0	91.6	56 - 143				
2-Chlorotoluene	21.79	1.0	20	0	109	79 - 122				
2-Hexanone	40.26	2.0	40	0	101	57 - 139				
4-Chlorotoluene	21.44	1.0	20	0	107	78 - 122				
4-Isopropyltoluene	19.96	1.0	20	0	99.8	77 - 127				
4-Methyl-2-pentanone	40.84	2.0	40	0	102	67 - 130				
Acetone	32.99	2.0	40	0	82.5	39 - 160				
Benzene	20.26	1.0	20	0	101	79 - 120				
Bromobenzene	19.96	1.0	20	0	99.8	80 - 120				
Bromochloromethane	19	1.0	20	0	95.0	78 - 123				
Bromodichloromethane	19.08	1.0	20	0	95.4	79 - 125				
Bromoform	17.18	1.0	20	0	85.9	66 - 130				
Bromomethane	24.39	1.0	20	0	122	53 - 141				

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**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22041050

## QC BATCH REPORT

Batch ID: R407392 ( 0 )		Instrument: VOA9		Method: VOLATILES ORGANICS BY METHOD 8260C					
LCS		Sample ID: VLCSW-220426		Units: ug/L		Analysis Date: 26-Apr-2022 12:21			
Client ID:		Run ID: VOA9_407392		SeqNo: 6619359		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	44.25	2.0	40	0	111	64 - 133			
Carbon tetrachloride	19.28	1.0	20	0	96.4	72 - 136			
Chlorobenzene	19.64	1.0	20	0	98.2	82 - 118			
Chloroethane	19.76	1.0	20	0	98.8	60 - 138			
Chloroform	18.69	1.0	20	0	93.4	79 - 124			
Chloromethane	18.99	1.0	20	0	94.9	50 - 139			
cis-1,2-Dichloroethene	19.21	1.0	20	0	96.0	78 - 123			
cis-1,3-Dichloropropene	18.64	1.0	20	0	93.2	75 - 124			
Dibromochloromethane	18.33	1.0	20	0	91.7	74 - 126			
Dibromomethane	20.07	1.0	20	0	100	79 - 123			
Dichlorodifluoromethane	20.21	1.0	20	0	101	32 - 152			
Ethylbenzene	21.1	1.0	20	0	105	79 - 121			
Hexachlorobutadiene	21.59	1.0	20	0	108	66 - 134			
Isopropylbenzene	22.09	1.0	20	0	110	72 - 131			
m,p-Xylene	42.34	2.0	40	0	106	80 - 121			
Methylene chloride	19.93	2.0	20	0	99.7	74 - 124			
Naphthalene	18.56	1.0	20	0	92.8	61 - 128			
n-Butylbenzene	20.3	1.0	20	0	102	75 - 128			
n-Propylbenzene	22.47	1.0	20	0	112	76 - 126			
o-Xylene	20.19	1.0	20	0	101	78 - 122			
sec-Butylbenzene	19.95	1.0	20	0	99.8	77 - 126			
Styrene	19.23	1.0	20	0	96.2	78 - 123			
tert-Butylbenzene	21.77	1.0	20	0	109	78 - 124			
Tetrachloroethene	20.74	1.0	20	0	104	74 - 129			
Toluene	21.25	1.0	20	0	106	80 - 121			
trans-1,2-Dichloroethene	19.44	1.0	20	0	97.2	75 - 124			
trans-1,3-Dichloropropene	18.12	1.0	20	0	90.6	73 - 127			
Trichloroethene	20.12	1.0	20	0	101	79 - 123			
Trichlorofluoromethane	19.87	1.0	20	0	99.4	65 - 141			
Vinyl chloride	19.45	1.0	20	0	97.2	58 - 137			
Surr: 1,2-Dichloroethane-d4	50.52	1.0	50	0	101	81 - 118			
Surr: 4-Bromofluorobenzene	51.32	1.0	50	0	103	85 - 114			
Surr: Dibromofluoromethane	48.77	1.0	50	0	97.5	80 - 119			
Surr: Toluene-d8	53.36	1.0	50	0	107	89 - 112			

## ALS Houston, US

Date: 02-May-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22041050

## QC BATCH REPORT

Batch ID: R407392 ( 0 )		Instrument: VOA9		Method: VOLATILES ORGANICS BY METHOD 8260C					
MS		Sample ID: HS22041001-01MS		Units: ug/L		Analysis Date: 26-Apr-2022 14:57			
Client ID:		Run ID: VOA9_407392		SeqNo: 6619365		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	18.32	1.0	20	0	91.6	78 - 124			
1,1,1-Trichloroethane	17.29	1.0	20	0	86.5	74 - 131			
1,1,2,2-Tetrachloroethane	18.67	1.0	20	0	93.4	71 - 121			
1,1,2-Trichloroethane	19.5	1.0	20	0	97.5	80 - 119			
1,1-Dichloroethane	17.01	1.0	20	0	85.0	77 - 125			
1,1-Dichloroethene	16.72	1.0	20	0	83.6	71 - 131			
1,1-Dichloropropene	17.8	1.0	20	0	89.0	78 - 125			
1,2,3-Trichlorobenzene	17.19	1.0	20	0	85.9	69 - 129			
1,2,3-Trichloropropane	17.53	1.0	20	0	87.6	73 - 122			
1,2,4-Trichlorobenzene	16.88	1.0	20	0	84.4	69 - 130			
1,2,4-Trimethylbenzene	19.47	1.0	20	0	97.3	76 - 124			
1,2-Dibromo-3-chloropropane	16.58	1.0	20	0	82.9	62 - 128			
1,2-Dibromoethane	19.38	1.0	20	0	96.9	77 - 121			
1,2-Dichlorobenzene	18.02	1.0	20	0	90.1	80 - 119			
1,2-Dichloroethane	19.43	1.0	20	1.128	91.5	73 - 128			
1,2-Dichloropropane	18.29	1.0	20	0	91.4	78 - 122			
1,3,5-Trimethylbenzene	19.37	1.0	20	0	96.9	75 - 124			
1,3-Dichlorobenzene	18.48	1.0	20	0	92.4	80 - 119			
1,3-Dichloropropane	19.14	1.0	20	0	95.7	80 - 119			
1,4-Dichlorobenzene	17.44	1.0	20	0	87.2	79 - 118			
2,2-Dichloropropane	10.38	1.0	20	0	51.9	60 - 139			S
2-Butanone	29.6	2.0	40	0	74.0	56 - 143			
2-Chlorotoluene	19.49	1.0	20	0	97.5	79 - 122			
2-Hexanone	36.82	2.0	40	0	92.1	57 - 139			
4-Chlorotoluene	19.14	1.0	20	0	95.7	78 - 122			
4-Isopropyltoluene	16.95	1.0	20	0	84.7	77 - 127			
4-Methyl-2-pentanone	38.43	2.0	40	0	96.1	67 - 130			
Acetone	25.43	2.0	40	0	63.6	39 - 160			
Benzene	18.8	1.0	20	0	94.0	79 - 120			
Bromobenzene	18.54	1.0	20	0	92.7	80 - 120			
Bromochloromethane	16.12	1.0	20	0	80.6	78 - 123			
Bromodichloromethane	17.81	1.0	20	0	89.1	79 - 125			
Bromoform	16.17	1.0	20	0	80.8	66 - 130			
Bromomethane	16.89	1.0	20	0	84.4	53 - 141			

## ALS Houston, US

Date: 02-May-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22041050

## QC BATCH REPORT

Batch ID: R407392 ( 0 )		Instrument: VOA9		Method: VOLATILES ORGANICS BY METHOD 8260C					
MS		Sample ID: HS22041001-01MS		Units: ug/L		Analysis Date: 26-Apr-2022 14:57			
Client ID:		Run ID: VOA9_407392		SeqNo: 6619365		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	33.61	2.0	40	0	84.0	64 - 133			
Carbon tetrachloride	18.25	1.0	20	2.904	76.7	72 - 136			
Chlorobenzene	18.5	1.0	20	0	92.5	82 - 118			
Chloroethane	17.45	1.0	20	0	87.2	60 - 138			
Chloroform	17	1.0	20	0	85.0	79 - 124			
Chloromethane	13.08	1.0	20	0	65.4	50 - 139			
cis-1,2-Dichloroethene	46.47	1.0	20	30.79	78.4	78 - 123			
cis-1,3-Dichloropropene	15.25	1.0	20	0	76.2	75 - 124			
Dibromochloromethane	16.83	1.0	20	0	84.1	74 - 126			
Dibromomethane	18.76	1.0	20	0	93.8	79 - 123			
Dichlorodifluoromethane	10.55	1.0	20	0	52.8	32 - 152			
Ethylbenzene	19.35	1.0	20	0	96.7	79 - 121			
Hexachlorobutadiene	15.25	1.0	20	0	76.2	66 - 134			
Isopropylbenzene	20.05	1.0	20	0	100	72 - 131			
m,p-Xylene	38.95	2.0	40	0	97.4	80 - 121			
Methylene chloride	17.02	2.0	20	0	85.1	74 - 124			
Naphthalene	16.98	1.0	20	0	84.9	61 - 128			
n-Butylbenzene	16.08	1.0	20	0	80.4	75 - 128			
n-Propylbenzene	19.36	1.0	20	0	96.8	76 - 126			
o-Xylene	19.2	1.0	20	0	96.0	78 - 122			
sec-Butylbenzene	17.34	1.0	20	0	86.7	77 - 126			
Styrene	17.68	1.0	20	0	88.4	78 - 123			
tert-Butylbenzene	19.34	1.0	20	0	96.7	78 - 124			
Tetrachloroethene	18.44	1.0	20	0	92.2	74 - 129			
Toluene	19.9	1.0	20	0	99.5	80 - 121			
trans-1,2-Dichloroethene	17.04	1.0	20	0.6211	82.1	75 - 124			
trans-1,3-Dichloropropene	15.26	1.0	20	0	76.3	73 - 127			
Trichloroethene	440.3	1.0	20	442.7	-12.0	79 - 123			SEO
Trichlorofluoromethane	16.01	1.0	20	0	80.0	65 - 141			
Vinyl chloride	14.37	1.0	20	0	71.9	58 - 137			
Surr: 1,2-Dichloroethane-d4	44.77	1.0	50	0	89.5	81 - 118			
Surr: 4-Bromofluorobenzene	51.44	1.0	50	0	103	85 - 114			
Surr: Dibromofluoromethane	43.77	1.0	50	0	87.5	80 - 119			
Surr: Toluene-d8	53.97	1.0	50	0	108	89 - 112			

## ALS Houston, US

Date: 02-May-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22041050

## QC BATCH REPORT

Batch ID: R407392 ( 0 )		Instrument: VOA9		Method: VOLATILES ORGANICS BY METHOD 8260C						
MSD		Sample ID: HS22041001-01MSD		Units: ug/L		Analysis Date: 26-Apr-2022 15:20				
Client ID:		Run ID: VOA9_407392		SeqNo: 6619366		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	18.05	1.0	20	0	90.2	78 - 124	18.32	1.53	20	
1,1,1-Trichloroethane	17.12	1.0	20	0	85.6	74 - 131	17.29	1.04	20	
1,1,2,2-Tetrachloroethane	18.99	1.0	20	0	94.9	71 - 121	18.67	1.68	20	
1,1,2-Trichloroethane	19.01	1.0	20	0	95.0	80 - 119	19.5	2.55	20	
1,1-Dichloroethane	16.65	1.0	20	0	83.3	77 - 125	17.01	2.12	20	
1,1-Dichloroethene	16.11	1.0	20	0	80.6	71 - 131	16.72	3.68	20	
1,1-Dichloropropene	17.33	1.0	20	0	86.7	78 - 125	17.8	2.64	20	
1,2,3-Trichlorobenzene	18	1.0	20	0	90.0	69 - 129	17.19	4.58	20	
1,2,3-Trichloropropane	18.08	1.0	20	0	90.4	73 - 122	17.53	3.12	20	
1,2,4-Trichlorobenzene	17.3	1.0	20	0	86.5	69 - 130	16.88	2.43	20	
1,2,4-Trimethylbenzene	19.04	1.0	20	0	95.2	76 - 124	19.47	2.24	20	
1,2-Dibromo-3-chloropropane	17.17	1.0	20	0	85.9	62 - 128	16.58	3.49	20	
1,2-Dibromoethane	19.6	1.0	20	0	98.0	77 - 121	19.38	1.14	20	
1,2-Dichlorobenzene	18.42	1.0	20	0	92.1	80 - 119	18.02	2.22	20	
1,2-Dichloroethane	19.56	1.0	20	1.128	92.2	73 - 128	19.43	0.659	20	
1,2-Dichloropropane	17.98	1.0	20	0	89.9	78 - 122	18.29	1.72	20	
1,3,5-Trimethylbenzene	19.3	1.0	20	0	96.5	75 - 124	19.37	0.396	20	
1,3-Dichlorobenzene	18.43	1.0	20	0	92.1	80 - 119	18.48	0.274	20	
1,3-Dichloropropane	19.28	1.0	20	0	96.4	80 - 119	19.14	0.74	20	
1,4-Dichlorobenzene	17.13	1.0	20	0	85.7	79 - 118	17.44	1.79	20	
2,2-Dichloropropane	10.21	1.0	20	0	51.1	60 - 139	10.38	1.65	20	S
2-Butanone	30.88	2.0	40	0	77.2	56 - 143	29.6	4.21	20	
2-Chlorotoluene	19.17	1.0	20	0	95.8	79 - 122	19.49	1.67	20	
2-Hexanone	37.87	2.0	40	0	94.7	57 - 139	36.82	2.79	20	
4-Chlorotoluene	18.75	1.0	20	0	93.8	78 - 122	19.14	2.04	20	
4-Isopropyltoluene	16.95	1.0	20	0	84.7	77 - 127	16.95	0.00889	20	
4-Methyl-2-pentanone	39.4	2.0	40	0	98.5	67 - 130	38.43	2.5	20	
Acetone	26.66	2.0	40	0	66.6	39 - 160	25.43	4.73	20	
Benzene	18.62	1.0	20	0	93.1	79 - 120	18.8	0.998	20	
Bromobenzene	18.26	1.0	20	0	91.3	80 - 120	18.54	1.53	20	
Bromochloromethane	16.06	1.0	20	0	80.3	78 - 123	16.12	0.386	20	
Bromodichloromethane	17.59	1.0	20	0	88.0	79 - 125	17.81	1.25	20	
Bromoform	16.11	1.0	20	0	80.5	66 - 130	16.17	0.394	20	
Bromomethane	17.2	1.0	20	0	86.0	53 - 141	16.89	1.85	20	



## ALS Houston, US

Date: 02-May-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22041050

## QC BATCH REPORT

Batch ID: R407392 ( 0 )		Instrument: VOA9		Method: VOLATILES ORGANICS BY METHOD 8260C					
MSD		Sample ID: HS22041001-01MSD		Units: ug/L		Analysis Date: 26-Apr-2022 15:20			
Client ID:		Run ID: VOA9_407392		SeqNo: 6619366		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	32.81	2.0	40	0	82.0	64 - 133	33.61	2.38	20
Carbon tetrachloride	17.57	1.0	20	2.904	73.3	72 - 136	18.25	3.79	20
Chlorobenzene	18.21	1.0	20	0	91.0	82 - 118	18.5	1.6	20
Chloroethane	16.11	1.0	20	0	80.5	60 - 138	17.45	7.97	20
Chloroform	16.75	1.0	20	0	83.7	79 - 124	17	1.46	20
Chloromethane	13.02	1.0	20	0	65.1	50 - 139	13.08	0.423	20
cis-1,2-Dichloroethene	46.02	1.0	20	30.79	76.1	78 - 123	46.47	0.99	20 S
cis-1,3-Dichloropropene	15.22	1.0	20	0	76.1	75 - 124	15.25	0.158	20
Dibromochloromethane	16.81	1.0	20	0	84.1	74 - 126	16.83	0.088	20
Dibromomethane	18.45	1.0	20	0	92.2	79 - 123	18.76	1.67	20
Dichlorodifluoromethane	10.42	1.0	20	0	52.1	32 - 152	10.55	1.29	20
Ethylbenzene	18.92	1.0	20	0	94.6	79 - 121	19.35	2.26	20
Hexachlorobutadiene	15.74	1.0	20	0	78.7	66 - 134	15.25	3.16	20
Isopropylbenzene	19.68	1.0	20	0	98.4	72 - 131	20.05	1.86	20
m,p-Xylene	38.25	2.0	40	0	95.6	80 - 121	38.95	1.81	20
Methylene chloride	16.79	2.0	20	0	83.9	74 - 124	17.02	1.39	20
Naphthalene	17.58	1.0	20	0	87.9	61 - 128	16.98	3.44	20
n-Butylbenzene	15.86	1.0	20	0	79.3	75 - 128	16.08	1.39	20
n-Propylbenzene	19.13	1.0	20	0	95.6	76 - 126	19.36	1.22	20
o-Xylene	18.43	1.0	20	0	92.2	78 - 122	19.2	4.12	20
sec-Butylbenzene	17.14	1.0	20	0	85.7	77 - 126	17.34	1.15	20
Styrene	17.49	1.0	20	0	87.4	78 - 123	17.68	1.08	20
tert-Butylbenzene	19	1.0	20	0	95.0	78 - 124	19.34	1.78	20
Tetrachloroethene	17.7	1.0	20	0	88.5	74 - 129	18.44	4.1	20
Toluene	19.38	1.0	20	0	96.9	80 - 121	19.9	2.65	20
trans-1,2-Dichloroethene	16.65	1.0	20	0.6211	80.2	75 - 124	17.04	2.29	20
trans-1,3-Dichloropropene	15.18	1.0	20	0	75.9	73 - 127	15.26	0.544	20
Trichloroethene	425	1.0	20	442.7	-88.6	79 - 123	440.3	3.54	20 SEO
Trichlorofluoromethane	15.44	1.0	20	0	77.2	65 - 141	16.01	3.61	20
Vinyl chloride	14.01	1.0	20	0	70.1	58 - 137	14.37	2.55	20
Surr: 1,2-Dichloroethane-d4	44	1.0	50	0	88.0	81 - 118	44.77	1.72	20
Surr: 4-Bromofluorobenzene	51.42	1.0	50	0	103	85 - 114	51.44	0.0489	20
Surr: Dibromofluoromethane	43.93	1.0	50	0	87.9	80 - 119	43.77	0.371	20
Surr: Toluene-d8	54	1.0	50	0	108	89 - 112	53.97	0.0426	20

ALS Houston, US

Date: 02-May-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22041050

**QC BATCH REPORT****Batch ID:** R407392 ( 0 )**Instrument:** VOA9**Method:** VOLATILES ORGANICS BY METHOD  
8260C

The following samples were analyzed in this batch:

HS22041050-01	HS22041050-02
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## ALS Houston, US

Date: 02-May-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22041050

**QC BATCH REPORT**

Batch ID: R407733 ( 0 )		Instrument: ICS-Integrion		Method: ANIONS BY SW9056A					
<b>MBLK</b>	Sample ID: <b>MBLK</b>	Units: <b>mg/L</b>		Analysis Date: <b>29-Apr-2022 18:58</b>					
Client ID:	Run ID: <b>ICS-Integrion_407733</b>		SeqNo: <b>6626902</b>		PrepDate:		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	0.500	0.500							U
Sulfate	0.500	0.500							U

<b>LCS</b>	Sample ID: <b>LCS</b>	Units: <b>mg/L</b>		Analysis Date: <b>29-Apr-2022 19:03</b>					
Client ID:	Run ID: <b>ICS-Integrion_407733</b>		SeqNo: <b>6626903</b>		PrepDate:		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	20.18	0.500	20	0	101	80 - 120			
Sulfate	20.39	0.500	20	0	102	80 - 120			

<b>MS</b>	Sample ID: <b>HS22041050-01MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>29-Apr-2022 19:56</b>					
Client ID: <b>LH18/24-SP650_022022</b>	Run ID: <b>ICS-Integrion_407733</b>		SeqNo: <b>6626910</b>		PrepDate:		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	730.8	0.500	10	734.2	-34.5	80 - 120			SEO
Sulfate	62.79	0.500	10	53.57	92.2	80 - 120			O

<b>MSD</b>	Sample ID: <b>HS22041050-01MSD</b>	Units: <b>mg/L</b>		Analysis Date: <b>29-Apr-2022 20:01</b>					
Client ID: <b>LH18/24-SP650_022022</b>	Run ID: <b>ICS-Integrion_407733</b>		SeqNo: <b>6626911</b>		PrepDate:		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	731.1	0.500	10	734.2	-31.3	80 - 120	730.8	0.0434	20 SEO
Sulfate	62.8	0.500	10	53.57	92.3	80 - 120	62.79	0.0134	20 O

The following samples were analyzed in this batch: HS22041050-01

## ALS Houston, US

Date: 02-May-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22041050

**QUALIFIERS,  
ACRONYMS, UNITS**

<b>Qualifier</b>	<b>Description</b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

<b>Acronym</b>	<b>Description</b>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

<b>Unit Reported</b>	<b>Description</b>
mg/L	Milligrams per Liter

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**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

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Agency	Number	Expire Date
Florida	E87611-34	30-Jun-2022
Illinois	2000322021-7	09-May-2022
Kansas	E-10352 2021-2022	31-Jul-2022
Louisiana	03087, 2021-2022	30-Jun-2022

ALS Houston, US

Date: 02-May-22

## Sample Receipt Checklist

Work Order ID: HS22041050

Date/Time Received: **21-Apr-2022 09:30**

Client Name: Bhate Environmental

Received by: **Paresh M. Giga**

Completed By: <u>/S/ Paresh M. Giga</u>	21-Apr-2022 12:10	Reviewed by: <u>/S/ Andy C. Neir</u>	22-Apr-2022 09:43
eSignature	Date/Time	eSignature	Date/Time

Matrices: **Water**Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	1 Page(s)
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	COC IDs:none
Samplers name present on COC?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Temperature(s)/Thermometer(s):	1.3C/1.8C U/c IR31		
Cooler(s)/Kit(s):	46743		
Date/Time sample(s) sent to storage:	4/21/2022 12:15		
Water - VOA vials have zero headspace?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>
pH adjusted?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>
pH adjusted by:			

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:


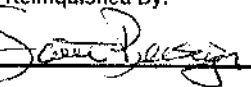
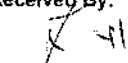
Comments:


Corrective Action:


## CHAIN OF CUSTODY

Name Of Lab Shipping To: ALS 10450 Stancil Rd. Suite 210, Houston, Tx. 77099 ATTN: Ragen Gigi

Page 1 of 1

<b>Project:</b> BHATE LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS			<b>Project No.</b>  NWO1312.0150.0 16.0001			<b>Analyses</b>		<div>HS22041050</div> <div>Bhate Environmental Associates, Inc. Longhorn GW Treatment Plant Bi-Weekly Samples</div> <div></div>																			
<b>Job:</b> <b>GROUNDWATER TREATMENT PLANT BI-WEEKLY SAMPLES</b>																											
<b>Prepared By:</b>  Scott Beesinger			<b>P.O Number</b>																								
<b>Field Sample I.D.</b>			<b>Sample Matrix</b>			<b>Date / Time</b>			<b>MS / MSD</b>	<b>No. OF CONTAINERS</b>	<b>VOC</b>	<b>CHLORIDE, SULFATE</b>											<b>Remarks (Preservatives, etc.)</b>	<b>Lab I.D.#</b>			
LH18/24-SP650_042022			Water			04/20/22 / 14:00																					
LH18/24-SP650_042022			Water			04/20/22 / 14:00																					
Trip Blank			Water			04/20/22																					
<b>Additional Remarks:</b>												<b>Standard TAT on all parameters</b>															
<b>Relinquished By:</b> 			<b>Date</b> 04/20/22		<b>Time</b> 14:30		<b>Received By:</b> 			<b>Date</b> 4/21/2022		<b>Time</b> 09:30		<b>Relinquished By:</b>			<b>Date</b>		<b>Time</b>		<b>Received By:</b>			<b>Date</b>		<b>Time</b>	
<b>For Lab Use Only</b>																											
<b>Received At Lab By:</b>						<b>Date</b>		<b>Time</b>		<b>Airbill No.</b>		<b>Opened By:</b>				<b>Date</b>		<b>Time</b>		<b>Temp of Container</b>		<b>Seal No.</b>		<b>Condition</b>			
<b>Remarks</b>																											

 <b>ALS</b> 10450 Standliff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5656 Fax. +1 281 530 5887	Date: <u>11-21-82</u> Name: <u>John Belandier</u> Company: <u>PHATS</u>
	<b>CUSTODY SEAL</b> Date: <u>11-21-82</u> Name: <u>John Belandier</u> Company: <u>PHATS</u>

<b>FedEx</b> TRACK 0221 5300 5230 2678 <b>AB SGRA</b>  4236674 26Apr7822 GGGA SEED2/8019/C008	THU - 21 APR AA PRIORITY OVERNIGHT 46743 77099 TX-LIS IAH
--	---





---

10450 Stancliff Rd. Suite 210  
Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887

May 02, 2022

Marcia Olive  
Bhate Environmental Associates, Inc.  
445 Union Blvd Ste 129  
Lakewood, CO 80228

Work Order: **HS22041334**

Laboratory Results for: **Longhorn GW Treatment Plant Weekly Samples**

Dear Marcia Olive,

ALS Environmental received 3 sample(s) on Apr 27, 2022 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: DAYNA.FISHER

Ragen Giga  
Project Manager

ALS Houston, US

Date: 02-May-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**Work Order:** HS22041334

**SAMPLE SUMMARY**

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS22041334-01	LH18/24-SP650_042622	Water		26-Apr-2022 14:00	27-Apr-2022 09:40	<input type="checkbox"/>
HS22041334-02	LH18/24-SP650_042622_AIX	Water		26-Apr-2022 14:00	27-Apr-2022 09:40	<input type="checkbox"/>
HS22041334-03	LH18/24-SP650_042622_BIX	Water		26-Apr-2022 14:00	27-Apr-2022 09:40	<input type="checkbox"/>

ALS Houston, US

Date: 02-May-22

---

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**Work Order:** HS22041334

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**CASE NARRATIVE**

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**Work Order Comments**

- The analysis for Perchlorate was subcontracted to ALS Houston High-Res Lab. Final report attached
- 

**WetChemistry by Method E350.3****Batch ID: R407739**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**WetChemistry by Method E415.1****Batch ID: R407578**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**WetChemistry by Method E365.3****Batch ID: R407460**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

## ALS Houston, US

Date: 02-May-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Weekly Samples  
 Sample ID: LH18/24-SP650\_042622  
 Collection Date: 26-Apr-2022 14:00

**ANALYTICAL REPORT**

WorkOrder:HS22041334  
 Lab ID:HS22041334-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>AMMONIA AS N BY E350.3(ISE)</b>		<b>Method:E350.3</b>						Analyst: MZD
Nitrogen, Ammonia (As N)	24	a	0.10	0.10	0.20	mg/L	1	02-May-2022 12:07
<b>ORTHO PHOSPHATE (PO4) AS P BY E365.3-1978</b>		<b>Method:E365.3</b>						Analyst: MZD
Phosphorus, Total Orthophosphate (As P)	6.96	a	0.200	0.250	0.500	mg/L	20	27-Apr-2022 15:16
<b>TOTAL ORGANIC CARBON BY E415.1</b>		<b>Method:E415.1</b>						Analyst: SB
Organic Carbon, Total	4.93	a	0.500	1.00	1.00	mg/L	1	28-Apr-2022 07:16

ALS Houston, US

Date: 02-May-22

Client:	Bhate Environmental Associates, Inc.	<b>ANALYTICAL REPORT</b>
Project:	Longhorn GW Treatment Plant Weekly Samples	WorkOrder:HS22041334
Sample ID:	LH18/24-SP650_042622_AIX	Lab ID:HS22041334-02
Collection Date:	26-Apr-2022 14:00	Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		Method:NA						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	28-Apr-2022 17:14

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US

Date: 02-May-22

Client:	Bhate Environmental Associates, Inc.	<b>ANALYTICAL REPORT</b>
Project:	Longhorn GW Treatment Plant Weekly Samples	WorkOrder:HS22041334
Sample ID:	LH18/24-SP650_042622_BIX	Lab ID:HS22041334-03
Collection Date:	26-Apr-2022 14:00	Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		Method:NA						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	28-Apr-2022 17:14

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US

Date: 02-May-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22041334

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> R407460 ( 0 )		<b>Test Name :</b> ORTHO PHOSPHATE (PO4) AS P BY E365.3-1978			<b>Matrix:</b> Water	
HS22041334-01	LH18/24-SP650_042622	26 Apr 2022 14:00			27 Apr 2022 15:16	20
<b>Batch ID:</b> R407578 ( 0 )		<b>Test Name :</b> TOTAL ORGANIC CARBON BY E415.1			<b>Matrix:</b> Water	
HS22041334-01	LH18/24-SP650_042622	26 Apr 2022 14:00			28 Apr 2022 07:16	1
<b>Batch ID:</b> R407589 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			<b>Matrix:</b> Water	
HS22041334-02	LH18/24-SP650_042622_AIX	26 Apr 2022 14:00			28 Apr 2022 17:14	1
HS22041334-03	LH18/24-SP650_042622_BIX	26 Apr 2022 14:00			28 Apr 2022 17:14	1
<b>Batch ID:</b> R407739 ( 0 )		<b>Test Name :</b> AMMONIA AS N BY E350.3(ISE)			<b>Matrix:</b> Water	
HS22041334-01	LH18/24-SP650_042622	26 Apr 2022 14:00			02 May 2022 12:07	1





## QC BATCH REPORT

Batch ID: R407578 ( 0 )		Instrument: TOC_04		Method: TOTAL ORGANIC CARBON BY E415.1						
MBLK	Sample ID: MBLK-04272022	Units: mg/L			Analysis Date: 28-Apr-2022 06:31					
Client ID:		Run ID: TOC_04_407578	SeqNo: 6623352		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total 1.00 1.00										
LCS	Sample ID: LCS-04272022	Units: mg/L			Analysis Date: 28-Apr-2022 06:46					
Client ID:		Run ID: TOC_04_407578	SeqNo: 6623353		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total 10.19 1.00 10 0 102 85 - 115										
LCSD	Sample ID: LCSD-04272022	Units: mg/L			Analysis Date: 28-Apr-2022 07:01					
Client ID:		Run ID: TOC_04_407578	SeqNo: 6623354		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total 10.41 1.00 10 0 104 85 - 115 10.19 2.14 20										
MS	Sample ID: HS22041334-01MS	Units: mg/L			Analysis Date: 28-Apr-2022 07:30					
Client ID: LH18/24-SP650_042622		Run ID: TOC_04_407578	SeqNo: 6623356		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total 15.43 1.00 10 4.932 105 80 - 120										
The following samples were analyzed in this batch: HS22041334-01										



**ALS Houston, US**

Date: 02-May-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22041334

**QUALIFIERS,  
ACRONYMS, UNITS**

<b>Qualifier</b>	<b>Description</b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

<b>Acronym</b>	<b>Description</b>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

ALS Houston, US

Date: 02-May-22

---

**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

---

Agency	Number	Expire Date
Florida	E87611-34	30-Jun-2022
Illinois	2000322021-7	09-May-2022
Kansas	E-10352 2021-2022	31-Jul-2022
Louisiana	03087, 2021-2022	30-Jun-2022

---

ALS Houston, US

Date: 02-May-22

## Sample Receipt Checklist

Work Order ID: HS22041334

Date/Time Received: 27-Apr-2022 09:40

Client Name: Bhate Environmental

Received by: Niles D. Ranchod

Completed By: /S/ Pablo Martinez

27-Apr-2022 11:29

Reviewed by: /S/ Ragen Giga

27-Apr-2022 20:29

eSignature

Date/Time

eSignature

Date/Time

Matrices: **WATER**Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?

Yes ☒No ☐Not Present ☐

Custody seals intact on shipping container/cooler?

Yes ☒No ☐Not Present ☐

Custody seals intact on sample bottles?

Yes ☐No ☐Not Present ☒

VOA/TX1005/TX1006 Solids in hermetically sealed vials?

Yes ☐No ☐Not Present ☒

Chain of custody present?

Yes ☒No ☐

1 Page(s)

Chain of custody signed when relinquished and received?

Yes ☒No ☐

COC IDs: CLIENT

Samplers name present on COC?

Yes ☒No ☐

Chain of custody agrees with sample labels?

Yes ☒No ☐

Samples in proper container/bottle?

Yes ☒No ☐

Sample containers intact?

Yes ☒No ☐

Sufficient sample volume for indicated test?

Yes ☒No ☐

All samples received within holding time?

Yes ☒No ☐

Container/Temp Blank temperature in compliance?

Yes ☒No ☐

Temperature(s)/Thermometer(s):

4.0°C/4.5°C UC/C

IR 31

Cooler(s)/Kit(s):

47673

Date/Time sample(s) sent to storage:

4/27/22 11:35

Water - VOA vials have zero headspace?

Yes ☒No ☐No VOA vials submitted ☐

Water - pH acceptable upon receipt?

Yes ☒No ☐N/A ☐

pH adjusted?

Yes ☐No ☒N/A ☐

pH adjusted by:

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:


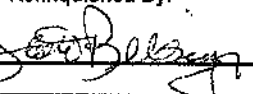
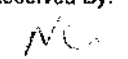

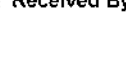
Comments:


Corrective Action:

## CHAIN OF CUSTODY

Name Of Lab Shipping To: ALS 10450 Stancliff Rd. Suite 210 Houston, TX. 77099 (281) 530-5656 ATTN: Ragen Gigi

Page 1 of 1

Project: BHATE LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS						Project No.  NWO1312.0150.0 16.0001																																	
Job: <b>GROUNDWATER TREATMENT PLANT WEEKLY SAMPLES</b>												Analyses																											
Prepared By:						P.O. Number						<b>HS22041334</b> Bhate Environmental Associates, Inc. Longhorn GW Treatment Plant Weekly Samples 																											
Scott Beesinger																																							
Field Sample I.D.						Sample Matrix						Date / Time						MS / MSD		No. OF CONTAINERS		AMMONIA-N		TOTAL ORGANIC CARBON		ORTHO-PHOSPHATE		PERCHLORATE		Remarks (Preservatives, etc.)						Lab I.D.#			
LH18/24-SP650_042622						Water						04/26/22 / 14:00						3		X		X								H2SO4									
LH18/24-SP650_042622						Water						04/26/22 / 14:00						1						X						NONE									
LH18/24-SP650_042622_AIX						Water						04/26/22 / 14:00						1								X				NONE									
LH18/24-SP650_042622_BIX						Water						04/26/22 / 14:00						1								X				NONE									
Additional Remarks: <b>24 HOUR TAT on PERCHLORATE. Standard TAT on all other parameters</b>																																							
Relinquished By:						Date		Time		Received By:						Date		Time		Relinquished By:						Date		Time		Received By:						Date		Time	
						04/26/22		14:30								04/26/22		14:00																					
For Lab Use Only																																							
Received At Lab By:						Date		Time		Airbill No.						Opened By:						Date		Time		Temp of Container						Seal No.		Condition					
Remarks:																																							

	<b>ALS</b>	Date: _____ No: _____ Co: _____
	10450 Stancliff Rd., Suite 210	
	Houston, Texas 77099	
	Tel. +1 281 530 5656 Fax. +1 281 530 5887	

**CUSTODY SEAL**

24/27 TIME 1730

CHICAGO

**FedEx**

TRK# 5300 5230 2689

0221

**AB SGRA**


**WED - 27 APR 10:30A**

**PRIORITY OVERNIGHT**

77099

TX-US IAH

Exp 02/23



\*475872 04/26 577J2/2079/PC42



April 28, 2022

Service Request No:E2200374

Ragen Giga  
ALS Environmental - US  
10450 Stancliff Rd Suite 210  
Houston, TX 77099

**Laboratory Results for: HS22041334**

Dear Ragen,

Enclosed are the results of the sample(s) submitted to our laboratory April 27, 2022  
For your reference, these analyses have been assigned our service request number **E2200374**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current TNI standards, where applicable, and except as noted in the laboratory case narrative provided. All results are intended to be considered in their entirety and ALS Environmental is not responsible for use of less than the complete final report. Results apply only to the items submitted to the laboratory, as received for analysis. In accordance with the current TNI Standard, a statement on the estimated uncertainty of measurement of any quantitative analysis will be supplied upon request.

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Corey Grandits  
Project Manager

ADDRESS 10450 Stancliff Rd., Suite 210, Houston, TX 77099  
PHONE +1 281 530 5656 | FAX +1 281 530 5887  
ALS Group USA, Corp.  
dba ALS Environmental





# Certificate of Analysis

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

**ALS Environmental**

**Client:** ALS-Houston  
**Project:** HS22041334  
**Sample Matrix:** W

**Service Request No.:** E2200374  
**Date Received:** 04/27/22

**CASE NARRATIVE**

All analyses were performed in adherence to the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II. When appropriate to the method, method blank results have been reported with each analytical test.

**Sample Receipt**

Two samples were received for analysis at ALS Environmental in Houston on 04/27/22.

The samples were received in good condition and are consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

**Data Validation Notes and Discussion****Precision and Accuracy:**

EQ2200170: Laboratory Control Spike/Duplicate Laboratory Control Spike (LCS/DLCS) samples were analyzed and reported in addition to a MS/MSD for this extraction batch. The LCS-DLCS recoveries met acceptance criteria; MS/MSD was performed on an unrelated sample.

DoD Certification is held for the method/matrix/analytes provided in this report.

*The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.*

*Use of ALS group USA Corp dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.*

**Client:** ALS Environmental - US  
**Project:** HS22041334

**Service Request:**E2200374

**SAMPLE CROSS-REFERENCE**

<u>SAMPLE #</u>	<u>CLIENT SAMPLE ID</u>	<u>DATE</u>	<u>TIME</u>
E2200374-001	LH18/24-SP650_042622_AIX	4/26/2022	1400
E2200374-002	LH18/24-SP650_042622_BIX	4/26/2022	1400

**Service Request Summary**

**Folder #:** E2200374  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22041334  
**Project Number:**  
  
**Report To:** Ragen Giga  
 ALS Environmental - US  
 10450 Standliff Rd Suite 210  
 Houston, TX 77099  
 USA  
  
**Phone Number:**  
**Cell Number:**  
**Fax Number:**  
**E-mail:** ragenp.giga@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 04/27/22  
**Internal Due Date:** 4/28/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22041334  
**EDD:** No EDD Specified

2 120 mL-Plastic Bottle Natural WM Unpreserved  
**Location:** EHRMS-AirArch 1  
**Pressure Gas:**  
**Rush**

				HOUSTON
Lab Samp No.	Client Samp No	Matrix	Collected	CIO4 DOD/6850
E2200374-001	LH18/24-SP650_042622_AIX	Water	04/26/22 1400	IV
E2200374-002	LH18/24-SP650_042622_BIX	Water	04/26/22 1400	IV

**Service Request Summary**

**Folder #:** E2200374  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22041334  
**Project Number:**  
  
**Report To:** Ragen Giga  
 ALS Environmental - US  
 10450 Standliff Rd Suite 210  
 Houston, TX 77099  
 USA  
  
**Phone Number:**  
**Cell Number:**  
**Fax Number:**  
**E-mail:** ragenp.giga@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 04/27/22  
**Internal Due Date:** 4/28/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22041334  
**EDD:** No EDD Specified

2 120 mL-Plastic Bottle Natural WM Unpreserved  
**Location:** EHRMS-AirArch 1  
**Pressure Gas:**  
**Rush**

**Test Comments:**

Group	Test/Method	Samples	Comments
Semivola GCMS	CIO4 DOD/6850	2	IV DUE 5/18

## Data Qualifiers

### Lab Standard

- + Possible Tedlar bag artifact.
- A TIC is a suspected aldol-condensation product
- B Analyte found in the associated method blank as well as in the sample.
- BC Reported results are not blank corrected.
- BH The back section of the tube yielded higher results than the front.
- BT Results indicated possible breakthrough; back section  $\geq 10\%$  front section.
- C Result identification confirmed.
- D Compound identified in an analysis at a secondary dilution factor
- D Spike was diluted out
- DE Reported results are corrected for desorption efficiency.
- E Estimated value. Concentration above calibration range
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- H1 Sample analysis performed past holding time. See case narrative.
- H2 Initial analysis within holding time. Reanalysis for the required dilution was past holding time.
- H3 Sample was received and analyzed past holding time.
- H4 Sample was extracted past required extraction holding time, but analyzed within analysis holding time. See case narrative.
- I Internal standard not within the specified limits. See case narrative.
- J Estimated Value. Concentration found below MRL.
- K (Auto) The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- K A deflection in the QC ion may indicate interference with the quantitation of this ion. The concentration of this analyte should be considered as an estimate.
- K Analyte was detected above the method reporting limit prior to normalization.
- K The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- L1 Laboratory control sample recovery outside the specified limits; results may be biased high.
- L2 Laboratory control sample recovery outside the specified limits; results may be biased low.
- L3 Laboratory control sample recovery outside the specified limits.
- M Matrix interference; results may be biased high.
- M The duplicate injection precision not met.
- M1 Matrix interference due to coelution with a non-target compound; results may be biased high.

## Data Qualifiers

### Lab Standard

- N Presumptive evidence of a compound for TICs that have been identified based on a mass spectral library search.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- P Indicates chlorodiphenyl ether interference present at the retention time of the target compound.
- P Pesticide/Aroclor target analyte > 40% difference for detected concentrations between GC columns
- Q Indicates as estimated value because the P and P + 2 theoretical abundance ratio does not meet method criteria.
- R Duplicate Precision not met.
- R1 Duplicate precision not within the specified limits; however, the results are below the MRL and considered estimated.
- S Surrogate recovery not within specified limits.
- S The reported value was determined by the Method of Standard Additions (MSA).
- T Analyte is a tentatively identified compound, result is estimated.
- U Compound was analyzed for, but was not detected (ND).
- V1 The continuing calibration verification standard was outside (biased high) the specified limits for this compound.
- V2 The continuing calibration verification standard was outside (biased low) the specified limits for this compound.
- W Result quantified, but the corresponding peak was detected outside the generated retention time window.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- X See case narrative.
- Y Recovery outside limits
- Y The chromatogram resembles a petroleum product but does not match the calibration standard.
- Z The chromatogram does not resemble a petroleum product.
- i The MRL/MDL has been elevated due to a matrix interference.

## ALS Laboratory Group

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### Acronyms

Cal	Calibration
Conc	CONCetration
Dioxin(s)	Polychlorinated dibenzo-p-dioxin(s)
EDL	Estimated Detection Limit
EMPC	Estimated Maximum Possible Concentration
Flags	Data qualifiers
Furan(s)	Polychlorinated dibenzofuran(s)
g	Grams
ICAL	Initial CALibration
ID	IDentifier
Ions	Masses monitored for the analyte during data acquisition
L	Liter (s)
LCS	Laboratory Control Sample
DLCS	Duplicate Laboratory Control Sample
MB	Method Blank
MCL	Method Calibration Limit
MDL	Method Detection Limit
mL	Milliliters
MS	Matrix Spiked sample
DMS	Duplicate Matrix Spiked sample
NO	Number of peaks meeting all identification criteria
PCDD(s)	Polychlorinated dibenzo-p-dioxin(s)
PCDF(s)	Polychlorinated dibenzofuran(s)
ppb	Parts per billion
ppm	Parts per million
ppq	Parts per quadrillion
ppt	Parts per trillion
QA	Quality Assurance
QC	Quality Control
Ratio	Ratio of areas from monitored ions for an analyte
% Rec.	Percent recovery
RPD	Relative Percent Difference
RRF	Relative Response Factor
RT	Retention Time
SDG	Sample Delivery Group
S/N	Signal-to-noise ratio
TEF	Toxicity Equivalence Factor
TEQ	Toxicity Equivalence Quotient





### State Certifications, Accreditations, and Licenses

Agency	Number	Expire Date
Arizona Department of Health Services	AZ0793-2022	5/27/2022
California Department of Health Services	2919	4/30/2022
California Department of Health Services	2919-2022	4/30/2022
Florida Department of Health	E87611-34	6/30/2022
Hawaii Department of Health	2021-2022	4/30/2022
Illinois Environmental Protection Agency	2000322021-7	5/9/2022
Kansas Department of Health and Environment	E-10352 2022	7/31/2022
Louisiana Department of Environmental Quality	03087-2021	6/30/2022
Louisiana Department of Environmental Quality	03087-2020	6/30/2022
Louisiana Department of Health and Hospitals	LA028	12/31/2022
Maine Department of Health and Human Services	2020016	6/5/2022
Maryland Department of the Environment	343	6/30/2022
Michigan Department of Environmental Quality	9971	4/30/2022
Minnesota Department of Health	2228443	12/31/2022
Nebraska Department of Health and Human Services	NE-OS-25-13	4/30/2022
Nevada Department of Conservation and Natural Resources	TX026932022-1	7/31/2022
New Jersey Department of Environmental Protection	TX008	6/30/2022
New York Department of Health	11707	3/31/2023
Oklahoma Department of Environmental Quality	2021-080	8/31/2022
Pennsylvania Department of Environmental Protection	68-03441-015	6/30/2022
Tennessee Department of Environment and Conservation	04016-2021	4/30/2022
Tennessee Department of Environment and Conservation	04016	4/30/2022
Texas Commission on Environmental Quality	T104704231-21-27	4/30/2022
Texas Commission on Environmental Quality	T104704231-21-28	4/30/2022
United States Department of Agriculture	P330-19-00299	10/10/2022
Utah Department of Health Environmental Laboratory Certification	TX026932021-12	7/31/2022
Washington Department of Health	C819-2022	11/14/2022



## Chain of Custody

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)



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Houston, TX 77099  
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F: +1 281 530 5887  
[www.alsglobal.com](http://www.alsglobal.com)

## Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 18642

**SUBCONTRACT TO:**

ALS Environmental  
10450 Stancliff Road Suite 210  
Houston, TX 77084

**Phone:** +1 281 530 5656

**CUSTOMER  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Ragen Giga  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Email:** RagenP.Giga@ALSGlobal.com  
**Alternate  
Contact:**  
**Email:**

**INVOICE  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Accounts Payable  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Reference:** HS22041334  
**TSR:** Houston House Acct

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS22041334-02	LH18/24-SP650_042622_AIX	Water	26 Apr 2022 14:00
	6850-Perch. DOD Level II & Level IV	in separate pdf	28 Apr 2022
2. HS22041334-03	LH18/24-SP650_042622_BIX	Water	26 Apr 2022 14:00
	6850-Perch. DOD Level II & Level IV	in separate pdf	28 Apr 2022

**Comments:** Please analyze for the analysis listed above.  
Send report to the emails shown above.

**QC Level:** DOD IV (DoD Data Package)

Relinquished By:

*Paul M*

Date/Time:

*4/27/22 11:40*

Received By:

*[Signature]* CORETA

Date/Time:

*4/27/22 11:40*

Cooler ID(s):

*[Signature]*

Temperature(s):

RIGHT SOLUTIONS | RIGHT PARTNER



## Cooler Receipt Form

Project Chemist 14Client/Project AL4-4 Thermometer ID 1231Date/Time Received: 4-27-22 Initials: 14 Date/Time Logged in: 4-27-22 Initials 141. Method of delivery: ☐ US Mail ☐ Fed Ex ☐ UPS ☐ DHL ☒ <sup>AL4</sup> Courier ☐ Client2. Samples received in: ☒ Cooler ☐ Box ☐ Envelope ☐ Other

3. Were custody seals on coolers? ☐ Yes ☒ No If yes, how many and where?

Were they intact? ☐ Yes ☐ No ☒ N/A

Were they signed and dated? ☐ Yes ☐ No ☒ N/A

4. Packing Material: ☐ Inserts ☒ Baggies ☐ Bubble Wrap ☐ Gel Packs ☒ Wet Ice ☐ Sleeves ☐ Other5. Foreign or Regulated Soil? ☐ Yes ☐ No Location of Sampling:

Cooler Tracking Number	COC ID	Date Opened	Time Opened	Opened By	Temp. °C	Temp Blank?
NA		4-27-22	1140	14	50	<input checked="" type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>

6. Were custody papers properly filled out (ink, signed, dated, etc)? ☒ Yes ☐ No7. Did all bottles arrive in good condition (not broken, no signs of leakage)? ☒ Yes ☐ No8. Were all sample labels complete (i.e., sample ID, analysis, preservation, etc)? ☒ Yes ☐ No9. Were appropriate bottles/containers and volumes received for the requested tests? ☒ Yes ☐ No10. Did sample labels and tags agree with custody documents? ☒ Yes ☐ No

Notes, Discrepancies, &amp; Resolutions:

Service request Label:

HS-HRMSCoolerReceipt R1.0

ALS Environmental - Houston HRMS



10450 Stancliff Rd., Suite 210  
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[www.alsglobal.com](http://www.alsglobal.com)

## SAMPLE ACCEPTANCE POLICY

This policy outlines the criteria samples must meet to be accepted by ALS Environmental – Houston HRMS.

### **Cooler Custody Seals (desirable, mandatory if specified in SAP):**

- ✓ Intact on outside of cooler, signed and dated

### **Chain-of-Custody (COC) documentation (mandatory):**

The following is required on each COC:

- ✓ Sample ID, the location, date and time of collection, collector's name, preservation type, sample type, and any other special remarks concerning the sample. The COC must be completed in ink.
- ✓ Signature and date of relinquishing party.

In the absence of a COC at sample receipt, the COC will be requested from the client.

### **Sample Integrity (mandatory):**

Samples are inspected upon arrival to ensure that sample integrity was not compromised during transfer to the laboratory.

- ✓ Sample containers must arrive in good condition (not broken or leaking).
- ✓ Samples must be labeled appropriately, including Sample IDs, and requested test using durable labels and indelible ink.
- ✓ The correct type of sample bottle must be used for the method requested.
- ✓ An appropriate sample volume, or weight, must be received.
- ✓ Sample IDs and number of containers must reconcile with the COC.
- ✓ Samples must be received within the method defined holding time.

### **Temperature Requirement (varies by sample matrix):**

- ✓ Aqueous and Non-aqueous samples must be shipped and stored cold, at 0 to 6°C.
- ✓ Tissue samples must be shipped and stored frozen, at -20 to -10°C.
- ✓ Air samples are shipped and stored cold, at 0 to 6°C
- ✓ The sample temperature must be recorded on the COC

All cooler inspections are documented on the Cooler Receipt Form (CRF). A separate CRF is completed for each service request. Any samples not meeting the above criteria are noted on the CRF and the Project Manager notified. The Project Manager must resolve any sample integrity issues with the client prior to proceeding with the analysis. Such resolutions are documented in writing and filed with the project folder. Data associated with samples received outside of this acceptance policy will be qualified on the case narrative of the final report



# Preparation Information Benchsheets

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

**Preparation Information Benchsheet**

**Prep Run#:** 398806  
**Team:** Semivoa GCMS/GRIVERA

**Prep WorkFlow:** GenExt28Day  
**Prep Method:** Method

**Status:** Prepped  
**Prep Date/Time:** 4/28/22 09:30

#	Lab Code	Client ID	B#	Method /Test	pH	Cl	Matrix	Amt. Ext.	Sample Description
1	E2200370-001	095-RS2827-250422	.01	6850/CIO4 DOD			Water	10mL	
2	E2200370-002	095-RS2828-250422	.01	6850/CIO4 DOD			Water	10mL	
3	E2200370-003	146-RS1732-250422	.01	6850/CIO4 DOD			Water	10mL	
4	E2200370-004	K95-RS693-250422	.01	6850/CIO4 DOD			Water	10mL	
5	E2200370-005	K95-RS711-250422	.01	6850/CIO4 DOD			Water	10mL	
6	E2200370-006	K95-RS793-250422	.01	6850/CIO4 DOD			Water	10mL	
7	E2200374-001	LH18/24-SP650_042622_AIX	.01	6850/CIO4 DOD			Water	10mL	
8	E2200374-002	LH18/24-SP650_042622_BIX	.01	6850/CIO4 DOD			Water	10mL	
9	EQ2200170-01	MB		6850/CIO4 DOD			Liquid	10mL	
10	EQ2200170-02	LCS		6850/CIO4 DOD			Liquid	10mL	
11	EQ2200170-03	DLCS		6850/CIO4 DOD			Liquid	10mL	
12	EQ2200170-04	K95-RS793-250422 MS	.02	6850/CIO4 DOD			Liquid	10mL	
13	EQ2200170-05	K95-RS793-250422 DMS	.03	6850/CIO4 DOD			Liquid	10mL	
14	R2203457-004	2204141408Y PL-6-545	.01	6850/CIO4			Water	10mL	
15	R2203564-005	2204181352A BLM-14-327	.01	6850/CIO4			Water	10mL	
16	R2203564-010	2204191020A 200-B-240	.01	6850/CIO4			Water	10mL	

**Spiking Solutions**

Name: Perchlorate Internal Standard 1ug/mL				Inventory ID 221408		Logbook Ref: Perchlorate Internal Standard				Expires On: 04/30/2022	
E2200370-001	100.00µL	E2200370-002	100.00µL	E2200370-003	100.00µL	E2200370-004	100.00µL	E2200370-005	100.00µL	E2200370-006	100.00µL
E2200374-001	100.00µL	E2200374-002	100.00µL	EQ2200170-01	100.00µL	EQ2200170-01	100.00µL	EQ2200170-02	100.00µL	EQ2200170-02	100.00µL
EQ2200170-03	100.00µL	EQ2200170-03	100.00µL	EQ2200170-04	100.00µL	EQ2200170-05	100.00µL	R2203457-004	100.00µL	R2203564-005	100.00µL
R2203564-010	100.00µL										
Name: Perchlorate Intermediate Stock1				Inventory ID 221456		Logbook Ref: Perchlorate				Expires On: 04/30/2022	
EQ2200170-02	1.00µL	EQ2200170-02	1.00µL	EQ2200170-03	1.00µL	EQ2200170-03	1.00µL	EQ2200170-04	1.00µL	EQ2200170-05	1.00µL

**Preparation Materials**

Water HPLC Grade	08/03/2021 Water (218532)	6850 Amber Glass screw vial	2mL Screw Top Vial (221894)	537M Glass Culture Tubes	537M Glass Tubes (218064)
6850 0.45um syringe filters	6850 Syringe Filters (222410)	6850 Luer-Lok Syringes	Luer-Lok Syringes (221305)	6850 Pipette Tips 50-1000 uL	6850 Pipette Tips (221929)

*Preparation Information Benchsheet*

**Prep Run#:** 398806  
**Team:** Semivoa GCMS/GRIVERA

**Prep WorkFlow:** GenExt28Day  
**Prep Method:** Method

**Status:** Prepped  
**Prep Date/Time:** 4/28/22 09:30

**Preparation Steps**

Step: Preparation  
Started: 4/28/22 09:30  
Finished: 4/28/22 10:15  
By: GRIVERA  
Comments

Comments: \_\_\_\_\_  
\_\_\_\_\_

Reviewed By: GR Date: 4/28/22

## Chain of Custody

Relinquished By: _____	Date: _____	<u>Extracts Examined</u> Yes No
Received By: _____	Date: _____	





## Analytical Results

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22041334  
**Sample Matrix:** Water  
**Sample Name:** LH18/24-SP650\_042622\_AIX  
**Lab Code:** E2200374-001

**Service Request:** E2200374  
**Date Collected:** 4/26/22 1400  
**Date Received:** 4/27/22  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	1.31		0.500	0.250	0.125	5	4/28/22	4/28/22 14:58	398806	762278	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22041334  
**Sample Matrix:** Water  
**Sample Name:** LH18/24-SP650\_042622\_BIX  
**Lab Code:** E2200374-002

**Service Request:** E2200374  
**Date Collected:** 4/26/22 1400  
**Date Received:** 4/27/22  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	37.5		0.500	0.250	0.125	5	4/28/22	4/28/22 15:06	398806	762278	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22041334  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** EQ2200170-01

**Service Request:** E2200374  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	0.100	0.0500	0.0250	1	4/28/22	4/28/22 13:57	398806	762278	



## Accuracy & Precision

**ALS Environmental - Houston HRMS**  
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Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS22041334  
**Sample Matrix:** Water

**Service Request:** E2200374  
**Date Analyzed:** 4/28/22

**Lab Control Sample Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**Analytical Method:** 6850  
**Prep Method:** Method

**Units:** µg/L  
**Basis:** NA

**Extraction Lot:** 398806

Analyte Name	Lab Control Sample EQ2200170-02			Duplicate Lab Control Sample EQ2200170-03			% Rec Limits	RPD	RPD Limit
	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Perchlorate	0.115	0.100	115	0.119	0.100	119	84 - 119	3	15

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22041334  
**Sample Matrix:** Water  
**Sample Name:** Lab Control Sample  
**Lab Code:** EQ2200170-02

**Service Request:** E2200374  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.115		0.100	0.0500	0.0250	1	4/28/22	4/28/22 14:21	398806	762278	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22041334  
**Sample Matrix:** Water  
**Sample Name:** Duplicate Lab Control Sample  
**Lab Code:** EQ2200170-03

**Service Request:** E2200374  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.119		0.100	0.0500	0.0250	1	4/28/22	4/28/22 14:28	398806	762278	





May 19, 2022

Service Request No:E2200449

Dane Wacasey  
ALS Environmental - US  
10450 Stancliff Rd Suite 210  
Houston, TX 77099

**Laboratory Results for: HS22050786**

Enclosed are the results of the sample(s) submitted to our laboratory May 18, 2022  
For your reference, these analyses have been assigned our service request number **E2200449**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current TNI standards, where applicable, and except as noted in the laboratory case narrative provided. All results are intended to be considered in their entirety and ALS Environmental is not responsible for use of less than the complete final report. Results apply only to the items submitted to the laboratory, as received for analysis. In accordance with the current TNI Standard, a statement on the estimated uncertainty of measurement of any quantitative analysis will be supplied upon request.

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Corey Grandits  
Project Manager

ADDRESS 10450 Stancliff Rd., Suite 210, Houston, TX 77099  
PHONE +1 281 530 5656 | FAX +1 281 530 5887  
ALS Group USA, Corp.  
dba ALS Environmental



# Certificate of Analysis

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

**ALS Environmental**

**Client:** ALS-Houston  
**Project:** HS22050786  
**Sample Matrix:** W

**Service Request No.:** E2200449  
**Date Received:** 05/18/22

**CASE NARRATIVE**

All analyses were performed in adherence to the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II. When appropriate to the method, method blank results have been reported with each analytical test.

**Sample Receipt**

Two samples were received for analysis at ALS Environmental in Houston on 05/18/22.

The samples were received in good condition and are consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

**Data Validation Notes and Discussion****Precision and Accuracy:**

EQ2200206: Laboratory Control Spike/Duplicate Laboratory Control Spike (LCS/DLCS) samples were analyzed and reported in addition to a MS/MSD for this extraction batch. The LCS-DLCS RPD recoveries met acceptance criteria; MS/MSD was performed on an unrelated sample.

DoD Certification is held for the method/matrix/analytes provided in this report.

*The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.*

*Use of ALS group USA Corp dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.*

**Client:** ALS Environmental - US  
**Project:** HS22050786

**Service Request:**E2200449

**SAMPLE CROSS-REFERENCE**

<u>SAMPLE #</u>	<u>CLIENT SAMPLE ID</u>	<u>DATE</u>	<u>TIME</u>
E2200449-001	LH18/24-SP650_051722_AIX	5/17/2022	1400
E2200449-002	LH18/24-SP650_051722_BIX	5/17/2022	1400

**Service Request Summary**

**Folder #:** E2200449  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22050786  
**Project Number:**

**Report To:**  
 ALS Environmental - US  
 10450 Stancliff Rd Suite 210  
 Houston, TX 77099  
 USA

**Phone Number:**  
**Cell Number:**  
**Fax Number:**  
**E-mail:**

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 05/18/22  
**Internal Due Date:** 5/19/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22050786  
**EDD:** No EDD Specified

2 120 mL-Plastic Bottle Natural WM Unpreserved  
**Location:** EHRMS-AirArch 1  
**Pressure Gas:**  
**Rush**

				HOUSTON
Lab Samp No.	Client Samp No	Matrix	Collected	CIO4 DOD/6850
E2200449-001	LH18/24-SP650_051722_AIX	Water	05/17/22 1400	IV
E2200449-002	LH18/24-SP650_051722_BIX	Water	05/17/22 1400	IV

**Service Request Summary**

**Folder #:** E2200449  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22050786  
**Project Number:**

**Report To:**  
 ALS Environmental - US  
 10450 Stancliff Rd Suite 210  
 Houston, TX 77099  
 USA

**Phone Number:**  
**Cell Number:**  
**Fax Number:**  
**E-mail:**

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 05/18/22  
**Internal Due Date:** 5/19/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22050786  
**EDD:** No EDD Specified

2 120 mL-Plastic Bottle Natural WM Unpreserved

**Location:** EHRMS-AirArch 1

**Pressure Gas:**

**Rush**

**Test Comments:**

Group	Test/Method	Samples	Comments
Semivoa GCMS	CIO4 DOD/6850	2	IV DUE 6/9

## Data Qualifiers

### Lab Standard

- + Possible Tedlar bag artifact.
- A TIC is a suspected aldol-condensation product
- B Analyte found in the associated method blank as well as in the sample.
- BC Reported results are not blank corrected.
- BH The back section of the tube yielded higher results than the front.
- BT Results indicated possible breakthrough; back section  $\geq 10\%$  front section.
- C Result identification confirmed.
- D Compound identified in an analysis at a secondary dilution factor
- D Spike was diluted out
- DE Reported results are corrected for desorption efficiency.
- E Estimated value. Concentration above calibration range
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- H1 Sample analysis performed past holding time. See case narrative.
- H2 Initial analysis within holding time. Reanalysis for the required dilution was past holding time.
- H3 Sample was received and analyzed past holding time.
- H4 Sample was extracted past required extraction holding time, but analyzed within analysis holding time. See case narrative.
- I Internal standard not within the specified limits. See case narrative.
- J Estimated Value. Concentration found below MRL.
- K (Auto) The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- K A deflection in the QC ion may indicate interference with the quantitation of this ion. The concentration of this analyte should be considered as an estimate.
- K Analyte was detected above the method reporting limit prior to normalization.
- K The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- L1 Laboratory control sample recovery outside the specified limits; results may be biased high.
- L2 Laboratory control sample recovery outside the specified limits; results may be biased low.
- L3 Laboratory control sample recovery outside the specified limits.
- M Matrix interference; results may be biased high.
- M The duplicate injection precision not met.
- M1 Matrix interference due to coelution with a non-target compound; results may be biased high.

## Data Qualifiers

### Lab Standard

- N Presumptive evidence of a compound for TICs that have been identified based on a mass spectral library search.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- P Indicates chlorodiphenyl ether interference present at the retention time of the target compound.
- P Pesticide/Aroclor target analyte > 40% difference for detected concentrations between GC columns
- Q Indicates as estimated value because the P and P + 2 theoretical abundance ratio does not meet method criteria.
- R Duplicate Precision not met.
- R1 Duplicate precision not within the specified limits; however, the results are below the MRL and considered estimated.
- S Surrogate recovery not within specified limits.
- S The reported value was determined by the Method of Standard Additions (MSA).
- T Analyte is a tentatively identified compound, result is estimated.
- U Compound was analyzed for, but was not detected (ND).
- V1 The continuing calibration verification standard was outside (biased high) the specified limits for this compound.
- V2 The continuing calibration verification standard was outside (biased low) the specified limits for this compound.
- W Result quantified, but the corresponding peak was detected outside the generated retention time window.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- X See case narrative.
- Y Recovery outside limits
- Y The chromatogram resembles a petroleum product but does not match the calibration standard.
- Z The chromatogram does not resemble a petroleum product.
- i The MRL/MDL has been elevated due to a matrix interference.



## ALS Laboratory Group

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### Acronyms

Cal	Calibration
Conc	CONCEntration
Dioxin(s)	Polychlorinated dibenzo-p-dioxin(s)
EDL	Estimated Detection Limit
EMPC	Estimated Maximum Possible Concentration
Flags	Data qualifiers
Furan(s)	Polychlorinated dibenzofuran(s)
g	Grams
ICAL	Initial CALibration
ID	IDentifier
Ions	Masses monitored for the analyte during data acquisition
L	Liter (s)
LCS	Laboratory Control Sample
DLCS	Duplicate Laboratory Control Sample
MB	Method Blank
MCL	Method Calibration Limit
MDL	Method Detection Limit
mL	Milliliters
MS	Matrix Spiked sample
DMS	Duplicate Matrix Spiked sample
NO	Number of peaks meeting all identification criteria
PCDD(s)	Polychlorinated dibenzo-p-dioxin(s)
PCDF(s)	Polychlorinated dibenzofuran(s)
ppb	Parts per billion
ppm	Parts per million
ppq	Parts per quadrillion
ppt	Parts per trillion
QA	Quality Assurance
QC	Quality Control
Ratio	Ratio of areas from monitored ions for an analyte
% Rec.	Percent recovery
RPD	Relative Percent Difference
RRF	Relative Response Factor
RT	Retention Time
SDG	Sample Delivery Group
S/N	Signal-to-noise ratio
TEF	Toxicity Equivalence Factor
TEQ	Toxicity Equivalence Quotient



## State Certifications, Accreditations, and Licenses

Agency	Number	Expire Date
Arizona Department of Health Services	AZ0793-2022	5/27/2022
Department of Defense	L22-90	3/31/2024
Florida Department of Health	E87611-34	6/30/2022
Hawaii Department of Health	2022	4/30/2023
Illinois Environmental Protection Agency	2000322022-9	5/9/2023
Kansas Department of Health and Environment	E-10352 2022	7/31/2022
Louisiana Department of Environmental Quality	03087-2021	6/30/2022
Louisiana Department of Health and Hospitals	LA028	12/31/2022
Maine Department of Health and Human Services	2020016	6/5/2022
Maryland Department of the Environment	343	6/30/2022
Michigan Department of Environmental Quality	9971-2022	4/30/2023
Minnesota Department of Health	2228443	12/31/2022
Nebraska Department of Health and Human Services	NE-OS-25-13	4/30/2023
Nevada Department of Conservation and Natural Resources	TX026932022-1	7/31/2022
New Hampshire Environmental Laboratory Accreditation Program	209422	4/24/2023
New Jersey Department of Environmental Protection	TX008	6/30/2022
New York Department of Health	11707	3/31/2023
Oklahoma Department of Environmental Quality	2021-080	8/31/2022
Oregon Environmental Laboratory Accreditation Program	TX200002	5/15/2023
Pennsylvania Department of Environmental Protection	68-03441-015	6/30/2022
Perry Johnson Laboratory Accreditation	L22-91	3/31/2024
Tennessee Department of Environment and Conservation	04016-2022	4/30/2023
Texas Commission on Environmental Quality	T104704231-22-29	4/30/2023
United States Department of Agriculture	P330-19-00299	10/10/2022
Utah Department of Health Environmental Laboratory Certification	TX026932021-12	7/31/2022
Washington Department of Health	C819-2022	11/14/2022



## Chain of Custody

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)



10450 Stancliff Rd, Ste 210  
Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887  
www.alsglobal.com

## Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 18786

**SUBCONTRACT TO:**

ALS Environmental  
10450 Stancliff Road Suite 210  
Houston, TX 77084

**Phone:** +1 281 530 5656

**CUSTOMER  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Ragen Giga  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Email:** RagenP.Giga@ALSGlobal.com  
**Alternate  
Contact:**  
**Email:**

**INVOICE  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Accounts Payable  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Reference:** HS22050786  
**TSR:** Houston House Acct

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS22050786-02	LH18/24-SP650_051722_AIX	Water	17 May 2022 14:00
	6850-Perch. DOD Level II & Level IV	in separate pdf	19 May 2022
2. HS22050786-03	LH18/24-SP650_051722_BIX	Water	17 May 2022 14:00
	6850-Perch. DOD Level II & Level IV	in separate pdf	19 May 2022

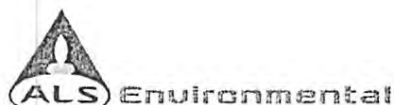
**Comments:** Please analyze for the analysis listed above.  
Send report to the emails shown above.

**QC Level:** DOD IV (DoD Data Package)

Relinquished By: *Patricia Mann*  
Received By: *[Signature]*  
Cooler ID(s): *000514*

Date/Time: *5/18/22 11:00*  
Date/Time: *5/18/22 11:00*  
Temperature(s): \_\_\_\_\_

RIGHT SOLUTIONS | RIGHT PARTNER



## Cooler Receipt Form

Project Chemist ChClient/Project AL7-11 Thermometer ID 1821Date/Time Received: 9-18-22 Initials: Ch Date/Time Logged in: 9-18-22 Initials Ch1. Method of delivery: ☐ US Mail ☐ Fed Ex ☐ UPS ☐ DHL ☒ <sup>ALS</sup> Courier ☐ Client2. Samples received in: ☒ Cooler ☐ Box ☐ Envelope ☐ Other \_\_\_\_\_

3. Were custody seals on coolers? ☐ Yes ☒ No If yes, how many and where?

Were they intact? ☐ Yes ☐ No ☒ N/A

Were they signed and dated? ☐ Yes ☐ No ☒ N/A

--

4. Packing Material: ☐ Inserts ☒ Baggies ☐ Bubble Wrap ☐ Gel Packs ☒ Wet Ice ☐ Sleeves ☐ Other \_\_\_\_\_5. Foreign or Regulated Soil? ☐ Yes ☐ No Location of Sampling: \_\_\_\_\_

Cooler Tracking Number	COC ID	Date Opened	Time Opened	Opened By	Temp. °C	Temp Blank?
<u>NA</u>		<u>9-18-22</u>	<u>1100</u>	<u>Ch</u>	<u>4.6</u>	<input checked="" type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>

6. Were custody papers properly filled out (ink, signed, dated, etc)? ☒ Yes ☐ No7. Did all bottles arrive in good condition (not broken, no signs of leakage)? ☒ Yes ☐ No8. Were all sample labels complete (i.e., sample ID, analysis, preservation, etc)? ☒ Yes ☐ No9. Were appropriate bottles/containers and volumes received for the requested tests? ☒ Yes ☐ No10. Did sample labels and tags agree with custody documents? ☒ Yes ☐ No

Notes, Discrepancies, &amp; Resolutions:

--

Service request Label:

HS-HRMSCoolerReceipt R1.0

ALS Environmental - Houston HRMS



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F: +1 713 266 1599  
[www.alsglobal.com](http://www.alsglobal.com)

## SAMPLE ACCEPTANCE POLICY

This policy outlines the criteria samples must meet to be accepted by ALS Environmental – Houston HRMS.

### **Cooler Custody Seals (desirable, mandatory if specified in SAP):**

- ✓ Intact on outside of cooler, signed and dated

### **Chain-of-Custody (COC) documentation (mandatory):**

The following is required on each COC:

- ✓ Sample ID, the location, date and time of collection, collector's name, preservation type, sample type, and any other special remarks concerning the sample. The COC must be completed in ink.
- ✓ Signature and date of relinquishing party.

In the absence of a COC at sample receipt, the COC will be requested from the client.

### **Sample Integrity (mandatory):**

Samples are inspected upon arrival to ensure that sample integrity was not compromised during transfer to the laboratory.

- ✓ Sample containers must arrive in good condition (not broken or leaking).
- ✓ Samples must be labeled appropriately, including Sample IDs, and requested test using durable labels and indelible ink.
- ✓ The correct type of sample bottle must be used for the method requested.
- ✓ An appropriate sample volume, or weight, must be received.
- ✓ Sample IDs and number of containers must reconcile with the COC.
- ✓ Samples must be received within the method defined holding time.

### **Temperature Requirement (varies by sample matrix):**

- ✓ Aqueous and Non-aqueous samples must be shipped and stored cold, at 0 to 6°C.
- ✓ Tissue samples must be shipped and stored frozen, at -20 to -10°C.
- ✓ Air samples are shipped and stored cold, at 0 to 6°C
- ✓ The sample temperature must be recorded on the COC

All cooler inspections are documented on the Cooler Receipt Form (CRF). A separate CRF is completed for each service request. Any samples not meeting the above criteria are noted on the CRF and the Project Manager notified. The Project Manager must resolve any sample integrity issues with the client prior to proceeding with the analysis. Such resolutions are documented in writing and filed with the project folder. Data associated with samples received outside of this acceptance policy will be qualified on the case narrative of the final report.



# Preparation Information Benchsheets

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

**Preparation Information Benchsheet**

**Prep Run#:** 400057  
**Team:** Semivoa GCMS/GRIVERA

**Prep WorkFlow:** GenExt28Day  
**Prep Method:** Method

**Status:** Prepped  
**Prep Date/Time:** 5/19/22 09:15

#	Lab Code	Client ID	B#	Method /Test	pH	Cl	Matrix	Amt. Ext.	Sample Description
1	E2200449-001	LH18/24-SP650_051722_AIX	.01	6850/CIO4 DOD			Water	10mL	
2	E2200449-002	LH18/24-SP650_051722_BIX	.01	6850/CIO4 DOD			Water	10mL	
3	E2200450-001	L135H-RS1435-150522	.01	6850/CIO4 DOD			Water	10mL	
4	E2200450-002	L135H-RS2080-150522	.01	6850/CIO4 DOD			Water	10mL	
5	E2200450-003	L135H-RS2082-150522	.01	6850/CIO4 DOD			Water	10mL	
6	E2200450-004	L135H-RS1436-150522	.01	6850/CIO4 DOD			Water	10mL	
7	E2200450-005	L135H-RS2081-150522	.01	6850/CIO4 DOD			Water	10mL	
8	E2200450-006	L135H-RS660-150522	.01	6850/CIO4 DOD			Water	10mL	
9	E2200450-007	RSA-EB-13-160522	.01	6850/CIO4 DOD			Water	10mL	
10	E2200450-008	RSA-EB-14-160522	.01	6850/CIO4 DOD			Water	10mL	
11	E2200450-009	RSA-FB-04-170522	.01	6850/CIO4 DOD			Water	10mL	
12	E2200450-010	RSA-EB-15-170522	.01	6850/CIO4 DOD			Water	10mL	
13	EQ2200206-01	MB		6850/CIO4 DOD			Liquid	10mL	
14	EQ2200206-02	LCS		6850/CIO4 DOD			Liquid	10mL	
15	EQ2200206-03	DLCS		6850/CIO4 DOD			Liquid	10mL	
16	EQ2200206-04	L135H-RS1435-150522 MS	.02	6850/CIO4 DOD			Liquid	10mL	
17	EQ2200206-05	L135H-RS1435-150522 DMS	.03	6850/CIO4 DOD			Liquid	10mL	
18	R2204205-006	2205051257B 600A-001-GW-1	.01	6850/CIO4			Water	10mL	
19	R2204328-010	2205101013Y PL-7-560	.01	6850/CIO4			Water	10mL	

**Spiking Solutions**

Name:	Perchlorate Intermediate Stock1	Inventory ID	222798	Logbook Ref:	Perchlorate (1st Source)	Expires On:	10/29/2022
-------	---------------------------------	--------------	--------	--------------	--------------------------	-------------	------------

EQ2200206-02 1.00μL EQ2200206-02 1.00μL EQ2200206-03 1.00μL EQ2200206-03 1.00μL EQ2200206-04 1.00μL EQ2200206-05 1.00μL

Name:	Perchlorate Internal Standard 1ug/mL	Inventory ID	223118	Logbook Ref:	Perchlorate Internal Standard	Expires On:	10/31/2022
-------	--------------------------------------	--------------	--------	--------------	-------------------------------	-------------	------------

E2200449-001 100.00μL E2200449-002 100.00μL E2200450-001 100.00μL E2200450-002 100.00μL E2200450-003 100.00μL E2200450-004 100.00μL  
E2200450-005 100.00μL E2200450-006 100.00μL E2200450-007 100.00μL E2200450-008 100.00μL E2200450-009 100.00μL E2200450-010 100.00μL  
EQ2200206-01 100.00μL EQ2200206-01 100.00μL EQ2200206-02 100.00μL EQ2200206-02 100.00μL EQ2200206-03 100.00μL EQ2200206-03 100.00μL  
EQ2200206-04 100.00μL EQ2200206-05 100.00μL R2204205-006 100.00μL R2204328-010 100.00μL

**Preparation Materials**

Water HPLC Grade 02/16/2022 Water (221769) 6850 Amber Glass screw vial 2mL Screw Top Vial (221894) 537M Glass Culture Tubes 537M Glass Tubes (218064)  
6850 0.45um syringe filters 6850 Syringe Filters (222410) 6850 Luer-Lok Syringes Luer-Lok Syringes (221305) 6850 Pipette Tips 50-1000 uL 6850 Pipette Tips (221929)



Preparation Information Benchsheet

Prep Run#: 400057  
Team: Semivoa GCMS/GRIVERA

Prep WorkFlow: GenExt28Day  
Prep Method: Method

Status: Prepped  
Prep Date/Time: 5/19/22 09:15

Preparation Steps

Step: Preparation  
Started: 5/19/22 09:15  
Finished: 5/19/22 09:57  
By: GRIVERA  
Comments

Comments: \_\_\_\_\_

Reviewed By: GR Date: 5/19/22

Chain of Custody

Relinquished By: _____	Date: _____	<u>Extracts Examined</u> Yes No
Received By: _____	Date: _____	



## Analytical Results

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22050786  
**Sample Matrix:** Water  
**Sample Name:** LH18/24-SP650\_051722\_AIX  
**Lab Code:** E2200449-001

**Service Request:** E2200449  
**Date Collected:** 5/17/22 1400  
**Date Received:** 5/18/22  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.931		0.200	0.100	0.0500	2	5/19/22	5/19/22 15:36	400057	764737	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22050786  
**Sample Matrix:** Water  
**Sample Name:** LH18/24-SP650\_051722\_BIX  
**Lab Code:** E2200449-002

**Service Request:** E2200449  
**Date Collected:** 5/17/22 1400  
**Date Received:** 5/18/22  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	68.1		0.500	0.250	0.125	5	5/19/22	5/19/22 14:30	400057	764737	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22050786  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** EQ2200206-01

**Service Request:** E2200449  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	0.100	0.0500	0.0250	1	5/19/22	5/19/22 13:03	400057	764737	



## Accuracy & Precision

**ALS Environmental - Houston HRMS**  
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Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS22050786  
**Sample Matrix:** Water

**Service Request:** E2200449  
**Date Analyzed:** 5/19/22

**Lab Control Sample Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**Analytical Method:** 6850  
**Prep Method:** Method

**Units:** µg/L  
**Basis:** NA

**Extraction Lot:** 400057

Analyte Name	Lab Control Sample EQ2200206-02			Duplicate Lab Control Sample EQ2200206-03			% Rec Limits	RPD	RPD Limit
	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Perchlorate	0.111	0.100	111	0.101	0.100	101	84 - 119	10	15

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22050786  
**Sample Matrix:** Water  
**Sample Name:** Lab Control Sample  
**Lab Code:** EQ2200206-02

**Service Request:** E2200449  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.111		0.100	0.0500	0.0250	1	5/19/22	5/19/22 13:11	400057	764737	



## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22050786  
**Sample Matrix:** Water  
**Sample Name:** Duplicate Lab Control Sample  
**Lab Code:** EQ2200206-03

**Service Request:** E2200449  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.101		0.100	0.0500	0.0250	1	5/19/22	5/19/22 13:43	400057	764737	



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10450 Stancliff Rd. Suite 210  
Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887

May 25, 2022

Marcia Olive  
Bhate Environmental Associates, Inc.  
445 Union Blvd Ste 129  
Lakewood, CO 80228

Work Order: **HS22050786**

Laboratory Results for: **Longhorn GW Treatment Plant Weekly Samples**

Dear Marcia Olive,

ALS Environmental received 3 sample(s) on May 18, 2022 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: JUMOKE.LAWAL

Dane J. Wacasey

ALS Houston, US

Date: 25-May-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**Work Order:** HS22050786

**SAMPLE SUMMARY**

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS22050786-01	LH18/24-SP650_051722	Water		17-May-2022 14:00	18-May-2022 09:40	<input type="checkbox"/>
HS22050786-02	LH18/24-SP650_051722_AIX	Water		17-May-2022 14:00	18-May-2022 09:40	<input type="checkbox"/>
HS22050786-03	LH18/24-SP650_051722_BIX	Water		17-May-2022 14:00	18-May-2022 09:40	<input type="checkbox"/>

**ALS Houston, US**

Date: 25-May-22

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**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**Work Order:** HS22050786

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**CASE NARRATIVE**

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**Work Order Comments**

- The analysis for Perchlorate was subcontracted to ALS Houston High-Res Lab. Final report attached
- 

**WetChemistry by Method E350.3****Batch ID: R409310**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**WetChemistry by Method E365.3****Batch ID: R408980**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**WetChemistry by Method E415.1****Batch ID: R408915**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

## ALS Houston, US

Date: 25-May-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Weekly Samples  
 Sample ID: LH18/24-SP650\_051722  
 Collection Date: 17-May-2022 14:00

**ANALYTICAL REPORT**

WorkOrder:HS22050786  
 Lab ID:HS22050786-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>AMMONIA AS N BY E350.3(ISE)</b>		<b>Method:E350.3</b>					Analyst: MZD	
Nitrogen, Ammonia (As N)	28	a	0.10	0.10	0.20	mg/L	1	25-May-2022 11:30
<b>ORTHO PHOSPHATE (PO4) AS P BY E365.3-1978</b>		<b>Method:E365.3</b>					Analyst: AP	
Phosphorus, Total Orthophosphate (As P)	5.90	a	0.250	0.312	0.625	mg/L	25	18-May-2022 17:48
<b>TOTAL ORGANIC CARBON BY E415.1</b>		<b>Method:E415.1</b>					Analyst: JAC	
Organic Carbon, Total	5.74	a	0.500	1.00	1.00	mg/L	1	19-May-2022 04:36

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 25-May-22

Client: Bhate Environmental Associates, Inc.  
Project: Longhorn GW Treatment Plant Weekly Samples  
Sample ID: LH18/24-SP650\_051722\_AIX  
Collection Date: 17-May-2022 14:00

**ANALYTICAL REPORT**

WorkOrder:HS22050786  
Lab ID:HS22050786-02  
Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>						Analyst: GR
Subcontract Analysis	See Attached		0	0		NA	1	19-May-2022 16:33

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 25-May-22

Client: Bhate Environmental Associates, Inc.  
Project: Longhorn GW Treatment Plant Weekly Samples  
Sample ID: LH18/24-SP650\_051722\_BIX  
Collection Date: 17-May-2022 14:00

**ANALYTICAL REPORT**

WorkOrder: HS22050786  
Lab ID: HS22050786-03  
Matrix: Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method: NA</b>						Analyst: GR
Subcontract Analysis	See Attached		0	0		NA	1	19-May-2022 16:33

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US

Date: 25-May-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22050786

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> R408915 ( 0 )		<b>Test Name :</b> TOTAL ORGANIC CARBON BY E415.1			<b>Matrix:</b> Water	
HS22050786-01	LH18/24-SP650_051722	17 May 2022 14:00			19 May 2022 04:36	1
<b>Batch ID:</b> R408954 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			<b>Matrix:</b> Water	
HS22050786-02	LH18/24-SP650_051722_AIX	17 May 2022 14:00			19 May 2022 16:33	1
HS22050786-03	LH18/24-SP650_051722_BIX	17 May 2022 14:00			19 May 2022 16:33	1
<b>Batch ID:</b> R408980 ( 0 )		<b>Test Name :</b> ORTHO PHOSPHATE (PO4) AS P BY E365.3-1978			<b>Matrix:</b> Water	
HS22050786-01	LH18/24-SP650_051722	17 May 2022 14:00			18 May 2022 17:48	25
<b>Batch ID:</b> R409310 ( 0 )		<b>Test Name :</b> AMMONIA AS N BY E350.3(ISE)			<b>Matrix:</b> Water	
HS22050786-01	LH18/24-SP650_051722	17 May 2022 14:00			25 May 2022 11:30	1



ALS Houston, US

Date: 25-May-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22050786

**QC BATCH REPORT**

Batch ID: R408915 ( 0 )		Instrument: TOC_04		Method: TOTAL ORGANIC CARBON BY E415.1						
<b>MBLK</b>	Sample ID: MBLK-05132022	Units: mg/L		Analysis Date: 19-May-2022 03:55						
Client ID:	Run ID: TOC_04_408915	SeqNo: 6653787		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	1.00	1.00								U
<b>LCS</b>	Sample ID: LCS-05132022	Units: mg/L		Analysis Date: 19-May-2022 04:09						
Client ID:	Run ID: TOC_04_408915	SeqNo: 6653788		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	9.182	1.00	10	0	91.8	85 - 115				
<b>LCSD</b>	Sample ID: LCSD-05132022	Units: mg/L		Analysis Date: 19-May-2022 04:23						
Client ID:	Run ID: TOC_04_408915	SeqNo: 6653789		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	9.425	1.00	10	0	94.2	85 - 115	9.182	2.61	20	
<b>MS</b>	Sample ID: HS22050786-01MS	Units: mg/L		Analysis Date: 19-May-2022 04:50						
Client ID: LH18/24-SP650_051722	Run ID: TOC_04_408915	SeqNo: 6653791		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	15.24	1.00	10	5.736	95.0	80 - 120				
The following samples were analyzed in this batch: HS22050786-01										

## ALS Houston, US

Date: 25-May-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22050786

**QC BATCH REPORT**

Batch ID: R408980 ( 0 )		Instrument: UV-2450		Method: ORTHO PHOSPHATE (PO4) AS P BY E365.3-1978						
<b>MBLK</b>	Sample ID: MBLK-R408980	Units: mg/L		Analysis Date: 18-May-2022 17:48						
Client ID:	Run ID: UV-2450_408980		SeqNo: 6655569		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phosphorus, Total Orthophosphate (As P)	0.0125	0.0250								U
<b>LCS</b>	Sample ID: LCS-R408980	Units: mg/L		Analysis Date: 18-May-2022 17:48						
Client ID:	Run ID: UV-2450_408980		SeqNo: 6655568		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phosphorus, Total Orthophosphate (As P)	0.266	0.0250	0.25	0	106	85 - 115				
<b>MS</b>	Sample ID: HS22050797-01MS	Units: mg/L		Analysis Date: 18-May-2022 17:48						
Client ID:	Run ID: UV-2450_408980		SeqNo: 6655571		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phosphorus, Total Orthophosphate (As P)	0.548	0.0250	0.25	0.291	103	80 - 120				
<b>MSD</b>	Sample ID: HS22050797-01MSD	Units: mg/L		Analysis Date: 18-May-2022 17:48						
Client ID:	Run ID: UV-2450_408980		SeqNo: 6655570		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phosphorus, Total Orthophosphate (As P)	0.545	0.0250	0.25	0.291	102	80 - 120	0.548	0.549	20	
The following samples were analyzed in this batch: HS22050786-01										

ALS Houston, US

Date: 25-May-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22050786

**QC BATCH REPORT**

Batch ID: R409310 ( 0 )		Instrument: WetChem_HS		Method: AMMONIA AS N BY E350.3(ISE)						
<b>MBLK</b>	Sample ID: MBLK-R409310	Units: mg/L		Analysis Date: 25-May-2022 11:30						
Client ID:	Run ID: WetChem_HS_409310		SeqNo: 6662838		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	0.10	0.20								U
<b>LCS</b>	Sample ID: LCS-R409310	Units: mg/L		Analysis Date: 25-May-2022 11:30						
Client ID:	Run ID: WetChem_HS_409310		SeqNo: 6662837		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	9.911	0.20	10	0	99.1	80 - 120				
<b>MS</b>	Sample ID: HS22050786-01MS	Units: mg/L		Analysis Date: 25-May-2022 11:30						
Client ID: LH18/24-SP650_051722	Run ID: WetChem_HS_409310		SeqNo: 6662840		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	37.51	0.20	10	27.99	95.2	80 - 120				
<b>MSD</b>	Sample ID: HS22050786-01MSD	Units: mg/L		Analysis Date: 25-May-2022 11:30						
Client ID: LH18/24-SP650_051722	Run ID: WetChem_HS_409310		SeqNo: 6662839		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	37.52	0.20	10	27.99	95.3	80 - 120	37.51	0.0213	20	
The following samples were analyzed in this batch: HS22050786-01										

**ALS Houston, US**

Date: 25-May-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22050786

**QUALIFIERS,  
ACRONYMS, UNITS**

<b>Qualifier</b>	<b>Description</b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

<b>Acronym</b>	<b>Description</b>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

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**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

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Agency	Number	Expire Date
Dept of Defense	L21-682	31-Dec-2023
Florida	E87611-34	30-Jun-2022
Illinois	2000322022-9	09-May-2023
Kansas	E-10352 2021-2022	31-Jul-2022
Louisiana	03087, 2021-2022	30-Jun-2022
Maryland	343, 2021-2022	30-Jun-2022
North Carolina	624-2022	31-Dec-2022
Oklahoma	2021-080	31-Aug-2022
Texas	T104704231-22-29	30-Apr-2023
Utah	TX026932021-12	30-Jul-2022

ALS Houston, US

Date: 25-May-22

## Sample Receipt Checklist

Work Order ID: HS22050786

Date/Time Received: **18-May-2022 09:40**

Client Name: Bhate Environmental

Received by: **Pablo Martinez**Completed By: /S/ Pablo Martinez

18-May-2022 11:04

Reviewed by: /S/ Dane J. Wacasey

19-May-2022 08:32

eSignature

Date/Time

eSignature

Date/Time

Matrices: **WATER**Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?

Yes ☒No ☐Not Present ☐

Custody seals intact on shipping container/cooler?

Yes ☒No ☐Not Present ☐

Custody seals intact on sample bottles?

Yes ☐No ☐Not Present ☒

VOA/TX1005/TX1006 Solids in hermetically sealed vials?

Yes ☐No ☐Not Present ☒

Chain of custody present?

Yes ☒No ☐

1 Page(s)

Chain of custody signed when relinquished and received?

Yes ☒No ☐

COC IDs: CLIENT

Samplers name present on COC?

Yes ☒No ☐

Chain of custody agrees with sample labels?

Yes ☒No ☐

Samples in proper container/bottle?

Yes ☒No ☐

Sample containers intact?

Yes ☒No ☐

Sufficient sample volume for indicated test?

Yes ☒No ☐

All samples received within holding time?

Yes ☒No ☐

Container/Temp Blank temperature in compliance?

Yes ☒No ☐

Temperature(s)/Thermometer(s):

0.7°C/1.2°C UC/C

IR 31

Cooler(s)/Kit(s):

48808

Date/Time sample(s) sent to storage:

5/18/22 11:10

Water - VOA vials have zero headspace?

Yes ☒No ☐No VOA vials submitted ☐

Water - pH acceptable upon receipt?

Yes ☒No ☐N/A ☐

pH adjusted?

Yes ☐No ☒N/A ☐

pH adjusted by:

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:


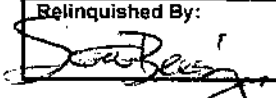
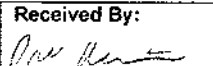
Regarding:

Comments:

Corrective Action:

## CHAIN OF CUSTODY

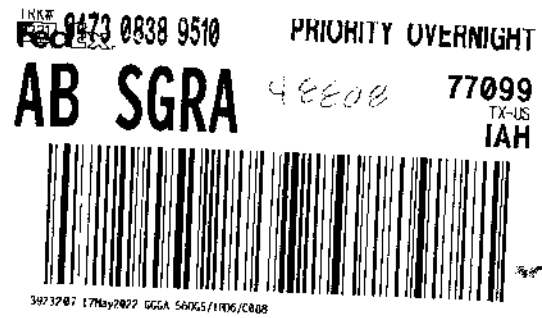
Name Of Lab Shipping To: ALS 10450 Stanchiff Rd. Suite 210 Houston, TX, 77099 (281) 530-5656 ATTN: Ragen GigiPage 1 of 1

<b>Project:</b> BHATE LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS			<b>Project No.</b> NWO1312.0150.0 16.0001			<b>Analyses</b> <div style="text-align: center;"> <b>HS22050786</b>          Bhate Environmental Associates, Inc.          Longhorn GW Treatment Plant Weekly Samples       </div> 													
<b>Job:</b> <b>GROUNDWATER TREATMENT PLANT WEEKLY SAMPLES</b>			MS / MSD	No. OF CONTAINERS	AMMONIA - N	TOTAL ORGANIC CARBON	ORTHO-PHOSPHATE	PERCHLORATE											
<b>Prepared By:</b> Scott Beesinger		<b>P.O. Number</b>																	
<b>Field Sample I.D.</b>	<b>Sample Matrix</b>	<b>Date / Time</b>															<b>Remarks (Preservatives, etc.)</b>	<b>Lab I.D.#</b>	
LH18/24-SP650_051722	Water	05/17/22 / 14:00		3	X	X											H2SO4		
LH18/24-SP650_051722	Water	05/17/22 / 14:00		1			X										NONE		
LH18/24-SP650_051722_AIX	Water	05/17/22 / 14:00		1				X									NONE		
LH18/24-SP650_051722_BIX	Water	05/17/22 / 14:00		1				X									NONE		
<b>Additional Remarks:</b> 24 HOUR TAT on PERCHLORATE. Standard TAT on all other parameters																			
<b>Relinquished By:</b> 		<b>Date</b> 05/17/22	<b>Time</b> 14:30	<b>Received By:</b> 		<b>Date</b> 5/18/22	<b>Time</b> 9:40	<b>Relinquished By:</b>		<b>Date</b>	<b>Time</b>	<b>Received By:</b>		<b>Date</b>	<b>Time</b>				
<b>For Lab Use Only</b>																			
<b>Received At Lab By:</b>		<b>Date</b>	<b>Time</b>	<b>Airbill No.</b>		<b>Opened By:</b>		<b>Date</b>	<b>Time</b>	<b>Temp of Container</b>	<b>Seal No.</b>	<b>Condition</b>							
<b>Remarks:</b>																			

42608 0.72  
 1231 17705



CUSTODY SEAL	
Date: 5/17/02	Time: 1430
Name: Scotty R. [Signature]	
Company: [Signature]	
Seal Broken By: [Signature]	
Date: 5/17/02	







May 19, 2022

Service Request No:E2200449

Dane Wacasey  
ALS Environmental - US  
10450 Stancliff Rd Suite 210  
Houston, TX 77099

**Laboratory Results for: HS22050786**

Enclosed are the results of the sample(s) submitted to our laboratory May 18, 2022  
For your reference, these analyses have been assigned our service request number **E2200449**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current TNI standards, where applicable, and except as noted in the laboratory case narrative provided. All results are intended to be considered in their entirety and ALS Environmental is not responsible for use of less than the complete final report. Results apply only to the items submitted to the laboratory, as received for analysis. In accordance with the current TNI Standard, a statement on the estimated uncertainty of measurement of any quantitative analysis will be supplied upon request.

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Corey Grandits  
Project Manager

ADDRESS 10450 Stancliff Rd., Suite 210, Houston, TX 77099  
PHONE +1 281 530 5656 | FAX +1 281 530 5887  
ALS Group USA, Corp.  
dba ALS Environmental



# Certificate of Analysis

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

**ALS Environmental**

**Client:** ALS-Houston  
**Project:** HS22050786  
**Sample Matrix:** W

**Service Request No.:** E2200449  
**Date Received:** 05/18/22

**CASE NARRATIVE**

All analyses were performed in adherence to the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II. When appropriate to the method, method blank results have been reported with each analytical test.

**Sample Receipt**

Two samples were received for analysis at ALS Environmental in Houston on 05/18/22.

The samples were received in good condition and are consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

**Data Validation Notes and Discussion****Precision and Accuracy:**

EQ2200206: Laboratory Control Spike/Duplicate Laboratory Control Spike (LCS/DLCS) samples were analyzed and reported in addition to a MS/MSD for this extraction batch. The LCS-DLCS RPD recoveries met acceptance criteria; MS/MSD was performed on an unrelated sample.

DoD Certification is held for the method/matrix/analytes provided in this report.

*The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.*

*Use of ALS group USA Corp dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.*

**Client:** ALS Environmental - US  
**Project:** HS22050786

**Service Request:**E2200449

**SAMPLE CROSS-REFERENCE**

<u>SAMPLE #</u>	<u>CLIENT SAMPLE ID</u>	<u>DATE</u>	<u>TIME</u>
E2200449-001	LH18/24-SP650_051722_AIX	5/17/2022	1400
E2200449-002	LH18/24-SP650_051722_BIX	5/17/2022	1400

**Service Request Summary**

**Folder #:** E2200449  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22050786  
**Project Number:**

**Report To:**  
 ALS Environmental - US  
 10450 Stancliff Rd Suite 210  
 Houston, TX 77099  
 USA

**Phone Number:**  
**Cell Number:**  
**Fax Number:**  
**E-mail:**

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 05/18/22  
**Internal Due Date:** 5/19/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22050786  
**EDD:** No EDD Specified

2 120 mL-Plastic Bottle Natural WM Unpreserved

**Location:** EHRMS-AirArch 1

**Pressure Gas:**

**Rush**

				HOUSTON
Lab Samp No.	Client Samp No	Matrix	Collected	CIO4 DOD/6850
E2200449-001	LH18/24-SP650_051722_AIX	Water	05/17/22 1400	IV
E2200449-002	LH18/24-SP650_051722_BIX	Water	05/17/22 1400	IV

**Service Request Summary**

**Folder #:** E2200449  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22050786  
**Project Number:**

**Report To:**  
 ALS Environmental - US  
 10450 Stancliff Rd Suite 210  
 Houston, TX 77099  
 USA

**Phone Number:**  
**Cell Number:**  
**Fax Number:**  
**E-mail:**

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 05/18/22  
**Internal Due Date:** 5/19/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22050786  
**EDD:** No EDD Specified

2 120 mL-Plastic Bottle Natural WM Unpreserved  
**Location:** EHRMS-AirArch 1  
**Pressure Gas:**  
**Rush**

**Test Comments:**

Group	Test/Method	Samples	Comments
Semivola GCMS	CIO4 DOD/6850	2	IV DUE 6/9

## Data Qualifiers

### Lab Standard

- + Possible Tedlar bag artifact.
- A TIC is a suspected aldol-condensation product
- B Analyte found in the associated method blank as well as in the sample.
- BC Reported results are not blank corrected.
- BH The back section of the tube yielded higher results than the front.
- BT Results indicated possible breakthrough; back section  $\geq 10\%$  front section.
- C Result identification confirmed.
- D Compound identified in an analysis at a secondary dilution factor
- D Spike was diluted out
- DE Reported results are corrected for desorption efficiency.
- E Estimated value. Concentration above calibration range
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- H1 Sample analysis performed past holding time. See case narrative.
- H2 Initial analysis within holding time. Reanalysis for the required dilution was past holding time.
- H3 Sample was received and analyzed past holding time.
- H4 Sample was extracted past required extraction holding time, but analyzed within analysis holding time. See case narrative.
- I Internal standard not within the specified limits. See case narrative.
- J Estimated Value. Concentration found below MRL.
- K (Auto) The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- K A deflection in the QC ion may indicate interference with the quantitation of this ion. The concentration of this analyte should be considered as an estimate.
- K Analyte was detected above the method reporting limit prior to normalization.
- K The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- L1 Laboratory control sample recovery outside the specified limits; results may be biased high.
- L2 Laboratory control sample recovery outside the specified limits; results may be biased low.
- L3 Laboratory control sample recovery outside the specified limits.
- M Matrix interference; results may be biased high.
- M The duplicate injection precision not met.
- M1 Matrix interference due to coelution with a non-target compound; results may be biased high.

## Data Qualifiers

### Lab Standard

- N Presumptive evidence of a compound for TICs that have been identified based on a mass spectral library search.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- P Indicates chlorodiphenyl ether interference present at the retention time of the target compound.
- P Pesticide/Aroclor target analyte > 40% difference for detected concentrations between GC columns
- Q Indicates as estimated value because the P and P + 2 theoretical abundance ratio does not meet method criteria.
- R Duplicate Precision not met.
- R1 Duplicate precision not within the specified limits; however, the results are below the MRL and considered estimated.
- S Surrogate recovery not within specified limits.
- S The reported value was determined by the Method of Standard Additions (MSA).
- T Analyte is a tentatively identified compound, result is estimated.
- U Compound was analyzed for, but was not detected (ND).
- V1 The continuing calibration verification standard was outside (biased high) the specified limits for this compound.
- V2 The continuing calibration verification standard was outside (biased low) the specified limits for this compound.
- W Result quantified, but the corresponding peak was detected outside the generated retention time window.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- X See case narrative.
- Y Recovery outside limits
- Y The chromatogram resembles a petroleum product but does not match the calibration standard.
- Z The chromatogram does not resemble a petroleum product.
- i The MRL/MDL has been elevated due to a matrix interference.



## ALS Laboratory Group

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### Acronyms

Cal	Calibration
Conc	CONCetration
Dioxin(s)	Polychlorinated dibenzo-p-dioxin(s)
EDL	Estimated Detection Limit
EMPC	Estimated Maximum Possible Concentration
Flags	Data qualifiers
Furan(s)	Polychlorinated dibenzofuran(s)
g	Grams
ICAL	Initial CALibration
ID	IDentifier
Ions	Masses monitored for the analyte during data acquisition
L	Liter (s)
LCS	Laboratory Control Sample
DLCS	Duplicate Laboratory Control Sample
MB	Method Blank
MCL	Method Calibration Limit
MDL	Method Detection Limit
mL	Milliliters
MS	Matrix Spiked sample
DMS	Duplicate Matrix Spiked sample
NO	Number of peaks meeting all identification criteria
PCDD(s)	Polychlorinated dibenzo-p-dioxin(s)
PCDF(s)	Polychlorinated dibenzofuran(s)
ppb	Parts per billion
ppm	Parts per million
ppq	Parts per quadrillion
ppt	Parts per trillion
QA	Quality Assurance
QC	Quality Control
Ratio	Ratio of areas from monitored ions for an analyte
% Rec.	Percent recovery
RPD	Relative Percent Difference
RRF	Relative Response Factor
RT	Retention Time
SDG	Sample Delivery Group
S/N	Signal-to-noise ratio
TEF	Toxicity Equivalence Factor
TEQ	Toxicity Equivalence Quotient



## State Certifications, Accreditations, and Licenses

Agency	Number	Expire Date
Arizona Department of Health Services	AZ0793-2022	5/27/2022
Department of Defense	L22-90	3/31/2024
Florida Department of Health	E87611-34	6/30/2022
Hawaii Department of Health	2022	4/30/2023
Illinois Environmental Protection Agency	2000322022-9	5/9/2023
Kansas Department of Health and Environment	E-10352 2022	7/31/2022
Louisiana Department of Environmental Quality	03087-2021	6/30/2022
Louisiana Department of Health and Hospitals	LA028	12/31/2022
Maine Department of Health and Human Services	2020016	6/5/2022
Maryland Department of the Environment	343	6/30/2022
Michigan Department of Environmental Quality	9971-2022	4/30/2023
Minnesota Department of Health	2228443	12/31/2022
Nebraska Department of Health and Human Services	NE-OS-25-13	4/30/2023
Nevada Department of Conservation and Natural Resources	TX026932022-1	7/31/2022
New Hampshire Environmental Laboratory Accreditation Program	209422	4/24/2023
New Jersey Department of Environmental Protection	TX008	6/30/2022
New York Department of Health	11707	3/31/2023
Oklahoma Department of Environmental Quality	2021-080	8/31/2022
Oregon Environmental Laboratory Accreditation Program	TX200002	5/15/2023
Pennsylvania Department of Environmental Protection	68-03441-015	6/30/2022
Perry Johnson Laboratory Accreditation	L22-91	3/31/2024
Tennessee Department of Environment and Conservation	04016-2022	4/30/2023
Texas Commission on Environmental Quality	T104704231-22-29	4/30/2023
United States Department of Agriculture	P330-19-00299	10/10/2022
Utah Department of Health Environmental Laboratory Certification	TX026932021-12	7/31/2022
Washington Department of Health	C819-2022	11/14/2022



## Chain of Custody

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
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## Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 18786

**SUBCONTRACT TO:**

ALS Environmental  
10450 Stancliff Road Suite 210  
Houston, TX 77084

**Phone:** +1 281 530 5656

**CUSTOMER  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Ragen Giga  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Email:** RagenP.Giga@ALSGlobal.com  
**Alternate  
Contact:**  
**Email:**

**INVOICE  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Accounts Payable  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Reference:** HS22050786  
**TSR:** Houston House Acct

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS22050786-02	LH18/24-SP650_051722_AIX	Water	17 May 2022 14:00
	6850-Perch. DOD Level II & Level IV	in separate pdf	19 May 2022
2. HS22050786-03	LH18/24-SP650_051722_BIX	Water	17 May 2022 14:00
	6850-Perch. DOD Level II & Level IV	in separate pdf	19 May 2022

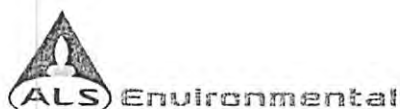
**Comments:** Please analyze for the analysis listed above.  
Send report to the emails shown above.

**QC Level:** DOD IV (DoD Data Package)

Relinquished By: Pablo Man  
Received By: COBETH  
Cooler ID(s):

Date/Time: 5/18/22 11:40  
Date/Time: 5/18/22 11:46  
Temperature(s):

RIGHT SOLUTIONS | RIGHT PARTNER



## Cooler Receipt Form

Project Chemist

CH

Client/Project

ALY-11

Thermometer ID

1021

Date/Time Received:

9-18-22

Initials:

CH

Date/Time Logged in:

9-18-22

Initials

CH

1. Method of delivery: ☐ US Mail ☐ Fed Ex ☐ UPS ☐ DHL ☒ Courier ☐ Client2. Samples received in: ☒ Cooler ☐ Box ☐ Envelope ☐ Other3. Were custody seals on coolers? ☐ Yes ☒ No

If yes, how many and where?

Were they intact? ☐ Yes ☐ No ☒ N/AWere they signed and dated? ☐ Yes ☐ No ☒ N/A4. Packing Material: ☐ Inserts ☒ Baggies ☐ Bubble Wrap ☐ Gel Packs ☒ Wet Ice ☐ Sleeves ☐ Other

5. Foreign or Regulated Soil?

☐ Yes ☐ No

Location of Sampling:

Cooler Tracking Number	COC ID	Date Opened	Time Opened	Opened By	Temp. °C	Temp Blank?
NA		9-18-22	1100	CH	4.6	<input checked="" type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>

6. Were custody papers properly filled out (ink, signed, dated, etc)?

☒ Yes ☐ No

7. Did all bottles arrive in good condition (not broken, no signs of leakage)?

☒ Yes ☐ No

8. Were all sample labels complete (i.e., sample ID, analysis, preservation, etc)?

☒ Yes ☐ No

9. Were appropriate bottles/containers and volumes received for the requested tests?

☒ Yes ☐ No

10. Did sample labels and tags agree with custody documents?

☒ Yes ☐ No

Notes, Discrepancies, &amp; Resolutions:

Service request Label:

HS-HRMSCoolerReceipt R1.0

ALS Environmental - Houston HRMS



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## SAMPLE ACCEPTANCE POLICY

This policy outlines the criteria samples must meet to be accepted by ALS Environmental – Houston HRMS.

### **Cooler Custody Seals (desirable, mandatory if specified in SAP):**

- ✓ Intact on outside of cooler, signed and dated

### **Chain-of-Custody (COC) documentation (mandatory):**

The following is required on each COC:

- ✓ Sample ID, the location, date and time of collection, collector's name, preservation type, sample type, and any other special remarks concerning the sample. The COC must be completed in ink.
- ✓ Signature and date of relinquishing party.

In the absence of a COC at sample receipt, the COC will be requested from the client.

### **Sample Integrity (mandatory):**

Samples are inspected upon arrival to ensure that sample integrity was not compromised during transfer to the laboratory.

- ✓ Sample containers must arrive in good condition (not broken or leaking).
- ✓ Samples must be labeled appropriately, including Sample IDs, and requested test using durable labels and indelible ink.
- ✓ The correct type of sample bottle must be used for the method requested.
- ✓ An appropriate sample volume, or weight, must be received.
- ✓ Sample IDs and number of containers must reconcile with the COC.
- ✓ Samples must be received within the method defined holding time.

### **Temperature Requirement (varies by sample matrix):**

- ✓ Aqueous and Non-aqueous samples must be shipped and stored cold, at 0 to 6°C.
- ✓ Tissue samples must be shipped and stored frozen, at -20 to -10°C.
- ✓ Air samples are shipped and stored cold, at 0 to 6°C
- ✓ The sample temperature must be recorded on the COC

All cooler inspections are documented on the Cooler Receipt Form (CRF). A separate CRF is completed for each service request. Any samples not meeting the above criteria are noted on the CRF and the Project Manager notified. The Project Manager must resolve any sample integrity issues with the client prior to proceeding with the analysis. Such resolutions are documented in writing and filed with the project folder. Data associated with samples received outside of this acceptance policy will be qualified on the case narrative of the final report



# Preparation Information Benchsheets

**ALS Environmental - Houston HRMS**  
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Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

**Preparation Information Benchsheet**

**Prep Run#:** 400057  
**Team:** Semivoa GCMS/GRIVERA

**Prep WorkFlow:** GenExt28Day  
**Prep Method:** Method

**Status:** Prepped  
**Prep Date/Time:** 5/19/22 09:15

#	Lab Code	Client ID	B#	Method /Test	pH	Cl	Matrix	Amt. Ext.	Sample Description
1	E2200449-001	LH18/24-SP650_051722_AIX	.01	6850/CIO4 DOD			Water	10mL	
2	E2200449-002	LH18/24-SP650_051722_BIX	.01	6850/CIO4 DOD			Water	10mL	
3	E2200450-001	L135H-RS1435-150522	.01	6850/CIO4 DOD			Water	10mL	
4	E2200450-002	L135H-RS2080-150522	.01	6850/CIO4 DOD			Water	10mL	
5	E2200450-003	L135H-RS2082-150522	.01	6850/CIO4 DOD			Water	10mL	
6	E2200450-004	L135H-RS1436-150522	.01	6850/CIO4 DOD			Water	10mL	
7	E2200450-005	L135H-RS2081-150522	.01	6850/CIO4 DOD			Water	10mL	
8	E2200450-006	L135H-RS660-150522	.01	6850/CIO4 DOD			Water	10mL	
9	E2200450-007	RSA-EB-13-160522	.01	6850/CIO4 DOD			Water	10mL	
10	E2200450-008	RSA-EB-14-160522	.01	6850/CIO4 DOD			Water	10mL	
11	E2200450-009	RSA-FB-04-170522	.01	6850/CIO4 DOD			Water	10mL	
12	E2200450-010	RSA-EB-15-170522	.01	6850/CIO4 DOD			Water	10mL	
13	EQ2200206-01	MB		6850/CIO4 DOD			Liquid	10mL	
14	EQ2200206-02	LCS		6850/CIO4 DOD			Liquid	10mL	
15	EQ2200206-03	DLCS		6850/CIO4 DOD			Liquid	10mL	
16	EQ2200206-04	L135H-RS1435-150522 MS	.02	6850/CIO4 DOD			Liquid	10mL	
17	EQ2200206-05	L135H-RS1435-150522 DMS	.03	6850/CIO4 DOD			Liquid	10mL	
18	R2204205-006	2205051257B 600A-001-GW-1	.01	6850/CIO4			Water	10mL	
19	R2204328-010	2205101013Y PL-7-560	.01	6850/CIO4			Water	10mL	

**Spiking Solutions**

Name:	Perchlorate Intermediate Stock1	Inventory ID	222798	Logbook Ref:	Perchlorate (1st Source)	Expires On:	10/29/2022
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EQ2200206-02 1.00μL EQ2200206-02 1.00μL EQ2200206-03 1.00μL EQ2200206-03 1.00μL EQ2200206-04 1.00μL EQ2200206-05 1.00μL

Name:	Perchlorate Internal Standard 1ug/mL	Inventory ID	223118	Logbook Ref:	Perchlorate Internal Standard	Expires On:	10/31/2022
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E2200449-001 100.00μL E2200449-002 100.00μL E2200450-001 100.00μL E2200450-002 100.00μL E2200450-003 100.00μL E2200450-004 100.00μL  
E2200450-005 100.00μL E2200450-006 100.00μL E2200450-007 100.00μL E2200450-008 100.00μL E2200450-009 100.00μL E2200450-010 100.00μL  
EQ2200206-01 100.00μL EQ2200206-01 100.00μL EQ2200206-02 100.00μL EQ2200206-02 100.00μL EQ2200206-03 100.00μL EQ2200206-03 100.00μL  
EQ2200206-04 100.00μL EQ2200206-05 100.00μL R2204205-006 100.00μL R2204328-010 100.00μL

**Preparation Materials**

Water HPLC Grade 02/16/2022 Water (221769) 6850 Amber Glass screw vial 2mL Screw Top Vial (221894) 537M Glass Culture Tubes 537M Glass Tubes (218064)  
6850 0.45um syringe filters 6850 Syringe Filters (222410) 6850 Luer-Lok Syringes Luer-Lok Syringes (221305) 6850 Pipette Tips 50-1000 uL 6850 Pipette Tips (221929)



Preparation Information Benchsheet

Prep Run#: 400057  
Team: Semivoa GCMS/GRIVERA

Prep WorkFlow: GenExt28Day  
Prep Method: Method

Status: Prepped  
Prep Date/Time: 5/19/22 09:15

Preparation Steps

Step: Preparation  
Started: 5/19/22 09:15  
Finished: 5/19/22 09:57  
By: GRIVERA  
Comments

Comments:

Reviewed By: GR Date: 5/19/22

Chain of Custody

Relinquished By:	Date:	<u>Extracts Examined</u> Yes No
Received By:	Date:	



# Analytical Results

**ALS Environmental - Houston HRMS**  
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Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22050786  
**Sample Matrix:** Water  
**Sample Name:** LH18/24-SP650\_051722\_AIX  
**Lab Code:** E2200449-001

**Service Request:** E2200449  
**Date Collected:** 5/17/22 1400  
**Date Received:** 5/18/22  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.931		0.200	0.100	0.0500	2	5/19/22	5/19/22 15:36	400057	764737	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22050786  
**Sample Matrix:** Water  
**Sample Name:** LH18/24-SP650\_051722\_BIX  
**Lab Code:** E2200449-002

**Service Request:** E2200449  
**Date Collected:** 5/17/22 1400  
**Date Received:** 5/18/22  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	68.1		0.500	0.250	0.125	5	5/19/22	5/19/22 14:30	400057	764737	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22050786  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** EQ2200206-01

**Service Request:** E2200449  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	0.100	0.0500	0.0250	1	5/19/22	5/19/22 13:03	400057	764737	



## Accuracy & Precision

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## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS22050786  
**Sample Matrix:** Water

**Service Request:** E2200449  
**Date Analyzed:** 5/19/22

**Lab Control Sample Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**Analytical Method:** 6850  
**Prep Method:** Method

**Units:** µg/L  
**Basis:** NA

**Extraction Lot:** 400057

Analyte Name	Lab Control Sample EQ2200206-02			Duplicate Lab Control Sample EQ2200206-03			% Rec Limits	RPD	RPD Limit
	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Perchlorate	0.111	0.100	111	0.101	0.100	101	84 - 119	10	15

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22050786  
**Sample Matrix:** Water  
**Sample Name:** Lab Control Sample  
**Lab Code:** EQ2200206-02

**Service Request:** E2200449  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.111		0.100	0.0500	0.0250	1	5/19/22	5/19/22 13:11	400057	764737	



## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22050786  
**Sample Matrix:** Water  
**Sample Name:** Duplicate Lab Control Sample  
**Lab Code:** EQ2200206-03

**Service Request:** E2200449  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.101		0.100	0.0500	0.0250	1	5/19/22	5/19/22 13:43	400057	764737	



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June 03, 2022

Marcia Olive  
Bhate Environmental Associates, Inc.  
445 Union Blvd Ste 129  
Lakewood, CO 80228

Work Order: **HS22050817**

Laboratory Results for: **Longhorn GW Treatment Plant Bi-Weekly Samples**

Dear Marcia Olive,

ALS Environmental received 2 sample(s) on May 18, 2022 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: JUMOKE.LAWAL

Dane J. Wacasey

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**Work Order:** HS22050817

**SAMPLE SUMMARY**

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS22050817-01	LH18/24-SP650_051722	Water		17-May-2022 14:00	18-May-2022 09:40	<input type="checkbox"/>
HS22050817-02	Trip Blank	Water	CG-020822 -743	17-May-2022 00:00	18-May-2022 09:40	<input type="checkbox"/>

**ALS Houston, US**

Date: 03-Jun-22

---

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**Work Order:** HS22050817

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**CASE NARRATIVE**

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**Work Order Comments**

- The analysis for Perchlorate was subcontracted to ALS Houston High-Res Lab. Final report attached
- 

**GCMS Volatiles by Method SW8260****Batch ID: R409050****Sample ID: HS22050805-04MS**

- MS and MSD are for an unrelated sample
- 

**WetChemistry by Method SW9056****Batch ID: R409911****Sample ID: HS22051205-01MS**

- MS and MSD are for an unrelated sample (Chloride)
-

## ALS Houston, US

Date: 03-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Bi-Weekly Samples  
 Sample ID: LH18/24-SP650\_051722  
 Collection Date: 17-May-2022 14:00

## ANALYTICAL REPORT

WorkOrder:HS22050817  
 Lab ID:HS22050817-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD</b>		<b>Method:SW8260</b>						Analyst: PC
<b>8260C</b>								
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	ug/L	1	20-May-2022 18:05
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:05
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	ug/L	1	20-May-2022 18:05
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	ug/L	1	20-May-2022 18:05
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:05
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:05
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	ug/L	1	20-May-2022 18:05
1,2,3-Trichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	20-May-2022 18:05
1,2,3-Trichloropropane	1.0	U	0.50	1.0	1.0	ug/L	1	20-May-2022 18:05
1,2,4-Trichlorobenzene	1.0	U	0.50	1.0	1.0	ug/L	1	20-May-2022 18:05
1,2,4-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	20-May-2022 18:05
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:05
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:05
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	ug/L	1	20-May-2022 18:05
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:05
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	ug/L	1	20-May-2022 18:05
1,3,5-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	20-May-2022 18:05
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	ug/L	1	20-May-2022 18:05
1,3-Dichloropropane	1.0	U	0.30	1.0	1.0	ug/L	1	20-May-2022 18:05
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	ug/L	1	20-May-2022 18:05
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:05
2-Butanone	1.0	U	0.50	1.0	2.0	ug/L	1	20-May-2022 18:05
2-Chlorotoluene	1.0	U	0.30	1.0	1.0	ug/L	1	20-May-2022 18:05
2-Hexanone	2.0	U	1.0	2.0	2.0	ug/L	1	20-May-2022 18:05
4-Chlorotoluene	1.0	U	0.40	1.0	1.0	ug/L	1	20-May-2022 18:05
4-Isopropyltoluene	1.0	U	0.30	1.0	1.0	ug/L	1	20-May-2022 18:05
4-Methyl-2-pentanone	2.0	U	0.70	2.0	2.0	ug/L	1	20-May-2022 18:05
Acetone	2.0	U	0.40	2.0	2.0	ug/L	1	20-May-2022 18:05
Benzene	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:05
Bromobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	20-May-2022 18:05
Bromochloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:05
Bromodichloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:05
Bromoform	0.50	U	0.40	0.50	1.0	ug/L	1	20-May-2022 18:05
Bromomethane	1.0	U	0.40	1.0	1.0	ug/L	1	20-May-2022 18:05
Carbon disulfide	2.0	U	0.60	2.0	2.0	ug/L	1	20-May-2022 18:05
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	ug/L	1	20-May-2022 18:05
Chlorobenzene	0.50	U	0.30	0.50	1.0	ug/L	1	20-May-2022 18:05
Chloroethane	0.50	U	0.30	0.50	1.0	ug/L	1	20-May-2022 18:05
Chloroform	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:05

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 03-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Bi-Weekly Samples  
 Sample ID: LH18/24-SP650\_051722  
 Collection Date: 17-May-2022 14:00

## ANALYTICAL REPORT

WorkOrder:HS22050817  
 Lab ID:HS22050817-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD 8260C</b>			<b>Method:SW8260</b>					Analyst: PC
Chloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:05
<b>cis-1,2-Dichloroethene</b>	<b>2.2</b>		<b>0.20</b>	<b>0.50</b>	<b>1.0</b>	<b>ug/L</b>	1	20-May-2022 18:05
cis-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:05
Dibromochloromethane	0.50	U	0.30	0.50	1.0	ug/L	1	20-May-2022 18:05
Dibromomethane	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:05
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	ug/L	1	20-May-2022 18:05
Ethylbenzene	0.50	U	0.30	0.50	1.0	ug/L	1	20-May-2022 18:05
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	ug/L	1	20-May-2022 18:05
Isopropylbenzene	0.50	U	0.30	0.50	1.0	ug/L	1	20-May-2022 18:05
m,p-Xylene	1.0	U	0.50	1.0	2.0	ug/L	1	20-May-2022 18:05
Methylene chloride	2.0	U	0.40	2.0	2.0	ug/L	1	20-May-2022 18:05
n-Butylbenzene	1.0	U	0.40	1.0	1.0	ug/L	1	20-May-2022 18:05
n-Propylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	20-May-2022 18:05
Naphthalene	1.0	U	0.30	1.0	1.0	ug/L	1	20-May-2022 18:05
o-Xylene	0.50	U	0.30	0.50	1.0	ug/L	1	20-May-2022 18:05
sec-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	20-May-2022 18:05
Styrene	0.50	U	0.30	0.50	1.0	ug/L	1	20-May-2022 18:05
tert-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	20-May-2022 18:05
Tetrachloroethene	0.50	U	0.30	0.50	1.0	ug/L	1	20-May-2022 18:05
Toluene	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:05
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:05
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:05
Trichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:05
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	ug/L	1	20-May-2022 18:05
Vinyl chloride	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:05
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>103</i>			<b>0</b>	<i>81-118</i>	<b>%REC</b>	<i>1</i>	<i>20-May-2022 18:05</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>88.0</i>			<b>0</b>	<i>85-114</i>	<b>%REC</b>	<i>1</i>	<i>20-May-2022 18:05</i>
<i>Surr: Dibromofluoromethane</i>	<i>96.8</i>			<b>0</b>	<i>80-119</i>	<b>%REC</b>	<i>1</i>	<i>20-May-2022 18:05</i>
<i>Surr: Toluene-d8</i>	<i>111</i>			<b>0</b>	<i>89-112</i>	<b>%REC</b>	<i>1</i>	<i>20-May-2022 18:05</i>
<b>ANIONS BY SW9056A</b>			<b>Method:SW9056</b>					Analyst: YP
<b>Chloride</b>	<b>770</b>		<b>4.00</b>	<b>10.0</b>	<b>10.0</b>	<b>mg/L</b>	20	02-Jun-2022 15:11
<b>Sulfate</b>	<b>29.7</b>		<b>0.200</b>	<b>0.500</b>	<b>0.500</b>	<b>mg/L</b>	1	02-Jun-2022 15:06

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 03-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Bi-Weekly Samples  
 Sample ID: Trip Blank  
 Collection Date: 17-May-2022 00:00

## ANALYTICAL REPORT

WorkOrder:HS22050817  
 Lab ID:HS22050817-02  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD</b>		<b>Method:SW8260</b>						Analyst: PC
<b>8260C</b>								
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	ug/L	1	20-May-2022 18:28
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:28
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	ug/L	1	20-May-2022 18:28
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	ug/L	1	20-May-2022 18:28
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:28
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:28
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	ug/L	1	20-May-2022 18:28
1,2,3-Trichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	20-May-2022 18:28
1,2,3-Trichloropropane	1.0	U	0.50	1.0	1.0	ug/L	1	20-May-2022 18:28
1,2,4-Trichlorobenzene	1.0	U	0.50	1.0	1.0	ug/L	1	20-May-2022 18:28
1,2,4-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	20-May-2022 18:28
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:28
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:28
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	ug/L	1	20-May-2022 18:28
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:28
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	ug/L	1	20-May-2022 18:28
1,3,5-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	20-May-2022 18:28
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	ug/L	1	20-May-2022 18:28
1,3-Dichloropropane	1.0	U	0.30	1.0	1.0	ug/L	1	20-May-2022 18:28
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	ug/L	1	20-May-2022 18:28
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:28
2-Butanone	1.0	U	0.50	1.0	2.0	ug/L	1	20-May-2022 18:28
2-Chlorotoluene	1.0	U	0.30	1.0	1.0	ug/L	1	20-May-2022 18:28
2-Hexanone	2.0	U	1.0	2.0	2.0	ug/L	1	20-May-2022 18:28
4-Chlorotoluene	1.0	U	0.40	1.0	1.0	ug/L	1	20-May-2022 18:28
4-Isopropyltoluene	1.0	U	0.30	1.0	1.0	ug/L	1	20-May-2022 18:28
4-Methyl-2-pentanone	2.0	U	0.70	2.0	2.0	ug/L	1	20-May-2022 18:28
Acetone	2.0	U	0.40	2.0	2.0	ug/L	1	20-May-2022 18:28
Benzene	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:28
Bromobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	20-May-2022 18:28
Bromochloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:28
Bromodichloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:28
Bromoform	0.50	U	0.40	0.50	1.0	ug/L	1	20-May-2022 18:28
Bromomethane	1.0	U	0.40	1.0	1.0	ug/L	1	20-May-2022 18:28
Carbon disulfide	2.0	U	0.60	2.0	2.0	ug/L	1	20-May-2022 18:28
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	ug/L	1	20-May-2022 18:28
Chlorobenzene	0.50	U	0.30	0.50	1.0	ug/L	1	20-May-2022 18:28
Chloroethane	0.50	U	0.30	0.50	1.0	ug/L	1	20-May-2022 18:28
Chloroform	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:28

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 03-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Bi-Weekly Samples  
 Sample ID: Trip Blank  
 Collection Date: 17-May-2022 00:00

## ANALYTICAL REPORT

WorkOrder:HS22050817  
 Lab ID:HS22050817-02  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD</b>		<b>Method:SW8260</b>						Analyst: PC
<b>8260C</b>								
Chloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:28
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:28
cis-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:28
Dibromochloromethane	0.50	U	0.30	0.50	1.0	ug/L	1	20-May-2022 18:28
Dibromomethane	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:28
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	ug/L	1	20-May-2022 18:28
Ethylbenzene	0.50	U	0.30	0.50	1.0	ug/L	1	20-May-2022 18:28
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	ug/L	1	20-May-2022 18:28
Isopropylbenzene	0.50	U	0.30	0.50	1.0	ug/L	1	20-May-2022 18:28
m,p-Xylene	1.0	U	0.50	1.0	2.0	ug/L	1	20-May-2022 18:28
Methylene chloride	2.0	U	0.40	2.0	2.0	ug/L	1	20-May-2022 18:28
n-Butylbenzene	1.0	U	0.40	1.0	1.0	ug/L	1	20-May-2022 18:28
n-Propylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	20-May-2022 18:28
Naphthalene	1.0	U	0.30	1.0	1.0	ug/L	1	20-May-2022 18:28
o-Xylene	0.50	U	0.30	0.50	1.0	ug/L	1	20-May-2022 18:28
sec-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	20-May-2022 18:28
Styrene	0.50	U	0.30	0.50	1.0	ug/L	1	20-May-2022 18:28
tert-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	20-May-2022 18:28
Tetrachloroethene	0.50	U	0.30	0.50	1.0	ug/L	1	20-May-2022 18:28
Toluene	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:28
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:28
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:28
Trichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:28
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	ug/L	1	20-May-2022 18:28
Vinyl chloride	0.50	U	0.20	0.50	1.0	ug/L	1	20-May-2022 18:28
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>101</i>			<b>0</b>	<i>81-118</i>	<b>%REC</b>	<i>1</i>	<i>20-May-2022 18:28</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>86.2</i>			<b>0</b>	<i>85-114</i>	<b>%REC</b>	<i>1</i>	<i>20-May-2022 18:28</i>
<i>Surr: Dibromofluoromethane</i>	<i>96.9</i>			<b>0</b>	<i>80-119</i>	<b>%REC</b>	<i>1</i>	<i>20-May-2022 18:28</i>
<i>Surr: Toluene-d8</i>	<i>112</i>			<b>0</b>	<i>89-112</i>	<b>%REC</b>	<i>1</i>	<i>20-May-2022 18:28</i>

Note: See Qualifiers Page for a list of qualifiers and their explanation.



ALS Houston, US

Date: 03-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22050817

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> R409050 ( 0 )		<b>Test Name :</b> VOLATILES ORGANICS BY METHOD 8260C			<b>Matrix:</b> Water	
HS22050817-01	LH18/24-SP650_051722	17 May 2022 14:00			20 May 2022 18:05	1
HS22050817-02	Trip Blank	17 May 2022 00:00			20 May 2022 18:28	1
<b>Batch ID:</b> R409911 ( 0 )		<b>Test Name :</b> ANIONS BY SW9056A			<b>Matrix:</b> Water	
HS22050817-01	LH18/24-SP650_051722	17 May 2022 14:00			02 Jun 2022 15:11	20
HS22050817-01	LH18/24-SP650_051722	17 May 2022 14:00			02 Jun 2022 15:06	1

## ALS Houston, US

Date: 03-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22050817

## QC BATCH REPORT

Batch ID: R409050 ( 0 )		Instrument: VOA9		Method: VOLATILES ORGANICS BY METHOD 8260C					
<b>MBLK</b>	Sample ID: VBLKW-220520	Units: ug/L		Analysis Date: 20-May-2022 12:08					
Client ID:	Run ID: VOA9_409050		SeqNo: 6656989		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	0.50	1.0							U
1,1,1-Trichloroethane	0.50	1.0							U
1,1,2,2-Tetrachloroethane	0.50	1.0							U
1,1,2-Trichloroethane	0.50	1.0							U
1,1-Dichloroethane	0.50	1.0							U
1,1-Dichloroethene	0.50	1.0							U
1,1-Dichloropropene	0.50	1.0							U
1,2,3-Trichlorobenzene	1.0	1.0							U
1,2,3-Trichloropropane	1.0	1.0							U
1,2,4-Trichlorobenzene	1.0	1.0							U
1,2,4-Trimethylbenzene	1.0	1.0							U
1,2-Dibromo-3-chloropropane	0.50	1.0							U
1,2-Dibromoethane	0.50	1.0							U
1,2-Dichlorobenzene	0.50	1.0							U
1,2-Dichloroethane	0.50	1.0							U
1,2-Dichloropropane	0.50	1.0							U
1,3,5-Trimethylbenzene	1.0	1.0							U
1,3-Dichlorobenzene	0.50	1.0							U
1,3-Dichloropropane	1.0	1.0							U
1,4-Dichlorobenzene	0.50	1.0							U
2,2-Dichloropropane	0.50	1.0							U
2-Butanone	1.0	2.0							U
2-Chlorotoluene	1.0	1.0							U
2-Hexanone	2.0	2.0							U
4-Chlorotoluene	1.0	1.0							U
4-Isopropyltoluene	1.0	1.0							U
4-Methyl-2-pentanone	2.0	2.0							U
Acetone	2.0	2.0							U
Benzene	0.50	1.0							U
Bromobenzene	1.0	1.0							U
Bromochloromethane	0.50	1.0							U
Bromodichloromethane	0.50	1.0							U
Bromoform	0.50	1.0							U
Bromomethane	1.0	1.0							U

## ALS Houston, US

Date: 03-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22050817

## QC BATCH REPORT

Batch ID: R409050 ( 0 )		Instrument: VOA9		Method: VOLATILES ORGANICS BY METHOD 8260C					
<b>MBLK</b>	Sample ID: VBLKW-220520	Units: ug/L		Analysis Date: 20-May-2022 12:08					
Client ID:	Run ID: VOA9_409050	SeqNo: 6656989		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	2.0	2.0							U
Carbon tetrachloride	0.50	1.0							U
Chlorobenzene	0.50	1.0							U
Chloroethane	0.50	1.0							U
Chloroform	0.50	1.0							U
Chloromethane	0.50	1.0							U
cis-1,2-Dichloroethene	0.50	1.0							U
cis-1,3-Dichloropropene	0.50	1.0							U
Dibromochloromethane	0.50	1.0							U
Dibromomethane	0.50	1.0							U
Dichlorodifluoromethane	0.50	1.0							U
Ethylbenzene	0.50	1.0							U
Hexachlorobutadiene	1.0	1.0							U
Isopropylbenzene	0.50	1.0							U
m,p-Xylene	1.0	2.0							U
Methylene chloride	2.0	2.0							U
Naphthalene	1.0	1.0							U
n-Butylbenzene	1.0	1.0							U
n-Propylbenzene	1.0	1.0							U
o-Xylene	0.50	1.0							U
sec-Butylbenzene	1.0	1.0							U
Styrene	0.50	1.0							U
tert-Butylbenzene	1.0	1.0							U
Tetrachloroethene	0.50	1.0							U
Toluene	0.50	1.0							U
trans-1,2-Dichloroethene	0.50	1.0							U
trans-1,3-Dichloropropene	0.50	1.0							U
Trichloroethene	0.50	1.0							U
Trichlorofluoromethane	0.50	1.0							U
Vinyl chloride	0.50	1.0							U
Surr: 1,2-Dichloroethane-d4	49.33	1.0	50	0	98.7	81 - 118			
Surr: 4-Bromofluorobenzene	44.61	1.0	50	0	89.2	85 - 114			
Surr: Dibromofluoromethane	46.48	1.0	50	0	93.0	80 - 119			
Surr: Toluene-d8	55.38	1.0	50	0	111	89 - 112			

## ALS Houston, US

Date: 03-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22050817

## QC BATCH REPORT

Batch ID: R409050 ( 0 )		Instrument: VOA9		Method: VOLATILES ORGANICS BY METHOD 8260C						
LCS		Sample ID: VLCSW-220520		Units: ug/L		Analysis Date: 20-May-2022 11:23				
Client ID:		Run ID: VOA9_409050		SeqNo: 6656988		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	17.9	1.0	20	0	89.5	78 - 124				
1,1,1-Trichloroethane	18.05	1.0	20	0	90.2	74 - 131				
1,1,2,2-Tetrachloroethane	20.47	1.0	20	0	102	71 - 121				
1,1,2-Trichloroethane	18.93	1.0	20	0	94.7	80 - 119				
1,1-Dichloroethane	17.87	1.0	20	0	89.3	77 - 125				
1,1-Dichloroethene	17.78	1.0	20	0	88.9	71 - 131				
1,1-Dichloropropene	18.21	1.0	20	0	91.0	78 - 125				
1,2,3-Trichlorobenzene	17.19	1.0	20	0	86.0	69 - 129				
1,2,3-Trichloropropane	18.21	1.0	20	0	91.0	73 - 122				
1,2,4-Trichlorobenzene	16.17	1.0	20	0	80.8	69 - 130				
1,2,4-Trimethylbenzene	17.84	1.0	20	0	89.2	76 - 124				
1,2-Dibromo-3-chloropropane	15.56	1.0	20	0	77.8	62 - 128				
1,2-Dibromoethane	18.98	1.0	20	0	94.9	77 - 121				
1,2-Dichlorobenzene	18.41	1.0	20	0	92.0	80 - 119				
1,2-Dichloroethane	18.59	1.0	20	0	92.9	73 - 128				
1,2-Dichloropropane	19.39	1.0	20	0	96.9	78 - 122				
1,3,5-Trimethylbenzene	17.46	1.0	20	0	87.3	75 - 124				
1,3-Dichlorobenzene	18.44	1.0	20	0	92.2	80 - 119				
1,3-Dichloropropane	19.21	1.0	20	0	96.0	80 - 119				
1,4-Dichlorobenzene	17.71	1.0	20	0	88.5	79 - 118				
2,2-Dichloropropane	18.79	1.0	20	0	94.0	60 - 139				
2-Butanone	36.67	2.0	40	0	91.7	56 - 143				
2-Chlorotoluene	20.53	1.0	20	0	103	79 - 122				
2-Hexanone	35.86	2.0	40	0	89.6	57 - 139				
4-Chlorotoluene	19.77	1.0	20	0	98.9	78 - 122				
4-Isopropyltoluene	15.54	1.0	20	0	77.7	77 - 127				
4-Methyl-2-pentanone	37.27	2.0	40	0	93.2	67 - 130				
Acetone	40.32	2.0	40	0	101	39 - 160				
Benzene	19.24	1.0	20	0	96.2	79 - 120				
Bromobenzene	19.22	1.0	20	0	96.1	80 - 120				
Bromochloromethane	18.28	1.0	20	0	91.4	78 - 123				
Bromodichloromethane	18.76	1.0	20	0	93.8	79 - 125				
Bromoform	14.72	1.0	20	0	73.6	66 - 130				
Bromomethane	22.65	1.0	20	0	113	53 - 141				

## ALS Houston, US

Date: 03-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22050817

## QC BATCH REPORT

Batch ID: R409050 ( 0 )		Instrument: VOA9		Method: VOLATILES ORGANICS BY METHOD 8260C					
LCS		Sample ID: VLCSW-220520		Units: ug/L		Analysis Date: 20-May-2022 11:23			
Client ID:		Run ID: VOA9_409050		SeqNo: 6656988		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	37.21	2.0	40	0	93.0	64 - 133			
Carbon tetrachloride	15.69	1.0	20	0	78.5	72 - 136			
Chlorobenzene	18.73	1.0	20	0	93.7	82 - 118			
Chloroethane	17.89	1.0	20	0	89.4	60 - 138			
Chloroform	18.25	1.0	20	0	91.2	79 - 124			
Chloromethane	18.73	1.0	20	0	93.7	50 - 139			
cis-1,2-Dichloroethene	18.25	1.0	20	0	91.2	78 - 123			
cis-1,3-Dichloropropene	17.17	1.0	20	0	85.8	75 - 124			
Dibromochloromethane	16.45	1.0	20	0	82.3	74 - 126			
Dibromomethane	19.04	1.0	20	0	95.2	79 - 123			
Dichlorodifluoromethane	19.26	1.0	20	0	96.3	32 - 152			
Ethylbenzene	19.03	1.0	20	0	95.2	79 - 121			
Hexachlorobutadiene	18.44	1.0	20	0	92.2	66 - 134			
Isopropylbenzene	18.6	1.0	20	0	93.0	72 - 131			
m,p-Xylene	38.45	2.0	40	0	96.1	80 - 121			
Methylene chloride	18.68	2.0	20	0	93.4	74 - 124			
Naphthalene	16.48	1.0	20	0	82.4	61 - 128			
n-Butylbenzene	16.8	1.0	20	0	84.0	75 - 128			
n-Propylbenzene	18.62	1.0	20	0	93.1	76 - 126			
o-Xylene	19.97	1.0	20	0	99.9	78 - 122			
sec-Butylbenzene	15.46	1.0	20	0	77.3	77 - 126			
Styrene	17.46	1.0	20	0	87.3	78 - 123			
tert-Butylbenzene	17.59	1.0	20	0	88.0	78 - 124			
Tetrachloroethene	19.56	1.0	20	0	97.8	74 - 129			
Toluene	20.62	1.0	20	0	103	80 - 121			
trans-1,2-Dichloroethene	17.69	1.0	20	0	88.4	75 - 124			
trans-1,3-Dichloropropene	16.57	1.0	20	0	82.8	73 - 127			
Trichloroethene	18.54	1.0	20	0	92.7	79 - 123			
Trichlorofluoromethane	17.67	1.0	20	0	88.4	65 - 141			
Vinyl chloride	18.96	1.0	20	0	94.8	58 - 137			
Surr: 1,2-Dichloroethane-d4	50.26	1.0	50	0	101	81 - 118			
Surr: 4-Bromofluorobenzene	49.33	1.0	50	0	98.7	85 - 114			
Surr: Dibromofluoromethane	48.96	1.0	50	0	97.9	80 - 119			
Surr: Toluene-d8	51.83	1.0	50	0	104	89 - 112			

## ALS Houston, US

Date: 03-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22050817

## QC BATCH REPORT

Batch ID: R409050 ( 0 )		Instrument: VOA9		Method: VOLATILES ORGANICS BY METHOD 8260C					
MS		Sample ID: HS22050805-04MS		Units: ug/L		Analysis Date: 20-May-2022 13:37			
Client ID:		Run ID: VOA9_409050		SeqNo: 6656993		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	17.37	1.0	20	0	86.9	78 - 124			
1,1,1-Trichloroethane	16.7	1.0	20	0	83.5	74 - 131			
1,1,2,2-Tetrachloroethane	18.74	1.0	20	0	93.7	71 - 121			
1,1,2-Trichloroethane	17.28	1.0	20	0	86.4	80 - 119			
1,1-Dichloroethane	16	1.0	20	0	80.0	77 - 125			
1,1-Dichloroethene	16.44	1.0	20	0	82.2	71 - 131			
1,1-Dichloropropene	17.72	1.0	20	0	88.6	78 - 125			
1,2,3-Trichlorobenzene	14.56	1.0	20	0	72.8	69 - 129			
1,2,3-Trichloropropane	16.42	1.0	20	0	82.1	73 - 122			
1,2,4-Trichlorobenzene	14.12	1.0	20	0	70.6	69 - 130			
1,2,4-Trimethylbenzene	16.68	1.0	20	0	83.4	76 - 124			
1,2-Dibromo-3-chloropropane	14.41	1.0	20	0	72.1	62 - 128			
1,2-Dibromoethane	17.65	1.0	20	0	88.3	77 - 121			
1,2-Dichlorobenzene	17.03	1.0	20	0	85.2	80 - 119			
1,2-Dichloroethane	16.79	1.0	20	0	84.0	73 - 128			
1,2-Dichloropropane	17.36	1.0	20	0	86.8	78 - 122			
1,3,5-Trimethylbenzene	16.97	1.0	20	0	84.8	75 - 124			
1,3-Dichlorobenzene	17.38	1.0	20	0	86.9	80 - 119			
1,3-Dichloropropane	17.79	1.0	20	0	88.9	80 - 119			
1,4-Dichlorobenzene	16.6	1.0	20	0	83.0	79 - 118			
2,2-Dichloropropane	16.77	1.0	20	0	83.8	60 - 139			
2-Butanone	27.85	2.0	40	0	69.6	56 - 143			
2-Chlorotoluene	19.54	1.0	20	0	97.7	79 - 122			
2-Hexanone	32.12	2.0	40	0	80.3	57 - 139			
4-Chlorotoluene	19.01	1.0	20	0	95.0	78 - 122			
4-Isopropyltoluene	15.45	1.0	20	0	77.2	77 - 127			
4-Methyl-2-pentanone	32.6	2.0	40	0	81.5	67 - 130			
Acetone	26.17	2.0	40	0	65.4	39 - 160			
Benzene	17.41	1.0	20	0	87.0	79 - 120			
Bromobenzene	17.89	1.0	20	0	89.5	80 - 120			
Bromochloromethane	15.69	1.0	20	0	78.4	78 - 123			
Bromodichloromethane	16.74	1.0	20	0	83.7	79 - 125			
Bromoform	13.99	1.0	20	0	70.0	66 - 130			
Bromomethane	18.99	1.0	20	0	94.9	53 - 141			

## ALS Houston, US

Date: 03-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22050817

## QC BATCH REPORT

Batch ID: R409050 ( 0 )		Instrument: VOA9		Method: VOLATILES ORGANICS BY METHOD 8260C					
MS		Sample ID: HS22050805-04MS		Units: ug/L		Analysis Date: 20-May-2022 13:37			
Client ID:		Run ID: VOA9_409050		SeqNo: 6656993		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	32.44	2.0	40	0	81.1	64 - 133			
Carbon tetrachloride	16.12	1.0	20	0	80.6	72 - 136			
Chlorobenzene	17.82	1.0	20	0	89.1	82 - 118			
Chloroethane	15.69	1.0	20	0	78.5	60 - 138			
Chloroform	16.12	1.0	20	0	80.6	79 - 124			
Chloromethane	15.39	1.0	20	0	76.9	50 - 139			
cis-1,2-Dichloroethene	15.78	1.0	20	0	78.9	78 - 123			
cis-1,3-Dichloropropene	14.66	1.0	20	0	73.3	75 - 124			S
Dibromochloromethane	15.38	1.0	20	0	76.9	74 - 126			
Dibromomethane	16.62	1.0	20	0	83.1	79 - 123			
Dichlorodifluoromethane	13.13	1.0	20	0	65.6	32 - 152			
Ethylbenzene	18.53	1.0	20	0	92.6	79 - 121			
Hexachlorobutadiene	17.51	1.0	20	0	87.5	66 - 134			
Isopropylbenzene	19.05	1.0	20	0	95.2	72 - 131			
m,p-Xylene	38.15	2.0	40	0	95.4	80 - 121			
Methylene chloride	15.64	2.0	20	0	78.2	74 - 124			
Naphthalene	13.65	1.0	20	0	68.2	61 - 128			
n-Butylbenzene	16.44	1.0	20	0	82.2	75 - 128			
n-Propylbenzene	18.21	1.0	20	0	91.0	76 - 126			
o-Xylene	19.13	1.0	20	0	95.7	78 - 122			
sec-Butylbenzene	15.35	1.0	20	0	76.7	77 - 126			S
Styrene	16.58	1.0	20	0	82.9	78 - 123			
tert-Butylbenzene	17.27	1.0	20	0	86.3	78 - 124			
Tetrachloroethene	19.33	1.0	20	0	96.6	74 - 129			
Toluene	19.75	1.0	20	0	98.8	80 - 121			
trans-1,2-Dichloroethene	16.02	1.0	20	0	80.1	75 - 124			
trans-1,3-Dichloropropene	14.89	1.0	20	0	74.4	73 - 127			
Trichloroethene	18.75	1.0	20	0	93.7	79 - 123			
Trichlorofluoromethane	16.76	1.0	20	0	83.8	65 - 141			
Vinyl chloride	16.24	1.0	20	0	81.2	58 - 137			
Surr: 1,2-Dichloroethane-d4	45.5	1.0	50	0	91.0	81 - 118			
Surr: 4-Bromofluorobenzene	50.87	1.0	50	0	102	85 - 114			
Surr: Dibromofluoromethane	44.61	1.0	50	0	89.2	80 - 119			
Surr: Toluene-d8	54.9	1.0	50	0	110	89 - 112			

## ALS Houston, US

Date: 03-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22050817

## QC BATCH REPORT

Batch ID: R409050 ( 0 )		Instrument: VOA9		Method: VOLATILES ORGANICS BY METHOD 8260C					
MSD		Sample ID: HS22050805-04MSD		Units: ug/L		Analysis Date: 20-May-2022 14:00			
Client ID:		Run ID: VOA9_409050		SeqNo: 6656994		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	16.79	1.0	20	0	83.9	78 - 124	17.37	3.44	20
1,1,1-Trichloroethane	16.48	1.0	20	0	82.4	74 - 131	16.7	1.33	20
1,1,2,2-Tetrachloroethane	19.01	1.0	20	0	95.0	71 - 121	18.74	1.41	20
1,1,2-Trichloroethane	17.69	1.0	20	0	88.4	80 - 119	17.28	2.33	20
1,1-Dichloroethane	15.48	1.0	20	0	77.4	77 - 125	16	3.31	20
1,1-Dichloroethene	15.81	1.0	20	0	79.1	71 - 131	16.44	3.89	20
1,1-Dichloropropene	17.63	1.0	20	0	88.2	78 - 125	17.72	0.491	20
1,2,3-Trichlorobenzene	17.22	1.0	20	0	86.1	69 - 129	14.56	16.8	20
1,2,3-Trichloropropane	17.11	1.0	20	0	85.5	73 - 122	16.42	4.11	20
1,2,4-Trichlorobenzene	16.13	1.0	20	0	80.7	69 - 130	14.12	13.3	20
1,2,4-Trimethylbenzene	17.5	1.0	20	0	87.5	76 - 124	16.68	4.75	20
1,2-Dibromo-3-chloropropane	15.11	1.0	20	0	75.5	62 - 128	14.41	4.73	20
1,2-Dibromoethane	17.53	1.0	20	0	87.7	77 - 121	17.65	0.676	20
1,2-Dichlorobenzene	17.55	1.0	20	0	87.7	80 - 119	17.03	2.98	20
1,2-Dichloroethane	16.91	1.0	20	0	84.5	73 - 128	16.79	0.668	20
1,2-Dichloropropane	17.3	1.0	20	0	86.5	78 - 122	17.36	0.369	20
1,3,5-Trimethylbenzene	17.46	1.0	20	0	87.3	75 - 124	16.97	2.86	20
1,3-Dichlorobenzene	17.89	1.0	20	0	89.4	80 - 119	17.38	2.89	20
1,3-Dichloropropane	17.61	1.0	20	0	88.0	80 - 119	17.79	1.03	20
1,4-Dichlorobenzene	17.15	1.0	20	0	85.7	79 - 118	16.6	3.28	20
2,2-Dichloropropane	16.38	1.0	20	0	81.9	60 - 139	16.77	2.3	20
2-Butanone	28.54	2.0	40	0	71.4	56 - 143	27.85	2.46	20
2-Chlorotoluene	19.79	1.0	20	0	99.0	79 - 122	19.54	1.29	20
2-Hexanone	33.36	2.0	40	0	83.4	57 - 139	32.12	3.78	20
4-Chlorotoluene	19.41	1.0	20	0	97.1	78 - 122	19.01	2.12	20
4-Isopropyltoluene	16.32	1.0	20	0	81.6	77 - 127	15.45	5.5	20
4-Methyl-2-pentanone	34.73	2.0	40	0	86.8	67 - 130	32.6	6.34	20
Acetone	26.05	2.0	40	0	65.1	39 - 160	26.17	0.487	20
Benzene	17.52	1.0	20	0	87.6	79 - 120	17.41	0.647	20
Bromobenzene	18.34	1.0	20	0	91.7	80 - 120	17.89	2.49	20
Bromochloromethane	15.42	1.0	20	0	77.1	78 - 123	15.69	1.73	20 S
Bromodichloromethane	16.3	1.0	20	0	81.5	79 - 125	16.74	2.69	20
Bromoform	14.03	1.0	20	0	70.1	66 - 130	13.99	0.254	20
Bromomethane	18.26	1.0	20	0	91.3	53 - 141	18.99	3.88	20



## ALS Houston, US

Date: 03-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22050817

## QC BATCH REPORT

Batch ID: R409050 ( 0 )		Instrument: VOA9		Method: VOLATILES ORGANICS BY METHOD 8260C					
MSD		Sample ID: HS22050805-04MSD		Units: ug/L		Analysis Date: 20-May-2022 14:00			
Client ID:		Run ID: VOA9_409050		SeqNo: 6656994		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	32.27	2.0	40	0	80.7	64 - 133	32.44	0.532	20
Carbon tetrachloride	16.1	1.0	20	0	80.5	72 - 136	16.12	0.131	20
Chlorobenzene	17.34	1.0	20	0	86.7	82 - 118	17.82	2.74	20
Chloroethane	15.28	1.0	20	0	76.4	60 - 138	15.69	2.63	20
Chloroform	15.72	1.0	20	0	78.6	79 - 124	16.12	2.48	20 S
Chloromethane	15.03	1.0	20	0	75.2	50 - 139	15.39	2.34	20
cis-1,2-Dichloroethene	15.64	1.0	20	0	78.2	78 - 123	15.78	0.893	20
cis-1,3-Dichloropropene	14.89	1.0	20	0	74.4	75 - 124	14.66	1.52	20 S
Dibromochloromethane	15.22	1.0	20	0	76.1	74 - 126	15.38	1.02	20
Dibromomethane	16.53	1.0	20	0	82.7	79 - 123	16.62	0.555	20
Dichlorodifluoromethane	12.68	1.0	20	0	63.4	32 - 152	13.13	3.46	20
Ethylbenzene	18.55	1.0	20	0	92.7	79 - 121	18.53	0.103	20
Hexachlorobutadiene	18.3	1.0	20	0	91.5	66 - 134	17.51	4.44	20
Isopropylbenzene	19.07	1.0	20	0	95.4	72 - 131	19.05	0.144	20
m,p-Xylene	37.55	2.0	40	0	93.9	80 - 121	38.15	1.58	20
Methylene chloride	15.08	2.0	20	0	75.4	74 - 124	15.64	3.6	20
Naphthalene	16.58	1.0	20	0	82.9	61 - 128	13.65	19.4	20
n-Butylbenzene	17.95	1.0	20	0	89.8	75 - 128	16.44	8.83	20
n-Propylbenzene	19.29	1.0	20	0	96.5	76 - 126	18.21	5.79	20
o-Xylene	19.02	1.0	20	0	95.1	78 - 122	19.13	0.593	20
sec-Butylbenzene	16.62	1.0	20	0	83.1	77 - 126	15.35	8	20
Styrene	16.87	1.0	20	0	84.3	78 - 123	16.58	1.75	20
tert-Butylbenzene	18.53	1.0	20	0	92.6	78 - 124	17.27	7.03	20
Tetrachloroethene	19.39	1.0	20	0	96.9	74 - 129	19.33	0.303	20
Toluene	19.4	1.0	20	0	97.0	80 - 121	19.75	1.8	20
trans-1,2-Dichloroethene	15.7	1.0	20	0	78.5	75 - 124	16.02	2.05	20
trans-1,3-Dichloropropene	15.19	1.0	20	0	76.0	73 - 127	14.89	2.03	20
Trichloroethene	17.92	1.0	20	0	89.6	79 - 123	18.75	4.52	20
Trichlorofluoromethane	16.2	1.0	20	0	81.0	65 - 141	16.76	3.36	20
Vinyl chloride	15.85	1.0	20	0	79.3	58 - 137	16.24	2.43	20
Surr: 1,2-Dichloroethane-d4	45.06	1.0	50	0	90.1	81 - 118	45.5	0.984	20
Surr: 4-Bromofluorobenzene	49.86	1.0	50	0	99.7	85 - 114	50.87	2.01	20
Surr: Dibromofluoromethane	44.44	1.0	50	0	88.9	80 - 119	44.61	0.375	20
Surr: Toluene-d8	54.85	1.0	50	0	110	89 - 112	54.9	0.0857	20

ALS Houston, US

Date: 03-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22050817

**QC BATCH REPORT****Batch ID:** R409050 ( 0 )**Instrument:** VOA9**Method:** VOLATILES ORGANICS BY METHOD  
8260C

The following samples were analyzed in this batch:

HS22050817-01	HS22050817-02
---------------	---------------

## ALS Houston, US

Date: 03-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22050817

**QC BATCH REPORT**

Batch ID: R409911 ( 0 )		Instrument: ICS-Integrion		Method: ANIONS BY SW9056A					
<b>MBLK</b>	Sample ID: <b>MBLK</b>	Units: <b>mg/L</b>		Analysis Date: <b>02-Jun-2022 14:34</b>					
Client ID:	Run ID: <b>ICS-Integrion_409911</b>		SeqNo: <b>6676526</b>		PrepDate:		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	0.500	0.500							U
Sulfate	0.500	0.500							U

<b>LCS</b>	Sample ID: <b>LCS</b>	Units: <b>mg/L</b>		Analysis Date: <b>02-Jun-2022 14:39</b>					
Client ID:	Run ID: <b>ICS-Integrion_409911</b>		SeqNo: <b>6676527</b>		PrepDate:		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	20.09	0.500	20	0	100	80 - 120			
Sulfate	19.63	0.500	20	0	98.1	80 - 120			

<b>MS</b>	Sample ID: <b>HS22051205-01MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>02-Jun-2022 15:32</b>					
Client ID:	Run ID: <b>ICS-Integrion_409911</b>		SeqNo: <b>6676533</b>		PrepDate:		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	297.7	0.500	10	297	6.93	80 - 120			SEO
Sulfate	36.6	0.500	10	26.74	98.7	80 - 120			

<b>MSD</b>	Sample ID: <b>HS22051205-01MSD</b>	Units: <b>mg/L</b>		Analysis Date: <b>02-Jun-2022 15:37</b>					
Client ID:	Run ID: <b>ICS-Integrion_409911</b>		SeqNo: <b>6676534</b>		PrepDate:		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	297	0.500	10	297	0.700	80 - 120	297.7	0.21	20 SEO
Sulfate	36.53	0.500	10	26.74	98.0	80 - 120	36.6	0.19	20

The following samples were analyzed in this batch: HS22050817-01

**ALS Houston, US**

Date: 03-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22050817

**QUALIFIERS,  
ACRONYMS, UNITS**

<b>Qualifier</b>	<b>Description</b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

<b>Acronym</b>	<b>Description</b>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

<b>Unit Reported</b>	<b>Description</b>
mg/L	Milligrams per Liter

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**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

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Agency	Number	Expire Date
Dept of Defense	L21-682	31-Dec-2023
Florida	E87611-34	30-Jun-2022
Illinois	2000322022-9	09-May-2023
Kansas	E-10352 2021-2022	31-Jul-2022
Louisiana	03087, 2021-2022	30-Jun-2022
Maryland	343, 2021-2022	30-Jun-2022
North Carolina	624-2022	31-Dec-2022
Oklahoma	2021-080	31-Aug-2022
Texas	T104704231-22-29	30-Apr-2023
Utah	TX026932021-12	30-Jul-2022

ALS Houston, US

Date: 03-Jun-22

## Sample Receipt Checklist

Work Order ID: HS22050817

Date/Time Received: **18-May-2022 09:40**

Client Name: Bhate Environmental

Received by: **Pablo Martinez**Completed By: /S/ Pablo Martinez

18-May-2022 16:08

eSignature

Date/Time

Reviewed by: /S/ Dane J. Wacasey

26-May-2022 19:33

eSignature

Date/Time

Matrices: **WATER**Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?

Yes ☒No ☐Not Present ☐

Custody seals intact on shipping container/cooler?

Yes ☒No ☐Not Present ☐

Custody seals intact on sample bottles?

Yes ☐No ☐Not Present ☒

VOA/TX1005/TX1006 Solids in hermetically sealed vials?

Yes ☐No ☐Not Present ☒

Chain of custody present?

Yes ☒No ☐

1 Page(s)

Chain of custody signed when relinquished and received?

Yes ☒No ☐

COC IDs: CLIENT

Samplers name present on COC?

Yes ☒No ☐

Chain of custody agrees with sample labels?

Yes ☒No ☐

Samples in proper container/bottle?

Yes ☒No ☐

Sample containers intact?

Yes ☒No ☐

Sufficient sample volume for indicated test?

Yes ☒No ☐

All samples received within holding time?

Yes ☒No ☐

Container/Temp Blank temperature in compliance?

Yes ☒No ☐

Temperature(s)/Thermometer(s):

0.7°C/1.2°C UC/C

IR 31

Cooler(s)/Kit(s):

48808

Date/Time sample(s) sent to storage:

5/18/22 16:15

Water - VOA vials have zero headspace?

Yes ☒No ☐No VOA vials submitted ☐

Water - pH acceptable upon receipt?

Yes ☐No ☐N/A ☒

pH adjusted?

Yes ☐No ☐N/A ☒

pH adjusted by:

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:



Comments:

Corrective Action:

## CHAIN OF CUSTODY

Name Of Lab Shipping To: ALS 10450 Stancliff Rd. Suite 210, Houston, Tx, 77099 ATTN: Ragen Gigi

Page 1 of 1[illegible]

 <b>ALS</b> 10450 Standcliff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5656 Fax. +1 281 530 5667	<b>CUSTODY SEAL</b>		Seal Broken By:  Date: 5/12/02
	Date: 5/10/02	Time: 1430	
	Name: SCOTT BOSS		
	Company: RUTHERFORD		

I KK # 9473 0838 9510  
 Federal  
**AB SGRA** 48808 77099  
 TX-US  
 IAH



3923287 17May2007 UGGA 56065/1006/C088





May 31, 2022

Service Request No:E2200480

Dane Wacasey  
ALS Group USA, Corp.  
10450 Stancliff Road  
Suite 210  
Houston, TX 77099-4338

**Laboratory Results for: HS22051188**

Dear Dane,

Enclosed are the results of the sample(s) submitted to our laboratory May 26, 2022  
For your reference, these analyses have been assigned our service request number **E2200480**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current TNI standards, where applicable, and except as noted in the laboratory case narrative provided. All results are intended to be considered in their entirety and ALS Environmental is not responsible for use of less than the complete final report. Results apply only to the items submitted to the laboratory, as received for analysis. In accordance with the current TNI Standard, a statement on the estimated uncertainty of measurement of any quantitative analysis will be supplied upon request.

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Corey Grandits  
Project Manager

ADDRESS 10450 Stancliff Rd., Suite 210, Houston, TX 77099  
PHONE +1 281 530 5656 | FAX +1 281 530 5887  
ALS Group USA, Corp.  
dba ALS Environmental



# Certificate of Analysis

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

**ALS Environmental**

**Client:** ALS-Houston  
**Project:** HS22051188  
**Sample Matrix:** W

**Service Request No.:** E2200480  
**Date Received:** 05/26/22

**CASE NARRATIVE**

All analyses were performed in adherence to the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II. When appropriate to the method, method blank results have been reported with each analytical test.

**Sample Receipt**

Two samples were received for analysis at ALS Environmental in Houston on 05/26/22.

The samples were received in good condition and are consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

**Data Validation Notes and Discussion****Precision and Accuracy:**

EQ2200219: Laboratory Control Spike/Duplicate Laboratory Control Spike (LCS/DLCS) samples were analyzed and reported in lieu of a MS/MSD for this extraction batch. The LCS-DLCS recoveries met acceptance criteria.

DoD Certification is held for the method/matrix/analytes provided in this report.

*The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.*

*Use of ALS group USA Corp dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.*

**Client:** ALS Environmental - US  
**Project:** HS22051188

**Service Request:**E2200480

**SAMPLE CROSS-REFERENCE**

<u>SAMPLE #</u>	<u>CLIENT SAMPLE ID</u>	<u>DATE</u>	<u>TIME</u>
E2200480-001	LH18/24-SP650_052422_AIX	5/24/2022	1400
E2200480-002	LH18/24-SP650_052422_BIX	5/24/2022	1400

**Service Request Summary**

**Folder #:** E2200480  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22051188  
**Project Number:**  
  
**Report To:** Dane Wacasey  
 ALS Group USA, Corp.  
 10450 Stancliff Road  
 Houston, TX 77099-4338  
 USA  
**Phone Number:** 281-575-2190  
**Cell Number:**  
**Fax Number:** 281-530-5887  
**E-mail:** dane.wacasey@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 05/26/22  
**Internal Due Date:** 5/31/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22051188  
**EDD:** No EDD Specified

2 120 mL-Plastic Bottle Natural WM Unpreserved

**Location:** EHRMS-AirArch 1

**Pressure Gas:**

**Rush**

				HOUSTON
Lab Samp No.	Client Samp No	Matrix	Collected	CIO4 DOD/6850
E2200480-001	LH18/24-SP650_052422_AIX	Water	05/24/22 1400	IV
E2200480-002	LH18/24-SP650_052422_BIX	Water	05/24/22 1400	IV

**Service Request Summary**

**Folder #:** E2200480  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22051188  
**Project Number:**  
  
**Report To:** Dane Wacasey  
 ALS Group USA, Corp.  
 10450 Stancliff Road  
 Houston, TX 77099-4338  
 USA  
**Phone Number:** 281-575-2190  
**Cell Number:**  
**Fax Number:** 281-530-5887  
**E-mail:** dane.wacasey@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 05/26/22  
**Internal Due Date:** 5/31/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22051188  
**EDD:** No EDD Specified

2 120 mL-Plastic Bottle Natural WM Unpreserved  
**Location:** EHRMS-AirArch 1  
**Pressure Gas:**  
**Rush**

**Test Comments:**

Group	Test/Method	Samples	Comments
Semivoa GCMS	CIO4 DOD/6850	2	IV DUE 6/17

## Data Qualifiers

### Lab Standard

- + Possible Tedlar bag artifact.
- A TIC is a suspected aldol-condensation product
- B Analyte found in the associated method blank as well as in the sample.
- BC Reported results are not blank corrected.
- BH The back section of the tube yielded higher results than the front.
- BT Results indicated possible breakthrough; back section  $\geq 10\%$  front section.
- C Result identification confirmed.
- D Compound identified in an analysis at a secondary dilution factor
- D Spike was diluted out
- DE Reported results are corrected for desorption efficiency.
- E Estimated value. Concentration above calibration range
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- H1 Sample analysis performed past holding time. See case narrative.
- H2 Initial analysis within holding time. Reanalysis for the required dilution was past holding time.
- H3 Sample was received and analyzed past holding time.
- H4 Sample was extracted past required extraction holding time, but analyzed within analysis holding time. See case narrative.
- I Internal standard not within the specified limits. See case narrative.
- J Estimated Value. Concentration found below MRL.
- K (Auto) The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- K A deflection in the QC ion may indicate interference with the quantitation of this ion. The concentration of this analyte should be considered as an estimate.
- K Analyte was detected above the method reporting limit prior to normalization.
- K The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- L1 Laboratory control sample recovery outside the specified limits; results may be biased high.
- L2 Laboratory control sample recovery outside the specified limits; results may be biased low.
- L3 Laboratory control sample recovery outside the specified limits.
- M Matrix interference; results may be biased high.
- M The duplicate injection precision not met.
- M1 Matrix interference due to coelution with a non-target compound; results may be biased high.

## Data Qualifiers

### Lab Standard

- N Presumptive evidence of a compound for TICs that have been identified based on a mass spectral library search.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- P Indicates chlorodiphenyl ether interference present at the retention time of the target compound.
- P Pesticide/Aroclor target analyte > 40% difference for detected concentrations between GC columns
- Q Indicates as estimated value because the P and P + 2 theoretical abundance ratio does not meet method criteria.
- R Duplicate Precision not met.
- R1 Duplicate precision not within the specified limits; however, the results are below the MRL and considered estimated.
- S Surrogate recovery not within specified limits.
- S The reported value was determined by the Method of Standard Additions (MSA).
- T Analyte is a tentatively identified compound, result is estimated.
- U Compound was analyzed for, but was not detected (ND).
- V1 The continuing calibration verification standard was outside (biased high) the specified limits for this compound.
- V2 The continuing calibration verification standard was outside (biased low) the specified limits for this compound.
- W Result quantified, but the corresponding peak was detected outside the generated retention time window.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- X See case narrative.
- Y Recovery outside limits
- Y The chromatogram resembles a petroleum product but does not match the calibration standard.
- Z The chromatogram does not resemble a petroleum product.
- i The MRL/MDL has been elevated due to a matrix interference.



## ALS Laboratory Group

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### Acronyms

Cal	Calibration
Conc	CONCetration
Dioxin(s)	Polychlorinated dibenzo-p-dioxin(s)
EDL	Estimated Detection Limit
EMPC	Estimated Maximum Possible Concentration
Flags	Data qualifiers
Furan(s)	Polychlorinated dibenzofuran(s)
g	Grams
ICAL	Initial CALibration
ID	IDentifier
Ions	Masses monitored for the analyte during data acquisition
L	Liter (s)
LCS	Laboratory Control Sample
DLCS	Duplicate Laboratory Control Sample
MB	Method Blank
MCL	Method Calibration Limit
MDL	Method Detection Limit
mL	Milliliters
MS	Matrix Spiked sample
DMS	Duplicate Matrix Spiked sample
NO	Number of peaks meeting all identification criteria
PCDD(s)	Polychlorinated dibenzo-p-dioxin(s)
PCDF(s)	Polychlorinated dibenzofuran(s)
ppb	Parts per billion
ppm	Parts per million
ppq	Parts per quadrillion
ppt	Parts per trillion
QA	Quality Assurance
QC	Quality Control
Ratio	Ratio of areas from monitored ions for an analyte
% Rec.	Percent recovery
RPD	Relative Percent Difference
RRF	Relative Response Factor
RT	Retention Time
SDG	Sample Delivery Group
S/N	Signal-to-noise ratio
TEF	Toxicity Equivalence Factor
TEQ	Toxicity Equivalence Quotient



### State Certifications, Accreditations, and Licenses

Agency	Number	Expire Date
Department of Defense	L22-90	3/31/2024
Florida Department of Health	E87611-34	6/30/2022
Hawaii Department of Health	2022	4/30/2023
Illinois Environmental Protection Agency	2000322022-9	5/9/2023
Kansas Department of Health and Environment	E-10352 2022	7/31/2022
Louisiana Department of Environmental Quality	03087-2021	6/30/2022
Louisiana Department of Health and Hospitals	LA028	12/31/2022
Maine Department of Health and Human Services	2020016	6/5/2022
Maryland Department of the Environment	343	6/30/2022
Michigan Department of Environmental Quality	9971-2022	4/30/2023
Minnesota Department of Health	2228443	12/31/2022
Nebraska Department of Health and Human Services	NE-OS-25-13	4/30/2023
Nevada Department of Conservation and Natural Resources	TX026932022-1	7/31/2022
New Hampshire Environmental Laboratory Accreditation Program	209422	4/24/2023
New Jersey Department of Environmental Protection	TX008	6/30/2022
New York Department of Health	11707	3/31/2023
Oklahoma Department of Environmental Quality	2021-080	8/31/2022
Oregon Environmental Laboratory Accreditation Program	TX200002	5/15/2023
Pennsylvania Department of Environmental Protection	68-03441-015	6/30/2022
Perry Johnson Laboratory Accreditation	L22-91	3/31/2024
Tennessee Department of Environment and Conservation	04016-2022	4/30/2023
Texas Commission on Environmental Quality	T104704231-22-29	4/30/2023
United States Department of Agriculture	P330-19-00299	10/10/2022
Utah Department of Health Environmental Laboratory Certification	TX026932021-12	7/31/2022
Washington Department of Health	C819-2022	11/14/2022



## Chain of Custody

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)



10450 Stancliff Rd, Ste 210  
Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887  
www.alsglobal.com

## Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 18837

**SUBCONTRACT TO:**

ALS Environmental  
10450 Stancliff Road Suite 210  
Houston, TX 77084

**Phone:** +1 281 530 5656

**CUSTOMER  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Dane J. Wacasey  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Email:** Dane.Wacasey@alsglobal.com  
**Alternate  
Contact:** Jumoke M. Lawal  
**Email:** jumoke.lawal@alsglobal.com

**INVOICE  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Accounts Payable  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Reference:** HS22051188  
**TSR:** Houston House Acct

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS22051188-02	LH18/24-SP650_052422_AIX	Water	24 May 2022 14:00
	6850-Perch. DOD Level II & Level IV	in separate pdf	27 May 2022
2. HS22051188-03	LH18/24-SP650_052422_BIX	Water	24 May 2022 14:00
	6850-Perch. DOD Level II & Level IV	in separate pdf	27 May 2022

**Comments:** Please analyze for the analysis listed above.  
Send report to the emails shown above.  
RUSH 24Hr.TAT

**QC Level:** DOD IV (DoD Data Package)

Relinquished By: \_\_\_\_\_

Date/Time: \_\_\_\_\_

Received By: \_\_\_\_\_

Date/Time: 5/26/22 1414

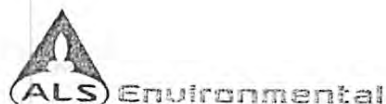
Cooler ID(s): \_\_\_\_\_

Temperature(s): \_\_\_\_\_

RIGHT SOLUTIONS | RIGHT PARTNER

26 May 2022

Page 1 of 1



## Cooler Receipt Form

Project Chemist

CA

Client/Project

ACS-H

Thermometer ID

1211

Date/Time Received:

5-26-22

Initials:

PA

Date/Time Logged in:

5-26-22

Initials

CA

1. Method of delivery: ☐ US Mail ☐ Fed Ex ☐ UPS ☐ DHL ☒ Courier ☐ Client2. Samples received in: ☒ Cooler ☐ Box ☐ Envelope ☐ Other3. Were custody seals on coolers? ☐ Yes ☒ No

Were they intact?

☐ Yes☐ No☒ N/A

Were they signed and dated?

☐ Yes☐ No☒ N/A

If yes, how many and where?

4. Packing Material: ☐ Inserts ☒ Baggies ☐ Bubble Wrap ☐ Gel Packs ☒ Wet Ice ☐ Sleeves ☐ Other

5. Foreign or Regulated Soil?

☐ Yes☐ No

Location of Sampling:

Cooler Tracking Number	COC ID	Date Opened	Time Opened	Opened By	Temp. °C	Temp Blank?
8A		5-26-22	1414	CA	25	<input checked="" type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>

6. Were custody papers properly filled out (ink, signed, dated, etc)?

☒ Yes☐ No

7. Did all bottles arrive in good condition (not broken, no signs of leakage)?

☒ Yes☐ No

8. Were all sample labels complete (i.e., sample ID, analysis, preservation, etc)?

☒ Yes☐ No

9. Were appropriate bottles/containers and volumes received for the requested tests?

☒ Yes☐ No

10. Did sample labels and tags agree with custody documents?

☒ Yes☐ No

Notes, Discrepancies, &amp; Resolutions:

Service request Label:

HS-HRMSCoolerReceipt R1.0

ALS Environmental - Houston HRMS



10450 Stancliff Rd., Suite 210  
Houston, TX 77099  
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[www.alsglobal.com](http://www.alsglobal.com)

## SAMPLE ACCEPTANCE POLICY

This policy outlines the criteria samples must meet to be accepted by ALS Environmental – Houston HRMS.

### **Cooler Custody Seals (desirable, mandatory if specified in SAP):**

- ✓ Intact on outside of cooler, signed and dated

### **Chain-of-Custody (COC) documentation (mandatory):**

The following is required on each COC:

- ✓ Sample ID, the location, date and time of collection, collector's name, preservation type, sample type, and any other special remarks concerning the sample. The COC must be completed in ink.
- ✓ Signature and date of relinquishing party.

In the absence of a COC at sample receipt, the COC will be requested from the client.

### **Sample Integrity (mandatory):**

Samples are inspected upon arrival to ensure that sample integrity was not compromised during transfer to the laboratory.

- ✓ Sample containers must arrive in good condition (not broken or leaking).
- ✓ Samples must be labeled appropriately, including Sample IDs, and requested test using durable labels and indelible ink.
- ✓ The correct type of sample bottle must be used for the method requested.
- ✓ An appropriate sample volume, or weight, must be received.
- ✓ Sample IDs and number of containers must reconcile with the COC.
- ✓ Samples must be received within the method defined holding time.

### **Temperature Requirement (varies by sample matrix):**

- ✓ Aqueous and Non-aqueous samples must be shipped and stored cold, at 0 to 6°C.
- ✓ Tissue samples must be shipped and stored frozen, at -20 to -10°C.
- ✓ Air samples are shipped and stored cold, at 0 to 6°C
- ✓ The sample temperature must be recorded on the COC

All cooler inspections are documented on the Cooler Receipt Form (CRF). A separate CRF is completed for each service request. Any samples not meeting the above criteria are noted on the CRF and the Project Manager notified. The Project Manager must resolve any sample integrity issues with the client prior to proceeding with the analysis. Such resolutions are documented in writing and filed with the project folder. Data associated with samples received outside of this acceptance policy will be qualified on the case narrative of the final report



# Preparation Information Benchsheets

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

**Preparation Information Benchsheet****Prep Run#:** 400589**Prep WorkFlow:** GenExt28Day**Status:** Prepped**Team:** Semivoa GCMS/GRIVERA**Prep Method:** Method**Prep Date/Time:** 5/27/22 08:30

#	Lab Code	Client ID	B#	Method /Test	pH	Cl	Matrix	Amt. Ext.	Sample Description
1	E2200470-001	146-RS1731-190522	.01	6850/CIO4 DOD			Water	10mL	
2	E2200480-001	LH18/24-SP650_052422_AIX	.01	6850/CIO4 DOD			Water	10mL	
3	E2200480-002	LH18/24-SP650_052422_BIX	.01	6850/CIO4 DOD			Water	10mL	
4	E2200483-001	LH18/24-SP650_052422_AIX	.01	6850/CIO4 DOD			Water	10mL	
5	E2200484-001	LH18/24-SP650_052422_AIX	.01	6850/CIO4 DOD			Water	10mL	
6	EQ2200219-01	MB		6850/CIO4 DOD			Liquid	10mL	
7	EQ2200219-02	LCS		6850/CIO4 DOD			Liquid	10mL	
8	EQ2200219-03	DLCS		6850/CIO4 DOD			Liquid	10mL	
9	R2204439-003	2205130615 B650-EFF-1	.01	6850/CIO4			Water	10mL	
10	R2204439-007	2205130633 B650-INF-1	.01	6850/CIO4			Water	10mL	
11	R2204439-009	2205130835Y PL-7-480	.01	6850/CIO4			Water	10mL	
12	R2204582-011	2205170813 MPE-1	.01	6850/CIO4			Water	10mL	
13	R2204582-030	2205170851 MPE-8	.01	6850/CIO4			Water	10mL	
14	R2204582-035	2205170923 MPE-11	.01	6850/CIO4			Water	10mL	
15	R2204616-004	2205180841 MPE-10	.01	6850/CIO4			Water	10mL	
16	R2204616-011	2205181302A NASA 4	.01	6850/CIO4			Water	10mL	

**Spiking Solutions**

Name: Perchlorate Intermediate Stock1		Inventory ID 222798		Logbook Ref: Perchlorate (1st Source)				Expires On: 10/29/2022	
EQ2200219-02	1.00µL	EQ2200219-02	1.00µL	EQ2200219-03	1.00µL	EQ2200219-03	1.00µL		

Name: Perchlorate Internal Standard 1ug/mL		Inventory ID 223118		Logbook Ref: Perchlorate Internal Standard				Expires On: 10/31/2022	
--	--	---------------------	--	--	--	--	--	------------------------	--

E2200470-001	100.00µL	E2200480-001	100.00µL	E2200480-002	100.00µL	E2200483-001	100.00µL	E2200484-001	100.00µL	EQ2200219-01	100.00µL
EQ2200219-01	100.00µL	EQ2200219-02	100.00µL	EQ2200219-02	100.00µL	EQ2200219-03	100.00µL	EQ2200219-03	100.00µL	R2204439-003	100.00µL
R2204439-007	100.00µL	R2204439-009	100.00µL	R2204582-011	100.00µL	R2204582-030	100.00µL	R2204582-035	100.00µL	R2204616-004	100.00µL
R2204616-011	100.00µL										

**Preparation Materials**

Water HPLC Grade	02/16/2022 Water (221769)	6850 Amber Glass screw vial	2mL Screw Top Vial (221894)	537M Glass Culture Tubes	537M Glass Tubes (218064)
6850 0.45um syringe filters	6850 Syringe Filters (222410)	6850 Luer-Lok Syringes	Luer-Lok Syringes (221305)	6850 Pipette Tips 50-1000 uL	6850 Pipette Tips (221929)



Preparation Information Benchsheet

Prep Run#: 400589  
Team: Semivoa GCMS/GRIVERA

Prep WorkFlow: GenExt28Day  
Prep Method: Method

Status: Prepped  
Prep Date/Time: 5/27/22 08:30

Preparation Steps

Step: Preparation  
Started: 5/27/22 08:30  
Finished: 5/27/22 09:30  
By: GRIVERA  
Comments

Comments:

Reviewed By: GR Date: 5/27/22

Chain of Custody

Relinquished By:	Date:	<u>Extracts Examined</u> Yes No
Received By:	Date:	



# Analytical Results

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22051188  
**Sample Matrix:** Water  
**Sample Name:** LH18/24-SP650\_052422\_AIX  
**Lab Code:** E2200480-001

**Service Request:** E2200480  
**Date Collected:** 5/24/22 1400  
**Date Received:** 5/26/22  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.433	J	0.500	0.250	0.125	5	5/27/22	5/31/22 15:18	400589	765929	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22051188  
**Sample Matrix:** Water  
**Sample Name:** LH18/24-SP650\_052422\_BIX  
**Lab Code:** E2200480-002

**Service Request:** E2200480  
**Date Collected:** 5/24/22 1400  
**Date Received:** 5/26/22  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	56.8		1.00	0.500	0.250	10	5/27/22	5/31/22 13:51	400589	765929	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22051188  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** EQ2200219-01

**Service Request:** E2200480  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	0.100	0.0500	0.0250	1	5/27/22	5/31/22 11:29	400589	765929	



## Accuracy & Precision

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS22051188  
**Sample Matrix:** Water

**Service Request:** E2200480  
**Date Analyzed:** 5/31/22

## Lab Control Sample Summary

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

**Units:** µg/L  
**Basis:** NA

**Extraction Lot:** 400589

Analyte Name	Lab Control Sample EQ2200219-02			Duplicate Lab Control Sample EQ2200219-03			% Rec Limits	RPD	RPD Limit
	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Perchlorate	0.119	0.100	119	0.117	0.100	117	84 - 119	2	15

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22051188  
**Sample Matrix:** Water  
**Sample Name:** Lab Control Sample  
**Lab Code:** EQ2200219-02

**Service Request:** E2200480  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.119		0.100	0.0500	0.0250	1	5/27/22	5/31/22 11:47	400589	765929	



## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US**Project:** HS22051188**Sample Matrix:** Water**Sample Name:** Duplicate Lab Control Sample**Lab Code:** EQ2200219-03**Service Request:** E2200480**Date Collected:** NA**Date Received:** NA**Units:** µg/L**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.117		0.100	0.0500	0.0250	1	5/27/22	5/31/22 12:18	400589	765929	



---

10450 Stancliff Rd. Suite 210  
Houston, TX 77099  
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June 06, 2022

Marcia Olive  
Bhate Environmental Associates, Inc.  
445 Union Blvd Ste 129  
Lakewood, CO 80228

Work Order: **HS22051188**

Laboratory Results for: **Longhorn GW Treatment Plant Weekly Samples**

Dear Marcia Olive,

ALS Environmental received 3 sample(s) on May 26, 2022 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: DAYNA.FISHER

Dane J. Wacasey

ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**Work Order:** HS22051188

**SAMPLE SUMMARY**

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS22051188-01	LH18/24-SP650_052422	Water		24-May-2022 14:00	26-May-2022 09:55	<input type="checkbox"/>
HS22051188-02	LH18/24-SP650_052422_AIX	Water		24-May-2022 14:00	26-May-2022 09:55	<input type="checkbox"/>
HS22051188-03	LH18/24-SP650_052422_BIX	Water		24-May-2022 14:00	26-May-2022 09:55	<input type="checkbox"/>

ALS Houston, US

Date: 06-Jun-22

---

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**Work Order:** HS22051188

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**CASE NARRATIVE**

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**Work Order Comments**

- The analysis for Perchlorate was subcontracted to ALS Houston High-Res Lab. Final report attached
- 

**WetChemistry by Method E415.1****Batch ID: R410002****Sample ID: HS22050862-02MS**

- MS is for an unrelated sample
- 

**WetChemistry by Method E350.3****Batch ID: R409938**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**WetChemistry by Method E365.3****Batch ID: R409438**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

## ALS Houston, US

Date: 06-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Weekly Samples  
 Sample ID: LH18/24-SP650\_052422  
 Collection Date: 24-May-2022 14:00

**ANALYTICAL REPORT**

WorkOrder:HS22051188  
 Lab ID:HS22051188-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>AMMONIA AS N BY E350.3(ISE)</b>		<b>Method:E350.3</b>						Analyst: MZD
Nitrogen, Ammonia (As N)	24	a	0.10	0.10	0.20	mg/L	1	03-Jun-2022 10:00
<b>ORTHO PHOSPHATE (PO4) AS P BY E365.3-1978</b>		<b>Method:E365.3</b>						Analyst: MZD
Phosphorus, Total Orthophosphate (As P)	5.09	a	0.100	0.125	0.250	mg/L	10	26-May-2022 11:52
<b>TOTAL ORGANIC CARBON BY E415.1</b>		<b>Method:E415.1</b>						Analyst: SB
Organic Carbon, Total	10.2	a	0.500	1.00	1.00	mg/L	1	04-Jun-2022 00:30

## ALS Houston, US

Date: 06-Jun-22

Client: Bhate Environmental Associates, Inc.  
Project: Longhorn GW Treatment Plant Weekly Samples  
Sample ID: LH18/24-SP650\_052422\_AIX  
Collection Date: 24-May-2022 14:00

**ANALYTICAL REPORT**

WorkOrder:HS22051188  
Lab ID:HS22051188-02  
Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>						Analyst: GR
Subcontract Analysis	See Attached		0	0		NA	1	31-May-2022 16:12

## ALS Houston, US

Date: 06-Jun-22

Client: Bhate Environmental Associates, Inc.  
Project: Longhorn GW Treatment Plant Weekly Samples  
Sample ID: LH18/24-SP650\_052422\_BIX  
Collection Date: 24-May-2022 14:00

**ANALYTICAL REPORT**

WorkOrder:HS22051188  
Lab ID:HS22051188-03  
Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>						Analyst: GR
Subcontract Analysis	See Attached		0	0		NA	1	31-May-2022 16:12

ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22051188

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> R409438 ( 0 )		<b>Test Name :</b> ORTHO PHOSPHATE (PO4) AS P BY E365.3-1978			<b>Matrix:</b> Water	
HS22051188-01	LH18/24-SP650_052422	24 May 2022 14:00			26 May 2022 11:52	10
<b>Batch ID:</b> R409692 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			<b>Matrix:</b> Water	
HS22051188-02	LH18/24-SP650_052422_AIX	24 May 2022 14:00			31 May 2022 16:12	1
HS22051188-03	LH18/24-SP650_052422_BIX	24 May 2022 14:00			31 May 2022 16:12	1
<b>Batch ID:</b> R409938 ( 0 )		<b>Test Name :</b> AMMONIA AS N BY E350.3(ISE)			<b>Matrix:</b> Water	
HS22051188-01	LH18/24-SP650_052422	24 May 2022 14:00			03 Jun 2022 10:00	1
<b>Batch ID:</b> R410002 ( 0 )		<b>Test Name :</b> TOTAL ORGANIC CARBON BY E415.1			<b>Matrix:</b> Water	
HS22051188-01	LH18/24-SP650_052422	24 May 2022 14:00			04 Jun 2022 00:30	1



## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22051188

**QC BATCH REPORT**

Batch ID: R409438 ( 0 )		Instrument: UV-2450		Method: ORTHO PHOSPHATE (PO4) AS P BY E365.3-1978					
<b>MBLK</b>	Sample ID: MBLK-R409438	Units: mg/L		Analysis Date: 26-May-2022 11:52					
Client ID:	Run ID: UV-2450_409438	SeqNo: 6665936		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.0125	0.0250							U
<b>LCS</b>	Sample ID: LCS-R409438	Units: mg/L		Analysis Date: 26-May-2022 11:52					
Client ID:	Run ID: UV-2450_409438	SeqNo: 6665935		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.266	0.0250	0.25	0	106	85 - 115			
<b>LCSD</b>	Sample ID: LCSD-R409438	Units: mg/L		Analysis Date: 26-May-2022 11:52					
Client ID:	Run ID: UV-2450_409438	SeqNo: 6665934		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.266	0.0250	0.25	0	106	85 - 115	0.266	0	20
<b>MS</b>	Sample ID: HS22051174-03MS	Units: mg/L		Analysis Date: 26-May-2022 11:52					
Client ID:	Run ID: UV-2450_409438	SeqNo: 6665938		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.268	0.0250	0.25	0.045	89.2	80 - 120			
<b>MSD</b>	Sample ID: HS22051174-03MSD	Units: mg/L		Analysis Date: 26-May-2022 11:52					
Client ID:	Run ID: UV-2450_409438	SeqNo: 6665937		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.268	0.0250	0.25	0.045	89.2	80 - 120	0.268	0	20

The following samples were analyzed in this batch: HS22051188-01





**ALS Houston, US**

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22051188

**QUALIFIERS,  
ACRONYMS, UNITS**

<b>Qualifier</b>	<b>Description</b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

<b>Acronym</b>	<b>Description</b>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

---

**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

---

Agency	Number	Expire Date
Dept of Defense	L21-682	31-Dec-2023
Florida	E87611-34	30-Jun-2022
Illinois	2000322022-9	09-May-2023
Kansas	E-10352 2021-2022	31-Jul-2022
Louisiana	03087, 2021-2022	30-Jun-2022
Maryland	343, 2021-2022	30-Jun-2022
North Carolina	624-2022	31-Dec-2022
Oklahoma	2021-080	31-Aug-2022
Texas	T104704231-22-29	30-Apr-2023
Utah	TX026932021-12	30-Jul-2022

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ALS Houston, US

Date: 06-Jun-22

## Sample Receipt Checklist

Work Order ID: HS22051188

Date/Time Received: **26-May-2022 09:55**

Client Name: Bhate Environmental

Received by: **Paresh M. Giga**

Completed By: <u>/S/ Paresh M. Giga</u>	26-May-2022 11:21	Reviewed by: _____	_____
eSignature	Date/Time	eSignature	Date/Time

Matrices: **Water**Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	1 Page(s)
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	COC IDs:none
Samplers name present on COC?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	

Temperature(s)/Thermometer(s):

1.5C/2.0C U/C | IR31

Cooler(s)/Kit(s):

47489

Date/Time sample(s) sent to storage:

5/26/2022 11:30

Water - VOA vials have zero headspace?

Yes ☐ No ☐ No VOA vials submitted ☒

Water - pH acceptable upon receipt?

Yes ☒ No ☐ N/A ☐

pH adjusted?

Yes ☐ No ☒ N/A ☐

pH adjusted by:

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:


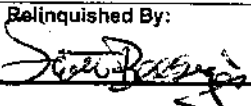
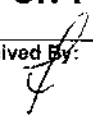
Comments:


Corrective Action:

## CHAIN OF CUSTODY

Name Of Lab Shipping To: ALS 10450 Stancliff Rd. Suite 210 Houston, TX. 77099 (281) 530-5656 ATTN: Ragen Gigi

Page 1 of 1

Project: BHATE LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS						Project No.  NWO1312.0150.0 16.0001									
Job: <b>GROUNDWATER TREATMENT PLANT WEEKLY SAMPLES</b>															
Prepared By:  Scott Beesinger								P.O. Number							
<div style="text-align: right;"><b>HS22051188</b> Bhate Environmental Associates, Inc. Longhorn GW Treatment Plant Weekly Samples</div> <div style="text-align: center;"></div>															
Field Sample I.D.		Sample Matrix		Date / Time		MS / MSD	No. OF CONTAINERS	AMMONIA-N	TOTAL ORGANIC CARBON	ORTHO-PHOSPHATE	PERCHLORATE	Remarks (Preservatives, etc.)		Lab I.D.#	
LH18/24-SP650_052422		Water		05/24/22 / 14:00		3	X	X				H2SO4			
LH18/24-SP650_052422		Water		05/24/22 / 14:00		1			X			NONE			
LH18/24-SP650_052422_AIX		Water		05/24/22 / 14:00		1				X		NONE			
LH18/24-SP650_052422_BIX		Water		05/24/22 / 14:00		1				X		NONE			
Additional Remarks: <b>24 HOUR TAT on PERCHLORATE. Standard TAT on all other parameters</b>															
Relinquished By:		Date	Time	Received By:		Date	Time	Relinquished By:		Date	Time	Received By:		Date	Time
		05/24/22	14:30	 5/26/22 CP=SS											
For Lab Use Only															
Received At Lab By:		Date	Time	Airbill No.	Opened By:		Date	Time	Temp of Container	Seal No.	Condition				
Remarks:  UCC -															

 <b>ALS</b> 10450 Stancliff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5656 Fax. +1 281 530 5887	<b>CUSTODY SEAL</b>		Seal Broken By: <i>SM</i>
	Date: <i>5/24/22</i>	Time: <i>1430</i>	Date: <i>05/26/22</i>
	Name: <i>Scott Beesinger</i>		
	Company: <i>BH&amp;B</i>		

47489

MAY 26 2022

Must Deliver Next Business Day  
Time and Temperature Sensitive!



47489

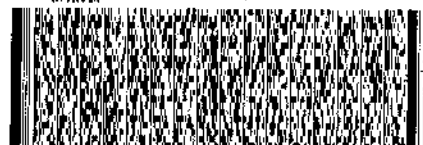
ORIGIN ID: SGRA (903) 930-6193  
 SCOTT BEESINGER  
 RETAIL ENVIRONMENTAL & INFRASTRUCTURE  
 2203-B EAST GRAND AVE  
 STE 1202  
 MARSHALL, TX 75670  
 UNITED STATES US

SHIP DATE: 14 JAN 21  
 ACTWT: 1.00 LB MAN  
 CAD: 162174270A110400  
 DIMS: 26x14x14 IN

10 CLIENT SERVICES  
 ALS LABORATORY GROUP  
 10450 STANCLIFF ROAD  
 SUITE 210  
 HOUSTON TX 77099

(281) 530-5656  
 REF: LHAPP 16 - B075777 - RJ

RMA: 000000



FedEx Express



TRK/BKF 0170  
 0838 9494

PRIORITY OVERNIGHT

AB SGRA

77099  
 TX-US  
 IAH



3973297 74642222 CGGA 56005/11006/C088





May 31, 2022

Service Request No:E2200480

Dane Wacasey  
ALS Group USA, Corp.  
10450 Stancliff Road  
Suite 210  
Houston, TX 77099-4338

**Laboratory Results for: HS22051188**

Dear Dane,

Enclosed are the results of the sample(s) submitted to our laboratory May 26, 2022  
For your reference, these analyses have been assigned our service request number **E2200480**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current TNI standards, where applicable, and except as noted in the laboratory case narrative provided. All results are intended to be considered in their entirety and ALS Environmental is not responsible for use of less than the complete final report. Results apply only to the items submitted to the laboratory, as received for analysis. In accordance with the current TNI Standard, a statement on the estimated uncertainty of measurement of any quantitative analysis will be supplied upon request.

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Corey Grandits  
Project Manager

ADDRESS 10450 Stancliff Rd., Suite 210, Houston, TX 77099  
PHONE +1 281 530 5656 | FAX +1 281 530 5887  
ALS Group USA, Corp.  
dba ALS Environmental



# Certificate of Analysis

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

**ALS Environmental**

**Client:** ALS-Houston  
**Project:** HS22051188  
**Sample Matrix:** W

**Service Request No.:** E2200480  
**Date Received:** 05/26/22

**CASE NARRATIVE**

All analyses were performed in adherence to the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II. When appropriate to the method, method blank results have been reported with each analytical test.

**Sample Receipt**

Two samples were received for analysis at ALS Environmental in Houston on 05/26/22.

The samples were received in good condition and are consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

**Data Validation Notes and Discussion****Precision and Accuracy:**

EQ2200219: Laboratory Control Spike/Duplicate Laboratory Control Spike (LCS/DLCS) samples were analyzed and reported in lieu of a MS/MSD for this extraction batch. The LCS-DLCS recoveries met acceptance criteria.

DoD Certification is held for the method/matrix/analytes provided in this report.

*The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.*

*Use of ALS group USA Corp dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.*

**Client:** ALS Environmental - US  
**Project:** HS22051188

**Service Request:**E2200480

**SAMPLE CROSS-REFERENCE**

<u>SAMPLE #</u>	<u>CLIENT SAMPLE ID</u>	<u>DATE</u>	<u>TIME</u>
E2200480-001	LH18/24-SP650_052422_AIX	5/24/2022	1400
E2200480-002	LH18/24-SP650_052422_BIX	5/24/2022	1400

**Service Request Summary**

**Folder #:** E2200480  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22051188  
**Project Number:**  
**Report To:** Dane Wacasey  
 ALS Group USA, Corp.  
 10450 Stancliff Road  
 Houston, TX 77099-4338  
 USA  
**Phone Number:** 281-575-2190  
**Cell Number:**  
**Fax Number:** 281-530-5887  
**E-mail:** dane.wacasey@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 05/26/22  
**Internal Due Date:** 5/31/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22051188  
**EDD:** No EDD Specified

2 120 mL-Plastic Bottle Natural WM Unpreserved

**Location:** EHRMS-AirArch 1

**Pressure Gas:**

**Rush**

				HOUSTON
Lab Samp No.	Client Samp No	Matrix	Collected	CIO4 DOD/6850
E2200480-001	LH18/24-SP650_052422_AIX	Water	05/24/22 1400	IV
E2200480-002	LH18/24-SP650_052422_BIX	Water	05/24/22 1400	IV

**Service Request Summary**

**Folder #:** E2200480  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22051188  
**Project Number:**  
  
**Report To:** Dane Wacasey  
 ALS Group USA, Corp.  
 10450 Stancliff Road  
 Houston, TX 77099-4338  
 USA  
**Phone Number:** 281-575-2190  
**Cell Number:**  
**Fax Number:** 281-530-5887  
**E-mail:** dane.wacasey@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 05/26/22  
**Internal Due Date:** 5/31/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22051188  
**EDD:** No EDD Specified

2 120 mL-Plastic Bottle Natural WM Unpreserved  
**Location:** EHRMS-AirArch 1  
**Pressure Gas:**  
**Rush**

**Test Comments:**

Group	Test/Method	Samples	Comments
Semivola GCMS	CIO4 DOD/6850	2	IV DUE 6/17

## Data Qualifiers

### Lab Standard

- + Possible Tedlar bag artifact.
- A TIC is a suspected aldol-condensation product
- B Analyte found in the associated method blank as well as in the sample.
- BC Reported results are not blank corrected.
- BH The back section of the tube yielded higher results than the front.
- BT Results indicated possible breakthrough; back section  $\geq 10\%$  front section.
- C Result identification confirmed.
- D Compound identified in an analysis at a secondary dilution factor
- D Spike was diluted out
- DE Reported results are corrected for desorption efficiency.
- E Estimated value. Concentration above calibration range
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- H1 Sample analysis performed past holding time. See case narrative.
- H2 Initial analysis within holding time. Reanalysis for the required dilution was past holding time.
- H3 Sample was received and analyzed past holding time.
- H4 Sample was extracted past required extraction holding time, but analyzed within analysis holding time. See case narrative.
- I Internal standard not within the specified limits. See case narrative.
- J Estimated Value. Concentration found below MRL.
- K (Auto) The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- K A deflection in the QC ion may indicate interference with the quantitation of this ion. The concentration of this analyte should be considered as an estimate.
- K Analyte was detected above the method reporting limit prior to normalization.
- K The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- L1 Laboratory control sample recovery outside the specified limits; results may be biased high.
- L2 Laboratory control sample recovery outside the specified limits; results may be biased low.
- L3 Laboratory control sample recovery outside the specified limits.
- M Matrix interference; results may be biased high.
- M The duplicate injection precision not met.
- M1 Matrix interference due to coelution with a non-target compound; results may be biased high.

## Data Qualifiers

### Lab Standard

- N Presumptive evidence of a compound for TICs that have been identified based on a mass spectral library search.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- P Indicates chlorodiphenyl ether interference present at the retention time of the target compound.
- P Pesticide/Aroclor target analyte > 40% difference for detected concentrations between GC columns
- Q Indicates as estimated value because the P and P + 2 theoretical abundance ratio does not meet method criteria.
- R Duplicate Precision not met.
- R1 Duplicate precision not within the specified limits; however, the results are below the MRL and considered estimated.
- S Surrogate recovery not within specified limits.
- S The reported value was determined by the Method of Standard Additions (MSA).
- T Analyte is a tentatively identified compound, result is estimated.
- U Compound was analyzed for, but was not detected (ND).
- V1 The continuing calibration verification standard was outside (biased high) the specified limits for this compound.
- V2 The continuing calibration verification standard was outside (biased low) the specified limits for this compound.
- W Result quantified, but the corresponding peak was detected outside the generated retention time window.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- X See case narrative.
- Y Recovery outside limits
- Y The chromatogram resembles a petroleum product but does not match the calibration standard.
- Z The chromatogram does not resemble a petroleum product.
- i The MRL/MDL has been elevated due to a matrix interference.



## ALS Laboratory Group

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### Acronyms

Cal	Calibration
Conc	CONCetration
Dioxin(s)	Polychlorinated dibenzo-p-dioxin(s)
EDL	Estimated Detection Limit
EMPC	Estimated Maximum Possible Concentration
Flags	Data qualifiers
Furan(s)	Polychlorinated dibenzofuran(s)
g	Grams
ICAL	Initial CALibration
ID	IDentifier
Ions	Masses monitored for the analyte during data acquisition
L	Liter (s)
LCS	Laboratory Control Sample
DLCS	Duplicate Laboratory Control Sample
MB	Method Blank
MCL	Method Calibration Limit
MDL	Method Detection Limit
mL	Milliliters
MS	Matrix Spiked sample
DMS	Duplicate Matrix Spiked sample
NO	Number of peaks meeting all identification criteria
PCDD(s)	Polychlorinated dibenzo-p-dioxin(s)
PCDF(s)	Polychlorinated dibenzofuran(s)
ppb	Parts per billion
ppm	Parts per million
ppq	Parts per quadrillion
ppt	Parts per trillion
QA	Quality Assurance
QC	Quality Control
Ratio	Ratio of areas from monitored ions for an analyte
% Rec.	Percent recovery
RPD	Relative Percent Difference
RRF	Relative Response Factor
RT	Retention Time
SDG	Sample Delivery Group
S/N	Signal-to-noise ratio
TEF	Toxicity Equivalence Factor
TEQ	Toxicity Equivalence Quotient



## State Certifications, Accreditations, and Licenses

Agency	Number	Expire Date
Department of Defense	L22-90	3/31/2024
Florida Department of Health	E87611-34	6/30/2022
Hawaii Department of Health	2022	4/30/2023
Illinois Environmental Protection Agency	2000322022-9	5/9/2023
Kansas Department of Health and Environment	E-10352 2022	7/31/2022
Louisiana Department of Environmental Quality	03087-2021	6/30/2022
Louisiana Department of Health and Hospitals	LA028	12/31/2022
Maine Department of Health and Human Services	2020016	6/5/2022
Maryland Department of the Environment	343	6/30/2022
Michigan Department of Environmental Quality	9971-2022	4/30/2023
Minnesota Department of Health	2228443	12/31/2022
Nebraska Department of Health and Human Services	NE-OS-25-13	4/30/2023
Nevada Department of Conservation and Natural Resources	TX026932022-1	7/31/2022
New Hampshire Environmental Laboratory Accreditation Program	209422	4/24/2023
New Jersey Department of Environmental Protection	TX008	6/30/2022
New York Department of Health	11707	3/31/2023
Oklahoma Department of Environmental Quality	2021-080	8/31/2022
Oregon Environmental Laboratory Accreditation Program	TX200002	5/15/2023
Pennsylvania Department of Environmental Protection	68-03441-015	6/30/2022
Perry Johnson Laboratory Accreditation	L22-91	3/31/2024
Tennessee Department of Environment and Conservation	04016-2022	4/30/2023
Texas Commission on Environmental Quality	T104704231-22-29	4/30/2023
United States Department of Agriculture	P330-19-00299	10/10/2022
Utah Department of Health Environmental Laboratory Certification	TX026932021-12	7/31/2022
Washington Department of Health	C819-2022	11/14/2022



## Chain of Custody

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)



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Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887  
www.alsglobal.com

## Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 18837

**SUBCONTRACT TO:**

ALS Environmental  
10450 Stancliff Road Suite 210  
Houston, TX 77084

**Phone:** +1 281 530 5656

**CUSTOMER  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Dane J. Wacasey  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Email:** Dane.Wacasey@alsglobal.com  
**Alternate  
Contact:** Jumoke M. Lawal  
**Email:** jumoke.lawal@alsglobal.com

**INVOICE  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Accounts Payable  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Reference:** HS22051188  
**TSR:** Houston House Acct

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS22051188-02	LH18/24-SP650_052422_AIX	Water	24 May 2022 14:00
	6850-Perch. DOD Level II & Level IV	in separate pdf	27 May 2022
2. HS22051188-03	LH18/24-SP650_052422_BIX	Water	24 May 2022 14:00
	6850-Perch. DOD Level II & Level IV	in separate pdf	27 May 2022

**Comments:** Please analyze for the analysis listed above.  
Send report to the emails shown above.  
RUSH 24Hr.TAT

**QC Level:** DOD IV (DoD Data Package)

Relinquished By: \_\_\_\_\_

Date/Time: \_\_\_\_\_

Received By: \_\_\_\_\_

Date/Time: 5/26/22 1414

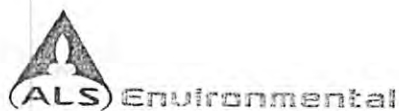
Cooler ID(s): \_\_\_\_\_

Temperature(s): \_\_\_\_\_

RIGHT SOLUTIONS | RIGHT PARTNER

26 May 2022

Page 1 of 1



## Cooler Receipt Form

Project Chemist LA

Client/Project

ALS-H

Thermometer ID

1211

Date/Time Received:

5-26-22

Initials:

PA

Date/Time Logged in:

5-26-22

Initials

LA1. Method of delivery: ☐ US Mail ☐ Fed Ex ☐ UPS ☐ DHL ☒ <sup>ALS</sup> Courier ☐ Client2. Samples received in: ☒ Cooler ☐ Box ☐ Envelope ☐ Other3. Were custody seals on coolers? ☐ Yes ☒ No

If yes, how many and where?

Were they intact? ☐ Yes ☐ No ☒ N/AWere they signed and dated? ☐ Yes ☐ No ☒ N/A4. Packing Material: ☐ Inserts ☒ Baggies ☐ Bubble Wrap ☐ Gel Packs ☒ Wet Ice ☐ Sleeves ☐ Other5. Foreign or Regulated Soil? ☐ Yes ☐ No Location of Sampling:

Cooler Tracking Number	COC ID	Date Opened	Time Opened	Opened By	Temp. °C	Temp Blank?
<u>NA</u>		<u>5-26-22</u>	<u>1414</u>	<u>LA</u>	<u>25</u>	<input checked="" type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>

6. Were custody papers properly filled out (ink, signed, dated, etc)? ☒ Yes ☐ No7. Did all bottles arrive in good condition (not broken, no signs of leakage)? ☒ Yes ☐ No8. Were all sample labels complete (i.e., sample ID, analysis, preservation, etc)? ☒ Yes ☐ No9. Were appropriate bottles/containers and volumes received for the requested tests? ☒ Yes ☐ No10. Did sample labels and tags agree with custody documents? ☒ Yes ☐ No

Notes, Discrepancies, &amp; Resolutions:

Service request Label:



10450 Stancliff Rd., Suite 210  
Houston, TX 77099  
T: +1 713 266 1599  
F: +1 713 266 1599  
[www.alsglobal.com](http://www.alsglobal.com)

## SAMPLE ACCEPTANCE POLICY

This policy outlines the criteria samples must meet to be accepted by ALS Environmental – Houston HRMS.

### **Cooler Custody Seals (desirable, mandatory if specified in SAP):**

- ✓ Intact on outside of cooler, signed and dated

### **Chain-of-Custody (COC) documentation (mandatory):**

The following is required on each COC:

- ✓ Sample ID, the location, date and time of collection, collector's name, preservation type, sample type, and any other special remarks concerning the sample. The COC must be completed in ink.
- ✓ Signature and date of relinquishing party.

In the absence of a COC at sample receipt, the COC will be requested from the client.

### **Sample Integrity (mandatory):**

Samples are inspected upon arrival to ensure that sample integrity was not compromised during transfer to the laboratory.

- ✓ Sample containers must arrive in good condition (not broken or leaking).
- ✓ Samples must be labeled appropriately, including Sample IDs, and requested test using durable labels and indelible ink.
- ✓ The correct type of sample bottle must be used for the method requested.
- ✓ An appropriate sample volume, or weight, must be received.
- ✓ Sample IDs and number of containers must reconcile with the COC.
- ✓ Samples must be received within the method defined holding time.

### **Temperature Requirement (varies by sample matrix):**

- ✓ Aqueous and Non-aqueous samples must be shipped and stored cold, at 0 to 6°C.
- ✓ Tissue samples must be shipped and stored frozen, at -20 to -10°C.
- ✓ Air samples are shipped and stored cold, at 0 to 6°C
- ✓ The sample temperature must be recorded on the COC

All cooler inspections are documented on the Cooler Receipt Form (CRF). A separate CRF is completed for each service request. Any samples not meeting the above criteria are noted on the CRF and the Project Manager notified. The Project Manager must resolve any sample integrity issues with the client prior to proceeding with the analysis. Such resolutions are documented in writing and filed with the project folder. Data associated with samples received outside of this acceptance policy will be qualified on the case narrative of the final report



## Preparation Information Benchsheets

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

**Preparation Information Benchsheet**

**Prep Run#:** 400589  
**Team:** Semivoa GCMS/GRIVERA

**Prep WorkFlow:** GenExt28Day  
**Prep Method:** Method

**Status:** Prepped  
**Prep Date/Time:** 5/27/22 08:30

#	Lab Code	Client ID	B#	Method /Test	pH	Cl	Matrix	Amt. Ext.	Sample Description
1	E2200470-001	146-RS1731-190522	.01	6850/CIO4 DOD			Water	10mL	
2	E2200480-001	LH18/24-SP650_052422_AIX	.01	6850/CIO4 DOD			Water	10mL	
3	E2200480-002	LH18/24-SP650_052422_BIX	.01	6850/CIO4 DOD			Water	10mL	
4	E2200483-001	LH18/24-SP650_052422_AIX	.01	6850/CIO4 DOD			Water	10mL	
5	E2200484-001	LH18/24-SP650_052422_AIX	.01	6850/CIO4 DOD			Water	10mL	
6	EQ2200219-01	MB		6850/CIO4 DOD			Liquid	10mL	
7	EQ2200219-02	LCS		6850/CIO4 DOD			Liquid	10mL	
8	EQ2200219-03	DLCS		6850/CIO4 DOD			Liquid	10mL	
9	R2204439-003	2205130615 B650-EFF-1	.01	6850/CIO4			Water	10mL	
10	R2204439-007	2205130633 B650-INF-1	.01	6850/CIO4			Water	10mL	
11	R2204439-009	2205130835Y PL-7-480	.01	6850/CIO4			Water	10mL	
12	R2204582-011	2205170813 MPE-1	.01	6850/CIO4			Water	10mL	
13	R2204582-030	2205170851 MPE-8	.01	6850/CIO4			Water	10mL	
14	R2204582-035	2205170923 MPE-11	.01	6850/CIO4			Water	10mL	
15	R2204616-004	2205180841 MPE-10	.01	6850/CIO4			Water	10mL	
16	R2204616-011	2205181302A NASA 4	.01	6850/CIO4			Water	10mL	

**Spiking Solutions**

Name: Perchlorate Intermediate Stock1		Inventory ID 222798		Logbook Ref: Perchlorate (1st Source)				Expires On: 10/29/2022	
EQ2200219-02	1.00µL	EQ2200219-02	1.00µL	EQ2200219-03	1.00µL	EQ2200219-03	1.00µL		

Name: Perchlorate Internal Standard 1ug/mL		Inventory ID 223118		Logbook Ref: Perchlorate Internal Standard				Expires On: 10/31/2022	
--	--	---------------------	--	--	--	--	--	------------------------	--

E2200470-001	100.00µL	E2200480-001	100.00µL	E2200480-002	100.00µL	E2200483-001	100.00µL	E2200484-001	100.00µL	EQ2200219-01	100.00µL
EQ2200219-01	100.00µL	EQ2200219-02	100.00µL	EQ2200219-02	100.00µL	EQ2200219-03	100.00µL	EQ2200219-03	100.00µL	R2204439-003	100.00µL
R2204439-007	100.00µL	R2204439-009	100.00µL	R2204582-011	100.00µL	R2204582-030	100.00µL	R2204582-035	100.00µL	R2204616-004	100.00µL
R2204616-011	100.00µL										

**Preparation Materials**

Water HPLC Grade	02/16/2022 Water (221769)	6850 Amber Glass screw vial	2mL Screw Top Vial (221894)	537M Glass Culture Tubes	537M Glass Tubes (218064)
6850 0.45um syringe filters	6850 Syringe Filters (222410)	6850 Luer-Lok Syringes	Luer-Lok Syringes (221305)	6850 Pipette Tips 50-1000 uL	6850 Pipette Tips (221929)



*Preparation Information Benchsheet*

**Prep Run#:** 400589  
**Team:** Semivoa GCMS/GRIVERA

**Prep WorkFlow:** GenExt28Day  
**Prep Method:** Method

**Status:** Prepped  
**Prep Date/Time:** 5/27/22 08:30

**Preparation Steps**

Step: Preparation  
Started: 5/27/22 08:30  
Finished: 5/27/22 09:30  
By: GRIVERA  
Comments

Comments: \_\_\_\_\_  
\_\_\_\_\_

Reviewed By: GR Date: 5/27/22

Chain of Custody

Relinquished By: _____	Date: _____	<u>Extracts Examined</u> Yes      No
Received By: _____	Date: _____	



# Analytical Results

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22051188  
**Sample Matrix:** Water  
**Sample Name:** LH18/24-SP650\_052422\_AIX  
**Lab Code:** E2200480-001

**Service Request:** E2200480  
**Date Collected:** 5/24/22 1400  
**Date Received:** 5/26/22  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.433	J	0.500	0.250	0.125	5	5/27/22	5/31/22 15:18	400589	765929	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22051188  
**Sample Matrix:** Water  
**Sample Name:** LH18/24-SP650\_052422\_BIX  
**Lab Code:** E2200480-002

**Service Request:** E2200480  
**Date Collected:** 5/24/22 1400  
**Date Received:** 5/26/22  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	56.8		1.00	0.500	0.250	10	5/27/22	5/31/22 13:51	400589	765929	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22051188  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** EQ2200219-01

**Service Request:** E2200480  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	0.100	0.0500	0.0250	1	5/27/22	5/31/22 11:29	400589	765929	



## Accuracy & Precision

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS22051188  
**Sample Matrix:** Water

**Service Request:** E2200480  
**Date Analyzed:** 5/31/22

**Lab Control Sample Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**Analytical Method:** 6850  
**Prep Method:** Method

**Units:** µg/L  
**Basis:** NA

**Extraction Lot:** 400589

Analyte Name	Lab Control Sample EQ2200219-02			Duplicate Lab Control Sample EQ2200219-03			% Rec Limits	RPD	RPD Limit
	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Perchlorate	0.119	0.100	119	0.117	0.100	117	84 - 119	2	15

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22051188  
**Sample Matrix:** Water  
**Sample Name:** Lab Control Sample  
**Lab Code:** EQ2200219-02

**Service Request:** E2200480  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.119		0.100	0.0500	0.0250	1	5/27/22	5/31/22 11:47	400589	765929	



## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22051188  
**Sample Matrix:** Water  
**Sample Name:** Duplicate Lab Control Sample  
**Lab Code:** EQ2200219-03

**Service Request:** E2200480  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.117		0.100	0.0500	0.0250	1	5/27/22	5/31/22 12:18	400589	765929	



May 31, 2022

Service Request No:E2200483

Dane Wacasey  
ALS Group USA, Corp.  
10450 Stancliff Road  
Suite 210  
Houston, TX 77099-4338

**Laboratory Results for: HS22051205**

Dear Dane,

Enclosed are the results of the sample(s) submitted to our laboratory May 26, 2022  
For your reference, these analyses have been assigned our service request number **E2200483**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current TNI standards, where applicable, and except as noted in the laboratory case narrative provided. All results are intended to be considered in their entirety and ALS Environmental is not responsible for use of less than the complete final report. Results apply only to the items submitted to the laboratory, as received for analysis. In accordance with the current TNI Standard, a statement on the estimated uncertainty of measurement of any quantitative analysis will be supplied upon request.

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Corey Grandits  
Project Manager

ADDRESS 10450 Stancliff Rd., Suite 210, Houston, TX 77099  
PHONE +1 281 530 5656 | FAX +1 281 530 5887  
ALS Group USA, Corp.  
dba ALS Environmental



# Certificate of Analysis

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

**ALS Environmental**

**Client:** ALS-Houston  
**Project:** HS22051205  
**Sample Matrix:** W

**Service Request No.:** E2200483  
**Date Received:** 05/26/22

**CASE NARRATIVE**

All analyses were performed in adherence to the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II. When appropriate to the method, method blank results have been reported with each analytical test.

**Sample Receipt**

One sample was received for analysis at ALS Environmental in Houston on 05/26/22.

The sample was received in good condition and is consistent with the accompanying chain of custody form. The sample was stored in a refrigerator at 4°C upon receipt at the laboratory.

**Data Validation Notes and Discussion****Precision and Accuracy:**

EQ2200219: Laboratory Control Spike/Duplicate Laboratory Control Spike (LCS/DLCS) samples were analyzed and reported in lieu of a MS/MSD for this extraction batch. The LCS-DLCS recoveries met acceptance criteria.

DoD Certification is held for the method/matrix/analytes provided in this report.

*The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.*

*Use of ALS group USA Corp dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.*

**Client:** ALS Environmental - US  
**Project:** HS22051205

**Service Request:**E2200483

**SAMPLE CROSS-REFERENCE**

<u>SAMPLE #</u>	<u>CLIENT SAMPLE ID</u>	<u>DATE</u>	<u>TIME</u>
E2200483-001	LH18/24-SP650_052422_AIX	5/24/2022	1400

**Service Request Summary**

**Folder #:** E2200483  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22051205  
**Project Number:**  
**Report To:** Dane Wacasey  
 ALS Group USA, Corp.  
 10450 Stancliff Road  
 Houston, TX 77099-4338  
 USA  
**Phone Number:** 281-575-2190  
**Cell Number:**  
**Fax Number:** 281-530-5887  
**E-mail:** dane.wacasey@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 05/26/22  
**Internal Due Date:** 6/10/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22051205  
**EDD:** No EDD Specified

1 120 mL-Plastic Bottle Natural WM Unpreserved

**Location:** EHRMS-AirArch 1

**Pressure Gas:**

				HOUSTON
Lab Samp No.	Client Samp No	Matrix	Collected	CIO4 DOD/6850
E2200483-001	LH18/24-SP650_052422_AIX	Water	05/24/22 1400	IV

**Service Request Summary**

**Folder #:** E2200483  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22051205  
**Project Number:**  
**Report To:** Dane Wacasey  
 ALS Group USA, Corp.  
 10450 Stancliff Road  
 Houston, TX 77099-4338  
 USA  
**Phone Number:** 281-575-2190  
**Cell Number:**  
**Fax Number:** 281-530-5887  
**E-mail:** dane.wacasey@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 05/26/22  
**Internal Due Date:** 6/10/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22051205  
**EDD:** No EDD Specified

1 120 mL-Plastic Bottle Natural WM Unpreserved

**Location:** EHRMS-AirArch 1

**Pressure Gas:**

**Test Comments:**

Group	Test/Method	Samples	Comments
Semivola GCMS	CIO4 DOD/6850	1	IV DUE 6/17

## Data Qualifiers

### Lab Standard

- + Possible Tedlar bag artifact.
- A TIC is a suspected aldol-condensation product
- B Analyte found in the associated method blank as well as in the sample.
- BC Reported results are not blank corrected.
- BH The back section of the tube yielded higher results than the front.
- BT Results indicated possible breakthrough; back section  $\geq 10\%$  front section.
- C Result identification confirmed.
- D Compound identified in an analysis at a secondary dilution factor
- D Spike was diluted out
- DE Reported results are corrected for desorption efficiency.
- E Estimated value. Concentration above calibration range
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- H1 Sample analysis performed past holding time. See case narrative.
- H2 Initial analysis within holding time. Reanalysis for the required dilution was past holding time.
- H3 Sample was received and analyzed past holding time.
- H4 Sample was extracted past required extraction holding time, but analyzed within analysis holding time. See case narrative.
- I Internal standard not within the specified limits. See case narrative.
- J Estimated Value. Concentration found below MRL.
- K (Auto) The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- K A deflection in the QC ion may indicate interference with the quantitation of this ion. The concentration of this analyte should be considered as an estimate.
- K Analyte was detected above the method reporting limit prior to normalization.
- K The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- L1 Laboratory control sample recovery outside the specified limits; results may be biased high.
- L2 Laboratory control sample recovery outside the specified limits; results may be biased low.
- L3 Laboratory control sample recovery outside the specified limits.
- M Matrix interference; results may be biased high.
- M The duplicate injection precision not met.
- M1 Matrix interference due to coelution with a non-target compound; results may be biased high.



## Data Qualifiers

### Lab Standard

- N Presumptive evidence of a compound for TICs that have been identified based on a mass spectral library search.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- P Indicates chlorodiphenyl ether interference present at the retention time of the target compound.
- P Pesticide/Aroclor target analyte > 40% difference for detected concentrations between GC columns
- Q Indicates as estimated value because the P and P + 2 theoretical abundance ratio does not meet method criteria.
- R Duplicate Precision not met.
- R1 Duplicate precision not within the specified limits; however, the results are below the MRL and considered estimated.
- S Surrogate recovery not within specified limits.
- S The reported value was determined by the Method of Standard Additions (MSA).
- T Analyte is a tentatively identified compound, result is estimated.
- U Compound was analyzed for, but was not detected (ND).
- V1 The continuing calibration verification standard was outside (biased high) the specified limits for this compound.
- V2 The continuing calibration verification standard was outside (biased low) the specified limits for this compound.
- W Result quantified, but the corresponding peak was detected outside the generated retention time window.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- X See case narrative.
- Y Recovery outside limits
- Y The chromatogram resembles a petroleum product but does not match the calibration standard.
- Z The chromatogram does not resemble a petroleum product.
- i The MRL/MDL has been elevated due to a matrix interference.

## ALS Laboratory Group

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### Acronyms

Cal	Calibration
Conc	CONCetration
Dioxin(s)	Polychlorinated dibenzo-p-dioxin(s)
EDL	Estimated Detection Limit
EMPC	Estimated Maximum Possible Concentration
Flags	Data qualifiers
Furan(s)	Polychlorinated dibenzofuran(s)
g	Grams
ICAL	Initial CALibration
ID	IDentifier
Ions	Masses monitored for the analyte during data acquisition
L	Liter (s)
LCS	Laboratory Control Sample
DLCS	Duplicate Laboratory Control Sample
MB	Method Blank
MCL	Method Calibration Limit
MDL	Method Detection Limit
mL	Milliliters
MS	Matrix Spiked sample
DMS	Duplicate Matrix Spiked sample
NO	Number of peaks meeting all identification criteria
PCDD(s)	Polychlorinated dibenzo-p-dioxin(s)
PCDF(s)	Polychlorinated dibenzofuran(s)
ppb	Parts per billion
ppm	Parts per million
ppq	Parts per quadrillion
ppt	Parts per trillion
QA	Quality Assurance
QC	Quality Control
Ratio	Ratio of areas from monitored ions for an analyte
% Rec.	Percent recovery
RPD	Relative Percent Difference
RRF	Relative Response Factor
RT	Retention Time
SDG	Sample Delivery Group
S/N	Signal-to-noise ratio
TEF	Toxicity Equivalence Factor
TEQ	Toxicity Equivalence Quotient



### State Certifications, Accreditations, and Licenses

Agency	Number	Expire Date
Department of Defense	L22-90	3/31/2024
Florida Department of Health	E87611-34	6/30/2022
Hawaii Department of Health	2022	4/30/2023
Illinois Environmental Protection Agency	2000322022-9	5/9/2023
Kansas Department of Health and Environment	E-10352 2022	7/31/2022
Louisiana Department of Environmental Quality	03087-2021	6/30/2022
Louisiana Department of Health and Hospitals	LA028	12/31/2022
Maine Department of Health and Human Services	2020016	6/5/2022
Maryland Department of the Environment	343	6/30/2022
Michigan Department of Environmental Quality	9971-2022	4/30/2023
Minnesota Department of Health	2228443	12/31/2022
Nebraska Department of Health and Human Services	NE-OS-25-13	4/30/2023
Nevada Department of Conservation and Natural Resources	TX026932022-1	7/31/2022
New Hampshire Environmental Laboratory Accreditation Program	209422	4/24/2023
New Jersey Department of Environmental Protection	TX008	6/30/2022
New York Department of Health	11707	3/31/2023
Oklahoma Department of Environmental Quality	2021-080	8/31/2022
Oregon Environmental Laboratory Accreditation Program	TX200002	5/15/2023
Pennsylvania Department of Environmental Protection	68-03441-015	6/30/2022
Perry Johnson Laboratory Accreditation	L22-91	3/31/2024
Tennessee Department of Environment and Conservation	04016-2022	4/30/2023
Texas Commission on Environmental Quality	T104704231-22-29	4/30/2023
United States Department of Agriculture	P330-19-00299	10/10/2022
Utah Department of Health Environmental Laboratory Certification	TX026932021-12	7/31/2022
Washington Department of Health	C819-2022	11/14/2022



## Chain of Custody

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)



10450 Stancliff Rd, Ste 210  
Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887  
www.alsglobal.com

## Subcontract Chain of Custody

**SAMPLING STATE:** Colorado

**COC ID:** 18841

**SUBCONTRACT TO:**

ALS Environmental  
10450 Stancliff Road Suite 210  
Houston, TX 77084

**Phone:** +1 281 530 5656

**CUSTOMER  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Ragen Giga  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Email:** RagenP.Giga@ALSGlobal.com  
**Alternate  
Contact:** Jumoke M. Lawal  
**Email:** jumoke.lawal@alsglobal.com

**INVOICE  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Accounts Payable  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Reference:** HS22051205  
**TSR:** Sonia West

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS22051205-01	LH18/24-SP140_052422	Water	24 May 2022 14:00
SUB_Perch-6850			10 Jun 2022

**Comments:** Please analyze for the analysis listed above.  
Send report to the emails shown above.

**QC Level:** DOD IV (DoD Data Package)

Relinquished By: \_\_\_\_\_

Date/Time: \_\_\_\_\_

Received By: \_\_\_\_\_

Date/Time: \_\_\_\_\_

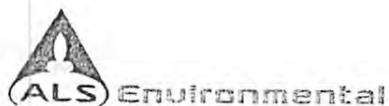
Cooler ID(s): \_\_\_\_\_

Temperature(s): \_\_\_\_\_

RIGHT SOLUTIONS | RIGHT PARTNER

26 May 2022

Page 1 of 1



## Cooler Receipt Form

Project Chemist

CA

Client/Project

ACS-H

Thermometer ID

1211

Date/Time Received:

5-26-22

Initials:

PH

Date/Time Logged in:

5-26-22

Initials

CA

1. Method of delivery: ☐ US Mail ☐ Fed Ex ☐ UPS ☐ DHL ☒ Courier ☐ Client2. Samples received in: ☒ Cooler ☐ Box ☐ Envelope ☐ Other3. Were custody seals on coolers? ☐ Yes ☒ No

If yes, how many and where?

Were they intact? ☐ Yes ☐ No ☒ N/AWere they signed and dated? ☐ Yes ☐ No ☒ N/A4. Packing Material: ☐ Inserts ☒ Baggies ☐ Bubble Wrap ☐ Gel Packs ☒ Wet Ice ☐ Sleeves ☐ Other5. Foreign or Regulated Soil? ☐ Yes ☐ No Location of Sampling:

Cooler Tracking Number	COC ID	Date Opened	Time Opened	Opened By	Temp. °C	Temp Blank?
NA		5-26-22	1414	CA	2.5	<input checked="" type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>

6. Were custody papers properly filled out (ink, signed, dated, etc)? ☒ Yes ☐ No7. Did all bottles arrive in good condition (not broken, no signs of leakage)? ☒ Yes ☐ No8. Were all sample labels complete (i.e., sample ID, analysis, preservation, etc)? ☒ Yes ☐ No9. Were appropriate bottles/containers and volumes received for the requested tests? ☒ Yes ☐ No10. Did sample labels and tags agree with custody documents? ☒ Yes ☐ No

Notes, Discrepancies, &amp; Resolutions:

Service request Label:

HS-HRMSCoolerReceipt R1.0

ALS Environmental - Houston HRMS



10450 Stancliff Rd., Suite 210  
Houston, TX 77099  
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[www.alsglobal.com](http://www.alsglobal.com)

## SAMPLE ACCEPTANCE POLICY

This policy outlines the criteria samples must meet to be accepted by ALS Environmental – Houston HRMS.

### **Cooler Custody Seals (desirable, mandatory if specified in SAP):**

- ✓ Intact on outside of cooler, signed and dated

### **Chain-of-Custody (COC) documentation (mandatory):**

The following is required on each COC:

- ✓ Sample ID, the location, date and time of collection, collector's name, preservation type, sample type, and any other special remarks concerning the sample. The COC must be completed in ink.
- ✓ Signature and date of relinquishing party.

In the absence of a COC at sample receipt, the COC will be requested from the client.

### **Sample Integrity (mandatory):**

Samples are inspected upon arrival to ensure that sample integrity was not compromised during transfer to the laboratory.

- ✓ Sample containers must arrive in good condition (not broken or leaking).
- ✓ Samples must be labeled appropriately, including Sample IDs, and requested test using durable labels and indelible ink.
- ✓ The correct type of sample bottle must be used for the method requested.
- ✓ An appropriate sample volume, or weight, must be received.
- ✓ Sample IDs and number of containers must reconcile with the COC.
- ✓ Samples must be received within the method defined holding time.

### **Temperature Requirement (varies by sample matrix):**

- ✓ Aqueous and Non-aqueous samples must be shipped and stored cold, at 0 to 6°C.
- ✓ Tissue samples must be shipped and stored frozen, at -20 to -10°C.
- ✓ Air samples are shipped and stored cold, at 0 to 6°C
- ✓ The sample temperature must be recorded on the COC

All cooler inspections are documented on the Cooler Receipt Form (CRF). A separate CRF is completed for each service request. Any samples not meeting the above criteria are noted on the CRF and the Project Manager notified. The Project Manager must resolve any sample integrity issues with the client prior to proceeding with the analysis. Such resolutions are documented in writing and filed with the project folder. Data associated with samples received outside of this acceptance policy will be qualified on the case narrative of the final report



# Preparation Information Benchsheets

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)



# Preparation Information Benchsheet

**Prep Run#:** 400589  
**Team:** Semivoa GCMS/GRIVERA

**Prep WorkFlow:** GenExt28Day  
**Prep Method:** Method

**Status:** Prepped  
**Prep Date/Time:** 5/27/22 08:30

#	Lab Code	Client ID	B#	Method /Test	pH	Cl	Matrix	Amt. Ext.	Sample Description
1	E2200470-001	146-RS1731-190522	.01	6850/CIO4 DOD			Water	10mL	
2	E2200480-001	LH18/24-SP650_052422_AIX	.01	6850/CIO4 DOD			Water	10mL	
3	E2200480-002	LH18/24-SP650_052422_BIX	.01	6850/CIO4 DOD			Water	10mL	
4	E2200483-001	LH18/24-SP650_052422_AIX	.01	6850/CIO4 DOD			Water	10mL	
5	E2200484-001	LH18/24-SP650_052422_AIX	.01	6850/CIO4 DOD			Water	10mL	
6	EQ2200219-01	MB		6850/CIO4 DOD			Liquid	10mL	
7	EQ2200219-02	LCS		6850/CIO4 DOD			Liquid	10mL	
8	EQ2200219-03	DLCS		6850/CIO4 DOD			Liquid	10mL	
9	R2204439-003	2205130615 B650-EFF-1	.01	6850/CIO4			Water	10mL	
10	R2204439-007	2205130633 B650-INF-1	.01	6850/CIO4			Water	10mL	
11	R2204439-009	2205130835Y PL-7-480	.01	6850/CIO4			Water	10mL	
12	R2204582-011	2205170813 MPE-1	.01	6850/CIO4			Water	10mL	
13	R2204582-030	2205170851 MPE-8	.01	6850/CIO4			Water	10mL	
14	R2204582-035	2205170923 MPE-11	.01	6850/CIO4			Water	10mL	
15	R2204616-004	2205180841 MPE-10	.01	6850/CIO4			Water	10mL	
16	R2204616-011	2205181302A NASA 4	.01	6850/CIO4			Water	10mL	

## Spiking Solutions

Name: Perchlorate Intermediate Stock1		Inventory ID 222798		Logbook Ref: Perchlorate (1st Source)				Expires On: 10/29/2022	
EQ2200219-02	1.00µL	EQ2200219-02	1.00µL	EQ2200219-03	1.00µL	EQ2200219-03	1.00µL		

Name: Perchlorate Internal Standard 1ug/mL		Inventory ID 223118		Logbook Ref: Perchlorate Internal Standard				Expires On: 10/31/2022	
--	--	---------------------	--	--	--	--	--	------------------------	--

E2200470-001	100.00µL	E2200480-001	100.00µL	E2200480-002	100.00µL	E2200483-001	100.00µL	E2200484-001	100.00µL	EQ2200219-01	100.00µL
EQ2200219-01	100.00µL	EQ2200219-02	100.00µL	EQ2200219-02	100.00µL	EQ2200219-03	100.00µL	EQ2200219-03	100.00µL	R2204439-003	100.00µL
R2204439-007	100.00µL	R2204439-009	100.00µL	R2204582-011	100.00µL	R2204582-030	100.00µL	R2204582-035	100.00µL	R2204616-004	100.00µL
R2204616-011	100.00µL										

## Preparation Materials

Water HPLC Grade	02/16/2022 Water (221769)	6850 Amber Glass screw vial	2mL Screw Top Vial (221894)	537M Glass Culture Tubes	537M Glass Tubes (218064)
6850 0.45um syringe filters	6850 Syringe Filters (222410)	6850 Luer-Lok Syringes	Luer-Lok Syringes (221305)	6850 Pipette Tips 50-1000 uL	6850 Pipette Tips (221929)

*Preparation Information Benchsheet*

**Prep Run#:** 400589  
**Team:** Semivoa GCMS/GRIVERA

**Prep WorkFlow:** GenExt28Day  
**Prep Method:** Method

**Status:** Prepped  
**Prep Date/Time:** 5/27/22 08:30

**Preparation Steps**

Step: Preparation  
Started: 5/27/22 08:30  
Finished: 5/27/22 09:30  
By: GRIVERA  
Comments

Comments: \_\_\_\_\_  
\_\_\_\_\_

Reviewed By: GR Date: 5/27/22

## Chain of Custody

Relinquished By: _____	Date: _____	<u>Extracts Examined</u> Yes No
Received By: _____	Date: _____	



# Analytical Results

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22051205  
**Sample Matrix:** Water  
**Sample Name:** LH18/24-SP650\_052422\_AIX  
**Lab Code:** E2200483-001

**Service Request:** E2200483  
**Date Collected:** 5/24/22 1400  
**Date Received:** 5/26/22  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	6990		50.0	25.0	12.5	500	5/27/22	5/31/22 13:59	400589	765929	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22051205  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** EQ2200219-01

**Service Request:** E2200483  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	0.100	0.0500	0.0250	1	5/27/22	5/31/22 11:29	400589	765929	



## Accuracy & Precision

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS22051205  
**Sample Matrix:** Water

**Service Request:** E2200483  
**Date Analyzed:** 5/31/22

**Lab Control Sample Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**Analytical Method:** 6850  
**Prep Method:** Method

**Units:** µg/L  
**Basis:** NA

**Extraction Lot:** 400589

Analyte Name	Lab Control Sample EQ2200219-02			Duplicate Lab Control Sample EQ2200219-03			% Rec Limits	RPD	RPD Limit
	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Perchlorate	0.119	0.100	119	0.117	0.100	117	84 - 119	2	15

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22051205  
**Sample Matrix:** Water  
**Sample Name:** Lab Control Sample  
**Lab Code:** EQ2200219-02

**Service Request:** E2200483  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.119		0.100	0.0500	0.0250	1	5/27/22	5/31/22 11:47	400589	765929	



## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22051205  
**Sample Matrix:** Water  
**Sample Name:** Duplicate Lab Control Sample  
**Lab Code:** EQ2200219-03

**Service Request:** E2200483  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.117		0.100	0.0500	0.0250	1	5/27/22	5/31/22 12:18	400589	765929	



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10450 Stancliff Rd. Suite 210  
Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887

June 06, 2022

Marcia Olive  
Bhate Environmental Associates, Inc.  
445 Union Blvd Ste 129  
Lakewood, CO 80228

Work Order: **HS22051205**

Laboratory Results for: **Groundwater Treatment Plant Quarterly Influent Samples**

Dear Marcia Olive,

ALS Environmental received 2 sample(s) on May 26, 2022 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: JUMOKE.LAWAL

Dane J. Wacasey

ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Influent Samples  
**Work Order:** HS22051205

**SAMPLE SUMMARY**

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS22051205-01	LH18/24-SP140_052422	Water		24-May-2022 14:00	26-May-2022 09:55	<input type="checkbox"/>
HS22051205-02	Trip Blank	Water	CG-020822 -744	24-May-2022 14:00	26-May-2022 09:55	<input type="checkbox"/>

ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Influent Samples  
**Work Order:** HS22051205

**CASE NARRATIVE**

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**Work Order Comments**

- The analysis for Perchlorate was subcontracted to ALS Houston High-Res Lab. Final report attached

---

**GCMS Semivolatiles by Method SW8270SIM****Batch ID: 179326****Sample ID: LH18/24-SP140\_052422 (HS22051205-01)**

- The surrogate recoveries could not be determined due to dilution below the calibration range.

---

**GCMS Volatiles by Method SW8260****Batch ID: R409584****Sample ID: HS22051211-01MSD**

- MSD is for an unrelated sample

---

**Metals by Method SW6020A****Batch ID: 179494****Sample ID: HS22051125-02MS**

- MS and MSD are for an unrelated sample

**Sample ID: HS22051125-02PDS**

- PDS is for an unrelated sample

---

**Metals by Method SW7470A****Batch ID: 179379**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

---

**WetChemistry by Method E1664A****Batch ID: R409973**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

---

**WetChemistry by Method SW9056****Batch ID: R409911****Sample ID: LH18/24-SP140\_052422 (HS22051205-01MS)**

- The MS and/or MSD recovery was outside of the control limits; however, the result in the parent sample is greater than 4x the spike amount. (Chloride)

---

**WetChemistry by Method E410.4****Batch ID: R409786**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

## ALS Houston, US

Date: 06-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Groundwater Treatment Plant Quarterly Influent Samples  
 Sample ID: LH18/24-SP140\_052422  
 Collection Date: 24-May-2022 14:00

## ANALYTICAL REPORT

WorkOrder:HS22051205  
 Lab ID:HS22051205-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD 8260C</b>		<b>Method:SW8260</b>						Analyst: PC
1,1,1,2-Tetrachloroethane	10	U	3.0	10	10	ug/L	10	27-May-2022 14:21
1,1,1-Trichloroethane	5.0	U	2.0	5.0	10	ug/L	10	27-May-2022 14:21
1,1,2,2-Tetrachloroethane	10	U	5.0	10	10	ug/L	10	27-May-2022 14:21
1,1,2-Trichloroethane	10	U	3.0	10	10	ug/L	10	27-May-2022 14:21
<b>1,1-Dichloroethane</b>	<b>9.7</b>	<b>J</b>	<b>2.0</b>	<b>5.0</b>	<b>10</b>	<b>ug/L</b>	10	27-May-2022 14:21
1,1-Dichloroethene	5.0	U	2.0	5.0	10	ug/L	10	27-May-2022 14:21
1,1-Dichloropropene	10	U	3.0	10	10	ug/L	10	27-May-2022 14:21
1,2,3-Trichlorobenzene	10	U	4.0	10	10	ug/L	10	27-May-2022 14:21
1,2,3-Trichloropropane	10	U	5.0	10	10	ug/L	10	27-May-2022 14:21
1,2,4-Trichlorobenzene	10	U	5.0	10	10	ug/L	10	27-May-2022 14:21
1,2,4-Trimethylbenzene	10	U	3.0	10	10	ug/L	10	27-May-2022 14:21
1,2-Dibromo-3-chloropropane	10	U	2.0	10	10	ug/L	10	27-May-2022 14:21
1,2-Dibromoethane	5.0	U	2.0	5.0	10	ug/L	10	27-May-2022 14:21
1,2-Dichlorobenzene	10	U	5.0	10	10	ug/L	10	27-May-2022 14:21
<b>1,2-Dichloroethane</b>	<b>25</b>		<b>2.0</b>	<b>5.0</b>	<b>10</b>	<b>ug/L</b>	10	27-May-2022 14:21
1,2-Dichloropropane	10	U	5.0	10	10	ug/L	10	27-May-2022 14:21
1,3,5-Trimethylbenzene	10	U	3.0	10	10	ug/L	10	27-May-2022 14:21
1,3-Dichlorobenzene	10	U	4.0	10	10	ug/L	10	27-May-2022 14:21
1,3-Dichloropropane	10	U	3.0	10	10	ug/L	10	27-May-2022 14:21
1,4-Dichlorobenzene	10	U	4.0	10	10	ug/L	10	27-May-2022 14:21
2,2-Dichloropropane	5.0	U	2.0	5.0	10	ug/L	10	27-May-2022 14:21
2-Butanone	10	U	5.0	10	20	ug/L	10	27-May-2022 14:21
2-Chlorotoluene	10	U	3.0	10	10	ug/L	10	27-May-2022 14:21
2-Hexanone	20	U	10	20	20	ug/L	10	27-May-2022 14:21
4-Chlorotoluene	10	U	4.0	10	10	ug/L	10	27-May-2022 14:21
4-Isopropyltoluene	10	U	3.0	10	10	ug/L	10	27-May-2022 14:21
4-Methyl-2-pentanone	20	U	7.0	20	20	ug/L	10	27-May-2022 14:21
Acetone	20	U	4.0	20	20	ug/L	10	27-May-2022 14:21
Benzene	5.0	U	2.0	5.0	10	ug/L	10	27-May-2022 14:21
Bromobenzene	10	U	4.0	10	10	ug/L	10	27-May-2022 14:21
Bromochloromethane	5.0	U	2.0	5.0	10	ug/L	10	27-May-2022 14:21
Bromodichloromethane	5.0	U	2.0	5.0	10	ug/L	10	27-May-2022 14:21
Bromoform	10	U	4.0	10	10	ug/L	10	27-May-2022 14:21
Bromomethane	10	U	4.0	10	10	ug/L	10	27-May-2022 14:21
Carbon disulfide	20	U	6.0	20	20	ug/L	10	27-May-2022 14:21
Carbon tetrachloride	10	U	5.0	10	10	ug/L	10	27-May-2022 14:21
Chlorobenzene	10	U	3.0	10	10	ug/L	10	27-May-2022 14:21
Chloroethane	10	U	3.0	10	10	ug/L	10	27-May-2022 14:21
<b>Chloroform</b>	<b>9.9</b>	<b>J</b>	<b>2.0</b>	<b>5.0</b>	<b>10</b>	<b>ug/L</b>	10	27-May-2022 14:21

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 06-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Groundwater Treatment Plant Quarterly Influent Samples  
 Sample ID: LH18/24-SP140\_052422  
 Collection Date: 24-May-2022 14:00

## ANALYTICAL REPORT

WorkOrder: HS22051205  
 Lab ID: HS22051205-01  
 Matrix: Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD 8260C</b>		<b>Method: SW8260</b>						Analyst: PC
Chloromethane	5.0	U	2.0	5.0	10	ug/L	10	27-May-2022 14:21
<b>cis-1,2-Dichloroethene</b>	<b>3,200</b>		<b>20</b>	<b>50</b>	<b>100</b>	<b>ug/L</b>	100	27-May-2022 15:24
cis-1,3-Dichloropropene	5.0	U	1.0	5.0	10	ug/L	10	27-May-2022 14:21
Dibromochloromethane	10	U	3.0	10	10	ug/L	10	27-May-2022 14:21
Dibromomethane	5.0	U	2.0	5.0	10	ug/L	10	27-May-2022 14:21
Dichlorodifluoromethane	10	U	3.0	10	10	ug/L	10	27-May-2022 14:21
Ethylbenzene	10	U	3.0	10	10	ug/L	10	27-May-2022 14:21
Hexachlorobutadiene	10	U	10	10	10	ug/L	10	27-May-2022 14:21
Isopropylbenzene	10	U	3.0	10	10	ug/L	10	27-May-2022 14:21
m,p-Xylene	10	U	5.0	10	20	ug/L	10	27-May-2022 14:21
<b>Methylene chloride</b>	<b>2,400</b>		<b>40</b>	<b>200</b>	<b>200</b>	<b>ug/L</b>	100	27-May-2022 15:24
n-Butylbenzene	10	U	4.0	10	10	ug/L	10	27-May-2022 14:21
n-Propylbenzene	10	U	3.0	10	10	ug/L	10	27-May-2022 14:21
Naphthalene	10	U	3.0	10	10	ug/L	10	27-May-2022 14:21
o-Xylene	10	U	3.0	10	10	ug/L	10	27-May-2022 14:21
sec-Butylbenzene	10	U	3.0	10	10	ug/L	10	27-May-2022 14:21
Styrene	10	U	3.0	10	10	ug/L	10	27-May-2022 14:21
tert-Butylbenzene	10	U	3.0	10	10	ug/L	10	27-May-2022 14:21
<b>Tetrachloroethene</b>	<b>36</b>		<b>3.0</b>	<b>10</b>	<b>10</b>	<b>ug/L</b>	10	27-May-2022 14:21
Toluene	5.0	U	2.0	5.0	10	ug/L	10	27-May-2022 14:21
<b>trans-1,2-Dichloroethene</b>	<b>11</b>		<b>2.0</b>	<b>5.0</b>	<b>10</b>	<b>ug/L</b>	10	27-May-2022 14:21
trans-1,3-Dichloropropene	5.0	U	2.0	5.0	10	ug/L	10	27-May-2022 14:21
<b>Trichloroethene</b>	<b>3,900</b>		<b>20</b>	<b>50</b>	<b>100</b>	<b>ug/L</b>	100	27-May-2022 15:24
Trichlorofluoromethane	10	U	3.0	10	10	ug/L	10	27-May-2022 14:21
<b>Vinyl chloride</b>	<b>300</b>		<b>2.0</b>	<b>5.0</b>	<b>10</b>	<b>ug/L</b>	10	27-May-2022 14:21
Surr: 1,2-Dichloroethane-d4	94.0			0	81-118	%REC	10	27-May-2022 14:21
Surr: 1,2-Dichloroethane-d4	93.2			0	81-118	%REC	100	27-May-2022 15:24
Surr: 4-Bromofluorobenzene	94.1			0	85-114	%REC	10	27-May-2022 14:21
Surr: 4-Bromofluorobenzene	91.5			0	85-114	%REC	100	27-May-2022 15:24
Surr: Dibromofluoromethane	93.7			0	80-119	%REC	10	27-May-2022 14:21
Surr: Dibromofluoromethane	93.4			0	80-119	%REC	100	27-May-2022 15:24
Surr: Toluene-d8	103			0	89-112	%REC	10	27-May-2022 14:21
Surr: Toluene-d8	101			0	89-112	%REC	100	27-May-2022 15:24
<b>SEMIVOLATILES SIM</b>		<b>Method: SW8270SIM</b>						Prep: SW3510 / 27-May-2022 Analyst: JLJ
<b>1,4-Dioxane</b>	<b>13</b>		<b>1.0</b>	<b>0</b>	<b>1.0</b>	<b>ug/L</b>	100	01-Jun-2022 11:58
Surr: 2-Fluorobiphenyl	0	S		0	40-140	%REC	100	01-Jun-2022 11:58
Surr: 4-Terphenyl-d14	0	S		0	40-140	%REC	100	01-Jun-2022 11:58
Surr: Nitrobenzene-d5	0	S		0	40-140	%REC	100	01-Jun-2022 11:58

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 06-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Groundwater Treatment Plant Quarterly Influent Samples  
 Sample ID: LH18/24-SP140\_052422  
 Collection Date: 24-May-2022 14:00

**ANALYTICAL REPORT**  
 WorkOrder:HS22051205  
 Lab ID:HS22051205-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>METALS BY ICPMS BY SW6020A</b>		<b>Method:SW6020A</b>				Prep:SW3010A / 02-Jun-2022		Analyst: JHD
Aluminum	0.126		0.00180	0.00500	0.0100	mg/L	1	06-Jun-2022 12:33
Antimony	0.000693	J	0.000400	0.00100	0.00500	mg/L	1	06-Jun-2022 12:33
Arsenic	0.00186	J	0.000400	0.00100	0.00500	mg/L	1	06-Jun-2022 12:33
Barium	0.622		0.00190	0.00250	0.00500	mg/L	1	06-Jun-2022 12:33
Beryllium	0.000500	U	0.000200	0.000500	0.00200	mg/L	1	06-Jun-2022 12:33
Cadmium	0.000500	U	0.000200	0.000500	0.00200	mg/L	1	06-Jun-2022 12:33
Calcium	27.5		0.340	0.500	5.00	mg/L	10	06-Jun-2022 15:42
Chromium	0.00200	J	0.000400	0.00100	0.00500	mg/L	1	06-Jun-2022 12:33
Cobalt	0.00621		0.000100	0.000500	0.00500	mg/L	1	06-Jun-2022 12:33
Iron	2.31		0.0120	0.0500	0.200	mg/L	1	06-Jun-2022 12:33
Lead	0.00100	U	0.000600	0.00100	0.00500	mg/L	1	06-Jun-2022 12:33
Magnesium	21.4		0.0100	0.0500	0.200	mg/L	1	06-Jun-2022 12:33
Manganese	0.506		0.000700	0.00250	0.00500	mg/L	1	06-Jun-2022 12:33
Nickel	0.0122		0.000600	0.00100	0.00500	mg/L	1	06-Jun-2022 12:33
Potassium	1.14		0.0180	0.0500	0.200	mg/L	1	06-Jun-2022 12:33
Selenium	0.00189	J	0.00110	0.00250	0.00500	mg/L	1	06-Jun-2022 12:33
Silver	0.000500	U	0.000200	0.000500	0.00500	mg/L	1	06-Jun-2022 12:33
Sodium	178		0.0140	0.0500	0.200	mg/L	1	06-Jun-2022 12:33
Thallium	0.000500	U	0.000200	0.000500	0.00200	mg/L	1	06-Jun-2022 12:33
Vanadium	0.00133	J	0.000600	0.00100	0.00500	mg/L	1	06-Jun-2022 12:33
Zinc	0.0332		0.00200	0.00250	0.00500	mg/L	1	06-Jun-2022 12:33
<b>MERCURY BY SW7470A</b>		<b>Method:SW7470A</b>				Prep:SW7470A / 31-May-2022		Analyst: MSC
Mercury	0.0000330	J	0.0000300	0.000100	0.000200	mg/L	1	31-May-2022 15:24
<b>OIL &amp; GREASE (HEM) BY E1664A</b>		<b>Method:E1664A</b>				Analyst: KAH		
Oil and Grease	1.00	U	0.610	1.00	2.00	mg/L	1	03-Jun-2022 14:00
<b>CHEMICAL OXYGEN DEMAND BY E410.4, REV 2.0, 1993</b>		<b>Method:E410.4</b>				Analyst: TH		
Chemical Oxygen Demand	16.0		5.00	7.50	15.0	mg/L	1	01-Jun-2022 14:00
<b>ANIONS BY SW9056A</b>		<b>Method:SW9056</b>				Analyst: YP		
Chloride	290		4.00	10.0	10.0	mg/L	20	02-Jun-2022 15:43
Sulfate	26.7		0.200	0.500	0.500	mg/L	1	02-Jun-2022 15:27
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>				Analyst: GR		
Subcontract Analysis	See Attached		0	0		NA	1	31-May-2022 16:12

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 06-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Groundwater Treatment Plant Quarterly Influent Samples  
 Sample ID: Trip Blank  
 Collection Date: 24-May-2022 14:00

## ANALYTICAL REPORT

WorkOrder: HS22051205  
 Lab ID: HS22051205-02  
 Matrix: Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD</b>			<b>Method: SW8260</b>					Analyst: PC
<b>8260C</b>								
1,1,1,2-Tetrachloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:18
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:18
1,1,2,2-Tetrachloroethane	1.0	U	0.50	1.0	1.0	ug/L	1	27-May-2022 13:18
1,1,2-Trichloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:18
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:18
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:18
1,1-Dichloropropene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:18
1,2,3-Trichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	27-May-2022 13:18
1,2,3-Trichloropropane	1.0	U	0.50	1.0	1.0	ug/L	1	27-May-2022 13:18
1,2,4-Trichlorobenzene	1.0	U	0.50	1.0	1.0	ug/L	1	27-May-2022 13:18
1,2,4-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:18
1,2-Dibromo-3-chloropropane	1.0	U	0.20	1.0	1.0	ug/L	1	27-May-2022 13:18
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:18
1,2-Dichlorobenzene	1.0	U	0.50	1.0	1.0	ug/L	1	27-May-2022 13:18
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:18
1,2-Dichloropropane	1.0	U	0.50	1.0	1.0	ug/L	1	27-May-2022 13:18
1,3,5-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:18
1,3-Dichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	27-May-2022 13:18
1,3-Dichloropropane	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:18
1,4-Dichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	27-May-2022 13:18
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:18
2-Butanone	1.0	U	0.50	1.0	2.0	ug/L	1	27-May-2022 13:18
2-Chlorotoluene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:18
2-Hexanone	2.0	U	1.0	2.0	2.0	ug/L	1	27-May-2022 13:18
4-Chlorotoluene	1.0	U	0.40	1.0	1.0	ug/L	1	27-May-2022 13:18
4-Isopropyltoluene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:18
4-Methyl-2-pentanone	2.0	U	0.70	2.0	2.0	ug/L	1	27-May-2022 13:18
Acetone	2.0	U	0.40	2.0	2.0	ug/L	1	27-May-2022 13:18
Benzene	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:18
Bromobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	27-May-2022 13:18
Bromochloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:18
Bromodichloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:18
Bromoform	1.0	U	0.40	1.0	1.0	ug/L	1	27-May-2022 13:18
Bromomethane	1.0	U	0.40	1.0	1.0	ug/L	1	27-May-2022 13:18
Carbon disulfide	2.0	U	0.60	2.0	2.0	ug/L	1	27-May-2022 13:18
Carbon tetrachloride	1.0	U	0.50	1.0	1.0	ug/L	1	27-May-2022 13:18
Chlorobenzene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:18
Chloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:18
Chloroform	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:18

Note: See Qualifiers Page for a list of qualifiers and their explanation.



## ALS Houston, US

Date: 06-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Groundwater Treatment Plant Quarterly Influent Samples  
 Sample ID: Trip Blank  
 Collection Date: 24-May-2022 14:00

## ANALYTICAL REPORT

WorkOrder:HS22051205  
 Lab ID:HS22051205-02  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD 8260C</b>			<b>Method:SW8260</b>					Analyst: PC
Chloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:18
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:18
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	ug/L	1	27-May-2022 13:18
Dibromochloromethane	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:18
Dibromomethane	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:18
Dichlorodifluoromethane	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:18
Ethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:18
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	ug/L	1	27-May-2022 13:18
Isopropylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:18
m,p-Xylene	1.0	U	0.50	1.0	2.0	ug/L	1	27-May-2022 13:18
<b>Methylene chloride</b>	<b>1.9</b>	<b>J</b>	<b>0.40</b>	<b>2.0</b>	<b>2.0</b>	<b>ug/L</b>	<b>1</b>	27-May-2022 13:18
n-Butylbenzene	1.0	U	0.40	1.0	1.0	ug/L	1	27-May-2022 13:18
n-Propylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:18
Naphthalene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:18
o-Xylene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:18
sec-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:18
Styrene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:18
tert-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:18
Tetrachloroethene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:18
Toluene	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:18
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:18
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:18
Trichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:18
<b>Trichlorofluoromethane</b>	<b>7.5</b>		<b>0.30</b>	<b>1.0</b>	<b>1.0</b>	<b>ug/L</b>	<b>1</b>	27-May-2022 13:18
Vinyl chloride	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:18
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>92.2</i>			<b>0</b>	<i>81-118</i>	<b>%REC</b>	<b>1</b>	27-May-2022 13:18
<i>Surr: 4-Bromofluorobenzene</i>	<i>93.6</i>			<b>0</b>	<i>85-114</i>	<b>%REC</b>	<b>1</b>	27-May-2022 13:18
<i>Surr: Dibromofluoromethane</i>	<i>93.8</i>			<b>0</b>	<i>80-119</i>	<b>%REC</b>	<b>1</b>	27-May-2022 13:18
<i>Surr: Toluene-d8</i>	<i>101</i>			<b>0</b>	<i>89-112</i>	<b>%REC</b>	<b>1</b>	27-May-2022 13:18

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## Weight / Prep Log

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Influent Samples  
**WorkOrder:** HS22051205

<b>Batch ID:</b> 179326	<b>Start Date:</b> 27 May 2022 07:00	<b>End Date:</b> 27 May 2022 11:30
<b>Method:</b> SV AQ SEP FUN EXTRACT-LOWLEV - 3510C	<b>Prep Code:</b> 3510_B_SIM	

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor	
HS22051205-01	1	1000 (mL)	1 (mL)	0.001	1-liter amber glass, Neat

<b>Batch ID:</b> 179379	<b>Start Date:</b> 31 May 2022 09:00	<b>End Date:</b> 31 May 2022 12:00
<b>Method:</b> MERCURY PREP BY 7470A- WATER	<b>Prep Code:</b> HG_WPR	

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor	
HS22051205-01		10 (mL)	10 (mL)	1	120 plastic HNO3

<b>Batch ID:</b> 179494	<b>Start Date:</b> 02 Jun 2022 12:00	<b>End Date:</b> 02 Jun 2022 16:00
<b>Method:</b> WATER - SW3010A	<b>Prep Code:</b> 3010A	

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor	
HS22051205-01		10 (mL)	10 (mL)	1	120 plastic HNO3

ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Influent Samples  
**WorkOrder:** HS22051205

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> 179326 ( 0 )		<b>Test Name :</b> SEMIVOLATILES SIM			<b>Matrix:</b> Water	
HS22051205-01	LH18/24-SP140_052422	24 May 2022 14:00		27 May 2022 10:33	01 Jun 2022 11:58	100
<b>Batch ID:</b> 179379 ( 0 )		<b>Test Name :</b> MERCURY BY SW7470A			<b>Matrix:</b> Water	
HS22051205-01	LH18/24-SP140_052422	24 May 2022 14:00		31 May 2022 09:00	31 May 2022 15:24	1
<b>Batch ID:</b> 179494 ( 0 )		<b>Test Name :</b> METALS BY ICPMS BY SW6020A			<b>Matrix:</b> Water	
HS22051205-01	LH18/24-SP140_052422	24 May 2022 14:00		02 Jun 2022 12:00	06 Jun 2022 15:42	10
HS22051205-01	LH18/24-SP140_052422	24 May 2022 14:00		02 Jun 2022 12:00	06 Jun 2022 12:33	1
<b>Batch ID:</b> R409584 ( 0 )		<b>Test Name :</b> VOLATILES ORGANICS BY METHOD 8260C			<b>Matrix:</b> Water	
HS22051205-01	LH18/24-SP140_052422	24 May 2022 14:00			27 May 2022 15:24	100
HS22051205-01	LH18/24-SP140_052422	24 May 2022 14:00			27 May 2022 14:21	10
HS22051205-02	Trip Blank	24 May 2022 14:00			27 May 2022 13:18	1
<b>Batch ID:</b> R409692 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			<b>Matrix:</b> Water	
HS22051205-01	LH18/24-SP140_052422	24 May 2022 14:00			31 May 2022 16:12	1
<b>Batch ID:</b> R409786 ( 0 )		<b>Test Name :</b> CHEMICAL OXYGEN DEMAND BY E410.4, REV 2.0, 1993			<b>Matrix:</b> Water	
HS22051205-01	LH18/24-SP140_052422	24 May 2022 14:00			01 Jun 2022 14:00	1
<b>Batch ID:</b> R409911 ( 0 )		<b>Test Name :</b> ANIONS BY SW9056A			<b>Matrix:</b> Water	
HS22051205-01	LH18/24-SP140_052422	24 May 2022 14:00			02 Jun 2022 15:43	20
HS22051205-01	LH18/24-SP140_052422	24 May 2022 14:00			02 Jun 2022 15:27	1
<b>Batch ID:</b> R409973 ( 0 )		<b>Test Name :</b> OIL & GREASE (HEM) BY E1664A			<b>Matrix:</b> Water	
HS22051205-01	LH18/24-SP140_052422	24 May 2022 14:00			03 Jun 2022 14:00	1

ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Influent Samples  
**WorkOrder:** HS22051205

**QC BATCH REPORT**

Batch ID: 179379 ( 0 )		Instrument: HG03		Method: MERCURY BY SW7470A						
<b>MBLK</b>	Sample ID: <b>MBLK-179379</b>	Units: <b>mg/L</b>		Analysis Date: <b>31-May-2022 15:01</b>						
Client ID:	Run ID: <b>HG03_409663</b>		SeqNo: <b>6671388</b>		PrepDate: <b>31-May-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.000100	0.000200								U
<b>LCS</b>	Sample ID: <b>LCS-179379</b>	Units: <b>mg/L</b>		Analysis Date: <b>31-May-2022 15:02</b>						
Client ID:	Run ID: <b>HG03_409663</b>		SeqNo: <b>6671389</b>		PrepDate: <b>31-May-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00546	0.000200	0.005	0	109	82 - 119				
<b>MS</b>	Sample ID: <b>HS22051125-02MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>31-May-2022 15:11</b>						
Client ID:	Run ID: <b>HG03_409663</b>		SeqNo: <b>6671393</b>		PrepDate: <b>31-May-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00501	0.000200	0.005	-0.000009000	100	82 - 119				
<b>MSD</b>	Sample ID: <b>HS22051125-02MSD</b>	Units: <b>mg/L</b>		Analysis Date: <b>31-May-2022 15:12</b>						
Client ID:	Run ID: <b>HG03_409663</b>		SeqNo: <b>6671394</b>		PrepDate: <b>31-May-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00499	0.000200	0.005	-0.000009000	100.0	82 - 119	0.005010	0.4	20	
The following samples were analyzed in this batch: HS22051205-01										

## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Influent Samples  
**WorkOrder:** HS22051205

**QC BATCH REPORT**

Batch ID: 179494 ( 0 )		Instrument: ICPMS05		Method: METALS BY ICPMS BY SW6020A					
<b>MBLK</b>	Sample ID: <b>MBLK-179494</b>	Units: <b>mg/L</b>		Analysis Date: <b>06-Jun-2022 11:42</b>					
Client ID:	Run ID: <b>ICPMS05_410027</b>	SeqNo: <b>6679556</b>		PrepDate: <b>02-Jun-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Aluminum	0.00500	0.0100							U
Antimony	0.00100	0.00500							U
Arsenic	0.00100	0.00500							U
Barium	0.00250	0.00500							U
Beryllium	0.000500	0.00200							U
Cadmium	0.000500	0.00200							U
Calcium	0.0500	0.500							U
Chromium	0.00100	0.00500							U
Cobalt	0.000500	0.00500							U
Iron	0.0500	0.200							U
Lead	0.00100	0.00500							U
Magnesium	0.0500	0.200							U
Manganese	0.00250	0.00500							U
Nickel	0.00100	0.00500							U
Potassium	0.0500	0.200							U
Selenium	0.00250	0.00500							U
Silver	0.000500	0.00500							U
Sodium	0.0500	0.200							U
Thallium	0.000500	0.00200							U
Vanadium	0.00100	0.00500							U
Zinc	0.004713	0.00500							J

## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Influent Samples  
**WorkOrder:** HS22051205

**QC BATCH REPORT**

Batch ID: 179494 ( 0 )		Instrument: ICPMS05		Method: METALS BY ICPMS BY SW6020A					
<b>LCS</b>		Sample ID: <b>LCS-179494</b>		Units: <b>mg/L</b>		Analysis Date: <b>06-Jun-2022 11:44</b>			
Client ID:		Run ID: <b>ICPMS05_410027</b>		SeqNo: <b>6679557</b>		PrepDate: <b>02-Jun-2022</b>		DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Aluminum	0.1071	0.0100	0.1	0	107	84 - 117			
Antimony	0.05104	0.00500	0.05	0	102	85 - 117			
Arsenic	0.0542	0.00500	0.05	0	108	84 - 116			
Barium	0.0513	0.00500	0.05	0	103	86 - 114			
Beryllium	0.05115	0.00200	0.05	0	102	83 - 121			
Cadmium	0.05284	0.00200	0.05	0	106	87 - 115			
Calcium	4.98	0.500	5	0	99.6	87 - 118			
Chromium	0.05212	0.00500	0.05	0	104	85 - 116			
Cobalt	0.05281	0.00500	0.05	0	106	86 - 115			
Iron	5.033	0.200	5	0	101	87 - 118			
Lead	0.05142	0.00500	0.05	0	103	88 - 115			
Magnesium	5.204	0.200	5	0	104	83 - 118			
Manganese	0.05236	0.00500	0.05	0	105	87 - 115			
Nickel	0.05415	0.00500	0.05	0	108	85 - 117			
Potassium	5.227	0.200	5	0	105	87 - 115			
Selenium	0.05407	0.00500	0.05	0	108	80 - 120			
Silver	0.05086	0.00500	0.05	0	102	85 - 116			
Sodium	5.103	0.200	5	0	102	85 - 117			
Thallium	0.05005	0.00200	0.05	0	100	82 - 116			
Vanadium	0.05231	0.00500	0.05	0	105	86 - 115			
Zinc	0.05663	0.00500	0.05	0	113	83 - 119			

## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Influent Samples  
**WorkOrder:** HS22051205

## QC BATCH REPORT

Batch ID: 179494 ( 0 )		Instrument: ICPMS05		Method: METALS BY ICPMS BY SW6020A					
<b>MS</b>		Sample ID: HS22051125-02MS		Units: mg/L		Analysis Date: 06-Jun-2022 16:48			
Client ID:		Run ID: ICPMS05_410027		SeqNo: 6680200		PrepDate: 02-Jun-2022		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Aluminum	47.75	0.0100	0.1	53.66	-5910	84 - 117			SEO
Antimony	0.05224	0.00500	0.05	0.000808	103	85 - 117			
Arsenic	0.05871	0.00500	0.05	0.004244	109	84 - 116			
Barium	0.06552	0.00500	0.05	0.0133	104	86 - 114			
Beryllium	0.06769	0.00200	0.05	0.01909	97.2	83 - 121			
Cadmium	0.06194	0.00200	0.05	0.01215	99.6	87 - 115			
Calcium	526.2	0.500	5	562	-715	87 - 118			SEO
Chromium	0.06871	0.00500	0.05	0.01817	101	85 - 116			
Cobalt	0.4166	0.00500	0.05	0.3696	94.1	86 - 115			O
Iron	13.14	0.200	5	8.317	96.4	87 - 118			
Lead	0.05169	0.00500	0.05	0.002905	97.6	88 - 115			
Magnesium	228.4	0.200	5	243.1	-294	83 - 118			SEO
Manganese	5.97	0.00500	0.05	6.337	-734	87 - 115			SEO
Nickel	1.184	0.00500	0.05	1.143	80.6	85 - 117			SO
Potassium	15.02	0.200	5	11.21	76.2	87 - 115			S
Selenium	0.0969	0.00500	0.05	0.04204	110	80 - 120			
Silver	0.04469	0.00500	0.05	0.000063	89.3	85 - 116			
Sodium	167.5	0.200	5	173.7	-124	85 - 117			SO
Thallium	0.04815	0.00200	0.05	0.000662	95.0	82 - 116			
Vanadium	0.05883	0.00500	0.05	0.005511	107	86 - 115			
Zinc	1.019	0.00500	0.05	0.974	89.5	83 - 119			O

## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Influent Samples  
**WorkOrder:** HS22051205

**QC BATCH REPORT**

Batch ID: 179494 ( 0 )		Instrument: ICPMS05		Method: METALS BY ICPMS BY SW6020A						
<b>MSD</b>		Sample ID: HS22051125-02MSD		Units: mg/L		Analysis Date: 06-Jun-2022 16:32				
Client ID:		Run ID: ICPMS05_410027		SeqNo: 6680003		PrepDate: 02-Jun-2022		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual
Aluminum	47.18	0.0100	0.1	53.66	-6480	84 - 117	47.75	1.21	20	SEO
Antimony	0.05132	0.00500	0.05	0.000808	101	85 - 117	0.05224	1.77	20	
Arsenic	0.05829	0.00500	0.05	0.004244	108	84 - 116	0.05871	0.713	20	
Barium	0.06312	0.00500	0.05	0.0133	99.6	86 - 114	0.06552	3.73	20	
Beryllium	0.06912	0.00200	0.05	0.01909	100	83 - 121	0.06769	2.08	20	
Cadmium	0.06066	0.00200	0.05	0.01215	97.0	87 - 115	0.06194	2.09	20	
Calcium	516.4	0.500	5	562	-910	87 - 118	526.2	1.87	20	SEO
Chromium	0.06613	0.00500	0.05	0.01817	95.9	85 - 116	0.06871	3.83	20	
Cobalt	0.4017	0.00500	0.05	0.3696	64.2	86 - 115	0.4166	3.65	20	SO
Iron	12.73	0.200	5	8.317	88.2	87 - 118	13.14	3.15	20	
Lead	0.05461	0.00500	0.05	0.002905	103	88 - 115	0.05169	5.49	20	
Magnesium	223.1	0.200	5	243.1	-399	83 - 118	228.4	2.33	20	SEO
Manganese	5.855	0.00500	0.05	6.337	-964	87 - 115	5.97	1.95	20	SEO
Nickel	1.154	0.00500	0.05	1.143	21.0	85 - 117	1.184	2.55	20	SO
Potassium	14.76	0.200	5	11.21	71.2	87 - 115	15.02	1.69	20	S
Selenium	0.09704	0.00500	0.05	0.04204	110	80 - 120	0.0969	0.143	20	
Silver	0.04355	0.00500	0.05	0.000063	87.0	85 - 116	0.04469	2.59	20	
Sodium	160.9	0.200	5	173.7	-255	85 - 117	167.5	3.99	20	SO
Thallium	0.05072	0.00200	0.05	0.000662	100	82 - 116	0.04815	5.2	20	
Vanadium	0.05712	0.00500	0.05	0.005511	103	86 - 115	0.05883	2.94	20	
Zinc	1.005	0.00500	0.05	0.974	62.8	83 - 119	1.019	1.32	20	SO
<b>PDS</b>		Sample ID: HS22051125-02PDS		Units: mg/L		Analysis Date: 06-Jun-2022 17:10				
Client ID:		Run ID: ICPMS05_410027		SeqNo: 6680207		PrepDate: 02-Jun-2022		DF: 100		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual
Aluminum	59.69	1.00	10	49.42	103	80 - 120				O
Calcium	1408	50.0	1000	533.6	87.4	80 - 120				
Magnesium	1086	20.0	1000	227.9	85.8	80 - 120				
Manganese	15.21	0.500	10	6.198	90.2	80 - 120				



## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Influent Samples  
**WorkOrder:** HS22051205

**QC BATCH REPORT**

Batch ID: 179494 ( 0 )		Instrument: ICPMS05		Method: METALS BY ICPMS BY SW6020A					
<b>PDS</b>		Sample ID: HS22051125-02PDS		Units: mg/L		Analysis Date: 06-Jun-2022 16:50			
Client ID:		Run ID: ICPMS05_410027		SeqNo: 6680201		PrepDate: 02-Jun-2022		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Antimony	0.0995	0.00500	0.1	0.000808	98.7	80 - 120			
Arsenic	0.1151	0.00500	0.1	0.004244	111	80 - 120			
Barium	0.1161	0.00500	0.1	0.0133	103	80 - 120			
Beryllium	0.1161	0.00200	0.1	0.01909	97.0	80 - 120			
Cadmium	0.1114	0.00200	0.1	0.01215	99.3	80 - 120			
Chromium	0.1178	0.00500	0.1	0.01817	99.6	80 - 120			
Iron	17.49	0.200	10	8.317	91.7	80 - 120			
Lead	0.104	0.00500	0.1	0.002905	101	80 - 120			
Nickel	1.173	0.00500	0.1	1.143	29.5	80 - 120			SO
Potassium	19.42	0.200	10	11.21	82.1	80 - 120			
Selenium	0.1562	0.00500	0.1	0.04204	114	80 - 120			
Silver	0.08859	0.00500	0.1	0.000063	88.5	80 - 120			
Sodium	158.3	0.200	10	173.7	-154	80 - 120			SO
Thallium	0.1022	0.00200	0.1	0.000662	102	80 - 120			
Vanadium	0.1095	0.00500	0.1	0.005511	104	80 - 120			
Zinc	0.9988	0.00500	0.1	0.974	24.8	80 - 120			SO
<b>SD</b>		Sample ID: HS22051125-02SD		Units: mg/L		Analysis Date: 06-Jun-2022 17:08			
Client ID:		Run ID: ICPMS05_410027		SeqNo: 6680206		PrepDate: 02-Jun-2022		DF: 500	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%D	%D Limit Qual
Aluminum	48.36	5.00					49.42	2.15	10
Calcium	519.2	250					533.6	2.7	10
Magnesium	226.9	100					227.9	0.456	10
Manganese	6.077	2.50					6.198	1.97	10

## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Influent Samples  
**WorkOrder:** HS22051205

**QC BATCH REPORT**

Batch ID: 179494 ( 0 )		Instrument: ICPMS05		Method: METALS BY ICPMS BY SW6020A						
<b>SD</b>	Sample ID: <b>HS22051125-02SD</b>	Units: <b>mg/L</b>		Analysis Date: <b>06-Jun-2022 11:48</b>						
Client ID:	Run ID: <b>ICPMS05_410027</b>	SeqNo: <b>6679559</b>		PrepDate: <b>02-Jun-2022</b>		DF: <b>5</b>				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%D	%D Limit	Qual
Antimony	0.00500	0.0250					0.000808	0	10	U
Arsenic	0.004514	0.0250					0.004244	0	10	J
Barium	0.01333	0.0250					0.0133	0	10	J
Cadmium	0.01273	0.0100					0.01215	4.77	10	
Chromium	0.01775	0.0250					0.01817	0	10	J
Cobalt	0.3916	0.0250					0.3696	5.94	10	
Iron	8.587	1.00					8.317	3.25	10	
Lead	0.00500	0.0250					0.002905	0	10	U
Nickel	1.161	0.0250					1.143	1.55	10	
Potassium	10.82	1.00					11.21	3.49	10	
Selenium	0.04354	0.0250					0.04204	3.55	10	
Silver	0.00250	0.0250					0.000063	0	10	U
Sodium	171.1	1.00					173.7	1.44	10	
Thallium	0.00250	0.0100					0.000662	0	10	U
Vanadium	0.008191	0.0250					0.005511	0	10	J
Zinc	1.002	0.0250					0.974	2.88	10	

The following samples were analyzed in this batch: HS22051205-01

## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Influent Samples  
**WorkOrder:** HS22051205

**QC BATCH REPORT**

Batch ID: 179326 ( 0 )		Instrument: SV-6		Method: SEMIVOLATILES SIM					
<b>MBLK</b>	Sample ID: <b>MBLK-179326</b>	Units: <b>ug/L</b>		Analysis Date: <b>01-Jun-2022 12:34</b>					
Client ID:	Run ID: <b>SV-6_409782</b>	SeqNo: <b>6673478</b>		PrepDate: <b>27-May-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual

1,4-Dioxane	0	0.010							U
Surr: 2-Fluorobiphenyl	0.07332	0	0.08	0	91.7	40 - 140			
Surr: 4-Terphenyl-d14	0.04394	0	0.08	0	54.9	40 - 140			
Surr: Nitrobenzene-d5	0.06231	0	0.08	0	77.9	40 - 140			

<b>LCS</b>	Sample ID: <b>LCS-179326</b>	Units: <b>ug/L</b>		Analysis Date: <b>01-Jun-2022 12:52</b>					
Client ID:	Run ID: <b>SV-6_409782</b>	SeqNo: <b>6673479</b>		PrepDate: <b>27-May-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual

1,4-Dioxane	0.106	0.010	0.08	0	132	40 - 140			
Surr: 2-Fluorobiphenyl	0.07826	0	0.08	0	97.8	40 - 140			
Surr: 4-Terphenyl-d14	0.04279	0	0.08	0	53.5	40 - 140			
Surr: Nitrobenzene-d5	0.06649	0	0.08	0	83.1	40 - 140			

<b>LCSD</b>	Sample ID: <b>LCSD-179326</b>	Units: <b>ug/L</b>		Analysis Date: <b>01-Jun-2022 13:13</b>					
Client ID:	Run ID: <b>SV-6_409782</b>	SeqNo: <b>6673480</b>		PrepDate: <b>27-May-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual

1,4-Dioxane	0.1102	0.010	0.08	0	138	40 - 140	0.106	3.91	20
Surr: 2-Fluorobiphenyl	0.08007	0	0.08	0	100	40 - 140	0.07826	2.29	20
Surr: 4-Terphenyl-d14	0.04829	0	0.08	0	60.4	40 - 140	0.04279	12.1	20
Surr: Nitrobenzene-d5	0.07331	0	0.08	0	91.6	40 - 140	0.06649	9.76	20

The following samples were analyzed in this batch: HS22051205-01

## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Influent Samples  
**WorkOrder:** HS22051205

## QC BATCH REPORT

Batch ID: R409584 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
<b>MBLK</b>	Sample ID: VBLKW-220527	Units: ug/L		Analysis Date: 27-May-2022 12:57					
Client ID:	Run ID: VOA6_409584	SeqNo: 6669171		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	1.0	1.0							U
1,1,1-Trichloroethane	0.50	1.0							U
1,1,2,2-Tetrachloroethane	1.0	1.0							U
1,1,2-Trichloroethane	1.0	1.0							U
1,1-Dichloroethane	0.50	1.0							U
1,1-Dichloroethene	0.50	1.0							U
1,1-Dichloropropene	1.0	1.0							U
1,2,3-Trichlorobenzene	1.0	1.0							U
1,2,3-Trichloropropane	1.0	1.0							U
1,2,4-Trichlorobenzene	1.0	1.0							U
1,2,4-Trimethylbenzene	1.0	1.0							U
1,2-Dibromo-3-chloropropane	1.0	1.0							U
1,2-Dibromoethane	0.50	1.0							U
1,2-Dichlorobenzene	1.0	1.0							U
1,2-Dichloroethane	0.50	1.0							U
1,2-Dichloropropane	1.0	1.0							U
1,3,5-Trimethylbenzene	1.0	1.0							U
1,3-Dichlorobenzene	1.0	1.0							U
1,3-Dichloropropane	1.0	1.0							U
1,4-Dichlorobenzene	1.0	1.0							U
2,2-Dichloropropane	0.50	1.0							U
2-Butanone	1.0	2.0							U
2-Chlorotoluene	1.0	1.0							U
2-Hexanone	2.0	2.0							U
4-Chlorotoluene	1.0	1.0							U
4-Isopropyltoluene	1.0	1.0							U
4-Methyl-2-pentanone	2.0	2.0							U
Acetone	2.0	2.0							U
Benzene	0.50	1.0							U
Bromobenzene	1.0	1.0							U
Bromochloromethane	0.50	1.0							U
Bromodichloromethane	0.50	1.0							U
Bromoform	1.0	1.0							U
Bromomethane	1.0	1.0							U

## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Influent Samples  
**WorkOrder:** HS22051205

## QC BATCH REPORT

Batch ID: R409584 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
<b>MBLK</b>	Sample ID: VBLKW-220527	Units: ug/L		Analysis Date: 27-May-2022 12:57					
Client ID:	Run ID: VOA6_409584	SeqNo: 6669171		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	2.0	2.0							U
Carbon tetrachloride	1.0	1.0							U
Chlorobenzene	1.0	1.0							U
Chloroethane	1.0	1.0							U
Chloroform	0.50	1.0							U
Chloromethane	0.50	1.0							U
cis-1,2-Dichloroethene	0.50	1.0							U
cis-1,3-Dichloropropene	0.50	1.0							U
Dibromochloromethane	1.0	1.0							U
Dibromomethane	0.50	1.0							U
Dichlorodifluoromethane	1.0	1.0							U
Ethylbenzene	1.0	1.0							U
Hexachlorobutadiene	1.0	1.0							U
Isopropylbenzene	1.0	1.0							U
m,p-Xylene	1.0	2.0							U
Methylene chloride	2.0	2.0							U
Naphthalene	1.0	1.0							U
n-Butylbenzene	1.0	1.0							U
n-Propylbenzene	1.0	1.0							U
o-Xylene	1.0	1.0							U
sec-Butylbenzene	1.0	1.0							U
Styrene	1.0	1.0							U
tert-Butylbenzene	1.0	1.0							U
Tetrachloroethene	1.0	1.0							U
Toluene	0.50	1.0							U
trans-1,2-Dichloroethene	0.50	1.0							U
trans-1,3-Dichloropropene	0.50	1.0							U
Trichloroethene	0.50	1.0							U
Trichlorofluoromethane	1.0	1.0							U
Vinyl chloride	0.50	1.0							U
Surr: 1,2-Dichloroethane-d4	46.57	1.0	50	0	93.1	81 - 118			
Surr: 4-Bromofluorobenzene	47.13	1.0	50	0	94.3	85 - 114			
Surr: Dibromofluoromethane	47.29	1.0	50	0	94.6	80 - 119			
Surr: Toluene-d8	51.29	1.0	50	0	103	89 - 112			

## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Influent Samples  
**WorkOrder:** HS22051205

## QC BATCH REPORT

Batch ID: R409584 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
LCS		Sample ID: VLCSW-220527		Units: ug/L		Analysis Date: 27-May-2022 12:15				
Client ID:		Run ID: VOA6_409584		SeqNo: 6669170		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	19.97	1.0	20	0	99.9	78 - 124				
1,1,1-Trichloroethane	19.49	1.0	20	0	97.5	74 - 131				
1,1,2,2-Tetrachloroethane	19.26	1.0	20	0	96.3	71 - 121				
1,1,2-Trichloroethane	19.42	1.0	20	0	97.1	80 - 119				
1,1-Dichloroethane	20.08	1.0	20	0	100	77 - 125				
1,1-Dichloroethene	19.13	1.0	20	0	95.7	71 - 131				
1,1-Dichloropropene	20.08	1.0	20	0	100	78 - 125				
1,2,3-Trichlorobenzene	20.19	1.0	20	0	101	69 - 129				
1,2,3-Trichloropropane	18.87	1.0	20	0	94.3	73 - 122				
1,2,4-Trichlorobenzene	20.32	1.0	20	0	102	69 - 130				
1,2,4-Trimethylbenzene	20.15	1.0	20	0	101	76 - 124				
1,2-Dibromo-3-chloropropane	18.1	1.0	20	0	90.5	62 - 128				
1,2-Dibromoethane	19.82	1.0	20	0	99.1	77 - 121				
1,2-Dichlorobenzene	20.04	1.0	20	0	100	80 - 119				
1,2-Dichloroethane	19.85	1.0	20	0	99.3	73 - 128				
1,2-Dichloropropane	20.06	1.0	20	0	100	78 - 122				
1,3,5-Trimethylbenzene	20.27	1.0	20	0	101	75 - 124				
1,3-Dichlorobenzene	20.26	1.0	20	0	101	80 - 119				
1,3-Dichloropropane	19.72	1.0	20	0	98.6	80 - 119				
1,4-Dichlorobenzene	20.12	1.0	20	0	101	79 - 118				
2,2-Dichloropropane	20.34	1.0	20	0	102	60 - 139				
2-Butanone	37.99	2.0	40	0	95.0	56 - 143				
2-Chlorotoluene	19.91	1.0	20	0	99.5	79 - 122				
2-Hexanone	40.04	2.0	40	0	100	57 - 139				
4-Chlorotoluene	20.31	1.0	20	0	102	78 - 122				
4-Isopropyltoluene	20.96	1.0	20	0	105	77 - 127				
4-Methyl-2-pentanone	38.98	2.0	40	0	97.4	67 - 130				
Acetone	38.96	2.0	40	0	97.4	39 - 160				
Benzene	20.02	1.0	20	0	100	79 - 120				
Bromobenzene	19.97	1.0	20	0	99.9	80 - 120				
Bromochloromethane	19.45	1.0	20	0	97.3	78 - 123				
Bromodichloromethane	19.37	1.0	20	0	96.9	79 - 125				
Bromoform	19.94	1.0	20	0	99.7	66 - 130				
Bromomethane	19.15	1.0	20	0	95.8	53 - 141				

## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Influent Samples  
**WorkOrder:** HS22051205

## QC BATCH REPORT

Batch ID: R409584 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
LCS		Sample ID: VLCSW-220527		Units: ug/L		Analysis Date: 27-May-2022 12:15			
Client ID:		Run ID: VOA6_409584		SeqNo: 6669170		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	39.7	2.0	40	0	99.3	64 - 133			
Carbon tetrachloride	19.23	1.0	20	0	96.1	72 - 136			
Chlorobenzene	20.1	1.0	20	0	101	82 - 118			
Chloroethane	20.05	1.0	20	0	100	60 - 138			
Chloroform	19.35	1.0	20	0	96.8	79 - 124			
Chloromethane	21.45	1.0	20	0	107	50 - 139			
cis-1,2-Dichloroethene	20.15	1.0	20	0	101	78 - 123			
cis-1,3-Dichloropropene	20.09	1.0	20	0	100	75 - 124			
Dibromochloromethane	19.84	1.0	20	0	99.2	74 - 126			
Dibromomethane	19.58	1.0	20	0	97.9	79 - 123			
Dichlorodifluoromethane	19.58	1.0	20	0	97.9	32 - 152			
Ethylbenzene	20.77	1.0	20	0	104	79 - 121			
Hexachlorobutadiene	21.02	1.0	20	0	105	66 - 134			
Isopropylbenzene	19.71	1.0	20	0	98.6	72 - 131			
m,p-Xylene	41.1	2.0	40	0	103	80 - 121			
Methylene chloride	18.35	2.0	20	0	91.8	74 - 124			
Naphthalene	19.04	1.0	20	0	95.2	61 - 128			
n-Butylbenzene	20.71	1.0	20	0	104	75 - 128			
n-Propylbenzene	20.68	1.0	20	0	103	76 - 126			
o-Xylene	20.73	1.0	20	0	104	78 - 122			
sec-Butylbenzene	20.44	1.0	20	0	102	77 - 126			
Styrene	20.46	1.0	20	0	102	78 - 123			
tert-Butylbenzene	20.43	1.0	20	0	102	78 - 124			
Tetrachloroethene	20.21	1.0	20	0	101	74 - 129			
Toluene	20.53	1.0	20	0	103	80 - 121			
trans-1,2-Dichloroethene	19.91	1.0	20	0	99.6	75 - 124			
trans-1,3-Dichloropropene	19.97	1.0	20	0	99.8	73 - 127			
Trichloroethene	20.17	1.0	20	0	101	79 - 123			
Trichlorofluoromethane	19.58	1.0	20	0	97.9	65 - 141			
Vinyl chloride	19.39	1.0	20	0	97.0	58 - 137			
Surr: 1,2-Dichloroethane-d4	49.68	1.0	50	0	99.4	81 - 118			
Surr: 4-Bromofluorobenzene	50.15	1.0	50	0	100	85 - 114			
Surr: Dibromofluoromethane	50.08	1.0	50	0	100	80 - 119			
Surr: Toluene-d8	48.78	1.0	50	0	97.6	89 - 112			

## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Influent Samples  
**WorkOrder:** HS22051205

## QC BATCH REPORT

Batch ID: R409584 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MS		Sample ID: HS22051211-01MS		Units: ug/L		Analysis Date: 27-May-2022 14:42			
Client ID:		Run ID: VOA6_409584		SeqNo: 6669176		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	19.09	1.0	20	0	95.5	78 - 124			
1,1,1-Trichloroethane	18.5	1.0	20	0	92.5	74 - 131			
1,1,2,2-Tetrachloroethane	18.87	1.0	20	0	94.4	71 - 121			
1,1,2-Trichloroethane	18.84	1.0	20	0	94.2	80 - 119			
1,1-Dichloroethane	18.61	1.0	20	0	93.1	77 - 125			
1,1-Dichloroethene	18.34	1.0	20	0	91.7	71 - 131			
1,1-Dichloropropene	19.12	1.0	20	0	95.6	78 - 125			
1,2,3-Trichlorobenzene	15.09	1.0	20	0	75.5	69 - 129			
1,2,3-Trichloropropane	19.45	1.0	20	0	97.2	73 - 122			
1,2,4-Trichlorobenzene	16.07	1.0	20	0	80.3	69 - 130			
1,2,4-Trimethylbenzene	19.13	1.0	20	0	95.6	76 - 124			
1,2-Dibromo-3-chloropropane	15.11	1.0	20	0	75.6	62 - 128			
1,2-Dibromoethane	18.97	1.0	20	0	94.9	77 - 121			
1,2-Dichlorobenzene	18.78	1.0	20	0	93.9	80 - 119			
1,2-Dichloroethane	18.79	1.0	20	0	94.0	73 - 128			
1,2-Dichloropropane	18.85	1.0	20	0	94.3	78 - 122			
1,3,5-Trimethylbenzene	19.23	1.0	20	0	96.2	75 - 124			
1,3-Dichlorobenzene	18.78	1.0	20	0	93.9	80 - 119			
1,3-Dichloropropane	19.13	1.0	20	0	95.6	80 - 119			
1,4-Dichlorobenzene	18.95	1.0	20	0	94.7	79 - 118			
2,2-Dichloropropane	19.23	1.0	20	0	96.2	60 - 139			
2-Butanone	29.5	2.0	40	0	73.8	56 - 143			
2-Chlorotoluene	18.89	1.0	20	0	94.5	79 - 122			
2-Hexanone	38.72	2.0	40	0	96.8	57 - 139			
4-Chlorotoluene	19.24	1.0	20	0	96.2	78 - 122			
4-Isopropyltoluene	20.31	1.0	20	0	102	77 - 127			
4-Methyl-2-pentanone	37.47	2.0	40	0	93.7	67 - 130			
Acetone	25.59	2.0	40	0	64.0	39 - 160			
Benzene	18.99	1.0	20	0	95.0	79 - 120			
Bromobenzene	19.35	1.0	20	0	96.7	80 - 120			
Bromochloromethane	18.22	1.0	20	0	91.1	78 - 123			
Bromodichloromethane	18.36	1.0	20	0	91.8	79 - 125			
Bromoform	18.6	1.0	20	0	93.0	66 - 130			
Bromomethane	13.57	1.0	20	0	67.9	53 - 141			



## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Influent Samples  
**WorkOrder:** HS22051205

## QC BATCH REPORT

Batch ID: R409584 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MS		Sample ID: HS22051211-01MS		Units: ug/L		Analysis Date: 27-May-2022 14:42			
Client ID:		Run ID: VOA6_409584		SeqNo: 6669176		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	36.16	2.0	40	0	90.4	64 - 133			
Carbon tetrachloride	18.7	1.0	20	0	93.5	72 - 136			
Chlorobenzene	19.25	1.0	20	0	96.2	82 - 118			
Chloroethane	12.12	1.0	20	0	60.6	60 - 138			
Chloroform	18.07	1.0	20	0	90.3	79 - 124			
Chloromethane	24.59	1.0	20	0	123	50 - 139			
cis-1,2-Dichloroethene	21.48	1.0	20	2.361	95.6	78 - 123			
cis-1,3-Dichloropropene	18.69	1.0	20	0	93.4	75 - 124			
Dibromochloromethane	19.18	1.0	20	0	95.9	74 - 126			
Dibromomethane	18.33	1.0	20	0	91.6	79 - 123			
Dichlorodifluoromethane	10.56	1.0	20	0	52.8	32 - 152			
Ethylbenzene	19.24	1.0	20	0	96.2	79 - 121			
Hexachlorobutadiene	21.33	1.0	20	0	107	66 - 134			
Isopropylbenzene	18.65	1.0	20	0	93.2	72 - 131			
m,p-Xylene	38.15	2.0	40	0	95.4	80 - 121			
Methylene chloride	16.75	2.0	20	0	83.8	74 - 124			
Naphthalene	13.11	1.0	20	0	65.6	61 - 128			
n-Butylbenzene	20.43	1.0	20	0	102	75 - 128			
n-Propylbenzene	19.82	1.0	20	0	99.1	76 - 126			
o-Xylene	18.96	1.0	20	0	94.8	78 - 122			
sec-Butylbenzene	19.94	1.0	20	0	99.7	77 - 126			
Styrene	19.09	1.0	20	0	95.4	78 - 123			
tert-Butylbenzene	19.84	1.0	20	0	99.2	78 - 124			
Tetrachloroethene	19.52	1.0	20	0	97.6	74 - 129			
Toluene	19.58	1.0	20	0	97.9	80 - 121			
trans-1,2-Dichloroethene	18.69	1.0	20	0	93.4	75 - 124			
trans-1,3-Dichloropropene	18.33	1.0	20	0	91.6	73 - 127			
Trichloroethene	19.46	1.0	20	0	97.3	79 - 123			
Trichlorofluoromethane	18.07	1.0	20	0	90.4	65 - 141			
Vinyl chloride	16.57	1.0	20	0	82.9	58 - 137			
Surr: 1,2-Dichloroethane-d4	48.43	1.0	50	0	96.9	81 - 118			
Surr: 4-Bromofluorobenzene	49.35	1.0	50	0	98.7	85 - 114			
Surr: Dibromofluoromethane	47.59	1.0	50	0	95.2	80 - 119			
Surr: Toluene-d8	50.29	1.0	50	0	101	89 - 112			

## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Influent Samples  
**WorkOrder:** HS22051205

**QC BATCH REPORT**

Batch ID: R409584 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
<b>MSD</b>		Sample ID: HS22051211-01MSD		Units: ug/L		Analysis Date: 27-May-2022 15:03			
Client ID:		Run ID: VOA6_409584		SeqNo: 6669177		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	19.83	1.0	20	0	99.1	78 - 124	19.09	3.77	20
1,1,1-Trichloroethane	18.67	1.0	20	0	93.3	74 - 131	18.5	0.885	20
1,1,2,2-Tetrachloroethane	20	1.0	20	0	100	71 - 121	18.87	5.82	20
1,1,2-Trichloroethane	19.09	1.0	20	0	95.4	80 - 119	18.84	1.29	20
1,1-Dichloroethane	18.1	1.0	20	0	90.5	77 - 125	18.61	2.81	20
1,1-Dichloroethene	18.14	1.0	20	0	90.7	71 - 131	18.34	1.08	20
1,1-Dichloropropene	19.21	1.0	20	0	96.1	78 - 125	19.12	0.491	20
1,2,3-Trichlorobenzene	18.89	1.0	20	0	94.5	69 - 129	15.09	22.4	20 R
1,2,3-Trichloropropane	19.14	1.0	20	0	95.7	73 - 122	19.45	1.59	20
1,2,4-Trichlorobenzene	19.38	1.0	20	0	96.9	69 - 130	16.07	18.7	20
1,2,4-Trimethylbenzene	20.37	1.0	20	0	102	76 - 124	19.13	6.26	20
1,2-Dibromo-3-chloropropane	17.92	1.0	20	0	89.6	62 - 128	15.11	17	20
1,2-Dibromoethane	19.23	1.0	20	0	96.1	77 - 121	18.97	1.35	20
1,2-Dichlorobenzene	20.02	1.0	20	0	100	80 - 119	18.78	6.43	20
1,2-Dichloroethane	18.64	1.0	20	0	93.2	73 - 128	18.79	0.802	20
1,2-Dichloropropane	19.06	1.0	20	0	95.3	78 - 122	18.85	1.08	20
1,3,5-Trimethylbenzene	20.21	1.0	20	0	101	75 - 124	19.23	4.97	20
1,3-Dichlorobenzene	20.02	1.0	20	0	100	80 - 119	18.78	6.37	20
1,3-Dichloropropane	19.34	1.0	20	0	96.7	80 - 119	19.13	1.08	20
1,4-Dichlorobenzene	20.51	1.0	20	0	103	79 - 118	18.95	7.92	20
2,2-Dichloropropane	19.38	1.0	20	0	96.9	60 - 139	19.23	0.743	20
2-Butanone	30.95	2.0	40	0	77.4	56 - 143	29.5	4.8	20
2-Chlorotoluene	19.73	1.0	20	0	98.6	79 - 122	18.89	4.33	20
2-Hexanone	39.36	2.0	40	0	98.4	57 - 139	38.72	1.62	20
4-Chlorotoluene	20.5	1.0	20	0	103	78 - 122	19.24	6.35	20
4-Isopropyltoluene	21.42	1.0	20	0	107	77 - 127	20.31	5.33	20
4-Methyl-2-pentanone	40.51	2.0	40	0	101	67 - 130	37.47	7.78	20
Acetone	26.01	2.0	40	0	65.0	39 - 160	25.59	1.62	20
Benzene	18.79	1.0	20	0	93.9	79 - 120	18.99	1.09	20
Bromobenzene	20.65	1.0	20	0	103	80 - 120	19.35	6.5	20
Bromochloromethane	17.92	1.0	20	0	89.6	78 - 123	18.22	1.63	20
Bromodichloromethane	18.21	1.0	20	0	91.0	79 - 125	18.36	0.819	20
Bromoform	19.31	1.0	20	0	96.5	66 - 130	18.6	3.75	20
Bromomethane	11.4	1.0	20	0	57.0	53 - 141	13.57	17.4	20

## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Influent Samples  
**WorkOrder:** HS22051205

## QC BATCH REPORT

Batch ID: R409584 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MSD		Sample ID: HS22051211-01MSD		Units: ug/L		Analysis Date: 27-May-2022 15:03			
Client ID:		Run ID: VOA6_409584		SeqNo: 6669177		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	35.45	2.0	40	0	88.6	64 - 133	36.16	1.97	20
Carbon tetrachloride	18.78	1.0	20	0	93.9	72 - 136	18.7	0.417	20
Chlorobenzene	19.76	1.0	20	0	98.8	82 - 118	19.25	2.65	20
Chloroethane	11.83	1.0	20	0	59.1	60 - 138	12.12	2.48	20 S
Chloroform	17.91	1.0	20	0	89.5	79 - 124	18.07	0.893	20
Chloromethane	23.28	1.0	20	0	116	50 - 139	24.59	5.5	20
cis-1,2-Dichloroethene	21.06	1.0	20	2.361	93.5	78 - 123	21.48	1.95	20
cis-1,3-Dichloropropene	18.52	1.0	20	0	92.6	75 - 124	18.69	0.886	20
Dibromochloromethane	19.44	1.0	20	0	97.2	74 - 126	19.18	1.39	20
Dibromomethane	18.76	1.0	20	0	93.8	79 - 123	18.33	2.35	20
Dichlorodifluoromethane	10.18	1.0	20	0	50.9	32 - 152	10.56	3.67	20
Ethylbenzene	20.2	1.0	20	0	101	79 - 121	19.24	4.91	20
Hexachlorobutadiene	22.96	1.0	20	0	115	66 - 134	21.33	7.37	20
Isopropylbenzene	19.45	1.0	20	0	97.3	72 - 131	18.65	4.23	20
m,p-Xylene	39.62	2.0	40	0	99.0	80 - 121	38.15	3.77	20
Methylene chloride	16.27	2.0	20	0	81.4	74 - 124	16.75	2.92	20
Naphthalene	17.63	1.0	20	0	88.1	61 - 128	13.11	29.4	20 R
n-Butylbenzene	21.85	1.0	20	0	109	75 - 128	20.43	6.72	20
n-Propylbenzene	20.77	1.0	20	0	104	76 - 126	19.82	4.69	20
o-Xylene	20.04	1.0	20	0	100	78 - 122	18.96	5.54	20
sec-Butylbenzene	21.23	1.0	20	0	106	77 - 126	19.94	6.26	20
Styrene	20.13	1.0	20	0	101	78 - 123	19.09	5.35	20
tert-Butylbenzene	20.91	1.0	20	0	105	78 - 124	19.84	5.23	20
Tetrachloroethene	20.67	1.0	20	0	103	74 - 129	19.52	5.69	20
Toluene	20.01	1.0	20	0	100	80 - 121	19.58	2.19	20
trans-1,2-Dichloroethene	18.8	1.0	20	0	94.0	75 - 124	18.69	0.611	20
trans-1,3-Dichloropropene	18.7	1.0	20	0	93.5	73 - 127	18.33	2.02	20
Trichloroethene	19.31	1.0	20	0	96.6	79 - 123	19.46	0.742	20
Trichlorofluoromethane	18.13	1.0	20	0	90.7	65 - 141	18.07	0.334	20
Vinyl chloride	15.92	1.0	20	0	79.6	58 - 137	16.57	4.03	20
Surr: 1,2-Dichloroethane-d4	46.3	1.0	50	0	92.6	81 - 118	48.43	4.48	20
Surr: 4-Bromofluorobenzene	49.2	1.0	50	0	98.4	85 - 114	49.35	0.313	20
Surr: Dibromofluoromethane	47.02	1.0	50	0	94.0	80 - 119	47.59	1.2	20
Surr: Toluene-d8	49.8	1.0	50	0	99.6	89 - 112	50.29	0.992	20

ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Influent Samples  
**WorkOrder:** HS22051205

**QC BATCH REPORT****Batch ID:** R409584 ( 0 )**Instrument:** VOA6**Method:** VOLATILES ORGANICS BY METHOD  
8260C

The following samples were analyzed in this batch:

HS22051205-01	HS22051205-02
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## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Influent Samples  
**WorkOrder:** HS22051205

**QC BATCH REPORT**

Batch ID: R409786 ( 0 )		Instrument: WetChem_HS		Method: CHEMICAL OXYGEN DEMAND BY E410.4, REV 2.0, 1993					
<b>MBLK</b>	Sample ID: MBLK-R409786	Units: mg/L		Analysis Date: 01-Jun-2022 14:00					
Client ID:	Run ID: WetChem_HS_409786		SeqNo: 6673549		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Chemical Oxygen Demand	7.50	15.0							U
<b>LCS</b>	Sample ID: LCS-R409786	Units: mg/L		Analysis Date: 01-Jun-2022 14:00					
Client ID:	Run ID: WetChem_HS_409786		SeqNo: 6673548		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Chemical Oxygen Demand	97	15.0	100	0	97.0	85 - 115			
<b>LCSD</b>	Sample ID: LCSD-R409786	Units: mg/L		Analysis Date: 01-Jun-2022 14:00					
Client ID:	Run ID: WetChem_HS_409786		SeqNo: 6673547		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Chemical Oxygen Demand	98	15.0	100	0	98.0	85 - 115	97	1.03	20
<b>MS</b>	Sample ID: HS22051129-01MS	Units: mg/L		Analysis Date: 01-Jun-2022 14:00					
Client ID:	Run ID: WetChem_HS_409786		SeqNo: 6673551		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Chemical Oxygen Demand	58	15.0	50	10	96.0	80 - 120			
<b>MSD</b>	Sample ID: HS22051129-01MSD	Units: mg/L		Analysis Date: 01-Jun-2022 14:00					
Client ID:	Run ID: WetChem_HS_409786		SeqNo: 6673550		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Chemical Oxygen Demand	59	15.0	50	10	98.0	80 - 120	58	1.71	20
The following samples were analyzed in this batch: HS22051205-01									

ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Influent Samples  
**WorkOrder:** HS22051205

**QC BATCH REPORT**

Batch ID: R409911 ( 0 )		Instrument: ICS-Integrion		Method: ANIONS BY SW9056A					
<b>MBLK</b>	Sample ID: MBLK	Units: mg/L		Analysis Date: 02-Jun-2022 14:34					
Client ID:	Run ID: ICS-Integrion_409911		SeqNo: 6676526		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	0.500	0.500							U
Sulfate	0.500	0.500							U

<b>LCS</b>	Sample ID: LCS	Units: mg/L		Analysis Date: 02-Jun-2022 14:39					
Client ID:	Run ID: ICS-Integrion_409911		SeqNo: 6676527		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	20.09	0.500	20	0	100	80 - 120			
Sulfate	19.63	0.500	20	0	98.1	80 - 120			

<b>MS</b>	Sample ID: HS22051205-01MS	Units: mg/L		Analysis Date: 02-Jun-2022 15:32					
Client ID: LH18/24-SP140_052422	Run ID: ICS-Integrion_409911		SeqNo: 6676533		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	297.7	0.500	10	297	6.93	80 - 120			SEO
Sulfate	36.6	0.500	10	26.74	98.7	80 - 120			

<b>MSD</b>	Sample ID: HS22051205-01MSD	Units: mg/L		Analysis Date: 02-Jun-2022 15:37					
Client ID: LH18/24-SP140_052422	Run ID: ICS-Integrion_409911		SeqNo: 6676534		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	297	0.500	10	297	0.700	80 - 120	297.7	0.21	20 SEO
Sulfate	36.53	0.500	10	26.74	98.0	80 - 120	36.6	0.19	20

The following samples were analyzed in this batch: HS22051205-01

## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Influent Samples  
**WorkOrder:** HS22051205

**QC BATCH REPORT**

Batch ID: R409973 ( 0 )		Instrument: Balance1		Method: OIL & GREASE (HEM) BY E1664A						
<b>MBLK</b>	Sample ID: WBLKW-060322	Units: mg/L		Analysis Date: 03-Jun-2022 14:00						
Client ID:	Run ID: Balance1_409973	SeqNo: 6677590		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Oil and Grease	1.00	2.00								U
<b>LCS</b>	Sample ID: WLC SW-060322	Units: mg/L		Analysis Date: 03-Jun-2022 14:00						
Client ID:	Run ID: Balance1_409973	SeqNo: 6677592		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Oil and Grease	38.6	2.00	40	0	96.5	78 - 114				
<b>LCSD</b>	Sample ID: WLCSDW-060322	Units: mg/L		Analysis Date: 03-Jun-2022 14:00						
Client ID:	Run ID: Balance1_409973	SeqNo: 6677591		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Oil and Grease	40.3	2.00	40	0	101	78 - 114	38.6	4.31	18	
<b>MS</b>	Sample ID: HS22051072-02MS	Units: mg/L		Analysis Date: 03-Jun-2022 14:00						
Client ID:	Run ID: Balance1_409973	SeqNo: 6677570		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Oil and Grease	39.3	2.00	40	0.4082	97.2	78 - 114				
The following samples were analyzed in this batch: HS22051205-01										

## ALS Houston, US

Date: 06-Jun-22

<b>Client:</b>	Bhate Environmental Associates, Inc.	<b>QUALIFIERS, ACRONYMS, UNITS</b>
<b>Project:</b>	Groundwater Treatment Plant Quarterly Influent Samples	
<b>WorkOrder:</b>	<b>HS22051205</b>	

<b>Qualifier</b>	<b>Description</b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

<b>Acronym</b>	<b>Description</b>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

<b>Unit Reported</b>	<b>Description</b>
mg/L	Milligrams per Liter



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**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

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Agency	Number	Expire Date
Dept of Defense	L21-682	31-Dec-2023
Florida	E87611-34	30-Jun-2022
Illinois	2000322022-9	09-May-2023
Kansas	E-10352 2021-2022	31-Jul-2022
Louisiana	03087, 2021-2022	30-Jun-2022
Maryland	343, 2021-2022	30-Jun-2022
North Carolina	624-2022	31-Dec-2022
Oklahoma	2021-080	31-Aug-2022
Texas	T104704231-22-29	30-Apr-2023
Utah	TX026932021-12	30-Jul-2022

ALS Houston, US

Date: 06-Jun-22

## Sample Receipt Checklist

Work Order ID: HS22051205

Date/Time Received: **26-May-2022 09:55**

Client Name: Bhate Environmental

Received by: **Paresh M. Giga**

<b>Completed By:</b> <u>/S/ Paresh M. Giga</u>	26-May-2022 12:58	<b>Reviewed by:</b> <u>/S/ Dane J. Wacasey</u>	26-May-2022 19:43
eSignature	Date/Time	eSignature	Date/Time

Matrices: **Water**Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	1 Page(s)
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	COC IDs:none
Samplers name present on COC?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	

Temperature(s)/Thermometer(s):

1.5C/2.0C U/C IR31

Cooler(s)/Kit(s):

47489

Date/Time sample(s) sent to storage:

5/26/2022 13:10

Water - VOA vials have zero headspace?

Yes ☒ No ☐ No VOA vials submitted ☐

Water - pH acceptable upon receipt?

Yes ☒ No ☐ N/A ☐

pH adjusted?

Yes ☐ No ☒ N/A ☐

pH adjusted by:

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:


Regarding:


Comments:

Corrective Action:

## CHAIN OF CUSTODY

Name Of Lab Shipping To: ALS 10450 Stancliff Rd., Suite 210 Houston, Tx. 77099 ATTN: RJ Modashia

<b>Project:</b> BHATE LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS			<b>Project No.</b> NWO1312.0150.0 16.0001			<b>Analyte</b>										<b>HS22051205</b> Bhate Environmental Associates, Inc. Groundwater Treatment Plant Quarterly Influent Sample				
<b>Job:</b> <b>GROUNDWATER TREATMENT PLANT QUARTERLY INFLUENT SAMPLES</b>																				
<b>Prepared By:</b> Scott Beesinger			<b>P. O. Number</b>																	
<b>Field Sample I.D.</b>			<b>Sample Matrix</b>			<b>Date / Time</b>			<b>MS / MSD</b>	<b>No. OF CONTAINERS</b>	<b>ROD Volatiles</b>	<b>Total Metals</b>	<b>Oil &amp; Grease</b>	<b>Chemical Oxygen Demand</b>	<b>Chloride &amp; Sulfate</b>	<b>1, 4 - DIOXANE</b>	<b>Perchlorate</b>	<b>Remarks (Preservatives, etc.)</b>	<b>Lab I.D.#</b>	
LH18/24-SP140_052422			Water			05/24/22 / 14:00				4	3		1						HCL	
LH18/24-SP140_052422			Water			05/24/22 / 14:00				1		1							HNO3	
LH18/24-SP140_052422			Water			05/24/22 / 14:00				2					1	1			NONE	
LH18/24-SP140_052422			Water			05/24/22 / 14:00				1				1					H2SO4	
LH18/24-SP140_052422			Water			05/24/22 / 14:00				1						1			NONE	
Trip Blank			Water			05/24/22				2	2								HCL	
<b>Additional Remarks: STANDARD TURN AROUND TIME</b>																				
<b>Relinquished By:</b> <i>Scott Beesinger</i>		<b>Date</b> 05/24/22	<b>Time</b> 14:30	<b>Received By:</b> <i>[Signature]</i>		<b>Date</b> 5/24/22	<b>Time</b> 09:55	<b>Relinquished By:</b>		<b>Date</b>	<b>Time</b>	<b>Received By:</b>		<b>Date</b>	<b>Time</b>					
<b>Received At Lab By:</b>				<b>Date</b>	<b>Time</b>	<b>Airbill No.</b>	<b>For Lab Use Only</b>				<b>Opened By:</b>	<b>Date</b>	<b>Time</b>	<b>Temp of Container</b>	<b>Seal No.</b>	<b>Condition</b>				
<b>Remarks:</b> 17489 1.50 #31 CEF-01																				

 <b>ALS</b> 10450 Stancliff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5656 Fax. +1 281 530 5867	<b>CUSTODY SEAL</b>		Seal Broken By:
	Date: 5/24/22	Time: 1430	SM
	Name: Scott Bus		Date: 05/26/22
	Company: BIRAT		

47489

MAY 27 2022

Must Deliver Next Business Day  
Time and Temperature Sensitive!



47489

ORIGIN: SGRA (903) 930-6189  
 SCOTT BEESINGER  
 APT 04 ENVIRONMENTAL & INFRASTRUCTURE  
 1203 W. EAST SPRING AVE  
 FTH 202  
 MARSHALL, TX 75670  
 UNITED STATES US

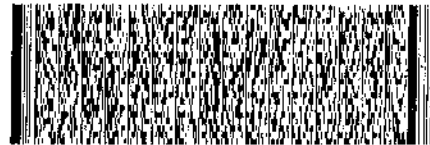
SHIP DATE: 04/24/21  
 ACTWT: 1.00 LB. HAN  
 EAO: +021247/CNFC34UB  
 G125: 26X16X14 IN

10 CLIENT SERVICES  
**ALS LABORATORY GROUP**  
 10450 STANCLIFF ROAD  
 SUITE 210  
 HOUSTON TX 77099

(281) 530-5656

REF: LHAPP 16-B075777-RJ

RMA: III IIII

FedEx  
Express

TRK# 0473 0838 9494

PRIORITY OVERNIGHT

AB SGRA

77099  
TX-US  
IAH

3923207 74msy2077 CCGA 56005/1096/C008



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10450 Stancliff Rd. Suite 210  
Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887

June 06, 2022

Marcia Olive  
Bhate Environmental Associates, Inc.  
445 Union Blvd Ste 129  
Lakewood, CO 80228

Work Order: **HS22051211**

Laboratory Results for: **Groundwater Treatment Plant Quarterly Effluent Samples**

Dear Marcia Olive,

ALS Environmental received 3 sample(s) on May 26, 2022 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: JUMOKE.LAWAL

Dane J. Wacasey

ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Effluent Samples  
**Work Order:** HS22051211

**SAMPLE SUMMARY**

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS22051211-01	LH18/24-SP650_052422	Water		24-May-2022 14:00	26-May-2022 09:55	<input type="checkbox"/>
HS22051211-02	LH18/24-SP650_052422_AIX	Water		24-May-2022 14:00	26-May-2022 09:55	<input type="checkbox"/>
HS22051211-03	Trip Blank	Water	CG-020822 -746	24-May-2022 14:00	26-May-2022 09:55	<input type="checkbox"/>

ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Effluent Samples  
**Work Order:** HS22051211

**CASE NARRATIVE****Work Order Comments**

- The analysis for Perchlorate was subcontracted to ALS Houston High-Res Lab. Final report attached

**GCMS Semivolatiles by Method SW8270SIM****Batch ID: 179326****Sample ID: LH18/24-SP650\_052422 (HS22051211-01)**

- The surrogate recoveries could not be determined due to dilution below the calibration range.

**GCMS Volatiles by Method SW8260****Batch ID: R409584****Sample ID: LH18/24-SP650\_052422(HS22051211-01MSD)**

- The matrix spike duplicate recovery was outside of the control limit. However, the matrix spike recovery and the RPD between the MS and MSD was in control. Chloroethane,

The RPD between the MS and MSD was outside of the control limit. 1,2,3-Trichlorobenzene, Naphthalene

**Metals by Method SW6020A****Batch ID: 179494****Sample ID: HS22051125-02MS**

- MS and MSD are for an unrelated sample

**Sample ID: HS22051125-02PDS**

- PDS is for an unrelated sample

**Metals by Method SW7470A****Batch ID: 179379**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

**WetChemistry by Method E1664A****Batch ID: R409973**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

**WetChemistry by Method SW9056****Batch ID: R409911****Sample ID: HS22051205-01MS**

- MS and MSD are for an unrelated sample (Chloride)

**WetChemistry by Method E410.4****Batch ID: R409786**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

## ALS Houston, US

Date: 06-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Groundwater Treatment Plant Quarterly Effluent Samples  
 Sample ID: LH18/24-SP650\_052422  
 Collection Date: 24-May-2022 14:00

## ANALYTICAL REPORT

WorkOrder:HS22051211  
 Lab ID:HS22051211-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD 8260C</b>			<b>Method:SW8260</b>					Analyst: PC
1,1,1,2-Tetrachloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 14:00
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 14:00
1,1,2,2-Tetrachloroethane	1.0	U	0.50	1.0	1.0	ug/L	1	27-May-2022 14:00
1,1,2-Trichloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 14:00
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 14:00
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 14:00
1,1-Dichloropropene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 14:00
1,2,3-Trichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	27-May-2022 14:00
1,2,3-Trichloropropane	1.0	U	0.50	1.0	1.0	ug/L	1	27-May-2022 14:00
1,2,4-Trichlorobenzene	1.0	U	0.50	1.0	1.0	ug/L	1	27-May-2022 14:00
1,2,4-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 14:00
1,2-Dibromo-3-chloropropane	1.0	U	0.20	1.0	1.0	ug/L	1	27-May-2022 14:00
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 14:00
1,2-Dichlorobenzene	1.0	U	0.50	1.0	1.0	ug/L	1	27-May-2022 14:00
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 14:00
1,2-Dichloropropane	1.0	U	0.50	1.0	1.0	ug/L	1	27-May-2022 14:00
1,3,5-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 14:00
1,3-Dichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	27-May-2022 14:00
1,3-Dichloropropane	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 14:00
1,4-Dichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	27-May-2022 14:00
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 14:00
2-Butanone	1.0	U	0.50	1.0	2.0	ug/L	1	27-May-2022 14:00
2-Chlorotoluene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 14:00
2-Hexanone	2.0	U	1.0	2.0	2.0	ug/L	1	27-May-2022 14:00
4-Chlorotoluene	1.0	U	0.40	1.0	1.0	ug/L	1	27-May-2022 14:00
4-Isopropyltoluene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 14:00
4-Methyl-2-pentanone	2.0	U	0.70	2.0	2.0	ug/L	1	27-May-2022 14:00
Acetone	2.0	U	0.40	2.0	2.0	ug/L	1	27-May-2022 14:00
Benzene	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 14:00
Bromobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	27-May-2022 14:00
Bromochloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 14:00
Bromodichloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 14:00
Bromoform	1.0	U	0.40	1.0	1.0	ug/L	1	27-May-2022 14:00
Bromomethane	1.0	U	0.40	1.0	1.0	ug/L	1	27-May-2022 14:00
Carbon disulfide	2.0	U	0.60	2.0	2.0	ug/L	1	27-May-2022 14:00
Carbon tetrachloride	1.0	U	0.50	1.0	1.0	ug/L	1	27-May-2022 14:00
Chlorobenzene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 14:00
Chloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 14:00
Chloroform	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 14:00

Note: See Qualifiers Page for a list of qualifiers and their explanation.



## ALS Houston, US

Date: 06-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Groundwater Treatment Plant Quarterly Effluent Samples  
 Sample ID: LH18/24-SP650\_052422  
 Collection Date: 24-May-2022 14:00

## ANALYTICAL REPORT

WorkOrder: HS22051211  
 Lab ID: HS22051211-01  
 Matrix: Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD 8260C</b>			<b>Method: SW8260</b>					Analyst: PC
Chloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 14:00
<b>cis-1,2-Dichloroethene</b>	<b>2.4</b>		<b>0.20</b>	<b>0.50</b>	<b>1.0</b>	<b>ug/L</b>	1	27-May-2022 14:00
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	ug/L	1	27-May-2022 14:00
Dibromochloromethane	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 14:00
Dibromomethane	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 14:00
Dichlorodifluoromethane	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 14:00
Ethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 14:00
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	ug/L	1	27-May-2022 14:00
Isopropylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 14:00
m,p-Xylene	1.0	U	0.50	1.0	2.0	ug/L	1	27-May-2022 14:00
Methylene chloride	2.0	U	0.40	2.0	2.0	ug/L	1	27-May-2022 14:00
n-Butylbenzene	1.0	U	0.40	1.0	1.0	ug/L	1	27-May-2022 14:00
n-Propylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 14:00
Naphthalene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 14:00
o-Xylene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 14:00
sec-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 14:00
Styrene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 14:00
tert-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 14:00
Tetrachloroethene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 14:00
Toluene	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 14:00
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 14:00
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 14:00
Trichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 14:00
Trichlorofluoromethane	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 14:00
Vinyl chloride	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 14:00
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>94.0</i>			<b>0</b>	<i>81-118</i>	<b>%REC</b>	<i>1</i>	<i>27-May-2022 14:00</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>93.5</i>			<b>0</b>	<i>85-114</i>	<b>%REC</b>	<i>1</i>	<i>27-May-2022 14:00</i>
<i>Surr: Dibromofluoromethane</i>	<i>93.1</i>			<b>0</b>	<i>80-119</i>	<b>%REC</b>	<i>1</i>	<i>27-May-2022 14:00</i>
<i>Surr: Toluene-d8</i>	<i>102</i>			<b>0</b>	<i>89-112</i>	<b>%REC</b>	<i>1</i>	<i>27-May-2022 14:00</i>
<b>SEMIVOLATILES SIM</b>			<b>Method: SW8270SIM</b>					Prep: SW3510 / 27-May-2022 Analyst: JLJ
<b>1,4-Dioxane</b>	<b>8.3</b>		<b>0.50</b>	<b>0</b>	<b>0.50</b>	<b>ug/L</b>	50	01-Jun-2022 12:16
<i>Surr: 2-Fluorobiphenyl</i>	<i>0</i>	<i>S</i>		<b>0</b>	<i>40-140</i>	<b>%REC</b>	<i>50</i>	<i>01-Jun-2022 12:16</i>
<i>Surr: 4-Terphenyl-d14</i>	<i>0</i>	<i>S</i>		<b>0</b>	<i>40-140</i>	<b>%REC</b>	<i>50</i>	<i>01-Jun-2022 12:16</i>
<i>Surr: Nitrobenzene-d5</i>	<i>0</i>	<i>S</i>		<b>0</b>	<i>40-140</i>	<b>%REC</b>	<i>50</i>	<i>01-Jun-2022 12:16</i>

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 06-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Groundwater Treatment Plant Quarterly Effluent Samples  
 Sample ID: LH18/24-SP650\_052422  
 Collection Date: 24-May-2022 14:00

**ANALYTICAL REPORT**

WorkOrder:HS22051211  
 Lab ID:HS22051211-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>METALS BY ICPMS BY SW6020A</b>		<b>Method:SW6020A</b>				Prep:SW3010A / 02-Jun-2022		Analyst: JHD
Aluminum	0.0189		0.00180	0.00500	0.0100	mg/L	1	06-Jun-2022 12:35
Antimony	0.00100	U	0.000400	0.00100	0.00500	mg/L	1	06-Jun-2022 12:35
Arsenic	0.000735	J	0.000400	0.00100	0.00500	mg/L	1	06-Jun-2022 12:35
Barium	0.331		0.00190	0.00250	0.00500	mg/L	1	06-Jun-2022 12:35
Beryllium	0.000500	U	0.000200	0.000500	0.00200	mg/L	1	06-Jun-2022 12:35
Cadmium	0.000500	U	0.000200	0.000500	0.00200	mg/L	1	06-Jun-2022 12:35
Calcium	17.3		0.340	0.500	5.00	mg/L	10	06-Jun-2022 15:44
Chromium	0.000529	J	0.000400	0.00100	0.00500	mg/L	1	06-Jun-2022 12:35
Cobalt	0.000500	U	0.000100	0.000500	0.00500	mg/L	1	06-Jun-2022 12:35
Iron	0.0721	J	0.0120	0.0500	0.200	mg/L	1	06-Jun-2022 12:35
Lead	0.00100	U	0.000600	0.00100	0.00500	mg/L	1	06-Jun-2022 12:35
Magnesium	12.4		0.0100	0.0500	0.200	mg/L	1	06-Jun-2022 12:35
Manganese	0.0629		0.000700	0.00250	0.00500	mg/L	1	06-Jun-2022 12:35
Nickel	0.00132	J	0.000600	0.00100	0.00500	mg/L	1	06-Jun-2022 12:35
Potassium	1.71		0.0180	0.0500	0.200	mg/L	1	06-Jun-2022 12:35
Selenium	0.00142	J	0.00110	0.00250	0.00500	mg/L	1	06-Jun-2022 12:35
Silver	0.000500	U	0.000200	0.000500	0.00500	mg/L	1	06-Jun-2022 12:35
Sodium	442		0.140	0.500	2.00	mg/L	10	06-Jun-2022 15:44
Thallium	0.000500	U	0.000200	0.000500	0.00200	mg/L	1	06-Jun-2022 12:35
Vanadium	0.00149	J	0.000600	0.00100	0.00500	mg/L	1	06-Jun-2022 12:35
Zinc	0.00651		0.00200	0.00250	0.00500	mg/L	1	06-Jun-2022 12:35
<b>MERCURY BY SW7470A</b>		<b>Method:SW7470A</b>				Prep:SW7470A / 31-May-2022		Analyst: MSC
Mercury	0.000100	U	0.0000300	0.000100	0.000200	mg/L	1	31-May-2022 15:26
<b>OIL &amp; GREASE (HEM) BY E1664A</b>		<b>Method:E1664A</b>				Analyst: KAH		
Oil and Grease	1.00	U	0.610	1.00	2.00	mg/L	1	03-Jun-2022 14:00
<b>CHEMICAL OXYGEN DEMAND BY E410.4, REV 2.0, 1993</b>		<b>Method:E410.4</b>				Analyst: TH		
Chemical Oxygen Demand	49.0		5.00	7.50	15.0	mg/L	1	01-Jun-2022 14:00
<b>ANIONS BY SW9056A</b>		<b>Method:SW9056</b>				Analyst: YP		
Chloride	793		4.00	10.0	10.0	mg/L	20	02-Jun-2022 13:41
Sulfate	31.4		0.200	0.500	0.500	mg/L	1	02-Jun-2022 13:36

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 06-Jun-22

Client:	Bhate Environmental Associates, Inc.	<b>ANALYTICAL REPORT</b>
Project:	Groundwater Treatment Plant Quarterly Effluent Samples	WorkOrder:HS22051211
Sample ID:	LH18/24-SP650_052422_AIX	Lab ID:HS22051211-02
Collection Date:	24-May-2022 14:00	Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>						Analyst: GR
Subcontract Analysis	See Attached		0	0		NA	1	02-Jun-2022 15:47

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 06-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Groundwater Treatment Plant Quarterly Effluent Samples  
 Sample ID: Trip Blank  
 Collection Date: 24-May-2022 14:00

## ANALYTICAL REPORT

WorkOrder:HS22051211  
 Lab ID:HS22051211-03  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD 8260C</b>			<b>Method:SW8260</b>					Analyst: PC
1,1,1,2-Tetrachloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:39
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:39
1,1,2,2-Tetrachloroethane	1.0	U	0.50	1.0	1.0	ug/L	1	27-May-2022 13:39
1,1,2-Trichloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:39
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:39
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:39
1,1-Dichloropropene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:39
1,2,3-Trichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	27-May-2022 13:39
1,2,3-Trichloropropane	1.0	U	0.50	1.0	1.0	ug/L	1	27-May-2022 13:39
1,2,4-Trichlorobenzene	1.0	U	0.50	1.0	1.0	ug/L	1	27-May-2022 13:39
1,2,4-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:39
1,2-Dibromo-3-chloropropane	1.0	U	0.20	1.0	1.0	ug/L	1	27-May-2022 13:39
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:39
1,2-Dichlorobenzene	1.0	U	0.50	1.0	1.0	ug/L	1	27-May-2022 13:39
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:39
1,2-Dichloropropane	1.0	U	0.50	1.0	1.0	ug/L	1	27-May-2022 13:39
1,3,5-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:39
1,3-Dichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	27-May-2022 13:39
1,3-Dichloropropane	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:39
1,4-Dichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	27-May-2022 13:39
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:39
2-Butanone	1.0	U	0.50	1.0	2.0	ug/L	1	27-May-2022 13:39
2-Chlorotoluene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:39
2-Hexanone	2.0	U	1.0	2.0	2.0	ug/L	1	27-May-2022 13:39
4-Chlorotoluene	1.0	U	0.40	1.0	1.0	ug/L	1	27-May-2022 13:39
4-Isopropyltoluene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:39
4-Methyl-2-pentanone	2.0	U	0.70	2.0	2.0	ug/L	1	27-May-2022 13:39
Acetone	2.0	U	0.40	2.0	2.0	ug/L	1	27-May-2022 13:39
Benzene	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:39
Bromobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	27-May-2022 13:39
Bromochloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:39
Bromodichloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:39
Bromoform	1.0	U	0.40	1.0	1.0	ug/L	1	27-May-2022 13:39
Bromomethane	1.0	U	0.40	1.0	1.0	ug/L	1	27-May-2022 13:39
Carbon disulfide	2.0	U	0.60	2.0	2.0	ug/L	1	27-May-2022 13:39
Carbon tetrachloride	1.0	U	0.50	1.0	1.0	ug/L	1	27-May-2022 13:39
Chlorobenzene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:39
Chloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:39
Chloroform	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:39

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 06-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Groundwater Treatment Plant Quarterly Effluent Samples  
 Sample ID: Trip Blank  
 Collection Date: 24-May-2022 14:00

## ANALYTICAL REPORT

WorkOrder:HS22051211  
 Lab ID:HS22051211-03  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD</b>		<b>Method:SW8260</b>						Analyst: PC
<b>8260C</b>								
Chloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:39
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:39
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	ug/L	1	27-May-2022 13:39
Dibromochloromethane	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:39
Dibromomethane	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:39
Dichlorodifluoromethane	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:39
Ethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:39
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	ug/L	1	27-May-2022 13:39
Isopropylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:39
m,p-Xylene	1.0	U	0.50	1.0	2.0	ug/L	1	27-May-2022 13:39
Methylene chloride	2.0	U	0.40	2.0	2.0	ug/L	1	27-May-2022 13:39
n-Butylbenzene	1.0	U	0.40	1.0	1.0	ug/L	1	27-May-2022 13:39
n-Propylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:39
Naphthalene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:39
o-Xylene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:39
sec-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:39
Styrene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:39
tert-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:39
Tetrachloroethene	1.0	U	0.30	1.0	1.0	ug/L	1	27-May-2022 13:39
Toluene	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:39
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:39
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:39
Trichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:39
<b>Trichlorofluoromethane</b>	<b>4.0</b>		<b>0.30</b>	<b>1.0</b>	<b>1.0</b>	<b>ug/L</b>	<b>1</b>	27-May-2022 13:39
Vinyl chloride	0.50	U	0.20	0.50	1.0	ug/L	1	27-May-2022 13:39
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>92.1</i>			<b>0</b>	<i>81-118</i>	<b>%REC</b>	<b>1</b>	27-May-2022 13:39
<i>Surr: 4-Bromofluorobenzene</i>	<i>92.0</i>			<b>0</b>	<i>85-114</i>	<b>%REC</b>	<b>1</b>	27-May-2022 13:39
<i>Surr: Dibromofluoromethane</i>	<i>92.9</i>			<b>0</b>	<i>80-119</i>	<b>%REC</b>	<b>1</b>	27-May-2022 13:39
<i>Surr: Toluene-d8</i>	<i>103</i>			<b>0</b>	<i>89-112</i>	<b>%REC</b>	<b>1</b>	27-May-2022 13:39

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## Weight / Prep Log

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Effluent Samples  
**WorkOrder:** HS22051211

<b>Batch ID:</b> 179326	<b>Start Date:</b> 27 May 2022 07:00	<b>End Date:</b> 27 May 2022 11:30
<b>Method:</b> SV AQ SEP FUN EXTRACT-LOWLEV - 3510C	<b>Prep Code:</b> 3510_B_SIM	

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor	
HS22051211-01	1	1000 (mL)	1 (mL)	0.001	1-liter amber glass, Neat

<b>Batch ID:</b> 179379	<b>Start Date:</b> 31 May 2022 09:00	<b>End Date:</b> 31 May 2022 12:00
<b>Method:</b> MERCURY PREP BY 7470A- WATER	<b>Prep Code:</b> HG_WPR	

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor	
HS22051211-01		10 (mL)	10 (mL)	1	120 plastic HNO3

<b>Batch ID:</b> 179494	<b>Start Date:</b> 02 Jun 2022 12:00	<b>End Date:</b> 02 Jun 2022 16:00
<b>Method:</b> WATER - SW3010A	<b>Prep Code:</b> 3010A	

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor	
HS22051211-01		10 (mL)	10 (mL)	1	120 plastic HNO3

ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Effluent Samples  
**WorkOrder:** HS22051211

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> 179326 ( 0 )		<b>Test Name :</b> SEMIVOLATILES SIM			<b>Matrix:</b> Water	
HS22051211-01	LH18/24-SP650_052422	24 May 2022 14:00		27 May 2022 10:33	01 Jun 2022 12:16	50
<b>Batch ID:</b> 179379 ( 0 )		<b>Test Name :</b> MERCURY BY SW7470A			<b>Matrix:</b> Water	
HS22051211-01	LH18/24-SP650_052422	24 May 2022 14:00		31 May 2022 09:00	31 May 2022 15:26	1
<b>Batch ID:</b> 179494 ( 0 )		<b>Test Name :</b> METALS BY ICPMS BY SW6020A			<b>Matrix:</b> Water	
HS22051211-01	LH18/24-SP650_052422	24 May 2022 14:00		02 Jun 2022 12:00	06 Jun 2022 15:44	10
HS22051211-01	LH18/24-SP650_052422	24 May 2022 14:00		02 Jun 2022 12:00	06 Jun 2022 12:35	1
<b>Batch ID:</b> R409584 ( 0 )		<b>Test Name :</b> VOLATILES ORGANICS BY METHOD 8260C			<b>Matrix:</b> Water	
HS22051211-01	LH18/24-SP650_052422	24 May 2022 14:00			27 May 2022 14:00	1
HS22051211-03	Trip Blank	24 May 2022 14:00			27 May 2022 13:39	1
<b>Batch ID:</b> R409786 ( 0 )		<b>Test Name :</b> CHEMICAL OXYGEN DEMAND BY E410.4, REV 2.0, 1993			<b>Matrix:</b> Water	
HS22051211-01	LH18/24-SP650_052422	24 May 2022 14:00			01 Jun 2022 14:00	1
<b>Batch ID:</b> R409873 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			<b>Matrix:</b> Water	
HS22051211-02	LH18/24-SP650_052422_AIX	24 May 2022 14:00			02 Jun 2022 15:47	1
<b>Batch ID:</b> R409911 ( 0 )		<b>Test Name :</b> ANIONS BY SW9056A			<b>Matrix:</b> Water	
HS22051211-01	LH18/24-SP650_052422	24 May 2022 14:00			02 Jun 2022 13:41	20
HS22051211-01	LH18/24-SP650_052422	24 May 2022 14:00			02 Jun 2022 13:36	1
<b>Batch ID:</b> R409973 ( 0 )		<b>Test Name :</b> OIL & GREASE (HEM) BY E1664A			<b>Matrix:</b> Water	
HS22051211-01	LH18/24-SP650_052422	24 May 2022 14:00			03 Jun 2022 14:00	1

ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Effluent Samples  
**WorkOrder:** HS22051211

**QC BATCH REPORT**

Batch ID: 179379 ( 0 )		Instrument: HG03		Method: MERCURY BY SW7470A						
<b>MBLK</b>	Sample ID: <b>MBLK-179379</b>	Units: <b>mg/L</b>		Analysis Date: <b>31-May-2022 15:01</b>						
Client ID:	Run ID: <b>HG03_409663</b>		SeqNo: <b>6671388</b>		PrepDate: <b>31-May-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.000100	0.000200								U
<b>LCS</b>	Sample ID: <b>LCS-179379</b>	Units: <b>mg/L</b>		Analysis Date: <b>31-May-2022 15:02</b>						
Client ID:	Run ID: <b>HG03_409663</b>		SeqNo: <b>6671389</b>		PrepDate: <b>31-May-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00546	0.000200	0.005	0	109	82 - 119				
<b>MS</b>	Sample ID: <b>HS22051125-02MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>31-May-2022 15:11</b>						
Client ID:	Run ID: <b>HG03_409663</b>		SeqNo: <b>6671393</b>		PrepDate: <b>31-May-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00501	0.000200	0.005	-0.000009000	100	82 - 119				
<b>MSD</b>	Sample ID: <b>HS22051125-02MSD</b>	Units: <b>mg/L</b>		Analysis Date: <b>31-May-2022 15:12</b>						
Client ID:	Run ID: <b>HG03_409663</b>		SeqNo: <b>6671394</b>		PrepDate: <b>31-May-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00499	0.000200	0.005	-0.000009000	100.0	82 - 119	0.005010	0.4	20	
The following samples were analyzed in this batch: HS22051211-01										



## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Effluent Samples  
**WorkOrder:** HS22051211

**QC BATCH REPORT**

Batch ID: 179494 ( 0 )		Instrument: ICPMS05		Method: METALS BY ICPMS BY SW6020A					
<b>MBLK</b>	Sample ID: <b>MBLK-179494</b>	Units: <b>mg/L</b>		Analysis Date: <b>06-Jun-2022 11:42</b>					
Client ID:	Run ID: <b>ICPMS05_410027</b>	SeqNo: <b>6679556</b>		PrepDate: <b>02-Jun-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Aluminum	0.00500	0.0100							U
Antimony	0.00100	0.00500							U
Arsenic	0.00100	0.00500							U
Barium	0.00250	0.00500							U
Beryllium	0.000500	0.00200							U
Cadmium	0.000500	0.00200							U
Calcium	0.0500	0.500							U
Chromium	0.00100	0.00500							U
Cobalt	0.000500	0.00500							U
Iron	0.0500	0.200							U
Lead	0.00100	0.00500							U
Magnesium	0.0500	0.200							U
Manganese	0.00250	0.00500							U
Nickel	0.00100	0.00500							U
Potassium	0.0500	0.200							U
Selenium	0.00250	0.00500							U
Silver	0.000500	0.00500							U
Sodium	0.0500	0.200							U
Thallium	0.000500	0.00200							U
Vanadium	0.00100	0.00500							U
Zinc	0.004713	0.00500							J

## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Effluent Samples  
**WorkOrder:** HS22051211

**QC BATCH REPORT**

Batch ID: 179494 ( 0 )		Instrument: ICPMS05		Method: METALS BY ICPMS BY SW6020A					
<b>LCS</b>		Sample ID: <b>LCS-179494</b>		Units: <b>mg/L</b>		Analysis Date: <b>06-Jun-2022 11:44</b>			
Client ID:		Run ID: <b>ICPMS05_410027</b>		SeqNo: <b>6679557</b>		PrepDate: <b>02-Jun-2022</b>		DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Aluminum	0.1071	0.0100	0.1	0	107	84 - 117			
Antimony	0.05104	0.00500	0.05	0	102	85 - 117			
Arsenic	0.0542	0.00500	0.05	0	108	84 - 116			
Barium	0.0513	0.00500	0.05	0	103	86 - 114			
Beryllium	0.05115	0.00200	0.05	0	102	83 - 121			
Cadmium	0.05284	0.00200	0.05	0	106	87 - 115			
Calcium	4.98	0.500	5	0	99.6	87 - 118			
Chromium	0.05212	0.00500	0.05	0	104	85 - 116			
Cobalt	0.05281	0.00500	0.05	0	106	86 - 115			
Iron	5.033	0.200	5	0	101	87 - 118			
Lead	0.05142	0.00500	0.05	0	103	88 - 115			
Magnesium	5.204	0.200	5	0	104	83 - 118			
Manganese	0.05236	0.00500	0.05	0	105	87 - 115			
Nickel	0.05415	0.00500	0.05	0	108	85 - 117			
Potassium	5.227	0.200	5	0	105	87 - 115			
Selenium	0.05407	0.00500	0.05	0	108	80 - 120			
Silver	0.05086	0.00500	0.05	0	102	85 - 116			
Sodium	5.103	0.200	5	0	102	85 - 117			
Thallium	0.05005	0.00200	0.05	0	100	82 - 116			
Vanadium	0.05231	0.00500	0.05	0	105	86 - 115			
Zinc	0.05663	0.00500	0.05	0	113	83 - 119			

## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Effluent Samples  
**WorkOrder:** HS22051211

**QC BATCH REPORT**

Batch ID: 179494 ( 0 )		Instrument: ICPMS05		Method: METALS BY ICPMS BY SW6020A					
<b>MS</b>		Sample ID: HS22051125-02MS		Units: mg/L		Analysis Date: 06-Jun-2022 16:48			
Client ID:		Run ID: ICPMS05_410027		SeqNo: 6680200		PrepDate: 02-Jun-2022		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Aluminum	47.75	0.0100	0.1	53.66	-5910	84 - 117			SEO
Antimony	0.05224	0.00500	0.05	0.000808	103	85 - 117			
Arsenic	0.05871	0.00500	0.05	0.004244	109	84 - 116			
Barium	0.06552	0.00500	0.05	0.0133	104	86 - 114			
Beryllium	0.06769	0.00200	0.05	0.01909	97.2	83 - 121			
Cadmium	0.06194	0.00200	0.05	0.01215	99.6	87 - 115			
Calcium	526.2	0.500	5	562	-715	87 - 118			SEO
Chromium	0.06871	0.00500	0.05	0.01817	101	85 - 116			
Cobalt	0.4166	0.00500	0.05	0.3696	94.1	86 - 115			O
Iron	13.14	0.200	5	8.317	96.4	87 - 118			
Lead	0.05169	0.00500	0.05	0.002905	97.6	88 - 115			
Magnesium	228.4	0.200	5	243.1	-294	83 - 118			SEO
Manganese	5.97	0.00500	0.05	6.337	-734	87 - 115			SEO
Nickel	1.184	0.00500	0.05	1.143	80.6	85 - 117			SO
Potassium	15.02	0.200	5	11.21	76.2	87 - 115			S
Selenium	0.0969	0.00500	0.05	0.04204	110	80 - 120			
Silver	0.04469	0.00500	0.05	0.000063	89.3	85 - 116			
Sodium	167.5	0.200	5	173.7	-124	85 - 117			SO
Thallium	0.04815	0.00200	0.05	0.000662	95.0	82 - 116			
Vanadium	0.05883	0.00500	0.05	0.005511	107	86 - 115			
Zinc	1.019	0.00500	0.05	0.974	89.5	83 - 119			O

## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Effluent Samples  
**WorkOrder:** HS22051211

**QC BATCH REPORT**

Batch ID: 179494 ( 0 )		Instrument: ICPMS05		Method: METALS BY ICPMS BY SW6020A						
<b>MSD</b>		Sample ID: HS22051125-02MSD		Units: mg/L		Analysis Date: 06-Jun-2022 16:32				
Client ID:		Run ID: ICPMS05_410027		SeqNo: 6680003		PrepDate: 02-Jun-2022		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual
Aluminum	47.18	0.0100	0.1	53.66	-6480	84 - 117	47.75	1.21	20	SEO
Antimony	0.05132	0.00500	0.05	0.000808	101	85 - 117	0.05224	1.77	20	
Arsenic	0.05829	0.00500	0.05	0.004244	108	84 - 116	0.05871	0.713	20	
Barium	0.06312	0.00500	0.05	0.0133	99.6	86 - 114	0.06552	3.73	20	
Beryllium	0.06912	0.00200	0.05	0.01909	100	83 - 121	0.06769	2.08	20	
Cadmium	0.06066	0.00200	0.05	0.01215	97.0	87 - 115	0.06194	2.09	20	
Calcium	516.4	0.500	5	562	-910	87 - 118	526.2	1.87	20	SEO
Chromium	0.06613	0.00500	0.05	0.01817	95.9	85 - 116	0.06871	3.83	20	
Cobalt	0.4017	0.00500	0.05	0.3696	64.2	86 - 115	0.4166	3.65	20	SO
Iron	12.73	0.200	5	8.317	88.2	87 - 118	13.14	3.15	20	
Lead	0.05461	0.00500	0.05	0.002905	103	88 - 115	0.05169	5.49	20	
Magnesium	223.1	0.200	5	243.1	-399	83 - 118	228.4	2.33	20	SEO
Manganese	5.855	0.00500	0.05	6.337	-964	87 - 115	5.97	1.95	20	SEO
Nickel	1.154	0.00500	0.05	1.143	21.0	85 - 117	1.184	2.55	20	SO
Potassium	14.76	0.200	5	11.21	71.2	87 - 115	15.02	1.69	20	S
Selenium	0.09704	0.00500	0.05	0.04204	110	80 - 120	0.0969	0.143	20	
Silver	0.04355	0.00500	0.05	0.000063	87.0	85 - 116	0.04469	2.59	20	
Sodium	160.9	0.200	5	173.7	-255	85 - 117	167.5	3.99	20	SO
Thallium	0.05072	0.00200	0.05	0.000662	100	82 - 116	0.04815	5.2	20	
Vanadium	0.05712	0.00500	0.05	0.005511	103	86 - 115	0.05883	2.94	20	
Zinc	1.005	0.00500	0.05	0.974	62.8	83 - 119	1.019	1.32	20	SO
<b>PDS</b>		Sample ID: HS22051125-02PDS		Units: mg/L		Analysis Date: 06-Jun-2022 17:10				
Client ID:		Run ID: ICPMS05_410027		SeqNo: 6680207		PrepDate: 02-Jun-2022		DF: 100		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual
Aluminum	59.69	1.00	10	49.42	103	80 - 120				O
Calcium	1408	50.0	1000	533.6	87.4	80 - 120				
Magnesium	1086	20.0	1000	227.9	85.8	80 - 120				
Manganese	15.21	0.500	10	6.198	90.2	80 - 120				

## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Effluent Samples  
**WorkOrder:** HS22051211

**QC BATCH REPORT**

Batch ID: 179494 ( 0 )		Instrument: ICPMS05		Method: METALS BY ICPMS BY SW6020A					
<b>PDS</b>		Sample ID: HS22051125-02PDS		Units: mg/L		Analysis Date: 06-Jun-2022 16:50			
Client ID:		Run ID: ICPMS05_410027		SeqNo: 6680201		PrepDate: 02-Jun-2022		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Antimony	0.0995	0.00500	0.1	0.000808	98.7	80 - 120			
Arsenic	0.1151	0.00500	0.1	0.004244	111	80 - 120			
Barium	0.1161	0.00500	0.1	0.0133	103	80 - 120			
Beryllium	0.1161	0.00200	0.1	0.01909	97.0	80 - 120			
Cadmium	0.1114	0.00200	0.1	0.01215	99.3	80 - 120			
Chromium	0.1178	0.00500	0.1	0.01817	99.6	80 - 120			
Iron	17.49	0.200	10	8.317	91.7	80 - 120			
Lead	0.104	0.00500	0.1	0.002905	101	80 - 120			
Nickel	1.173	0.00500	0.1	1.143	29.5	80 - 120			SO
Potassium	19.42	0.200	10	11.21	82.1	80 - 120			
Selenium	0.1562	0.00500	0.1	0.04204	114	80 - 120			
Silver	0.08859	0.00500	0.1	0.000063	88.5	80 - 120			
Sodium	158.3	0.200	10	173.7	-154	80 - 120			SO
Thallium	0.1022	0.00200	0.1	0.000662	102	80 - 120			
Vanadium	0.1095	0.00500	0.1	0.005511	104	80 - 120			
Zinc	0.9988	0.00500	0.1	0.974	24.8	80 - 120			SO
<b>SD</b>		Sample ID: HS22051125-02SD		Units: mg/L		Analysis Date: 06-Jun-2022 17:08			
Client ID:		Run ID: ICPMS05_410027		SeqNo: 6680206		PrepDate: 02-Jun-2022		DF: 500	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%D	%D Limit Qual
Aluminum	48.36	5.00					49.42	2.15	10
Calcium	519.2	250					533.6	2.7	10
Magnesium	226.9	100					227.9	0.456	10
Manganese	6.077	2.50					6.198	1.97	10

## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Effluent Samples  
**WorkOrder:** HS22051211

**QC BATCH REPORT**

Batch ID: 179494 ( 0 )		Instrument: ICPMS05		Method: METALS BY ICPMS BY SW6020A						
<b>SD</b>		Sample ID: <b>HS22051125-02SD</b>		Units: <b>mg/L</b>		Analysis Date: <b>06-Jun-2022 11:48</b>				
Client ID:		Run ID: <b>ICPMS05_410027</b>		SeqNo: <b>6679559</b>		PrepDate: <b>02-Jun-2022</b>		DF: <b>5</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%D	%D Limit	Qual
Antimony	0.00500	0.0250					0.000808	0	10	U
Arsenic	0.004514	0.0250					0.004244	0	10	J
Barium	0.01333	0.0250					0.0133	0	10	J
Cadmium	0.01273	0.0100					0.01215	4.77	10	
Chromium	0.01775	0.0250					0.01817	0	10	J
Cobalt	0.3916	0.0250					0.3696	5.94	10	
Iron	8.587	1.00					8.317	3.25	10	
Lead	0.00500	0.0250					0.002905	0	10	U
Nickel	1.161	0.0250					1.143	1.55	10	
Potassium	10.82	1.00					11.21	3.49	10	
Selenium	0.04354	0.0250					0.04204	3.55	10	
Silver	0.00250	0.0250					0.000063	0	10	U
Sodium	171.1	1.00					173.7	1.44	10	
Thallium	0.00250	0.0100					0.000662	0	10	U
Vanadium	0.008191	0.0250					0.005511	0	10	J
Zinc	1.002	0.0250					0.974	2.88	10	

The following samples were analyzed in this batch: HS22051211-01

## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Effluent Samples  
**WorkOrder:** HS22051211

**QC BATCH REPORT**

Batch ID: 179326 ( 0 )		Instrument: SV-6		Method: SEMIVOLATILES SIM					
<b>MBLK</b>	Sample ID: <b>MBLK-179326</b>	Units: <b>ug/L</b>		Analysis Date: <b>01-Jun-2022 12:34</b>					
Client ID:	Run ID: <b>SV-6_409782</b>	SeqNo: <b>6673478</b>		PrepDate: <b>27-May-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,4-Dioxane	0	0.010							U
Surr: 2-Fluorobiphenyl	0.07332	0	0.08	0	91.7	40 - 140			
Surr: 4-Terphenyl-d14	0.04394	0	0.08	0	54.9	40 - 140			
Surr: Nitrobenzene-d5	0.06231	0	0.08	0	77.9	40 - 140			

<b>LCS</b>	Sample ID: <b>LCS-179326</b>	Units: <b>ug/L</b>		Analysis Date: <b>01-Jun-2022 12:52</b>					
Client ID:	Run ID: <b>SV-6_409782</b>	SeqNo: <b>6673479</b>		PrepDate: <b>27-May-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,4-Dioxane	0.106	0.010	0.08	0	132	40 - 140			
Surr: 2-Fluorobiphenyl	0.07826	0	0.08	0	97.8	40 - 140			
Surr: 4-Terphenyl-d14	0.04279	0	0.08	0	53.5	40 - 140			
Surr: Nitrobenzene-d5	0.06649	0	0.08	0	83.1	40 - 140			

<b>LCSD</b>	Sample ID: <b>LCSD-179326</b>	Units: <b>ug/L</b>		Analysis Date: <b>01-Jun-2022 13:13</b>					
Client ID:	Run ID: <b>SV-6_409782</b>	SeqNo: <b>6673480</b>		PrepDate: <b>27-May-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,4-Dioxane	0.1102	0.010	0.08	0	138	40 - 140	0.106	3.91	20
Surr: 2-Fluorobiphenyl	0.08007	0	0.08	0	100	40 - 140	0.07826	2.29	20
Surr: 4-Terphenyl-d14	0.04829	0	0.08	0	60.4	40 - 140	0.04279	12.1	20
Surr: Nitrobenzene-d5	0.07331	0	0.08	0	91.6	40 - 140	0.06649	9.76	20

The following samples were analyzed in this batch: HS22051211-01

## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Effluent Samples  
**WorkOrder:** HS22051211

## QC BATCH REPORT

Batch ID: R409584 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
<b>MBLK</b>	Sample ID: VBLKW-220527	Units: ug/L		Analysis Date: 27-May-2022 12:57					
Client ID:	Run ID: VOA6_409584	SeqNo: 6669171		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	1.0	1.0							U
1,1,1-Trichloroethane	0.50	1.0							U
1,1,2,2-Tetrachloroethane	1.0	1.0							U
1,1,2-Trichloroethane	1.0	1.0							U
1,1-Dichloroethane	0.50	1.0							U
1,1-Dichloroethene	0.50	1.0							U
1,1-Dichloropropene	1.0	1.0							U
1,2,3-Trichlorobenzene	1.0	1.0							U
1,2,3-Trichloropropane	1.0	1.0							U
1,2,4-Trichlorobenzene	1.0	1.0							U
1,2,4-Trimethylbenzene	1.0	1.0							U
1,2-Dibromo-3-chloropropane	1.0	1.0							U
1,2-Dibromoethane	0.50	1.0							U
1,2-Dichlorobenzene	1.0	1.0							U
1,2-Dichloroethane	0.50	1.0							U
1,2-Dichloropropane	1.0	1.0							U
1,3,5-Trimethylbenzene	1.0	1.0							U
1,3-Dichlorobenzene	1.0	1.0							U
1,3-Dichloropropane	1.0	1.0							U
1,4-Dichlorobenzene	1.0	1.0							U
2,2-Dichloropropane	0.50	1.0							U
2-Butanone	1.0	2.0							U
2-Chlorotoluene	1.0	1.0							U
2-Hexanone	2.0	2.0							U
4-Chlorotoluene	1.0	1.0							U
4-Isopropyltoluene	1.0	1.0							U
4-Methyl-2-pentanone	2.0	2.0							U
Acetone	2.0	2.0							U
Benzene	0.50	1.0							U
Bromobenzene	1.0	1.0							U
Bromochloromethane	0.50	1.0							U
Bromodichloromethane	0.50	1.0							U
Bromoform	1.0	1.0							U
Bromomethane	1.0	1.0							U



## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Effluent Samples  
**WorkOrder:** HS22051211

## QC BATCH REPORT

Batch ID: R409584 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
<b>MBLK</b>	Sample ID: VBLKW-220527	Units: ug/L		Analysis Date: 27-May-2022 12:57					
Client ID:	Run ID: VOA6_409584	SeqNo: 6669171		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	2.0	2.0							U
Carbon tetrachloride	1.0	1.0							U
Chlorobenzene	1.0	1.0							U
Chloroethane	1.0	1.0							U
Chloroform	0.50	1.0							U
Chloromethane	0.50	1.0							U
cis-1,2-Dichloroethene	0.50	1.0							U
cis-1,3-Dichloropropene	0.50	1.0							U
Dibromochloromethane	1.0	1.0							U
Dibromomethane	0.50	1.0							U
Dichlorodifluoromethane	1.0	1.0							U
Ethylbenzene	1.0	1.0							U
Hexachlorobutadiene	1.0	1.0							U
Isopropylbenzene	1.0	1.0							U
m,p-Xylene	1.0	2.0							U
Methylene chloride	2.0	2.0							U
Naphthalene	1.0	1.0							U
n-Butylbenzene	1.0	1.0							U
n-Propylbenzene	1.0	1.0							U
o-Xylene	1.0	1.0							U
sec-Butylbenzene	1.0	1.0							U
Styrene	1.0	1.0							U
tert-Butylbenzene	1.0	1.0							U
Tetrachloroethene	1.0	1.0							U
Toluene	0.50	1.0							U
trans-1,2-Dichloroethene	0.50	1.0							U
trans-1,3-Dichloropropene	0.50	1.0							U
Trichloroethene	0.50	1.0							U
Trichlorofluoromethane	1.0	1.0							U
Vinyl chloride	0.50	1.0							U
Surr: 1,2-Dichloroethane-d4	46.57	1.0	50	0	93.1	81 - 118			
Surr: 4-Bromofluorobenzene	47.13	1.0	50	0	94.3	85 - 114			
Surr: Dibromofluoromethane	47.29	1.0	50	0	94.6	80 - 119			
Surr: Toluene-d8	51.29	1.0	50	0	103	89 - 112			

## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Effluent Samples  
**WorkOrder:** HS22051211

## QC BATCH REPORT

Batch ID: R409584 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
LCS		Sample ID: VLCSW-220527		Units: ug/L		Analysis Date: 27-May-2022 12:15				
Client ID:		Run ID: VOA6_409584		SeqNo: 6669170		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	19.97	1.0	20	0	99.9	78 - 124				
1,1,1-Trichloroethane	19.49	1.0	20	0	97.5	74 - 131				
1,1,2,2-Tetrachloroethane	19.26	1.0	20	0	96.3	71 - 121				
1,1,2-Trichloroethane	19.42	1.0	20	0	97.1	80 - 119				
1,1-Dichloroethane	20.08	1.0	20	0	100	77 - 125				
1,1-Dichloroethene	19.13	1.0	20	0	95.7	71 - 131				
1,1-Dichloropropene	20.08	1.0	20	0	100	78 - 125				
1,2,3-Trichlorobenzene	20.19	1.0	20	0	101	69 - 129				
1,2,3-Trichloropropane	18.87	1.0	20	0	94.3	73 - 122				
1,2,4-Trichlorobenzene	20.32	1.0	20	0	102	69 - 130				
1,2,4-Trimethylbenzene	20.15	1.0	20	0	101	76 - 124				
1,2-Dibromo-3-chloropropane	18.1	1.0	20	0	90.5	62 - 128				
1,2-Dibromoethane	19.82	1.0	20	0	99.1	77 - 121				
1,2-Dichlorobenzene	20.04	1.0	20	0	100	80 - 119				
1,2-Dichloroethane	19.85	1.0	20	0	99.3	73 - 128				
1,2-Dichloropropane	20.06	1.0	20	0	100	78 - 122				
1,3,5-Trimethylbenzene	20.27	1.0	20	0	101	75 - 124				
1,3-Dichlorobenzene	20.26	1.0	20	0	101	80 - 119				
1,3-Dichloropropane	19.72	1.0	20	0	98.6	80 - 119				
1,4-Dichlorobenzene	20.12	1.0	20	0	101	79 - 118				
2,2-Dichloropropane	20.34	1.0	20	0	102	60 - 139				
2-Butanone	37.99	2.0	40	0	95.0	56 - 143				
2-Chlorotoluene	19.91	1.0	20	0	99.5	79 - 122				
2-Hexanone	40.04	2.0	40	0	100	57 - 139				
4-Chlorotoluene	20.31	1.0	20	0	102	78 - 122				
4-Isopropyltoluene	20.96	1.0	20	0	105	77 - 127				
4-Methyl-2-pentanone	38.98	2.0	40	0	97.4	67 - 130				
Acetone	38.96	2.0	40	0	97.4	39 - 160				
Benzene	20.02	1.0	20	0	100	79 - 120				
Bromobenzene	19.97	1.0	20	0	99.9	80 - 120				
Bromochloromethane	19.45	1.0	20	0	97.3	78 - 123				
Bromodichloromethane	19.37	1.0	20	0	96.9	79 - 125				
Bromoform	19.94	1.0	20	0	99.7	66 - 130				
Bromomethane	19.15	1.0	20	0	95.8	53 - 141				

## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Effluent Samples  
**WorkOrder:** HS22051211

## QC BATCH REPORT

Batch ID: R409584 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
LCS		Sample ID: VLCSW-220527		Units: ug/L		Analysis Date: 27-May-2022 12:15			
Client ID:		Run ID: VOA6_409584		SeqNo: 6669170		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	39.7	2.0	40	0	99.3	64 - 133			
Carbon tetrachloride	19.23	1.0	20	0	96.1	72 - 136			
Chlorobenzene	20.1	1.0	20	0	101	82 - 118			
Chloroethane	20.05	1.0	20	0	100	60 - 138			
Chloroform	19.35	1.0	20	0	96.8	79 - 124			
Chloromethane	21.45	1.0	20	0	107	50 - 139			
cis-1,2-Dichloroethene	20.15	1.0	20	0	101	78 - 123			
cis-1,3-Dichloropropene	20.09	1.0	20	0	100	75 - 124			
Dibromochloromethane	19.84	1.0	20	0	99.2	74 - 126			
Dibromomethane	19.58	1.0	20	0	97.9	79 - 123			
Dichlorodifluoromethane	19.58	1.0	20	0	97.9	32 - 152			
Ethylbenzene	20.77	1.0	20	0	104	79 - 121			
Hexachlorobutadiene	21.02	1.0	20	0	105	66 - 134			
Isopropylbenzene	19.71	1.0	20	0	98.6	72 - 131			
m,p-Xylene	41.1	2.0	40	0	103	80 - 121			
Methylene chloride	18.35	2.0	20	0	91.8	74 - 124			
Naphthalene	19.04	1.0	20	0	95.2	61 - 128			
n-Butylbenzene	20.71	1.0	20	0	104	75 - 128			
n-Propylbenzene	20.68	1.0	20	0	103	76 - 126			
o-Xylene	20.73	1.0	20	0	104	78 - 122			
sec-Butylbenzene	20.44	1.0	20	0	102	77 - 126			
Styrene	20.46	1.0	20	0	102	78 - 123			
tert-Butylbenzene	20.43	1.0	20	0	102	78 - 124			
Tetrachloroethene	20.21	1.0	20	0	101	74 - 129			
Toluene	20.53	1.0	20	0	103	80 - 121			
trans-1,2-Dichloroethene	19.91	1.0	20	0	99.6	75 - 124			
trans-1,3-Dichloropropene	19.97	1.0	20	0	99.8	73 - 127			
Trichloroethene	20.17	1.0	20	0	101	79 - 123			
Trichlorofluoromethane	19.58	1.0	20	0	97.9	65 - 141			
Vinyl chloride	19.39	1.0	20	0	97.0	58 - 137			
Surr: 1,2-Dichloroethane-d4	49.68	1.0	50	0	99.4	81 - 118			
Surr: 4-Bromofluorobenzene	50.15	1.0	50	0	100	85 - 114			
Surr: Dibromofluoromethane	50.08	1.0	50	0	100	80 - 119			
Surr: Toluene-d8	48.78	1.0	50	0	97.6	89 - 112			

## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Effluent Samples  
**WorkOrder:** HS22051211

## QC BATCH REPORT

Batch ID: R409584 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MS		Sample ID: HS22051211-01MS		Units: ug/L		Analysis Date: 27-May-2022 14:42			
Client ID: LH18/24-SP650_052422		Run ID: VOA6_409584		SeqNo: 6669176		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	19.09	1.0	20	0	95.5	78 - 124			
1,1,1-Trichloroethane	18.5	1.0	20	0	92.5	74 - 131			
1,1,2,2-Tetrachloroethane	18.87	1.0	20	0	94.4	71 - 121			
1,1,2-Trichloroethane	18.84	1.0	20	0	94.2	80 - 119			
1,1-Dichloroethane	18.61	1.0	20	0	93.1	77 - 125			
1,1-Dichloroethene	18.34	1.0	20	0	91.7	71 - 131			
1,1-Dichloropropene	19.12	1.0	20	0	95.6	78 - 125			
1,2,3-Trichlorobenzene	15.09	1.0	20	0	75.5	69 - 129			
1,2,3-Trichloropropane	19.45	1.0	20	0	97.2	73 - 122			
1,2,4-Trichlorobenzene	16.07	1.0	20	0	80.3	69 - 130			
1,2,4-Trimethylbenzene	19.13	1.0	20	0	95.6	76 - 124			
1,2-Dibromo-3-chloropropane	15.11	1.0	20	0	75.6	62 - 128			
1,2-Dibromoethane	18.97	1.0	20	0	94.9	77 - 121			
1,2-Dichlorobenzene	18.78	1.0	20	0	93.9	80 - 119			
1,2-Dichloroethane	18.79	1.0	20	0	94.0	73 - 128			
1,2-Dichloropropane	18.85	1.0	20	0	94.3	78 - 122			
1,3,5-Trimethylbenzene	19.23	1.0	20	0	96.2	75 - 124			
1,3-Dichlorobenzene	18.78	1.0	20	0	93.9	80 - 119			
1,3-Dichloropropane	19.13	1.0	20	0	95.6	80 - 119			
1,4-Dichlorobenzene	18.95	1.0	20	0	94.7	79 - 118			
2,2-Dichloropropane	19.23	1.0	20	0	96.2	60 - 139			
2-Butanone	29.5	2.0	40	0	73.8	56 - 143			
2-Chlorotoluene	18.89	1.0	20	0	94.5	79 - 122			
2-Hexanone	38.72	2.0	40	0	96.8	57 - 139			
4-Chlorotoluene	19.24	1.0	20	0	96.2	78 - 122			
4-Isopropyltoluene	20.31	1.0	20	0	102	77 - 127			
4-Methyl-2-pentanone	37.47	2.0	40	0	93.7	67 - 130			
Acetone	25.59	2.0	40	0	64.0	39 - 160			
Benzene	18.99	1.0	20	0	95.0	79 - 120			
Bromobenzene	19.35	1.0	20	0	96.7	80 - 120			
Bromochloromethane	18.22	1.0	20	0	91.1	78 - 123			
Bromodichloromethane	18.36	1.0	20	0	91.8	79 - 125			
Bromoform	18.6	1.0	20	0	93.0	66 - 130			
Bromomethane	13.57	1.0	20	0	67.9	53 - 141			

## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Effluent Samples  
**WorkOrder:** HS22051211

## QC BATCH REPORT

Batch ID: R409584 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MS		Sample ID: HS22051211-01MS		Units: ug/L		Analysis Date: 27-May-2022 14:42			
Client ID: LH18/24-SP650_052422		Run ID: VOA6_409584		SeqNo: 6669176		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	36.16	2.0	40	0	90.4	64 - 133			
Carbon tetrachloride	18.7	1.0	20	0	93.5	72 - 136			
Chlorobenzene	19.25	1.0	20	0	96.2	82 - 118			
Chloroethane	12.12	1.0	20	0	60.6	60 - 138			
Chloroform	18.07	1.0	20	0	90.3	79 - 124			
Chloromethane	24.59	1.0	20	0	123	50 - 139			
cis-1,2-Dichloroethene	21.48	1.0	20	2.361	95.6	78 - 123			
cis-1,3-Dichloropropene	18.69	1.0	20	0	93.4	75 - 124			
Dibromochloromethane	19.18	1.0	20	0	95.9	74 - 126			
Dibromomethane	18.33	1.0	20	0	91.6	79 - 123			
Dichlorodifluoromethane	10.56	1.0	20	0	52.8	32 - 152			
Ethylbenzene	19.24	1.0	20	0	96.2	79 - 121			
Hexachlorobutadiene	21.33	1.0	20	0	107	66 - 134			
Isopropylbenzene	18.65	1.0	20	0	93.2	72 - 131			
m,p-Xylene	38.15	2.0	40	0	95.4	80 - 121			
Methylene chloride	16.75	2.0	20	0	83.8	74 - 124			
Naphthalene	13.11	1.0	20	0	65.6	61 - 128			
n-Butylbenzene	20.43	1.0	20	0	102	75 - 128			
n-Propylbenzene	19.82	1.0	20	0	99.1	76 - 126			
o-Xylene	18.96	1.0	20	0	94.8	78 - 122			
sec-Butylbenzene	19.94	1.0	20	0	99.7	77 - 126			
Styrene	19.09	1.0	20	0	95.4	78 - 123			
tert-Butylbenzene	19.84	1.0	20	0	99.2	78 - 124			
Tetrachloroethene	19.52	1.0	20	0	97.6	74 - 129			
Toluene	19.58	1.0	20	0	97.9	80 - 121			
trans-1,2-Dichloroethene	18.69	1.0	20	0	93.4	75 - 124			
trans-1,3-Dichloropropene	18.33	1.0	20	0	91.6	73 - 127			
Trichloroethene	19.46	1.0	20	0	97.3	79 - 123			
Trichlorofluoromethane	18.07	1.0	20	0	90.4	65 - 141			
Vinyl chloride	16.57	1.0	20	0	82.9	58 - 137			
Surr: 1,2-Dichloroethane-d4	48.43	1.0	50	0	96.9	81 - 118			
Surr: 4-Bromofluorobenzene	49.35	1.0	50	0	98.7	85 - 114			
Surr: Dibromofluoromethane	47.59	1.0	50	0	95.2	80 - 119			
Surr: Toluene-d8	50.29	1.0	50	0	101	89 - 112			

## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Effluent Samples  
**WorkOrder:** HS22051211

## QC BATCH REPORT

Batch ID: R409584 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
<b>MSD</b>		Sample ID: HS22051211-01MSD		Units: ug/L		Analysis Date: 27-May-2022 15:03			
Client ID: LH18/24-SP650_052422		Run ID: VOA6_409584		SeqNo: 6669177		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	19.83	1.0	20	0	99.1	78 - 124	19.09	3.77	20
1,1,1-Trichloroethane	18.67	1.0	20	0	93.3	74 - 131	18.5	0.885	20
1,1,2,2-Tetrachloroethane	20	1.0	20	0	100	71 - 121	18.87	5.82	20
1,1,2-Trichloroethane	19.09	1.0	20	0	95.4	80 - 119	18.84	1.29	20
1,1-Dichloroethane	18.1	1.0	20	0	90.5	77 - 125	18.61	2.81	20
1,1-Dichloroethene	18.14	1.0	20	0	90.7	71 - 131	18.34	1.08	20
1,1-Dichloropropene	19.21	1.0	20	0	96.1	78 - 125	19.12	0.491	20
1,2,3-Trichlorobenzene	18.89	1.0	20	0	94.5	69 - 129	15.09	22.4	20 R
1,2,3-Trichloropropane	19.14	1.0	20	0	95.7	73 - 122	19.45	1.59	20
1,2,4-Trichlorobenzene	19.38	1.0	20	0	96.9	69 - 130	16.07	18.7	20
1,2,4-Trimethylbenzene	20.37	1.0	20	0	102	76 - 124	19.13	6.26	20
1,2-Dibromo-3-chloropropane	17.92	1.0	20	0	89.6	62 - 128	15.11	17	20
1,2-Dibromoethane	19.23	1.0	20	0	96.1	77 - 121	18.97	1.35	20
1,2-Dichlorobenzene	20.02	1.0	20	0	100	80 - 119	18.78	6.43	20
1,2-Dichloroethane	18.64	1.0	20	0	93.2	73 - 128	18.79	0.802	20
1,2-Dichloropropane	19.06	1.0	20	0	95.3	78 - 122	18.85	1.08	20
1,3,5-Trimethylbenzene	20.21	1.0	20	0	101	75 - 124	19.23	4.97	20
1,3-Dichlorobenzene	20.02	1.0	20	0	100	80 - 119	18.78	6.37	20
1,3-Dichloropropane	19.34	1.0	20	0	96.7	80 - 119	19.13	1.08	20
1,4-Dichlorobenzene	20.51	1.0	20	0	103	79 - 118	18.95	7.92	20
2,2-Dichloropropane	19.38	1.0	20	0	96.9	60 - 139	19.23	0.743	20
2-Butanone	30.95	2.0	40	0	77.4	56 - 143	29.5	4.8	20
2-Chlorotoluene	19.73	1.0	20	0	98.6	79 - 122	18.89	4.33	20
2-Hexanone	39.36	2.0	40	0	98.4	57 - 139	38.72	1.62	20
4-Chlorotoluene	20.5	1.0	20	0	103	78 - 122	19.24	6.35	20
4-Isopropyltoluene	21.42	1.0	20	0	107	77 - 127	20.31	5.33	20
4-Methyl-2-pentanone	40.51	2.0	40	0	101	67 - 130	37.47	7.78	20
Acetone	26.01	2.0	40	0	65.0	39 - 160	25.59	1.62	20
Benzene	18.79	1.0	20	0	93.9	79 - 120	18.99	1.09	20
Bromobenzene	20.65	1.0	20	0	103	80 - 120	19.35	6.5	20
Bromochloromethane	17.92	1.0	20	0	89.6	78 - 123	18.22	1.63	20
Bromodichloromethane	18.21	1.0	20	0	91.0	79 - 125	18.36	0.819	20
Bromoform	19.31	1.0	20	0	96.5	66 - 130	18.6	3.75	20
Bromomethane	11.4	1.0	20	0	57.0	53 - 141	13.57	17.4	20

## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Effluent Samples  
**WorkOrder:** HS22051211

## QC BATCH REPORT

Batch ID: R409584 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MSD		Sample ID: HS22051211-01MSD		Units: ug/L		Analysis Date: 27-May-2022 15:03			
Client ID: LH18/24-SP650_052422		Run ID: VOA6_409584		SeqNo: 6669177		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	35.45	2.0	40	0	88.6	64 - 133	36.16	1.97	20
Carbon tetrachloride	18.78	1.0	20	0	93.9	72 - 136	18.7	0.417	20
Chlorobenzene	19.76	1.0	20	0	98.8	82 - 118	19.25	2.65	20
Chloroethane	11.83	1.0	20	0	59.1	60 - 138	12.12	2.48	20 S
Chloroform	17.91	1.0	20	0	89.5	79 - 124	18.07	0.893	20
Chloromethane	23.28	1.0	20	0	116	50 - 139	24.59	5.5	20
cis-1,2-Dichloroethene	21.06	1.0	20	2.361	93.5	78 - 123	21.48	1.95	20
cis-1,3-Dichloropropene	18.52	1.0	20	0	92.6	75 - 124	18.69	0.886	20
Dibromochloromethane	19.44	1.0	20	0	97.2	74 - 126	19.18	1.39	20
Dibromomethane	18.76	1.0	20	0	93.8	79 - 123	18.33	2.35	20
Dichlorodifluoromethane	10.18	1.0	20	0	50.9	32 - 152	10.56	3.67	20
Ethylbenzene	20.2	1.0	20	0	101	79 - 121	19.24	4.91	20
Hexachlorobutadiene	22.96	1.0	20	0	115	66 - 134	21.33	7.37	20
Isopropylbenzene	19.45	1.0	20	0	97.3	72 - 131	18.65	4.23	20
m,p-Xylene	39.62	2.0	40	0	99.0	80 - 121	38.15	3.77	20
Methylene chloride	16.27	2.0	20	0	81.4	74 - 124	16.75	2.92	20
Naphthalene	17.63	1.0	20	0	88.1	61 - 128	13.11	29.4	20 R
n-Butylbenzene	21.85	1.0	20	0	109	75 - 128	20.43	6.72	20
n-Propylbenzene	20.77	1.0	20	0	104	76 - 126	19.82	4.69	20
o-Xylene	20.04	1.0	20	0	100	78 - 122	18.96	5.54	20
sec-Butylbenzene	21.23	1.0	20	0	106	77 - 126	19.94	6.26	20
Styrene	20.13	1.0	20	0	101	78 - 123	19.09	5.35	20
tert-Butylbenzene	20.91	1.0	20	0	105	78 - 124	19.84	5.23	20
Tetrachloroethene	20.67	1.0	20	0	103	74 - 129	19.52	5.69	20
Toluene	20.01	1.0	20	0	100	80 - 121	19.58	2.19	20
trans-1,2-Dichloroethene	18.8	1.0	20	0	94.0	75 - 124	18.69	0.611	20
trans-1,3-Dichloropropene	18.7	1.0	20	0	93.5	73 - 127	18.33	2.02	20
Trichloroethene	19.31	1.0	20	0	96.6	79 - 123	19.46	0.742	20
Trichlorofluoromethane	18.13	1.0	20	0	90.7	65 - 141	18.07	0.334	20
Vinyl chloride	15.92	1.0	20	0	79.6	58 - 137	16.57	4.03	20
Surr: 1,2-Dichloroethane-d4	46.3	1.0	50	0	92.6	81 - 118	48.43	4.48	20
Surr: 4-Bromofluorobenzene	49.2	1.0	50	0	98.4	85 - 114	49.35	0.313	20
Surr: Dibromofluoromethane	47.02	1.0	50	0	94.0	80 - 119	47.59	1.2	20
Surr: Toluene-d8	49.8	1.0	50	0	99.6	89 - 112	50.29	0.992	20

ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Effluent Samples  
**WorkOrder:** HS22051211

**QC BATCH REPORT****Batch ID:** R409584 ( 0 )**Instrument:** VOA6**Method:** VOLATILES ORGANICS BY METHOD  
8260C

The following samples were analyzed in this batch:

HS22051211-01	HS22051211-03
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## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Effluent Samples  
**WorkOrder:** HS22051211

**QC BATCH REPORT**

Batch ID: R409786 ( 0 )		Instrument: WetChem_HS		Method: CHEMICAL OXYGEN DEMAND BY E410.4, REV 2.0, 1993					
<b>MBLK</b>	Sample ID: MBLK-R409786	Units: mg/L		Analysis Date: 01-Jun-2022 14:00					
Client ID:	Run ID: WetChem_HS_409786		SeqNo: 6673549		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Chemical Oxygen Demand	7.50	15.0							U
<b>LCS</b>	Sample ID: LCS-R409786	Units: mg/L		Analysis Date: 01-Jun-2022 14:00					
Client ID:	Run ID: WetChem_HS_409786		SeqNo: 6673548		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Chemical Oxygen Demand	97	15.0	100	0	97.0	85 - 115			
<b>LCSD</b>	Sample ID: LCSD-R409786	Units: mg/L		Analysis Date: 01-Jun-2022 14:00					
Client ID:	Run ID: WetChem_HS_409786		SeqNo: 6673547		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Chemical Oxygen Demand	98	15.0	100	0	98.0	85 - 115	97	1.03	20
<b>MS</b>	Sample ID: HS22051129-01MS	Units: mg/L		Analysis Date: 01-Jun-2022 14:00					
Client ID:	Run ID: WetChem_HS_409786		SeqNo: 6673551		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Chemical Oxygen Demand	58	15.0	50	10	96.0	80 - 120			
<b>MSD</b>	Sample ID: HS22051129-01MSD	Units: mg/L		Analysis Date: 01-Jun-2022 14:00					
Client ID:	Run ID: WetChem_HS_409786		SeqNo: 6673550		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Chemical Oxygen Demand	59	15.0	50	10	98.0	80 - 120	58	1.71	20
The following samples were analyzed in this batch: HS22051211-01									

## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Effluent Samples  
**WorkOrder:** HS22051211

**QC BATCH REPORT**

Batch ID: R409911 ( 0 )		Instrument: ICS-Integrion		Method: ANIONS BY SW9056A					
<b>MBLK</b>	Sample ID: <b>MBLK</b>	Units: <b>mg/L</b>		Analysis Date: <b>02-Jun-2022 14:34</b>					
Client ID:	Run ID: <b>ICS-Integrion_409911</b>		SeqNo: <b>6676526</b>		PrepDate:		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	0.500	0.500							U
Sulfate	0.500	0.500							U

<b>LCS</b>	Sample ID: <b>LCS</b>	Units: <b>mg/L</b>		Analysis Date: <b>02-Jun-2022 14:39</b>					
Client ID:	Run ID: <b>ICS-Integrion_409911</b>		SeqNo: <b>6676527</b>		PrepDate:		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	20.09	0.500	20	0	100	80 - 120			
Sulfate	19.63	0.500	20	0	98.1	80 - 120			

<b>MS</b>	Sample ID: <b>HS22051205-01MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>02-Jun-2022 15:32</b>					
Client ID:	Run ID: <b>ICS-Integrion_409911</b>		SeqNo: <b>6676533</b>		PrepDate:		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	297.7	0.500	10	297	6.93	80 - 120			SEO
Sulfate	36.6	0.500	10	26.74	98.7	80 - 120			

<b>MSD</b>	Sample ID: <b>HS22051205-01MSD</b>	Units: <b>mg/L</b>		Analysis Date: <b>02-Jun-2022 15:37</b>					
Client ID:	Run ID: <b>ICS-Integrion_409911</b>		SeqNo: <b>6676534</b>		PrepDate:		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	297	0.500	10	297	0.700	80 - 120	297.7	0.21	20 SEO
Sulfate	36.53	0.500	10	26.74	98.0	80 - 120	36.6	0.19	20

The following samples were analyzed in this batch: HS22051211-01

## ALS Houston, US

Date: 06-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Quarterly Effluent Samples  
**WorkOrder:** HS22051211

**QC BATCH REPORT**

Batch ID: R409973 ( 0 )		Instrument: Balance1		Method: OIL & GREASE (HEM) BY E1664A						
<b>MBLK</b>	Sample ID: WBLKW-060322	Units: mg/L		Analysis Date: 03-Jun-2022 14:00						
Client ID:	Run ID: Balance1_409973	SeqNo: 6677590		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Oil and Grease	1.00	2.00								U
<b>LCS</b>	Sample ID: WLCSSW-060322	Units: mg/L		Analysis Date: 03-Jun-2022 14:00						
Client ID:	Run ID: Balance1_409973	SeqNo: 6677592		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Oil and Grease	38.6	2.00	40	0	96.5	78 - 114				
<b>LCSD</b>	Sample ID: WLCSDW-060322	Units: mg/L		Analysis Date: 03-Jun-2022 14:00						
Client ID:	Run ID: Balance1_409973	SeqNo: 6677591		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Oil and Grease	40.3	2.00	40	0	101	78 - 114	38.6	4.31	18	
<b>MS</b>	Sample ID: HS22051072-02MS	Units: mg/L		Analysis Date: 03-Jun-2022 14:00						
Client ID:	Run ID: Balance1_409973	SeqNo: 6677570		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Oil and Grease	39.3	2.00	40	0.4082	97.2	78 - 114				
The following samples were analyzed in this batch: HS22051211-01										

## ALS Houston, US

Date: 06-Jun-22

<b>Client:</b>	Bhate Environmental Associates, Inc.	<b>QUALIFIERS, ACRONYMS, UNITS</b>
<b>Project:</b>	Groundwater Treatment Plant Quarterly Effluent Samples	
<b>WorkOrder:</b>	<b>HS22051211</b>	

<b>Qualifier</b>	<b>Description</b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

<b>Acronym</b>	<b>Description</b>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

<b>Unit Reported</b>	<b>Description</b>
mg/L	Milligrams per Liter

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**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

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Agency	Number	Expire Date
Dept of Defense	L21-682	31-Dec-2023
Florida	E87611-34	30-Jun-2022
Illinois	2000322022-9	09-May-2023
Kansas	E-10352 2021-2022	31-Jul-2022
Louisiana	03087, 2021-2022	30-Jun-2022
Maryland	343, 2021-2022	30-Jun-2022
North Carolina	624-2022	31-Dec-2022
Oklahoma	2021-080	31-Aug-2022
Texas	T104704231-22-29	30-Apr-2023
Utah	TX026932021-12	30-Jul-2022

ALS Houston, US

Date: 06-Jun-22

## Sample Receipt Checklist

Work Order ID: HS22051211

Date/Time Received: 26-May-2022 09:55

Client Name: Bhate Environmental

Received by: Paresh M. Giga

Completed By: <u>/S/ Paresh M. Giga</u>	26-May-2022 13:12	Reviewed by: <u>/S/ Dane J. Wacasey</u>	26-May-2022 20:08
eSignature	Date/Time	eSignature	Date/Time

Matrices: **Water**Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	1 Page(s)
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	COC IDs:none
Samplers name present on COC?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Temperature(s)/Thermometer(s):	1.5C/2.0C U/C IR31		
Cooler(s)/Kit(s):	47489		
Date/Time sample(s) sent to storage:	5/26/2022 13:20		
Water - VOA vials have zero headspace?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted by:			

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:

Corrective Action:


## CHAIN OF CUSTODY

Name Of Lab Shipping To: ALS 10450 Stancliff Rd., Suite 210 Houston, Tx. 77099 ATTN: RJ Modashia

HS22051211

Bhate Environmental Associates, Inc.  
Groundwater Treatment Plant Quarterly Effluent Sample

<b>Project:</b> BHATE LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS			<b>Project No.</b> NWO1312.0150.0 16.0001		<b>Analyse</b>														
<b>Job:</b> GROUNDWATER TREATMENT PLANT QUARTERLY EFFLUENT SAMPLES					MS / MSD	No. OF CONTAINERS	ROD Volatiles	Total Metals	Oil & Grease	Chemical Oxygen Demand	Chloride & Sulfate	1, 4 - DIOXANE	PERCHLORATE					Remarks (Preservatives, etc.)	Lab I.D.#
<b>Prepared By:</b> Scott Beesinger		<b>P. O. Number</b>																	
Field Sample I.D.	Sample Matrix	Date / Time																	
LH18/24-SP650_052422	Water	05/24/22 / 14:00		4	3		1											HCL	
LH18/24-SP650_052422	Water	05/24/22 / 14:00		1		1												HNO3	
LH18/24-SP650_052422	Water	05/24/22 / 14:00		2						1	1							NONE	
LH18/24-SP650_052422	Water	05/24/22 / 14:00		1					1									H2SO4	
LH18/24-SP650_052422_AIX	Water	05/24/22 / 14:00		1								1						NONE	
Trip Blank	Water	05/24/22		2	2													HCL	
<b>Additional Remarks:</b> Standard TAT																			
<b>Relinquished By:</b> 		<b>Date</b> 05/24/22	<b>Time</b> 14:30	<b>Received By:</b> 		<b>Date</b> 5/26/22	<b>Time</b> 09:55	<b>Relinquished By:</b>		<b>Date</b>	<b>Time</b>	<b>Received By:</b>		<b>Date</b>	<b>Time</b>				
<b>For Lab Use Only</b>																			
<b>Received At Lab By:</b>		<b>Date</b>	<b>Time</b>	<b>Airbill No.</b>		<b>Opened By:</b>		<b>Date</b>	<b>Time</b>	<b>Temp of Container</b>	<b>Seal No.</b>	<b>Condition</b>							
<b>Remarks:</b> OK. 47489 1.5" #31 01-05																			

 <b>ALS</b> 10450 Stancliff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5656 Fax. +1 281 530 5387	<b>CUSTODY SEAL</b>		Seal Broken By: <u>SM</u>
	Date: <u>5/24/22</u>	Time: <u>1430</u>	Date: <u>05/26/22</u>
	Name: <u>Scots Bus</u>		
	Company: <u>BHATT</u>		

47489

MAY 27 2022

Must Deliver Next Business Day  
Time and Temperature Sensitive!



47489

ORIGIN ID: SGRA (902) 930 6150  
 SCOTT BEESINGER  
 AIRTEL ENVIRONMENTAL & INFRASTRUCTURE  
 2203-B EAST GRAND AVE  
 FPO 9202  
 MARSHALL, TX 75670  
 UNITED STATES US

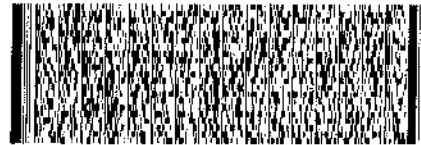
SHIP DATE: 04/24/21  
 ACTWGT: 1.00 LB MAIL  
 EAD: 02212422/00013408  
 DTMS: 26X14X14 IN

TO: CLIENT SERVICES  
 ALS LABORATORY GROUP  
 10450 STANCLIFF ROAD  
 SUITE 210  
 HOUSTON TX 77099

(281) 530-6666

REF: LHAPP 16-B075777-RJ

RMA III III III

FedEx  
Express

TRACK# 9473 0838 9494

red 51

PRIORITY OVERNIGHT

AB SGRA

77099

TX-US  
IAH

4973767 74867827 000A 58065/1/006/0008





June 02, 2022

Service Request No:E2200484

Dane Wacasey  
ALS Group USA, Corp.  
10450 Stancliff Road  
Suite 210  
Houston, TX 77099-4338

**Laboratory Results for: HS22051211**

Dear Dane,

Enclosed are the results of the sample(s) submitted to our laboratory May 26, 2022  
For your reference, these analyses have been assigned our service request number **E2200484**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current TNI standards, where applicable, and except as noted in the laboratory case narrative provided. All results are intended to be considered in their entirety and ALS Environmental is not responsible for use of less than the complete final report. Results apply only to the items submitted to the laboratory, as received for analysis. In accordance with the current TNI Standard, a statement on the estimated uncertainty of measurement of any quantitative analysis will be supplied upon request.

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Corey Grandits  
Project Manager

ADDRESS 10450 Stancliff Rd., Suite 210, Houston, TX 77099  
PHONE +1 281 530 5656 | FAX +1 281 530 5887  
ALS Group USA, Corp.  
dba ALS Environmental



# Certificate of Analysis

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

**ALS Environmental**

**Client:** ALS Houston  
**Project:** HS22051211  
**Sample Matrix:** W

**Service Request No.:** E2200484  
**Date Received:** 05/26/22

**CASE NARRATIVE**

All analyses were performed in adherence to the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II. When appropriate to the method, method blank results have been reported with each analytical test.

**Sample Receipt**

One sample was received for analysis at ALS Environmental in Houston on 05/26/22.

The sample was received in good condition and is consistent with the accompanying chain of custody form. The sample was stored in a refrigerator at 4°C upon receipt at the laboratory.

**Data Validation Notes and Discussion****Precision and Accuracy:**

EQ2200219: Laboratory Control Spike/Duplicate Laboratory Control Spike (LCS/DLCS) samples were analyzed and reported in lieu of a MS/MSD for this extraction batch. LCS/DLCS recoveries met acceptance criteria.

DoD Certification is held for the method/matrix/analytes provided in this report.

*The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.*

*Use of ALS group USA Corp dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.*

**Client:** ALS Environmental - US  
**Project:** HS22051211

**Service Request:**E2200484

**SAMPLE CROSS-REFERENCE**

<u>SAMPLE #</u>	<u>CLIENT SAMPLE ID</u>	<u>DATE</u>	<u>TIME</u>
E2200484-001	LH18/24-SP650_052422_AIX	5/24/2022	1400

**Service Request Summary**

**Folder #:** E2200484  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22051211  
**Project Number:**  
**Report To:** Dane Wacasey  
 ALS Group USA, Corp.  
 10450 Stancliff Road  
 Houston, TX 77099-4338  
 USA  
**Phone Number:** 281-575-2190  
**Cell Number:**  
**Fax Number:** 281-530-5887  
**E-mail:** dane.wacasey@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 05/26/22  
**Internal Due Date:** 6/10/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22051211  
**EDD:** No EDD Specified

1 120 mL-Plastic Bottle Natural WM Unpreserved

**Location:** EHRMS-AirArch 1

**Pressure Gas:**

Lab Samp No.	Client Samp No	Matrix	Collected	HOUSTON C104 DOD/6850
E2200484-001	LH18/24-SP650_052422_AIX	Water	05/24/22 1400	IV

**Service Request Summary**

**Folder #:** E2200484  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22051211  
**Project Number:**  
  
**Report To:** Dane Wacasey  
 ALS Group USA, Corp.  
 10450 Stancliff Road  
 Houston, TX 77099-4338  
 USA  
**Phone Number:** 281-575-2190  
**Cell Number:**  
**Fax Number:** 281-530-5887  
**E-mail:** dane.wacasey@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 05/26/22  
**Internal Due Date:** 6/10/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22051211  
**EDD:** No EDD Specified

1 120 mL-Plastic Bottle Natural WM Unpreserved

**Location:** EHRMS-AirArch 1

**Pressure Gas:**

**Test Comments:**

Group	Test/Method	Samples	Comments
Semivola GCMS	CIO4 DOD/6850	1	IV DUE 6/17

## Data Qualifiers

### Lab Standard

- + Possible Tedlar bag artifact.
- A TIC is a suspected aldol-condensation product
- B Analyte found in the associated method blank as well as in the sample.
- BC Reported results are not blank corrected.
- BH The back section of the tube yielded higher results than the front.
- BT Results indicated possible breakthrough; back section  $\geq 10\%$  front section.
- C Result identification confirmed.
- D Compound identified in an analysis at a secondary dilution factor
- D Spike was diluted out
- DE Reported results are corrected for desorption efficiency.
- E Estimated value. Concentration above calibration range
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- H1 Sample analysis performed past holding time. See case narrative.
- H2 Initial analysis within holding time. Reanalysis for the required dilution was past holding time.
- H3 Sample was received and analyzed past holding time.
- H4 Sample was extracted past required extraction holding time, but analyzed within analysis holding time. See case narrative.
- I Internal standard not within the specified limits. See case narrative.
- J Estimated Value. Concentration found below MRL.
- K (Auto) The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- K A deflection in the QC ion may indicate interference with the quantitation of this ion. The concentration of this analyte should be considered as an estimate.
- K Analyte was detected above the method reporting limit prior to normalization.
- K The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- L1 Laboratory control sample recovery outside the specified limits; results may be biased high.
- L2 Laboratory control sample recovery outside the specified limits; results may be biased low.
- L3 Laboratory control sample recovery outside the specified limits.
- M Matrix interference; results may be biased high.
- M The duplicate injection precision not met.
- M1 Matrix interference due to coelution with a non-target compound; results may be biased high.

## Data Qualifiers

### Lab Standard

- N Presumptive evidence of a compound for TICs that have been identified based on a mass spectral library search.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- P Indicates chlorodiphenyl ether interference present at the retention time of the target compound.
- P Pesticide/Aroclor target analyte > 40% difference for detected concentrations between GC columns
- Q Indicates as estimated value because the P and P + 2 theoretical abundance ratio does not meet method criteria.
- R Duplicate Precision not met.
- R1 Duplicate precision not within the specified limits; however, the results are below the MRL and considered estimated.
- S Surrogate recovery not within specified limits.
- S The reported value was determined by the Method of Standard Additions (MSA).
- T Analyte is a tentatively identified compound, result is estimated.
- U Compound was analyzed for, but was not detected (ND).
- V1 The continuing calibration verification standard was outside (biased high) the specified limits for this compound.
- V2 The continuing calibration verification standard was outside (biased low) the specified limits for this compound.
- W Result quantified, but the corresponding peak was detected outside the generated retention time window.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- X See case narrative.
- Y Recovery outside limits
- Y The chromatogram resembles a petroleum product but does not match the calibration standard.
- Z The chromatogram does not resemble a petroleum product.
- i The MRL/MDL has been elevated due to a matrix interference.



## ALS Laboratory Group

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### Acronyms

Cal	Calibration
Conc	CONCetration
Dioxin(s)	Polychlorinated dibenzo-p-dioxin(s)
EDL	Estimated Detection Limit
EMPC	Estimated Maximum Possible Concentration
Flags	Data qualifiers
Furan(s)	Polychlorinated dibenzofuran(s)
g	Grams
ICAL	Initial CALibration
ID	IDentifier
Ions	Masses monitored for the analyte during data acquisition
L	Liter (s)
LCS	Laboratory Control Sample
DLCS	Duplicate Laboratory Control Sample
MB	Method Blank
MCL	Method Calibration Limit
MDL	Method Detection Limit
mL	Milliliters
MS	Matrix Spiked sample
DMS	Duplicate Matrix Spiked sample
NO	Number of peaks meeting all identification criteria
PCDD(s)	Polychlorinated dibenzo-p-dioxin(s)
PCDF(s)	Polychlorinated dibenzofuran(s)
ppb	Parts per billion
ppm	Parts per million
ppq	Parts per quadrillion
ppt	Parts per trillion
QA	Quality Assurance
QC	Quality Control
Ratio	Ratio of areas from monitored ions for an analyte
% Rec.	Percent recovery
RPD	Relative Percent Difference
RRF	Relative Response Factor
RT	Retention Time
SDG	Sample Delivery Group
S/N	Signal-to-noise ratio
TEF	Toxicity Equivalence Factor
TEQ	Toxicity Equivalence Quotient



### State Certifications, Accreditations, and Licenses

Agency	Number	Expire Date
Department of Defense	L22-90	3/31/2024
Florida Department of Health	E87611-34	6/30/2022
Hawaii Department of Health	2022	4/30/2023
Illinois Environmental Protection Agency	2000322022-9	5/9/2023
Kansas Department of Health and Environment	E-10352 2022	7/31/2022
Louisiana Department of Environmental Quality	03087-2021	6/30/2022
Louisiana Department of Health and Hospitals	LA028	12/31/2022
Maine Department of Health and Human Services	2020016	6/5/2022
Maryland Department of the Environment	343	6/30/2022
Michigan Department of Environmental Quality	9971-2022	4/30/2023
Minnesota Department of Health	2228443	12/31/2022
Nebraska Department of Health and Human Services	NE-OS-25-13	4/30/2023
Nevada Department of Conservation and Natural Resources	TX026932022-1	7/31/2022
New Hampshire Environmental Laboratory Accreditation Program	209422	4/24/2023
New Jersey Department of Environmental Protection	TX008	6/30/2022
New York Department of Health	11707	3/31/2023
Oklahoma Department of Environmental Quality	2021-080	8/31/2022
Oregon Environmental Laboratory Accreditation Program	TX200002	5/15/2023
Pennsylvania Department of Environmental Protection	68-03441-015	6/30/2022
Perry Johnson Laboratory Accreditation	L22-91	3/31/2024
Tennessee Department of Environment and Conservation	04016-2022	4/30/2023
Texas Commission on Environmental Quality	T104704231-22-29	4/30/2023
United States Department of Agriculture	P330-19-00299	10/10/2022
Utah Department of Health Environmental Laboratory Certification	TX026932021-12	7/31/2022
Washington Department of Health	C819-2022	11/14/2022



## Chain of Custody

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)



10450 Stancliff Rd, Ste 210  
Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887  
www.alsglobal.com

## Subcontract Chain of Custody

**SAMPLING STATE:** Colorado

**COC ID:** 18842

**SUBCONTRACT TO:**

ALS Environmental  
10450 Stancliff Road Suite 210  
Houston, TX 77084

**Phone:** +1 281 530 5656

**CUSTOMER  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Dane J. Wacasey  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Email:** Dane.Wacasey@alsglobal.com  
**Alternate  
Contact:** Jumoke M. Lawal  
**Email:** jumoke.lawal@alsglobal.com

**INVOICE  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Accounts Payable  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Reference:** HS22051211  
**TSR:** Sonia West

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS22051211-02	LH18/24-SP650_052422_AIX	Water	24 May 2022 14:00
SUB_Perch-6850			10 Jun 2022

**Comments:** Please analyze for the analysis listed above.  
Send report to the emails shown above.

**QC Level:** DOD IV (DoD Data Package)

Relinquished By: \_\_\_\_\_

Date/Time: \_\_\_\_\_

Received By: \_\_\_\_\_

Date/Time: 5/12/22 1414

Cooler ID(s): \_\_\_\_\_

Temperature(s): \_\_\_\_\_

RIGHT SOLUTIONS | RIGHT PARTNER

26 May 2022

Page 1 of 1



## Cooler Receipt Form

Project Chemist

CA

Client/Project

ACS-H

Thermometer ID

1211

Date/Time Received:

5-26-22

Initials:

PA

Date/Time Logged in:

5-26-22

Initials

CA

1. Method of delivery: ☐ US Mail ☐ Fed Ex ☐ UPS ☐ DHL ☒ <sup>AL</sup>Courier ☐ Client2. Samples received in: ☒ Cooler ☐ Box ☐ Envelope ☐ Other3. Were custody seals on coolers? ☐ Yes ☒ NoIf yes, how many  
and where?Were they intact? ☐ Yes ☐ No ☒ N/AWere they signed and dated? ☐ Yes ☐ No ☒ N/A4. Packing Material: ☐ Inserts ☒ Baggies ☐ Bubble Wrap ☐ Gel Packs ☒ Wet Ice ☐ Sleeves ☐ Other

5. Foreign or Regulated Soil?

☐ Yes ☐ No

Location of Sampling:

Cooler Tracking Number	COC ID	Date Opened	Time Opened	Opened By	Temp. °C	Temp Blank?
NA		5-26-22	1414	CA	2.5	<input checked="" type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>

6. Were custody papers properly filled out (ink, signed, dated, etc)? ☒ Yes ☐ No7. Did all bottles arrive in good condition (not broken, no signs of leakage)? ☒ Yes ☐ No8. Were all sample labels complete (i.e., sample ID, analysis, preservation, etc)? ☒ Yes ☐ No9. Were appropriate bottles/containers and volumes received for the requested tests? ☒ Yes ☐ No10. Did sample labels and tags agree with custody documents? ☒ Yes ☐ No

Notes, Discrepancies, &amp; Resolutions:

Service request Label:

HS-HRMSCoolerReceipt R1.0

ALS Environmental - Houston HRMS



10450 Stancliff Rd., Suite 210  
Houston, TX 77099  
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[www.alsglobal.com](http://www.alsglobal.com)

## SAMPLE ACCEPTANCE POLICY

This policy outlines the criteria samples must meet to be accepted by ALS Environmental – Houston HRMS.

### **Cooler Custody Seals (desirable, mandatory if specified in SAP):**

- ✓ Intact on outside of cooler, signed and dated

### **Chain-of-Custody (COC) documentation (mandatory):**

The following is required on each COC:

- ✓ Sample ID, the location, date and time of collection, collector's name, preservation type, sample type, and any other special remarks concerning the sample. The COC must be completed in ink.
- ✓ Signature and date of relinquishing party.

In the absence of a COC at sample receipt, the COC will be requested from the client.

### **Sample Integrity (mandatory):**

Samples are inspected upon arrival to ensure that sample integrity was not compromised during transfer to the laboratory.

- ✓ Sample containers must arrive in good condition (not broken or leaking).
- ✓ Samples must be labeled appropriately, including Sample IDs, and requested test using durable labels and indelible ink.
- ✓ The correct type of sample bottle must be used for the method requested.
- ✓ An appropriate sample volume, or weight, must be received.
- ✓ Sample IDs and number of containers must reconcile with the COC.
- ✓ Samples must be received within the method defined holding time.

### **Temperature Requirement (varies by sample matrix):**

- ✓ Aqueous and Non-aqueous samples must be shipped and stored cold, at 0 to 6°C.
- ✓ Tissue samples must be shipped and stored frozen, at -20 to -10°C.
- ✓ Air samples are shipped and stored cold, at 0 to 6°C
- ✓ The sample temperature must be recorded on the COC

All cooler inspections are documented on the Cooler Receipt Form (CRF). A separate CRF is completed for each service request. Any samples not meeting the above criteria are noted on the CRF and the Project Manager notified. The Project Manager must resolve any sample integrity issues with the client prior to proceeding with the analysis. Such resolutions are documented in writing and filed with the project folder. Data associated with samples received outside of this acceptance policy will be qualified on the case narrative of the final report.



# Preparation Information Benchsheets

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

# Preparation Information Benchsheet

**Prep Run#:** 400589  
**Team:** Semivoa GCMS/GRIVERA

**Prep WorkFlow:** GenExt28Day  
**Prep Method:** Method

**Status:** Prepped  
**Prep Date/Time:** 5/27/22 08:30

#	Lab Code	Client ID	B#	Method /Test	pH	Cl	Matrix	Amt. Ext.	Sample Description
1	E2200470-001	146-RS1731-190522	.01	6850/CIO4 DOD			Water	10mL	
2	E2200480-001	LH18/24-SP650_052422_AIX	.01	6850/CIO4 DOD			Water	10mL	
3	E2200480-002	LH18/24-SP650_052422_BIX	.01	6850/CIO4 DOD			Water	10mL	
4	E2200483-001	LH18/24-SP650_052422_AIX	.01	6850/CIO4 DOD			Water	10mL	
5	E2200484-001	LH18/24-SP650_052422_AIX	.01	6850/CIO4 DOD			Water	10mL	
6	EQ2200219-01	MB		6850/CIO4 DOD			Liquid	10mL	
7	EQ2200219-02	LCS		6850/CIO4 DOD			Liquid	10mL	
8	EQ2200219-03	DLCS		6850/CIO4 DOD			Liquid	10mL	
9	R2204439-003	2205130615 B650-EFF-1	.01	6850/CIO4			Water	10mL	
10	R2204439-007	2205130633 B650-INF-1	.01	6850/CIO4			Water	10mL	
11	R2204439-009	2205130835Y PL-7-480	.01	6850/CIO4			Water	10mL	
12	R2204582-011	2205170813 MPE-1	.01	6850/CIO4			Water	10mL	
13	R2204582-030	2205170851 MPE-8	.01	6850/CIO4			Water	10mL	
14	R2204582-035	2205170923 MPE-11	.01	6850/CIO4			Water	10mL	
15	R2204616-004	2205180841 MPE-10	.01	6850/CIO4			Water	10mL	
16	R2204616-011	2205181302A NASA 4	.01	6850/CIO4			Water	10mL	

## Spiking Solutions

Name: Perchlorate Intermediate Stock1		Inventory ID 222798		Logbook Ref: Perchlorate (1st Source)				Expires On: 10/29/2022	
EQ2200219-02	1.00µL	EQ2200219-02	1.00µL	EQ2200219-03	1.00µL	EQ2200219-03	1.00µL		

Name: Perchlorate Internal Standard 1ug/mL		Inventory ID 223118		Logbook Ref: Perchlorate Internal Standard				Expires On: 10/31/2022	
--	--	---------------------	--	--	--	--	--	------------------------	--

E2200470-001	100.00µL	E2200480-001	100.00µL	E2200480-002	100.00µL	E2200483-001	100.00µL	E2200484-001	100.00µL	EQ2200219-01	100.00µL
EQ2200219-01	100.00µL	EQ2200219-02	100.00µL	EQ2200219-02	100.00µL	EQ2200219-03	100.00µL	EQ2200219-03	100.00µL	R2204439-003	100.00µL
R2204439-007	100.00µL	R2204439-009	100.00µL	R2204582-011	100.00µL	R2204582-030	100.00µL	R2204582-035	100.00µL	R2204616-004	100.00µL
R2204616-011	100.00µL										

## Preparation Materials

Water HPLC Grade	02/16/2022 Water (221769)	6850 Amber Glass screw vial	2mL Screw Top Vial (221894)	537M Glass Culture Tubes	537M Glass Tubes (218064)
6850 0.45um syringe filters	6850 Syringe Filters (222410)	6850 Luer-Lok Syringes	Luer-Lok Syringes (221305)	6850 Pipette Tips 50-1000 uL	6850 Pipette Tips (221929)



# *Preparation Information Benchsheet*

**Prep Run#:** 400589  
**Team:** Semivoa GCMS/GRIVERA

**Prep WorkFlow:** GenExt28Day  
**Prep Method:** Method

**Status:** Prepped  
**Prep Date/Time:** 5/27/22 08:30

## Preparation Steps

Step: Preparation  
Started: 5/27/22 08:30  
Finished: 5/27/22 09:30  
By: GRIVERA  
Comments

Comments: \_\_\_\_\_

Reviewed By: GR Date: 5/27/22

## Chain of Custody

Relinquished By: _____	Date: _____	<u>Extracts Examined</u>
Received By: _____	Date: _____	Yes No



# Analytical Results

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22051211  
**Sample Matrix:** Water  
**Sample Name:** LH18/24-SP650\_052422\_AIX  
**Lab Code:** E2200484-001

**Service Request:** E2200484  
**Date Collected:** 5/24/22 1400  
**Date Received:** 5/26/22  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.232		0.200	0.100	0.0500	2	5/27/22	6/2/22 13:29	400589	766203	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22051211  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** EQ2200219-01

**Service Request:** E2200484  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	0.100	0.0500	0.0250	1	5/27/22	5/31/22 11:29	400589	765929	



## Accuracy & Precision

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS22051211  
**Sample Matrix:** Water

**Service Request:** E2200484  
**Date Analyzed:** 5/31/22

## Lab Control Sample Summary

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

**Units:** µg/L  
**Basis:** NA

**Extraction Lot:** 400589

Analyte Name	Lab Control Sample EQ2200219-02			Duplicate Lab Control Sample EQ2200219-03			% Rec Limits	RPD	RPD Limit
	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Perchlorate	0.119	0.100	119	0.117	0.100	117	84 - 119	2	15

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22051211  
**Sample Matrix:** Water  
**Sample Name:** Lab Control Sample  
**Lab Code:** EQ2200219-02

**Service Request:** E2200484  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.119		0.100	0.0500	0.0250	1	5/27/22	5/31/22 11:47	400589	765929	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22051211  
**Sample Matrix:** Water  
**Sample Name:** Duplicate Lab Control Sample  
**Lab Code:** EQ2200219-03

**Service Request:** E2200484  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.117		0.100	0.0500	0.0250	1	5/27/22	5/31/22 12:18	400589	765929	





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June 13, 2022

Marcia Olive  
Bhate Environmental Associates, Inc.  
445 Union Blvd Ste 129  
Lakewood, CO 80228

Work Order: **HS22060246**

Laboratory Results for: **Longhorn GW Treatment Plant**

Dear Marcia Olive,

ALS Environmental received 3 sample(s) on Jun 04, 2022 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: JUMOKE.LAWAL

Dane J. Wacasey

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**Work Order:** HS22060246

**SAMPLE SUMMARY**

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS22060246-01	LH18/24-SP650_060322	Water		03-Jun-2022 14:00	04-Jun-2022 08:50	<input type="checkbox"/>
HS22060246-02	LH18/24-SP650_060322_AIX	Water		03-Jun-2022 14:00	04-Jun-2022 08:50	<input type="checkbox"/>
HS22060246-03	LH18/24-SP650_060322_BIX	Water		03-Jun-2022 14:00	04-Jun-2022 08:50	<input type="checkbox"/>

ALS Houston, US

Date: 13-Jun-22

---

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**Work Order:** HS22060246

---

**CASE NARRATIVE**

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**Work Order Comments**

- The analysis for Perchlorate was subcontracted to ALS Houston High-Res Lab. Final report attached
- 

**WetChemistry by Method E415.1****Batch ID: R410300**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**WetChemistry by Method E350.3****Batch ID: R410136**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**WetChemistry by Method E365.3****Batch ID: R409998**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

## ALS Houston, US

Date: 13-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant  
 Sample ID: LH18/24-SP650\_060322  
 Collection Date: 03-Jun-2022 14:00

**ANALYTICAL REPORT**

WorkOrder:HS22060246  
 Lab ID:HS22060246-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>AMMONIA AS N BY E350.3(ISE)</b>		<b>Method:E350.3</b>						Analyst: MZD
Nitrogen, Ammonia (As N)	31	a	0.10	0.10	0.20	mg/L	1	07-Jun-2022 12:20
<b>ORTHO PHOSPHATE (PO4) AS P BY E365.3-1978</b>		<b>Method:E365.3</b>						Analyst: TH
Phosphorus, Total Orthophosphate (As P)	6.07	a	0.100	0.125	0.250	mg/L	10	04-Jun-2022 10:44
<b>TOTAL ORGANIC CARBON BY E415.1</b>		<b>Method:E415.1</b>						Analyst: SB
Organic Carbon, Total	9.66	a	0.500	1.00	1.00	mg/L	1	08-Jun-2022 19:51

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 13-Jun-22

Client: Bhate Environmental Associates, Inc.  
Project: Longhorn GW Treatment Plant  
Sample ID: LH18/24-SP650\_060322\_AIX  
Collection Date: 03-Jun-2022 14:00

**ANALYTICAL REPORT**

WorkOrder:HS22060246  
Lab ID:HS22060246-02  
Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>						Analyst: GR
Subcontract Analysis	See Attached		0	0		NA	1	07-Jun-2022 16:41

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 13-Jun-22

Client: Bhate Environmental Associates, Inc.  
Project: Longhorn GW Treatment Plant  
Sample ID: LH18/24-SP650\_060322\_BIX  
Collection Date: 03-Jun-2022 14:00

**ANALYTICAL REPORT**

WorkOrder:HS22060246  
Lab ID:HS22060246-03  
Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>						Analyst: GR
Subcontract Analysis	See Attached		0	0		NA	1	07-Jun-2022 16:41

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US

Date: 13-Jun-22

**Client:** Bhate Environmental Associates, Inc.**Project:** Longhorn GW Treatment Plant**WorkOrder:** HS22060246**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> R409998 ( 0 )		<b>Test Name :</b> ORTHO PHOSPHATE (PO4) AS P BY E365.3-1978			<b>Matrix:</b> Water	
HS22060246-01	LH18/24-SP650_060322	03 Jun 2022 14:00			04 Jun 2022 10:44	10
<b>Batch ID:</b> R410136 ( 0 )		<b>Test Name :</b> AMMONIA AS N BY E350.3(ISE)			<b>Matrix:</b> Water	
HS22060246-01	LH18/24-SP650_060322	03 Jun 2022 14:00			07 Jun 2022 12:20	1
<b>Batch ID:</b> R410153 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			<b>Matrix:</b> Water	
HS22060246-02	LH18/24-SP650_060322_AIX	03 Jun 2022 14:00			07 Jun 2022 16:41	1
HS22060246-03	LH18/24-SP650_060322_BIX	03 Jun 2022 14:00			07 Jun 2022 16:41	1
<b>Batch ID:</b> R410300 ( 0 )		<b>Test Name :</b> TOTAL ORGANIC CARBON BY E415.1			<b>Matrix:</b> Water	
HS22060246-01	LH18/24-SP650_060322	03 Jun 2022 14:00			08 Jun 2022 19:51	1

## ALS Houston, US

Date: 13-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS22060246

**QC BATCH REPORT**

Batch ID: R409998 ( 0 )		Instrument: UV-2450		Method: ORTHO PHOSPHATE (PO4) AS P BY E365.3-1978					
<b>MBLK</b>	Sample ID: MBLK-R409998	Units: mg/L		Analysis Date: 04-Jun-2022 10:44					
Client ID:	Run ID: UV-2450_409998	SeqNo: 6678205		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.0125	0.0250							U
<b>LCS</b>	Sample ID: LCS-R409998	Units: mg/L		Analysis Date: 04-Jun-2022 10:44					
Client ID:	Run ID: UV-2450_409998	SeqNo: 6678204		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.259	0.0250	0.25	0	104	85 - 115			
<b>LCSD</b>	Sample ID: LCSD-R409998	Units: mg/L		Analysis Date: 04-Jun-2022 10:44					
Client ID:	Run ID: UV-2450_409998	SeqNo: 6678203		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.26	0.0250	0.25	0	104	85 - 115	0.259	0.385	20
<b>MS</b>	Sample ID: HS22060246-01MS	Units: mg/L		Analysis Date: 04-Jun-2022 10:44					
Client ID: LH18/24-SP650_060322	Run ID: UV-2450_409998	SeqNo: 6678207		PrepDate:		DF: 10			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	8.28	0.250	2.5	6.07	88.4	80 - 120			
<b>MSD</b>	Sample ID: HS22060246-01MSD	Units: mg/L		Analysis Date: 04-Jun-2022 10:44					
Client ID: LH18/24-SP650_060322	Run ID: UV-2450_409998	SeqNo: 6678206		PrepDate:		DF: 10			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	8.28	0.250	2.5	6.07	88.4	80 - 120	8.28	0	20

The following samples were analyzed in this batch: HS22060246-01



ALS Houston, US

Date: 13-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS22060246

**QC BATCH REPORT**

Batch ID: R410136 ( 0 )		Instrument: WetChem_HS		Method: AMMONIA AS N BY E350.3(ISE)						
<b>MBLK</b>	Sample ID: MBLK-R410136	Units: mg/L		Analysis Date: 07-Jun-2022 12:20						
Client ID:	Run ID: WetChem_HS_410136		SeqNo: 6681347		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	0.10	0.20								U
<b>LCS</b>	Sample ID: LCS-R410136	Units: mg/L		Analysis Date: 07-Jun-2022 12:20						
Client ID:	Run ID: WetChem_HS_410136		SeqNo: 6681346		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	9.45	0.20	10	0	94.5	80 - 120				
<b>MS</b>	Sample ID: HS22060246-01MS	Units: mg/L		Analysis Date: 07-Jun-2022 12:20						
Client ID: LH18/24-SP650_060322	Run ID: WetChem_HS_410136		SeqNo: 6681349		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	40.38	0.20	10	30.89	94.9	80 - 120				
<b>MSD</b>	Sample ID: HS22060246-01MSD	Units: mg/L		Analysis Date: 07-Jun-2022 12:20						
Client ID: LH18/24-SP650_060322	Run ID: WetChem_HS_410136		SeqNo: 6681348		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	40.38	0.20	10	30.89	94.9	80 - 120	40.38	0.00495	20	
The following samples were analyzed in this batch: HS22060246-01										

## ALS Houston, US

Date: 13-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS22060246

**QC BATCH REPORT**

Batch ID: R410300 ( 0 )		Instrument: TOC_04		Method: TOTAL ORGANIC CARBON BY E415.1						
<b>MBLK</b>	Sample ID: MBLK-06062022	Units: mg/L		Analysis Date: 08-Jun-2022 19:17						
Client ID:	Run ID: TOC_04_410300		SeqNo: 6685122		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	1.00	1.00								U
<b>LCS</b>	Sample ID: LCS-06062022	Units: mg/L		Analysis Date: 08-Jun-2022 19:28						
Client ID:	Run ID: TOC_04_410300		SeqNo: 6685123		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	10.36	1.00	10	0	104	85 - 115				
<b>LCSD</b>	Sample ID: LCSD-06062022	Units: mg/L		Analysis Date: 08-Jun-2022 19:39						
Client ID:	Run ID: TOC_04_410300		SeqNo: 6685124		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	10.37	1.00	10	0	104	85 - 115	10.36	0.0965	20	
<b>MS</b>	Sample ID: HS22060246-01MS	Units: mg/L		Analysis Date: 08-Jun-2022 20:02						
Client ID: LH18/24-SP650_060322	Run ID: TOC_04_410300		SeqNo: 6685126		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	20.38	1.00	10	9.656	107	80 - 120				
The following samples were analyzed in this batch: HS22060246-01										

**ALS Houston, US**

Date: 13-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS22060246

**QUALIFIERS,  
ACRONYMS, UNITS**

<b>Qualifier</b>	<b>Description</b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

<b>Acronym</b>	<b>Description</b>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

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**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

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Agency	Number	Expire Date
Dept of Defense	L21-682	31-Dec-2023
Florida	E87611-34	30-Jun-2022
Illinois	2000322022-9	09-May-2023
Kansas	E-10352 2021-2022	31-Jul-2022
Louisiana	03087, 2021-2022	30-Jun-2022
Maryland	343, 2021-2022	30-Jun-2022
North Carolina	624-2022	31-Dec-2022
Oklahoma	2021-080	31-Aug-2022
Texas	T104704231-22-29	30-Apr-2023
Utah	TX026932021-12	30-Jul-2022

ALS Houston, US

Date: 13-Jun-22

## Sample Receipt Checklist

Work Order ID: HS22060246

Date/Time Received: 04-Jun-2022 08:50

Client Name: Bhate Environmental

Received by: Corey Grandits

Completed By: <u>/S/ Niles D. Ranchod</u>	04-Jun-2022 09:57	Reviewed by: <u>/S/ Ragen Giga</u>	07-Jun-2022 10:17
eSignature	Date/Time	eSignature	Date/Time

Matrices: WCarrier name: FedEx

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	1 Page(s)
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samplers name present on COC?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	

Temperature(s)/Thermometer(s):

2.4uc/2.9c IR31

Cooler(s)/Kit(s):

48832

Date/Time sample(s) sent to storage:

6/4/2022

Water - VOA vials have zero headspace?

Yes ☒ No ☐ No VOA vials submitted ☐

Water - pH acceptable upon receipt?

Yes ☒ No ☐ N/A ☐

pH adjusted?

Yes ☐ No ☒ N/A ☐

pH adjusted by:

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:


Corrective Action:

## CHAIN OF CUSTODY

Name Of Lab Shipping To: ALS 10450 Stancliff Rd. Suite 210 Houston, TX. 77099 (281) 530-5656 ATTN: Ragen Gigi

Page 1 of 1

Project: BHATE LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS						Project No.  NWO1312.0150.0 16.0001																	
Job: <b>GROUNDWATER TREATMENT PLANT WEEKLY SAMPLES</b>																							
Prepared By:						P.O. Number																	
Scott Beesinger																							
Field Sample I.D.		Sample Matrix		Date / Time		MS / MSD	No. OF CONTAINERS	AMMONIA-N	TOTAL ORGANIC CARBON	ORTHO-PHOSPHATE	PERCHLORATE							Remarks (Preservatives, etc.)	Lab I.D.#				
LH18/24-SP650_060322		Water		06/03/22 / 14:00			3	X	X									H2SO4					
LH18/24-SP650_060322		Water		06/03/22 / 14:00			1			X								NONE					
LH18/24-SP650_060322_AIX		Water		06/03/22 / 14:00			1				X							NONE					
LH18/24-SP650_060322_BIX		Water		06/03/22 / 14:00			1				X							NONE					
Additional Remarks: 24 HOUR TAT on PERCHLORATE. Standard TAT on all other parameters																							
Relinquished By:		Date		Time		Received By:		Date		Time		Relinquished By:		Date		Time		Received By:		Date		Time	
[Signature]		06/03/22		14:30								Corey C		6-7-22		0846							
For Lab Use Only																							
Received At Lab By:		Date		Time		Airbill No.		Opened By:		Date		Time		Temp of Container		Seal No.		Condition					
Remarks:																							
48832 IR31 2.4% CF=0.5																							

 <b>ALS</b> 10450 Stancliff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5656 Fax. +1 281 530 5887	<b>CL STUDY SEAL</b>		Seal Broken By:
	Date: 6/3/22	Time: 1430	24
	Name: Scott Beesinger		Date: 5/10/22
	Company: BHATG		



ORIGIN ID: SGRA (903) 930-6193  
 ATT: SCOTT BEESINGER  
 RPT:M  
 1203-B EAST GRAND AVE PMB202  
 MARSHALL, TX 75670  
 UNITED STATES US

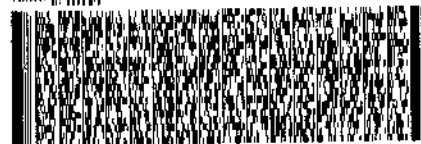
SHIP DATE: 26 JAN 22  
 ACTWGT: 1.00 LB MAN  
 CAD: 0221247/CAFE3508  
 DIMS: 14x11x10 IN

TO SHIPPING DEPT  
 ALS LABORATORY GROUP  
 10450 STANCLIFF RD  
 SUITE 210  
 HOUSTON TX 77099

(281) 530-5656

REF: LHAAP-4-80 83271-AG

RMA: 111111



FedEx  
 Express



5227 3851

PRIORITY OVERNIGHT

X0 SGRA

77099

TX-US  
 IAH



4738674 83Jun2022 GGCA 56XG2/2747/C098



June 07, 2022

Service Request No:E2200506

Dane Wacasey  
ALS Group USA, Corp.  
10450 Stancliff Road  
Suite 210  
Houston, TX 77099-4338

**Laboratory Results for: HS22060246**

Dear Dane,

Enclosed are the results of the sample(s) submitted to our laboratory June 06, 2022  
For your reference, these analyses have been assigned our service request number **E2200506**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current TNI standards, where applicable, and except as noted in the laboratory case narrative provided. All results are intended to be considered in their entirety and ALS Environmental is not responsible for use of less than the complete final report. Results apply only to the items submitted to the laboratory, as received for analysis. In accordance with the current TNI Standard, a statement on the estimated uncertainty of measurement of any quantitative analysis will be supplied upon request.

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Corey Grandits  
Project Manager

ADDRESS 10450 Stancliff Rd., Suite 210, Houston, TX 77099  
PHONE +1 281 530 5656 | FAX +1 281 530 5887  
ALS Group USA, Corp.  
dba ALS Environmental





# Certificate of Analysis

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

**ALS Environmental**

**Client:** ALS-Houston  
**Project:** HS22060246  
**Sample Matrix:** W

**Service Request No.:** E2200506  
**Date Received:** 06/06/22

**CASE NARRATIVE**

All analyses were performed in adherence to the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II. When appropriate to the method, method blank results have been reported with each analytical test.

**Sample Receipt**

Two samples were received for analysis at ALS Environmental in Houston on 06/06/22.

The samples were received in good condition and are consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

**Data Validation Notes and Discussion****Precision and Accuracy:**

EQ2200232 Laboratory Control Spike/Duplicate Laboratory Control Spike (LCS/DLCS) samples were analyzed and reported in lieu of a MS/MSD for this extraction batch. The LCS-DLCS recoveries met acceptance criteria.

DoD Certification is held for the method/matrix/analytes provided in this report.

*The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.*

*Use of ALS group USA Corp dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.*

**Client:** ALS Environmental - US  
**Project:** HS22060246

**Service Request:**E2200506

**SAMPLE CROSS-REFERENCE**

<u>SAMPLE #</u>	<u>CLIENT SAMPLE ID</u>	<u>DATE</u>	<u>TIME</u>
E2200506-001	LH18/24-SP650_060322_AIX	6/3/2022	1400
E2200506-002	LH18/24-SP650_060322_BIX	6/3/2022	1400

**Service Request Summary**

**Folder #:** E2200506  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22060246  
**Project Number:**  
**Report To:** Dane Wacasey  
 ALS Group USA, Corp.  
 10450 Stancliff Road  
 Houston, TX 77099-4338  
 USA  
**Phone Number:** 281-575-2190  
**Cell Number:**  
**Fax Number:** 281-530-5887  
**E-mail:** dane.wacasey@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 06/06/22  
**Internal Due Date:** 6/7/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22060246  
**EDD:** BASIC\_WQC\_CASNo  
 \_LOD

2 120 mL-Plastic Bottle Natural WM Unpreserved

**Location:** EHRMS-AirArch 1

**Pressure Gas:**

**Rush**

				HOUSTON
Lab Samp No.	Client Samp No	Matrix	Collected	CIO4 DOD/6850
E2200506-001	LH18/24-SP650_060322_AIX	Water	06/03/22 1400	II
E2200506-002	LH18/24-SP650_060322_BIX	Water	06/03/22 1400	II

**Service Request Summary**

**Folder #:** E2200506  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22060246  
**Project Number:**  
  
**Report To:** Dane Wacasey  
ALS Group USA, Corp.  
10450 Stancliff Road  
Houston, TX 77099-4338  
USA  
**Phone Number:** 281-575-2190  
**Cell Number:**  
**Fax Number:** 281-530-5887  
**E-mail:** dane.wacasey@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 06/06/22  
**Internal Due Date:** 6/7/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22060246  
**EDD:** BASIC\_WQC\_CASNo  
\_LOD

2 120 mL-Plastic Bottle Natural WM Unpreserved  
**Location:** EHRMS-AirArch 1  
**Pressure Gas:**  
**Rush**

## Data Qualifiers

### Lab Standard

- + Possible Tedlar bag artifact.
- A TIC is a suspected aldol-condensation product
- B Analyte found in the associated method blank as well as in the sample.
- BC Reported results are not blank corrected.
- BH The back section of the tube yielded higher results than the front.
- BT Results indicated possible breakthrough; back section  $\geq 10\%$  front section.
- C Result identification confirmed.
- D Compound identified in an analysis at a secondary dilution factor
- D Spike was diluted out
- DE Reported results are corrected for desorption efficiency.
- E Estimated value. Concentration above calibration range
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- H1 Sample analysis performed past holding time. See case narrative.
- H2 Initial analysis within holding time. Reanalysis for the required dilution was past holding time.
- H3 Sample was received and analyzed past holding time.
- H4 Sample was extracted past required extraction holding time, but analyzed within analysis holding time. See case narrative.
- I Internal standard not within the specified limits. See case narrative.
- J Estimated Value. Concentration found below MRL.
- K (Auto) The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- K A deflection in the QC ion may indicate interference with the quantitation of this ion. The concentration of this analyte should be considered as an estimate.
- K Analyte was detected above the method reporting limit prior to normalization.
- K The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- L1 Laboratory control sample recovery outside the specified limits; results may be biased high.
- L2 Laboratory control sample recovery outside the specified limits; results may be biased low.
- L3 Laboratory control sample recovery outside the specified limits.
- M Matrix interference; results may be biased high.
- M The duplicate injection precision not met.
- M1 Matrix interference due to coelution with a non-target compound; results may be biased high.

## Data Qualifiers

### Lab Standard

- N Presumptive evidence of a compound for TICs that have been identified based on a mass spectral library search.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- P Indicates chlorodiphenyl ether interference present at the retention time of the target compound.
- P Pesticide/Aroclor target analyte > 40% difference for detected concentrations between GC columns
- Q Indicates as estimated value because the P and P + 2 theoretical abundance ratio does not meet method criteria.
- R Duplicate Precision not met.
- R1 Duplicate precision not within the specified limits; however, the results are below the MRL and considered estimated.
- S Surrogate recovery not within specified limits.
- S The reported value was determined by the Method of Standard Additions (MSA).
- T Analyte is a tentatively identified compound, result is estimated.
- U Compound was analyzed for, but was not detected (ND).
- V1 The continuing calibration verification standard was outside (biased high) the specified limits for this compound.
- V2 The continuing calibration verification standard was outside (biased low) the specified limits for this compound.
- W Result quantified, but the corresponding peak was detected outside the generated retention time window.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- X See case narrative.
- Y Recovery outside limits
- Y The chromatogram resembles a petroleum product but does not match the calibration standard.
- Z The chromatogram does not resemble a petroleum product.
- i The MRL/MDL has been elevated due to a matrix interference.

## ALS Laboratory Group

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### Acronyms

Cal	Calibration
Conc	CONCetration
Dioxin(s)	Polychlorinated dibenzo-p-dioxin(s)
EDL	Estimated Detection Limit
EMPC	Estimated Maximum Possible Concentration
Flags	Data qualifiers
Furan(s)	Polychlorinated dibenzofuran(s)
g	Grams
ICAL	Initial CALibration
ID	IDentifier
Ions	Masses monitored for the analyte during data acquisition
L	Liter (s)
LCS	Laboratory Control Sample
DLCS	Duplicate Laboratory Control Sample
MB	Method Blank
MCL	Method Calibration Limit
MDL	Method Detection Limit
mL	Milliliters
MS	Matrix Spiked sample
DMS	Duplicate Matrix Spiked sample
NO	Number of peaks meeting all identification criteria
PCDD(s)	Polychlorinated dibenzo-p-dioxin(s)
PCDF(s)	Polychlorinated dibenzofuran(s)
ppb	Parts per billion
ppm	Parts per million
ppq	Parts per quadrillion
ppt	Parts per trillion
QA	Quality Assurance
QC	Quality Control
Ratio	Ratio of areas from monitored ions for an analyte
% Rec.	Percent recovery
RPD	Relative Percent Difference
RRF	Relative Response Factor
RT	Retention Time
SDG	Sample Delivery Group
S/N	Signal-to-noise ratio
TEF	Toxicity Equivalence Factor
TEQ	Toxicity Equivalence Quotient





### State Certifications, Accreditations, and Licenses

Agency	Number	Expire Date
Arizona Department of Health Services	AZ0793	5/27/2023
Department of Defense	L22-90	3/31/2024
Florida Department of Health	E87611-34	6/30/2022
Hawaii Department of Health	2022	4/30/2023
Illinois Environmental Protection Agency	2000322022-9	5/9/2023
Kansas Department of Health and Environment	E-10352 2022	7/31/2022
Louisiana Department of Environmental Quality	03087-2021	6/30/2022
Louisiana Department of Health and Hospitals	LA028	12/31/2022
Maine Department of Health and Human Services	2022017	6/5/2024
Maryland Department of the Environment	343	6/30/2022
Michigan Department of Environmental Quality	9971-2022	4/30/2023
Minnesota Department of Health	2228443	12/31/2022
Nebraska Department of Health and Human Services	NE-OS-25-13	4/30/2023
Nevada Department of Conservation and Natural Resources	TX026932022-1	7/31/2022
New Hampshire Environmental Laboratory Accreditation Program	209422	4/24/2023
New Jersey Department of Environmental Protection	TX008	6/30/2022
New York Department of Health	11707	3/31/2023
Oklahoma Department of Environmental Quality	2021-080	8/31/2022
Oregon Environmental Laboratory Accreditation Program	TX200002	5/15/2023
Pennsylvania Department of Environmental Protection	68-03441-015	6/30/2022
Perry Johnson Laboratory Accreditation	L22-91	3/31/2024
Tennessee Department of Environment and Conservation	04016-2022	4/30/2023
Texas Commission on Environmental Quality	T104704231-22-29	4/30/2023
United States Department of Agriculture	P330-19-00299	10/10/2022
Utah Department of Health Environmental Laboratory Certification	TX026932021-12	7/31/2022
Washington Department of Health	C819-2022	11/14/2022



## Chain of Custody

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)



10450 Stancliff Rd, Ste 210  
Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887  
www.alsglobal.com

## Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 18890

**SUBCONTRACT TO:**

ALS Environmental  
10450 Stancliff Road Suite 210  
Houston, TX 77084

**Phone:** +1 281 530 5656

**CUSTOMER  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Dane J. Wacasey  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Email:** Dane.Wacasey@alsglobal.com  
**Alternate  
Contact:** Jumoke M. Lawal  
**Email:** jumoke.lawal@alsglobal.com

**INVOICE  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Accounts Payable  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Reference:** HS22060246  
**TSR:** Houston House Acct

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS22060246-02	LH18/24-SP650_060322_AIX	Water	03 Jun 2022 14:00
	6850-Perch. DOD Level II & Level IV	in separate pdf	07 Jun 2022
2. HS22060246-03	LH18/24-SP650_060322_BIX	Water	03 Jun 2022 14:00
	6850-Perch. DOD Level II & Level IV	in separate pdf	07 Jun 2022

**Comments:** Please analyze for the analysis listed above.  
Send report to the emails shown above.

**QC Level:** DOD IV (DoD Data Package)

Relinquished By: \_\_\_\_\_

Date/Time: \_\_\_\_\_

Received By: \_\_\_\_\_

Date/Time: \_\_\_\_\_

Cooler ID(s): \_\_\_\_\_

Temperature(s): \_\_\_\_\_

RIGHT SOLUTIONS | RIGHT PARTNER

04 Jun 2022



Environmental

## Cooler Receipt Form

Project Chemist

14

Client/Project

AL4-H

Thermometer ID

10241

Date/Time Received:

6-6-22

Initials:

14

Date/Time Logged in:

6-6-22

Initials

14

1. Method of delivery:

☐ US Mail☐ Fed Ex☐ UPS☐ DHL☒ AL4 Courier☐ Client

2. Samples received in:

☒ Cooler☐ Box☐ Envelope☐ Other

3. Were custody seals on coolers?

☐ Yes☒ No

If yes, how many and where?

Were they intact?

☐ Yes☐ No☒ N/A

Were they signed and dated?

☐ Yes☐ No☒ N/A

4. Packing Material:

☐ Inserts☒ Baggies☐ Bubble Wrap☐ Gel Packs☒ Wet Ice☐ Sleeves☐ Other

5. Foreign or Regulated Soil?

☐ Yes☐ No

Location of Sampling:

Cooler Tracking Number	COC ID	Date Opened	Time Opened	Opened By	Temp. °C	Temp Blank?
ND		6-6-22	1114	14	3.2°C	<input checked="" type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>

6. Were custody papers properly filled out (ink, signed, dated, etc)?

☒ Yes☐ No

7. Did all bottles arrive in good condition (not broken, no signs of leakage)?

☒ Yes☐ No

8. Were all sample labels complete (i.e., sample ID, analysis, preservation, etc)?

☒ Yes☐ No

9. Were appropriate bottles/containers and volumes received for the requested tests?

☒ Yes☐ No

10. Did sample labels and tags agree with custody documents?

☒ Yes☐ No

Notes, Discrepancies, &amp; Resolutions:

Service request Label:

HS-HRMSCoolerReceipt R1.0

ALS Environmental - Houston HRMS



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## SAMPLE ACCEPTANCE POLICY

This policy outlines the criteria samples must meet to be accepted by ALS Environmental – Houston HRMS.

### **Cooler Custody Seals (desirable, mandatory if specified in SAP):**

- ✓ Intact on outside of cooler, signed and dated

### **Chain-of-Custody (COC) documentation (mandatory):**

The following is required on each COC:

- ✓ Sample ID, the location, date and time of collection, collector's name, preservation type, sample type, and any other special remarks concerning the sample. The COC must be completed in ink.
- ✓ Signature and date of relinquishing party.

In the absence of a COC at sample receipt, the COC will be requested from the client.

### **Sample Integrity (mandatory):**

Samples are inspected upon arrival to ensure that sample integrity was not compromised during transfer to the laboratory.

- ✓ Sample containers must arrive in good condition (not broken or leaking).
- ✓ Samples must be labeled appropriately, including Sample IDs, and requested test using durable labels and indelible ink.
- ✓ The correct type of sample bottle must be used for the method requested.
- ✓ An appropriate sample volume, or weight, must be received.
- ✓ Sample IDs and number of containers must reconcile with the COC.
- ✓ Samples must be received within the method defined holding time.

### **Temperature Requirement (varies by sample matrix):**

- ✓ Aqueous and Non-aqueous samples must be shipped and stored cold, at 0 to 6°C.
- ✓ Tissue samples must be shipped and stored frozen, at -20 to -10°C.
- ✓ Air samples are shipped and stored cold, at 0 to 6°C
- ✓ The sample temperature must be recorded on the COC

All cooler inspections are documented on the Cooler Receipt Form (CRF). A separate CRF is completed for each service request. Any samples not meeting the above criteria are noted on the CRF and the Project Manager notified. The Project Manager must resolve any sample integrity issues with the client prior to proceeding with the analysis. Such resolutions are documented in writing and filed with the project folder. Data associated with samples received outside of this acceptance policy will be qualified on the case narrative of the final report



# Preparation Information Benchsheets

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

# Preparation Information Benchsheet

01123085

Prep Run#: 400930  
Team: Semivoa GCMS/GRIVERA

Prep WorkFlow: GenExt28Day  
Prep Method: Method

Status: Prepped  
Prep Date/Time: 6/6/22 13:13

#	Lab Code	Client ID	B#	Method /Test	pH	Cl	Matrix	Amt. Ext.	Sample Description
1	E2200506-001	LH18/24-SP650_060322_AIX	.01	6850/ClO4 DOD			Water	10mL	
2	E2200506-002	LH18/24-SP650_060322_BIX	.01	6850/ClO4 DOD			Water	10mL	
3	EQ2200232-01	MB		6850/ClO4 DOD			Liquid	10mL	
4	EQ2200232-02	LCS		6850/ClO4 DOD			Liquid	10mL	
5	EQ2200232-03	DLCS		6850/ClO4 DOD			Liquid	10mL	

## Spiking Solutions

Name:	Perchlorate Intermediate Stock I	Inventory ID	222798	Logbook Ref:	Perchlorate (1st Source)	Expires On:	10/29/2022
-------	----------------------------------	--------------	--------	--------------	--------------------------	-------------	------------

EQ2200232-02 1.00µL EQ2200232-03 1.00µL

Name:	Perchlorate Internal Standard 1ug/mL	Inventory ID	223118	Logbook Ref:	Perchlorate Internal Standard	Expires On:	10/31/2022
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E2200506-001 100.00µL E2200506-002 100.00µL EQ2200232-01 100.00µL EQ2200232-02 100.00µL EQ2200232-03 100.00µL

## Preparation Materials

Water HPLC Grade	02/16/2022 Water (221769)	6850 Amber Glass screw vial	2mL Screw Top Vial (221894)	537M Glass Culture Tubes	537M Glass Tubes (218064)
6850 0.45um syringe filters	6850 Syringe Filters (222410)	6850 Luer-Lok Syringes	Luer-Lok Syringes (221305)	6850 Pipette Tips 50-1000 uL	6850 Pipette Tips (221929)

## Preparation Steps

Step: Preparation  
Started: 6/6/22 13:13  
Finished: 6/6/22 14:02  
By: GRIVERA  
Comments

Comments: \_\_\_\_\_

Reviewed By: GR Date: 6/6/22

## Chain of Custody

Relinquished By:	Date:	Extracts Examined
Received By:	Date:	Yes No



# Analytical Results

**ALS Environmental - Houston HRMS**  
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[www.alsglobal.com](http://www.alsglobal.com)



## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22060246  
**Sample Matrix:** Water  
**Sample Name:** LH18/24-SP650\_060322\_AIX  
**Lab Code:** E2200506-001

**Service Request:** E2200506  
**Date Collected:** 6/ 3/22 1400  
**Date Received:** 6/ 6/22  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	34.9		0.500	0.250	0.125	5	6/ 6/22	6/7/22 13:46	400930	766704	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22060246  
**Sample Matrix:** Water  
**Sample Name:** LH18/24-SP650\_060322\_BIX  
**Lab Code:** E2200506-002

**Service Request:** E2200506  
**Date Collected:** 6/ 3/22 1400  
**Date Received:** 6/ 6/22  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	3.97		0.200	0.100	0.0500	2	6/ 6/22	6/7/22 13:54	400930	766704	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22060246  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** EQ2200232-01

**Service Request:** E2200506  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	0.100	0.0500	0.0250	1	6/ 6/22	6/7/22 10:26	400930	766704	



## Accuracy & Precision

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[www.alsglobal.com](http://www.alsglobal.com)

## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS22060246  
**Sample Matrix:** Water

**Service Request:** E2200506  
**Date Analyzed:** 6/ 7/22

**Lab Control Sample Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**Analytical Method:** 6850  
**Prep Method:** Method

**Units:** µg/L  
**Basis:** NA

**Extraction Lot:** 400930

Analyte Name	Lab Control Sample EQ2200232-02			Duplicate Lab Control Sample EQ2200232-03			% Rec Limits	RPD	RPD Limit
	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Perchlorate	0.115	0.100	115	0.119	0.100	119	84 - 119	3	15

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22060246  
**Sample Matrix:** Water  
**Sample Name:** Lab Control Sample  
**Lab Code:** EQ2200232-02

**Service Request:** E2200506  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.115		0.100	0.0500	0.0250	1	6/ 6/22	6/7/22 11:54	400930	766704	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22060246  
**Sample Matrix:** Water  
**Sample Name:** Duplicate Lab Control Sample  
**Lab Code:** EQ2200232-03

**Service Request:** E2200506  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.119		0.100	0.0500	0.0250	1	6/ 6/22	6/7/22 12:17	400930	766704	



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June 09, 2022

Marcia Olive  
Bhate Environmental Associates, Inc.  
445 Union Blvd Ste 129  
Lakewood, CO 80228

Work Order: **HS22060250**

Laboratory Results for: **Longhorn GW Treatment Plant Bi-Weekly Samples**

Dear Marcia Olive,

ALS Environmental received 2 sample(s) on Jun 04, 2022 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: JUMOKE.LAWAL

Dane J. Wacasey



ALS Houston, US

Date: 09-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**Work Order:** HS22060250

**SAMPLE SUMMARY**

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS22060250-01	LH18/24-SP650_060322	Water		03-Jun-2022 14:00	04-Jun-2022 08:50	<input type="checkbox"/>
HS22060250-02	Trip Blank	Water	CG-041822 -83	03-Jun-2022 14:00	04-Jun-2022 08:50	<input type="checkbox"/>

ALS Houston, US

Date: 09-Jun-22

---

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**Work Order:** HS22060250

---

**CASE NARRATIVE**

---

**GCMS Volatiles by Method SW8260****Batch ID: R410162****Sample ID: LH18/24-SP650\_060322(HS22060250-01MSD)**

- The RPD between the MS and MSD was outside of the control limit. Naphthalene

---

**WetChemistry by Method SW9056****Batch ID: R410213****Sample ID: LH18/24-SP650\_060322 (HS22060250-01MS)**

- The MS and/or MSD recovery was outside of the control limits; however, the result in the parent sample is greater than 4x the spike amount. (Chloride)
-

## ALS Houston, US

Date: 09-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Bi-Weekly Samples  
 Sample ID: LH18/24-SP650\_060322  
 Collection Date: 03-Jun-2022 14:00

## ANALYTICAL REPORT

WorkOrder:HS22060250  
 Lab ID:HS22060250-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD</b>		<b>Method:SW8260</b>						Analyst: PC
<b>8260C</b>								
1,1,1,2-Tetrachloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 19:01
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 19:01
1,1,2,2-Tetrachloroethane	1.0	U	0.50	1.0	1.0	ug/L	1	07-Jun-2022 19:01
1,1,2-Trichloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 19:01
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 19:01
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 19:01
1,1-Dichloropropene	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 19:01
1,2,3-Trichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	07-Jun-2022 19:01
1,2,3-Trichloropropane	1.0	U	0.50	1.0	1.0	ug/L	1	07-Jun-2022 19:01
1,2,4-Trichlorobenzene	1.0	U	0.50	1.0	1.0	ug/L	1	07-Jun-2022 19:01
1,2,4-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 19:01
1,2-Dibromo-3-chloropropane	1.0	U	0.20	1.0	1.0	ug/L	1	07-Jun-2022 19:01
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 19:01
1,2-Dichlorobenzene	1.0	U	0.50	1.0	1.0	ug/L	1	07-Jun-2022 19:01
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 19:01
1,2-Dichloropropane	1.0	U	0.50	1.0	1.0	ug/L	1	07-Jun-2022 19:01
1,3,5-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 19:01
1,3-Dichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	07-Jun-2022 19:01
1,3-Dichloropropane	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 19:01
1,4-Dichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	07-Jun-2022 19:01
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 19:01
2-Butanone	1.0	U	0.50	1.0	2.0	ug/L	1	07-Jun-2022 19:01
2-Chlorotoluene	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 19:01
2-Hexanone	2.0	U	1.0	2.0	2.0	ug/L	1	07-Jun-2022 19:01
4-Chlorotoluene	1.0	U	0.40	1.0	1.0	ug/L	1	07-Jun-2022 19:01
4-Isopropyltoluene	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 19:01
4-Methyl-2-pentanone	2.0	U	0.70	2.0	2.0	ug/L	1	07-Jun-2022 19:01
Acetone	2.0	U	0.40	2.0	2.0	ug/L	1	07-Jun-2022 19:01
Benzene	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 19:01
Bromobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	07-Jun-2022 19:01
Bromochloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 19:01
Bromodichloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 19:01
Bromoform	1.0	U	0.40	1.0	1.0	ug/L	1	07-Jun-2022 19:01
Bromomethane	1.0	U	0.40	1.0	1.0	ug/L	1	07-Jun-2022 19:01
Carbon disulfide	2.0	U	0.60	2.0	2.0	ug/L	1	07-Jun-2022 19:01
Carbon tetrachloride	1.0	U	0.50	1.0	1.0	ug/L	1	07-Jun-2022 19:01
Chlorobenzene	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 19:01
Chloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 19:01
Chloroform	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 19:01

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 09-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Bi-Weekly Samples  
 Sample ID: LH18/24-SP650\_060322  
 Collection Date: 03-Jun-2022 14:00

## ANALYTICAL REPORT

WorkOrder:HS22060250  
 Lab ID:HS22060250-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD 8260C</b>		<b>Method:SW8260</b>						Analyst: PC
Chloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 19:01
<b>cis-1,2-Dichloroethene</b>	<b>2.4</b>		<b>0.20</b>	<b>0.50</b>	<b>1.0</b>	<b>ug/L</b>	1	07-Jun-2022 19:01
cis-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 19:01
Dibromochloromethane	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 19:01
Dibromomethane	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 19:01
Dichlorodifluoromethane	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 19:01
Ethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 19:01
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	ug/L	1	07-Jun-2022 19:01
Isopropylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 19:01
m,p-Xylene	1.0	U	0.50	1.0	2.0	ug/L	1	07-Jun-2022 19:01
Methylene chloride	2.0	U	0.40	2.0	2.0	ug/L	1	07-Jun-2022 19:01
n-Butylbenzene	1.0	U	0.40	1.0	1.0	ug/L	1	07-Jun-2022 19:01
n-Propylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 19:01
Naphthalene	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 19:01
o-Xylene	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 19:01
sec-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 19:01
Styrene	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 19:01
tert-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 19:01
Tetrachloroethene	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 19:01
Toluene	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 19:01
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 19:01
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 19:01
Trichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 19:01
Trichlorofluoromethane	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 19:01
Vinyl chloride	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 19:01
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>93.3</i>			<b>0</b>	<i>81-118</i>	<b>%REC</b>	<i>1</i>	<i>07-Jun-2022 19:01</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>94.2</i>			<b>0</b>	<i>85-114</i>	<b>%REC</b>	<i>1</i>	<i>07-Jun-2022 19:01</i>
<i>Surr: Dibromofluoromethane</i>	<i>94.9</i>			<b>0</b>	<i>80-119</i>	<b>%REC</b>	<i>1</i>	<i>07-Jun-2022 19:01</i>
<i>Surr: Toluene-d8</i>	<i>101</i>			<b>0</b>	<i>89-112</i>	<b>%REC</b>	<i>1</i>	<i>07-Jun-2022 19:01</i>
<b>ANIONS BY SW9056A</b>		<b>Method:SW9056</b>						Analyst: TH
<b>Chloride</b>	<b>840</b>		<b>4.00</b>	<b>10.0</b>	<b>10.0</b>	<b>mg/L</b>	20	07-Jun-2022 13:30
<b>Sulfate</b>	<b>26.9</b>		<b>0.200</b>	<b>0.500</b>	<b>0.500</b>	<b>mg/L</b>	1	07-Jun-2022 13:14

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 09-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Bi-Weekly Samples  
 Sample ID: Trip Blank  
 Collection Date: 03-Jun-2022 14:00

## ANALYTICAL REPORT

WorkOrder:HS22060250  
 Lab ID:HS22060250-02  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD 8260C</b>			<b>Method:SW8260</b>					Analyst: PC
1,1,1,2-Tetrachloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 16:54
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 16:54
1,1,2,2-Tetrachloroethane	1.0	U	0.50	1.0	1.0	ug/L	1	07-Jun-2022 16:54
1,1,2-Trichloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 16:54
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 16:54
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 16:54
1,1-Dichloropropene	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 16:54
1,2,3-Trichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	07-Jun-2022 16:54
1,2,3-Trichloropropane	1.0	U	0.50	1.0	1.0	ug/L	1	07-Jun-2022 16:54
1,2,4-Trichlorobenzene	1.0	U	0.50	1.0	1.0	ug/L	1	07-Jun-2022 16:54
1,2,4-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 16:54
1,2-Dibromo-3-chloropropane	1.0	U	0.20	1.0	1.0	ug/L	1	07-Jun-2022 16:54
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 16:54
1,2-Dichlorobenzene	1.0	U	0.50	1.0	1.0	ug/L	1	07-Jun-2022 16:54
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 16:54
1,2-Dichloropropane	1.0	U	0.50	1.0	1.0	ug/L	1	07-Jun-2022 16:54
1,3,5-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 16:54
1,3-Dichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	07-Jun-2022 16:54
1,3-Dichloropropane	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 16:54
1,4-Dichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	07-Jun-2022 16:54
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 16:54
2-Butanone	1.0	U	0.50	1.0	2.0	ug/L	1	07-Jun-2022 16:54
2-Chlorotoluene	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 16:54
2-Hexanone	2.0	U	1.0	2.0	2.0	ug/L	1	07-Jun-2022 16:54
4-Chlorotoluene	1.0	U	0.40	1.0	1.0	ug/L	1	07-Jun-2022 16:54
4-Isopropyltoluene	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 16:54
4-Methyl-2-pentanone	2.0	U	0.70	2.0	2.0	ug/L	1	07-Jun-2022 16:54
Acetone	2.0	U	0.40	2.0	2.0	ug/L	1	07-Jun-2022 16:54
Benzene	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 16:54
Bromobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	07-Jun-2022 16:54
Bromochloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 16:54
Bromodichloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 16:54
Bromoform	1.0	U	0.40	1.0	1.0	ug/L	1	07-Jun-2022 16:54
Bromomethane	1.0	U	0.40	1.0	1.0	ug/L	1	07-Jun-2022 16:54
Carbon disulfide	2.0	U	0.60	2.0	2.0	ug/L	1	07-Jun-2022 16:54
Carbon tetrachloride	1.0	U	0.50	1.0	1.0	ug/L	1	07-Jun-2022 16:54
Chlorobenzene	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 16:54
Chloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 16:54
Chloroform	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 16:54

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 09-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Bi-Weekly Samples  
 Sample ID: Trip Blank  
 Collection Date: 03-Jun-2022 14:00

## ANALYTICAL REPORT

WorkOrder:HS22060250  
 Lab ID:HS22060250-02  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD</b>		<b>Method:SW8260</b>						Analyst: PC
<b>8260C</b>								
Chloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 16:54
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 16:54
cis-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 16:54
Dibromochloromethane	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 16:54
Dibromomethane	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 16:54
Dichlorodifluoromethane	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 16:54
Ethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 16:54
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	ug/L	1	07-Jun-2022 16:54
Isopropylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 16:54
m,p-Xylene	1.0	U	0.50	1.0	2.0	ug/L	1	07-Jun-2022 16:54
Methylene chloride	2.0	U	0.40	2.0	2.0	ug/L	1	07-Jun-2022 16:54
n-Butylbenzene	1.0	U	0.40	1.0	1.0	ug/L	1	07-Jun-2022 16:54
n-Propylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 16:54
Naphthalene	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 16:54
o-Xylene	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 16:54
sec-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 16:54
Styrene	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 16:54
tert-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 16:54
Tetrachloroethene	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 16:54
Toluene	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 16:54
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 16:54
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 16:54
Trichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 16:54
Trichlorofluoromethane	1.0	U	0.30	1.0	1.0	ug/L	1	07-Jun-2022 16:54
Vinyl chloride	0.50	U	0.20	0.50	1.0	ug/L	1	07-Jun-2022 16:54
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>91.1</i>			<b>0</b>	<i>81-118</i>	<b>%REC</b>	<i>1</i>	<i>07-Jun-2022 16:54</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>92.9</i>			<b>0</b>	<i>85-114</i>	<b>%REC</b>	<i>1</i>	<i>07-Jun-2022 16:54</i>
<i>Surr: Dibromofluoromethane</i>	<i>92.0</i>			<b>0</b>	<i>80-119</i>	<b>%REC</b>	<i>1</i>	<i>07-Jun-2022 16:54</i>
<i>Surr: Toluene-d8</i>	<i>102</i>			<b>0</b>	<i>89-112</i>	<b>%REC</b>	<i>1</i>	<i>07-Jun-2022 16:54</i>

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US

Date: 09-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22060250

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> R410162 ( 0 )		<b>Test Name :</b> VOLATILES ORGANICS BY METHOD 8260C			<b>Matrix:</b> Water	
HS22060250-01	LH18/24-SP650_060322	03 Jun 2022 14:00			07 Jun 2022 19:01	1
HS22060250-02	Trip Blank	03 Jun 2022 14:00			07 Jun 2022 16:54	1
<b>Batch ID:</b> R410213 ( 0 )		<b>Test Name :</b> ANIONS BY SW9056A			<b>Matrix:</b> Water	
HS22060250-01	LH18/24-SP650_060322	03 Jun 2022 14:00			07 Jun 2022 13:30	20
HS22060250-01	LH18/24-SP650_060322	03 Jun 2022 14:00			07 Jun 2022 13:14	1

## ALS Houston, US

Date: 09-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22060250

## QC BATCH REPORT

Batch ID: R410162 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
<b>MBLK</b>	Sample ID: VBLKW-220607	Units: ug/L		Analysis Date: 07-Jun-2022 16:12					
Client ID:	Run ID: VOA6_410162	SeqNo: 6682008		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	1.0	1.0							U
1,1,1-Trichloroethane	0.50	1.0							U
1,1,2,2-Tetrachloroethane	1.0	1.0							U
1,1,2-Trichloroethane	1.0	1.0							U
1,1-Dichloroethane	0.50	1.0							U
1,1-Dichloroethene	0.50	1.0							U
1,1-Dichloropropene	1.0	1.0							U
1,2,3-Trichlorobenzene	1.0	1.0							U
1,2,3-Trichloropropane	1.0	1.0							U
1,2,4-Trichlorobenzene	1.0	1.0							U
1,2,4-Trimethylbenzene	1.0	1.0							U
1,2-Dibromo-3-chloropropane	1.0	1.0							U
1,2-Dibromoethane	0.50	1.0							U
1,2-Dichlorobenzene	1.0	1.0							U
1,2-Dichloroethane	0.50	1.0							U
1,2-Dichloropropane	1.0	1.0							U
1,3,5-Trimethylbenzene	1.0	1.0							U
1,3-Dichlorobenzene	1.0	1.0							U
1,3-Dichloropropane	1.0	1.0							U
1,4-Dichlorobenzene	1.0	1.0							U
2,2-Dichloropropane	0.50	1.0							U
2-Butanone	1.0	2.0							U
2-Chlorotoluene	1.0	1.0							U
2-Hexanone	2.0	2.0							U
4-Chlorotoluene	1.0	1.0							U
4-Isopropyltoluene	1.0	1.0							U
4-Methyl-2-pentanone	2.0	2.0							U
Acetone	2.0	2.0							U
Benzene	0.50	1.0							U
Bromobenzene	1.0	1.0							U
Bromochloromethane	0.50	1.0							U
Bromodichloromethane	0.50	1.0							U
Bromoform	1.0	1.0							U
Bromomethane	1.0	1.0							U



## ALS Houston, US

Date: 09-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22060250

## QC BATCH REPORT

Batch ID: R410162 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
<b>MBLK</b>	Sample ID: VBLKW-220607	Units: ug/L		Analysis Date: 07-Jun-2022 16:12					
Client ID:	Run ID: VOA6_410162	SeqNo: 6682008		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	2.0	2.0							U
Carbon tetrachloride	1.0	1.0							U
Chlorobenzene	1.0	1.0							U
Chloroethane	1.0	1.0							U
Chloroform	0.50	1.0							U
Chloromethane	0.50	1.0							U
cis-1,2-Dichloroethene	0.50	1.0							U
cis-1,3-Dichloropropene	0.50	1.0							U
Dibromochloromethane	1.0	1.0							U
Dibromomethane	0.50	1.0							U
Dichlorodifluoromethane	1.0	1.0							U
Ethylbenzene	1.0	1.0							U
Hexachlorobutadiene	1.0	1.0							U
Isopropylbenzene	1.0	1.0							U
m,p-Xylene	1.0	2.0							U
Methylene chloride	2.0	2.0							U
Naphthalene	1.0	1.0							U
n-Butylbenzene	1.0	1.0							U
n-Propylbenzene	1.0	1.0							U
o-Xylene	1.0	1.0							U
sec-Butylbenzene	1.0	1.0							U
Styrene	1.0	1.0							U
tert-Butylbenzene	1.0	1.0							U
Tetrachloroethene	1.0	1.0							U
Toluene	0.50	1.0							U
trans-1,2-Dichloroethene	0.50	1.0							U
trans-1,3-Dichloropropene	0.50	1.0							U
Trichloroethene	0.50	1.0							U
Trichlorofluoromethane	1.0	1.0							U
Vinyl chloride	0.50	1.0							U
Surr: 1,2-Dichloroethane-d4	46.01	1.0	50	0	92.0	81 - 118			
Surr: 4-Bromofluorobenzene	46.18	1.0	50	0	92.4	85 - 114			
Surr: Dibromofluoromethane	46.78	1.0	50	0	93.6	80 - 119			
Surr: Toluene-d8	50.59	1.0	50	0	101	89 - 112			

## ALS Houston, US

Date: 09-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22060250

## QC BATCH REPORT

Batch ID: R410162 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
LCS		Sample ID: VLCSW-220607		Units: ug/L		Analysis Date: 07-Jun-2022 15:09				
Client ID:		Run ID: VOA6_410162		SeqNo: 6682007		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	19.18	1.0	20	0	95.9	78 - 124				
1,1,1-Trichloroethane	18.11	1.0	20	0	90.6	74 - 131				
1,1,2,2-Tetrachloroethane	18.78	1.0	20	0	93.9	71 - 121				
1,1,2-Trichloroethane	18.59	1.0	20	0	92.9	80 - 119				
1,1-Dichloroethane	18.73	1.0	20	0	93.7	77 - 125				
1,1-Dichloroethene	17.57	1.0	20	0	87.9	71 - 131				
1,1-Dichloropropene	18.37	1.0	20	0	91.8	78 - 125				
1,2,3-Trichlorobenzene	19.1	1.0	20	0	95.5	69 - 129				
1,2,3-Trichloropropane	18.48	1.0	20	0	92.4	73 - 122				
1,2,4-Trichlorobenzene	18.37	1.0	20	0	91.9	69 - 130				
1,2,4-Trimethylbenzene	18.54	1.0	20	0	92.7	76 - 124				
1,2-Dibromo-3-chloropropane	16.64	1.0	20	0	83.2	62 - 128				
1,2-Dibromoethane	18.88	1.0	20	0	94.4	77 - 121				
1,2-Dichlorobenzene	18.77	1.0	20	0	93.9	80 - 119				
1,2-Dichloroethane	18.62	1.0	20	0	93.1	73 - 128				
1,2-Dichloropropane	19.69	1.0	20	0	98.4	78 - 122				
1,3,5-Trimethylbenzene	18.26	1.0	20	0	91.3	75 - 124				
1,3-Dichlorobenzene	18.87	1.0	20	0	94.4	80 - 119				
1,3-Dichloropropane	19.05	1.0	20	0	95.3	80 - 119				
1,4-Dichlorobenzene	18.85	1.0	20	0	94.2	79 - 118				
2,2-Dichloropropane	18.99	1.0	20	0	94.9	60 - 139				
2-Butanone	34.82	2.0	40	0	87.1	56 - 143				
2-Chlorotoluene	18.51	1.0	20	0	92.6	79 - 122				
2-Hexanone	37.93	2.0	40	0	94.8	57 - 139				
4-Chlorotoluene	18.98	1.0	20	0	94.9	78 - 122				
4-Isopropyltoluene	18.24	1.0	20	0	91.2	77 - 127				
4-Methyl-2-pentanone	35.97	2.0	40	0	89.9	67 - 130				
Acetone	40.18	2.0	40	0	100	39 - 160				
Benzene	19.45	1.0	20	0	97.2	79 - 120				
Bromobenzene	19.84	1.0	20	0	99.2	80 - 120				
Bromochloromethane	19.29	1.0	20	0	96.4	78 - 123				
Bromodichloromethane	18.68	1.0	20	0	93.4	79 - 125				
Bromoform	18.8	1.0	20	0	94.0	66 - 130				
Bromomethane	17.13	1.0	20	0	85.7	53 - 141				

## ALS Houston, US

Date: 09-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22060250

## QC BATCH REPORT

Batch ID: R410162 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
LCS		Sample ID: VLCSW-220607		Units: ug/L		Analysis Date: 07-Jun-2022 15:09			
Client ID:		Run ID: VOA6_410162		SeqNo: 6682007		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	36.93	2.0	40	0	92.3	64 - 133			
Carbon tetrachloride	17.06	1.0	20	0	85.3	72 - 136			
Chlorobenzene	19.33	1.0	20	0	96.7	82 - 118			
Chloroethane	17.95	1.0	20	0	89.8	60 - 138			
Chloroform	18.64	1.0	20	0	93.2	79 - 124			
Chloromethane	19.46	1.0	20	0	97.3	50 - 139			
cis-1,2-Dichloroethene	19.68	1.0	20	0	98.4	78 - 123			
cis-1,3-Dichloropropene	19.32	1.0	20	0	96.6	75 - 124			
Dibromochloromethane	19.15	1.0	20	0	95.7	74 - 126			
Dibromomethane	18.89	1.0	20	0	94.4	79 - 123			
Dichlorodifluoromethane	17.73	1.0	20	0	88.6	32 - 152			
Ethylbenzene	18.79	1.0	20	0	93.9	79 - 121			
Hexachlorobutadiene	18.63	1.0	20	0	93.2	66 - 134			
Isopropylbenzene	17.21	1.0	20	0	86.0	72 - 131			
m,p-Xylene	37.77	2.0	40	0	94.4	80 - 121			
Methylene chloride	17.78	2.0	20	0	88.9	74 - 124			
Naphthalene	17.62	1.0	20	0	88.1	61 - 128			
n-Butylbenzene	17.51	1.0	20	0	87.5	75 - 128			
n-Propylbenzene	18.43	1.0	20	0	92.2	76 - 126			
o-Xylene	19.12	1.0	20	0	95.6	78 - 122			
sec-Butylbenzene	17.62	1.0	20	0	88.1	77 - 126			
Styrene	19.4	1.0	20	0	97.0	78 - 123			
tert-Butylbenzene	17.9	1.0	20	0	89.5	78 - 124			
Tetrachloroethene	18.39	1.0	20	0	91.9	74 - 129			
Toluene	19.32	1.0	20	0	96.6	80 - 121			
trans-1,2-Dichloroethene	19.01	1.0	20	0	95.0	75 - 124			
trans-1,3-Dichloropropene	18.81	1.0	20	0	94.0	73 - 127			
Trichloroethene	19.35	1.0	20	0	96.8	79 - 123			
Trichlorofluoromethane	16.79	1.0	20	0	83.9	65 - 141			
Vinyl chloride	17.4	1.0	20	0	87.0	58 - 137			
Surr: 1,2-Dichloroethane-d4	49.21	1.0	50	0	98.4	81 - 118			
Surr: 4-Bromofluorobenzene	49.01	1.0	50	0	98.0	85 - 114			
Surr: Dibromofluoromethane	48.4	1.0	50	0	96.8	80 - 119			
Surr: Toluene-d8	48.14	1.0	50	0	96.3	89 - 112			

## ALS Houston, US

Date: 09-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22060250

## QC BATCH REPORT

Batch ID: R410162 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MS		Sample ID: HS22060250-01MS		Units: ug/L		Analysis Date: 07-Jun-2022 19:22			
Client ID: LH18/24-SP650_060322		Run ID: VOA6_410162		SeqNo: 6682017		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	20.13	1.0	20	0	101	78 - 124			
1,1,1-Trichloroethane	19.34	1.0	20	0	96.7	74 - 131			
1,1,2,2-Tetrachloroethane	20.28	1.0	20	0	101	71 - 121			
1,1,2-Trichloroethane	19.28	1.0	20	0	96.4	80 - 119			
1,1-Dichloroethane	19.28	1.0	20	0	96.4	77 - 125			
1,1-Dichloroethene	18.64	1.0	20	0	93.2	71 - 131			
1,1-Dichloropropene	20.22	1.0	20	0	101	78 - 125			
1,2,3-Trichlorobenzene	16.83	1.0	20	0	84.1	69 - 129			
1,2,3-Trichloropropane	18.06	1.0	20	0	90.3	73 - 122			
1,2,4-Trichlorobenzene	18.22	1.0	20	0	91.1	69 - 130			
1,2,4-Trimethylbenzene	20.77	1.0	20	0	104	76 - 124			
1,2-Dibromo-3-chloropropane	15.48	1.0	20	0	77.4	62 - 128			
1,2-Dibromoethane	19.65	1.0	20	0	98.2	77 - 121			
1,2-Dichlorobenzene	20.52	1.0	20	0	103	80 - 119			
1,2-Dichloroethane	20.08	1.0	20	0	100	73 - 128			
1,2-Dichloropropane	20	1.0	20	0	100.0	78 - 122			
1,3,5-Trimethylbenzene	21.02	1.0	20	0	105	75 - 124			
1,3-Dichlorobenzene	20.52	1.0	20	0	103	80 - 119			
1,3-Dichloropropane	19.96	1.0	20	0	99.8	80 - 119			
1,4-Dichlorobenzene	20.44	1.0	20	0	102	79 - 118			
2,2-Dichloropropane	19.22	1.0	20	0	96.1	60 - 139			
2-Butanone	31.37	2.0	40	0	78.4	56 - 143			
2-Chlorotoluene	20.5	1.0	20	0	103	79 - 122			
2-Hexanone	40.63	2.0	40	0	102	57 - 139			
4-Chlorotoluene	20.94	1.0	20	0	105	78 - 122			
4-Isopropyltoluene	21.53	1.0	20	0	108	77 - 127			
4-Methyl-2-pentanone	41.42	2.0	40	0	104	67 - 130			
Acetone	28.01	2.0	40	0	70.0	39 - 160			
Benzene	20.06	1.0	20	0	100	79 - 120			
Bromobenzene	20.86	1.0	20	0	104	80 - 120			
Bromochloromethane	18.64	1.0	20	0	93.2	78 - 123			
Bromodichloromethane	19.12	1.0	20	0	95.6	79 - 125			
Bromoform	18.86	1.0	20	0	94.3	66 - 130			
Bromomethane	13.12	1.0	20	0	65.6	53 - 141			

## ALS Houston, US

Date: 09-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22060250

## QC BATCH REPORT

Batch ID: R410162 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MS		Sample ID: HS22060250-01MS		Units: ug/L		Analysis Date: 07-Jun-2022 19:22			
Client ID: LH18/24-SP650_060322		Run ID: VOA6_410162		SeqNo: 6682017		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	38.07	2.0	40	0	95.2	64 - 133			
Carbon tetrachloride	19.77	1.0	20	0	98.9	72 - 136			
Chlorobenzene	20.51	1.0	20	0	103	82 - 118			
Chloroethane	15.49	1.0	20	0	77.5	60 - 138			
Chloroform	18.69	1.0	20	0	93.5	79 - 124			
Chloromethane	24.68	1.0	20	0	123	50 - 139			
cis-1,2-Dichloroethene	22.02	1.0	20	2.433	97.9	78 - 123			
cis-1,3-Dichloropropene	19.31	1.0	20	0	96.5	75 - 124			
Dibromochloromethane	19.62	1.0	20	0	98.1	74 - 126			
Dibromomethane	19.21	1.0	20	0	96.0	79 - 123			
Dichlorodifluoromethane	13.5	1.0	20	0	67.5	32 - 152			
Ethylbenzene	20.98	1.0	20	0	105	79 - 121			
Hexachlorobutadiene	19.6	1.0	20	0	98.0	66 - 134			
Isopropylbenzene	20.14	1.0	20	0	101	72 - 131			
m,p-Xylene	40.91	2.0	40	0	102	80 - 121			
Methylene chloride	17.4	2.0	20	0	87.0	74 - 124			
Naphthalene	14.75	1.0	20	0	73.7	61 - 128			
n-Butylbenzene	20.57	1.0	20	0	103	75 - 128			
n-Propylbenzene	21.5	1.0	20	0	108	76 - 126			
o-Xylene	20.72	1.0	20	0	104	78 - 122			
sec-Butylbenzene	21.02	1.0	20	0	105	77 - 126			
Styrene	20.47	1.0	20	0	102	78 - 123			
tert-Butylbenzene	21.62	1.0	20	0	108	78 - 124			
Tetrachloroethene	21.12	1.0	20	0	106	74 - 129			
Toluene	20.79	1.0	20	0	104	80 - 121			
trans-1,2-Dichloroethene	19.66	1.0	20	0	98.3	75 - 124			
trans-1,3-Dichloropropene	18.86	1.0	20	0	94.3	73 - 127			
Trichloroethene	20.12	1.0	20	0	101	79 - 123			
Trichlorofluoromethane	18.3	1.0	20	0	91.5	65 - 141			
Vinyl chloride	17.73	1.0	20	0	88.7	58 - 137			
Surr: 1,2-Dichloroethane-d4	45.87	1.0	50	0	91.7	81 - 118			
Surr: 4-Bromofluorobenzene	49.83	1.0	50	0	99.7	85 - 114			
Surr: Dibromofluoromethane	47.17	1.0	50	0	94.3	80 - 119			
Surr: Toluene-d8	49.32	1.0	50	0	98.6	89 - 112			

## ALS Houston, US

Date: 09-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22060250

## QC BATCH REPORT

Batch ID: R410162 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
<b>MSD</b>		Sample ID: HS22060250-01MSD		Units: ug/L		Analysis Date: 07-Jun-2022 19:43			
Client ID: LH18/24-SP650_060322		Run ID: VOA6_410162		SeqNo: 6682018		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	19.87	1.0	20	0	99.3	78 - 124	20.13	1.3	20
1,1,1-Trichloroethane	18.22	1.0	20	0	91.1	74 - 131	19.34	5.97	20
1,1,2,2-Tetrachloroethane	20.97	1.0	20	0	105	71 - 121	20.28	3.36	20
1,1,2-Trichloroethane	19.19	1.0	20	0	96.0	80 - 119	19.28	0.443	20
1,1-Dichloroethane	18.43	1.0	20	0	92.1	77 - 125	19.28	4.53	20
1,1-Dichloroethene	17.04	1.0	20	0	85.2	71 - 131	18.64	8.94	20
1,1-Dichloropropene	19.26	1.0	20	0	96.3	78 - 125	20.22	4.87	20
1,2,3-Trichlorobenzene	19.44	1.0	20	0	97.2	69 - 129	16.83	14.4	20
1,2,3-Trichloropropane	20.91	1.0	20	0	105	73 - 122	18.06	14.6	20
1,2,4-Trichlorobenzene	20.46	1.0	20	0	102	69 - 130	18.22	11.6	20
1,2,4-Trimethylbenzene	20.85	1.0	20	0	104	76 - 124	20.77	0.382	20
1,2-Dibromo-3-chloropropane	18.06	1.0	20	0	90.3	62 - 128	15.48	15.4	20
1,2-Dibromoethane	19.59	1.0	20	0	97.9	77 - 121	19.65	0.302	20
1,2-Dichlorobenzene	21.19	1.0	20	0	106	80 - 119	20.52	3.2	20
1,2-Dichloroethane	19.69	1.0	20	0	98.4	73 - 128	20.08	1.98	20
1,2-Dichloropropane	19.1	1.0	20	0	95.5	78 - 122	20	4.57	20
1,3,5-Trimethylbenzene	20.92	1.0	20	0	105	75 - 124	21.02	0.491	20
1,3-Dichlorobenzene	20.81	1.0	20	0	104	80 - 119	20.52	1.39	20
1,3-Dichloropropane	19.4	1.0	20	0	97.0	80 - 119	19.96	2.86	20
1,4-Dichlorobenzene	20.97	1.0	20	0	105	79 - 118	20.44	2.54	20
2,2-Dichloropropane	18.03	1.0	20	0	90.1	60 - 139	19.22	6.43	20
2-Butanone	31.19	2.0	40	0	78.0	56 - 143	31.37	0.595	20
2-Chlorotoluene	20.56	1.0	20	0	103	79 - 122	20.5	0.249	20
2-Hexanone	39.69	2.0	40	0	99.2	57 - 139	40.63	2.33	20
4-Chlorotoluene	20.82	1.0	20	0	104	78 - 122	20.94	0.559	20
4-Isopropyltoluene	21.26	1.0	20	0	106	77 - 127	21.53	1.28	20
4-Methyl-2-pentanone	40.61	2.0	40	0	102	67 - 130	41.42	1.98	20
Acetone	28.11	2.0	40	0	70.3	39 - 160	28.01	0.379	20
Benzene	19.2	1.0	20	0	96.0	79 - 120	20.06	4.36	20
Bromobenzene	21.36	1.0	20	0	107	80 - 120	20.86	2.36	20
Bromochloromethane	18.42	1.0	20	0	92.1	78 - 123	18.64	1.21	20
Bromodichloromethane	18.19	1.0	20	0	91.0	79 - 125	19.12	4.98	20
Bromoform	18.77	1.0	20	0	93.8	66 - 130	18.86	0.518	20
Bromomethane	12.02	1.0	20	0	60.1	53 - 141	13.12	8.76	20

## ALS Houston, US

Date: 09-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22060250

## QC BATCH REPORT

Batch ID: R410162 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MSD		Sample ID: HS22060250-01MSD		Units: ug/L		Analysis Date: 07-Jun-2022 19:43			
Client ID: LH18/24-SP650_060322		Run ID: VOA6_410162		SeqNo: 6682018		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	35.64	2.0	40	0	89.1	64 - 133	38.07	6.59	20
Carbon tetrachloride	18.84	1.0	20	0	94.2	72 - 136	19.77	4.81	20
Chlorobenzene	19.75	1.0	20	0	98.7	82 - 118	20.51	3.81	20
Chloroethane	14.34	1.0	20	0	71.7	60 - 138	15.49	7.72	20
Chloroform	18.05	1.0	20	0	90.3	79 - 124	18.69	3.49	20
Chloromethane	22.77	1.0	20	0	114	50 - 139	24.68	8.08	20
cis-1,2-Dichloroethene	21.26	1.0	20	2.433	94.1	78 - 123	22.02	3.52	20
cis-1,3-Dichloropropene	18.47	1.0	20	0	92.3	75 - 124	19.31	4.45	20
Dibromochloromethane	19.26	1.0	20	0	96.3	74 - 126	19.62	1.82	20
Dibromomethane	18.52	1.0	20	0	92.6	79 - 123	19.21	3.65	20
Dichlorodifluoromethane	12.37	1.0	20	0	61.9	32 - 152	13.5	8.76	20
Ethylbenzene	19.94	1.0	20	0	99.7	79 - 121	20.98	5.12	20
Hexachlorobutadiene	20.04	1.0	20	0	100	66 - 134	19.6	2.23	20
Isopropylbenzene	19.03	1.0	20	0	95.1	72 - 131	20.14	5.69	20
m,p-Xylene	39.35	2.0	40	0	98.4	80 - 121	40.91	3.9	20
Methylene chloride	16.64	2.0	20	0	83.2	74 - 124	17.4	4.47	20
Naphthalene	19.01	1.0	20	0	95.1	61 - 128	14.75	25.2	20 R
n-Butylbenzene	20.66	1.0	20	0	103	75 - 128	20.57	0.425	20
n-Propylbenzene	21.17	1.0	20	0	106	76 - 126	21.5	1.53	20
o-Xylene	19.73	1.0	20	0	98.7	78 - 122	20.72	4.88	20
sec-Butylbenzene	20.99	1.0	20	0	105	77 - 126	21.02	0.135	20
Styrene	19.7	1.0	20	0	98.5	78 - 123	20.47	3.85	20
tert-Butylbenzene	21.32	1.0	20	0	107	78 - 124	21.62	1.4	20
Tetrachloroethene	19.96	1.0	20	0	99.8	74 - 129	21.12	5.62	20
Toluene	19.9	1.0	20	0	99.5	80 - 121	20.79	4.38	20
trans-1,2-Dichloroethene	18.43	1.0	20	0	92.1	75 - 124	19.66	6.44	20
trans-1,3-Dichloropropene	18.36	1.0	20	0	91.8	73 - 127	18.86	2.67	20
Trichloroethene	19.21	1.0	20	0	96.1	79 - 123	20.12	4.64	20
Trichlorofluoromethane	17	1.0	20	0	85.0	65 - 141	18.3	7.35	20
Vinyl chloride	16.33	1.0	20	0	81.6	58 - 137	17.73	8.27	20
Surr: 1,2-Dichloroethane-d4	45.47	1.0	50	0	90.9	81 - 118	45.87	0.878	20
Surr: 4-Bromofluorobenzene	48.21	1.0	50	0	96.4	85 - 114	49.83	3.3	20
Surr: Dibromofluoromethane	46.73	1.0	50	0	93.5	80 - 119	47.17	0.931	20
Surr: Toluene-d8	50.13	1.0	50	0	100	89 - 112	49.32	1.62	20

ALS Houston, US

Date: 09-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22060250

**QC BATCH REPORT****Batch ID:** R410162 ( 0 )**Instrument:** VOA6**Method:** VOLATILES ORGANICS BY METHOD  
8260C

The following samples were analyzed in this batch:

HS22060250-01	HS22060250-02
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## ALS Houston, US

Date: 09-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22060250

**QC BATCH REPORT**

Batch ID: R410213 ( 0 )		Instrument: ICS-Integrion		Method: ANIONS BY SW9056A					
<b>MBLK</b>	Sample ID: MBLK	Units: mg/L		Analysis Date: 07-Jun-2022 13:03					
Client ID:	Run ID: ICS-Integrion_410213		SeqNo: 6683175		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Bromide	0.100	0.100							U
Chloride	0.500	0.500							U
Fluoride	0.100	0.100							U
Sulfate	0.500	0.500							U

<b>LCS</b>	Sample ID: LCS	Units: mg/L		Analysis Date: 07-Jun-2022 13:08					
Client ID:	Run ID: ICS-Integrion_410213		SeqNo: 6683176		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Bromide	3.777	0.100	4	0	94.4	80 - 120			
Chloride	19.72	0.500	20	0	98.6	80 - 120			
Fluoride	4.361	0.100	4	0	109	80 - 120			
Sulfate	19.56	0.500	20	0	97.8	80 - 120			

<b>MS</b>	Sample ID: HS22060250-01MS	Units: mg/L		Analysis Date: 07-Jun-2022 13:19					
Client ID: LH18/24-SP650_060322	Run ID: ICS-Integrion_410213		SeqNo: 6683178		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Bromide	3.101	0.100	2	1.199	95.1	80 - 120			
Chloride	752.2	0.500	10	781.9	-296	80 - 120			SEO
Fluoride	2.205	0.100	2	0.0377	108	80 - 120			
Sulfate	35.97	0.500	10	26.92	90.5	80 - 120			

<b>MSD</b>	Sample ID: HS22060250-01MSD	Units: mg/L		Analysis Date: 07-Jun-2022 13:24					
Client ID: LH18/24-SP650_060322	Run ID: ICS-Integrion_410213		SeqNo: 6683179		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Bromide	3.104	0.100	2	1.199	95.2	80 - 120	3.101	0.11	20
Chloride	750.8	0.500	10	781.9	-310	80 - 120	752.2	0.187	20 SEO
Fluoride	2.234	0.100	2	0.0377	110	80 - 120	2.205	1.3	20
Sulfate	35.92	0.500	10	26.92	90.0	80 - 120	35.97	0.132	20

The following samples were analyzed in this batch: HS22060250-01

**ALS Houston, US**

Date: 09-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22060250

**QUALIFIERS,  
ACRONYMS, UNITS**

<b>Qualifier</b>	<b>Description</b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

<b>Acronym</b>	<b>Description</b>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

<b>Unit Reported</b>	<b>Description</b>
mg/L	Milligrams per Liter

---

**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

---

Agency	Number	Expire Date
Dept of Defense	L21-682	31-Dec-2023
Florida	E87611-34	30-Jun-2022
Illinois	2000322022-9	09-May-2023
Kansas	E-10352 2021-2022	31-Jul-2022
Louisiana	03087, 2021-2022	30-Jun-2022
Maryland	343, 2021-2022	30-Jun-2022
North Carolina	624-2022	31-Dec-2022
Oklahoma	2021-080	31-Aug-2022
Texas	T104704231-22-29	30-Apr-2023
Utah	TX026932021-12	30-Jul-2022

ALS Houston, US

Date: 09-Jun-22

## Sample Receipt Checklist

Work Order ID: HS22060250

Date/Time Received: 04-Jun-2022 08:50

Client Name: Bhate Environmental

Received by: Corey Grandits

Completed By: /S/ Niles D. Ranchod

04-Jun-2022 10:19

Reviewed by: /S/ Dane J. Wacasey

09-Jun-2022 11:09

eSignature

Date/Time

eSignature

Date/Time

Matrices: WCarrier name: FedEx

Shipping container/cooler in good condition?

Yes ☒No ☐Not Present ☐

Custody seals intact on shipping container/cooler?

Yes ☒No ☐Not Present ☐

Custody seals intact on sample bottles?

Yes ☐No ☐Not Present ☒

VOA/TX1005/TX1006 Solids in hermetically sealed vials?

Yes ☐No ☐Not Present ☒

Chain of custody present?

Yes ☒No ☐

1 Page(s)

Chain of custody signed when relinquished and received?

Yes ☒No ☐

Samplers name present on COC?

Yes ☒No ☐

Chain of custody agrees with sample labels?

Yes ☒No ☐

Samples in proper container/bottle?

Yes ☒No ☐

Sample containers intact?

Yes ☒No ☐

Sufficient sample volume for indicated test?

Yes ☒No ☐

All samples received within holding time?

Yes ☒No ☐

Container/Temp Blank temperature in compliance?

Yes ☒No ☐

Temperature(s)/Thermometer(s):

2.4uc/2.9c

IR31

Cooler(s)/Kit(s):

48832

Date/Time sample(s) sent to storage:

6/4/22

Water - VOA vials have zero headspace?

Yes ☒No ☐No VOA vials submitted ☐

Water - pH acceptable upon receipt?

Yes ☒No ☐N/A ☐

pH adjusted?

Yes ☐No ☒N/A ☐

pH adjusted by:

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:


Corrective Action:

Name Of Lab Shipping To: ALS 10450 Stanchiff Rd. Suite 210, Houston, Tx. 77099 ATTN: Ragen Gigi

Page 1 of 1

## CHAIN OF CUSTODY

[illegible]

 <b>ALS</b> 10450 Stancliff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5556 Fax. +1 281 530 5887	<b>CLUSTODY SEAL</b>		Seal Broken By: <i>SM</i>
	Date: <i>03/22</i> Time: <i>1430</i> Name: <i>Scott Beesinger</i> Company: <i>BH4TC</i>	Date: <i>06/04/22</i>	

48832



48832

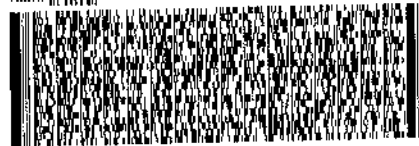
ORIGIN ID: SGRA (903) 930-6193  
 ATT: SCOTT BEESINGER  
 APTM  
 1203-D EAST GRAND AVE PMB202  
 MARSHALL, TX 75670  
 UNITED STATES US

SHIP DATE: 25 JAN 22  
 ACTWGT: 1.00 LB HAN  
 CAD: 0221247/CAFE3509  
 DIMS: 14x11x10 IN

TO SHIPPING DEPT  
 ALS LABORATORY GROUP  
 10450 STANCLIFF RD  
 SUITE 210  
 HOUSTON TX 77099

(281) 630-6556  
 REF: LHAAP-4-BO 83271-RG

RMA: ||| ||| |||

FedEx  
Express

FedEx 5227 3851

PRIORITY OVERNIGHT

X0 SGRA

77099  
 1X-US  
 IAH



4210674 03Jun2022 CCLA SPRG21774F FCB18



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10450 Stancliff Rd. Suite 210  
Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887

June 15, 2022

Marcia Olive  
Bhate Environmental Associates, Inc.  
445 Union Blvd Ste 129  
Lakewood, CO 80228

Work Order: **HS22060382**

Laboratory Results for: **Longhorn GW Treatment Plant Weekly Samples**

Dear Marcia Olive,

ALS Environmental received 3 sample(s) on Jun 08, 2022 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: JUMOKE.LAWAL

Dane J. Wacasey

ALS Houston, US

Date: 15-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**Work Order:** HS22060382

**SAMPLE SUMMARY**

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS22060382-01	LH18/24-SP650_060722	Water		07-Jun-2022 14:00	08-Jun-2022 10:00	<input type="checkbox"/>
HS22060382-02	LH18/24-SP650_060722_AIX	Water		07-Jun-2022 14:00	08-Jun-2022 10:00	<input type="checkbox"/>
HS22060382-03	LH18/24-SP650_060722_BIX	Water		07-Jun-2022 14:00	08-Jun-2022 10:00	<input type="checkbox"/>



**ALS Houston, US**

Date: 15-Jun-22

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**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**Work Order:** HS22060382

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**CASE NARRATIVE**

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**Work Order Comments**

- The analysis for Perchlorate was subcontracted to ALS Houston High-Res Lab. Final report attached
- 

**WetChemistry by Method E415.1****Batch ID: R410595**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**WetChemistry by Method E350.3****Batch ID: R410591**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**WetChemistry by Method E365.3****Batch ID: R410281**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

## ALS Houston, US

Date: 15-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Weekly Samples  
 Sample ID: LH18/24-SP650\_060722  
 Collection Date: 07-Jun-2022 14:00

**ANALYTICAL REPORT**

WorkOrder:HS22060382  
 Lab ID:HS22060382-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>AMMONIA AS N BY E350.3(ISE)</b>		<b>Method:E350.3</b>						Analyst: MZD
Nitrogen, Ammonia (As N)	23	a	0.10	0.10	0.20	mg/L	1	14-Jun-2022 11:45
<b>ORTHO PHOSPHATE (PO4) AS P BY E365.3-1978</b>		<b>Method:E365.3</b>						Analyst: MZD
Phosphorus, Total Orthophosphate (As P)	5.13	a	0.100	0.125	0.250	mg/L	10	09-Jun-2022 11:45
<b>TOTAL ORGANIC CARBON BY E415.1</b>		<b>Method:E415.1</b>						Analyst: SB
Organic Carbon, Total	7.30	a	0.500	1.00	1.00	mg/L	1	14-Jun-2022 04:57

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 15-Jun-22

Client: Bhate Environmental Associates, Inc.  
Project: Longhorn GW Treatment Plant Weekly Samples  
Sample ID: LH18/24-SP650\_060722\_AIX  
Collection Date: 07-Jun-2022 14:00

**ANALYTICAL REPORT**

WorkOrder:HS22060382  
Lab ID:HS22060382-02  
Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	10-Jun-2022 14:08

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 15-Jun-22

Client: Bhate Environmental Associates, Inc.  
Project: Longhorn GW Treatment Plant Weekly Samples  
Sample ID: LH18/24-SP650\_060722\_BIX  
Collection Date: 07-Jun-2022 14:00

**ANALYTICAL REPORT**

WorkOrder:HS22060382  
Lab ID:HS22060382-03  
Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	10-Jun-2022 14:08

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US

Date: 15-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22060382

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> R410281 ( 0 )		<b>Test Name :</b> ORTHO PHOSPHATE (PO4) AS P BY E365.3-1978			<b>Matrix:</b> Water	
HS22060382-01	LH18/24-SP650_060722	07 Jun 2022 14:00			09 Jun 2022 11:45	10
<b>Batch ID:</b> R410399 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			<b>Matrix:</b> Water	
HS22060382-02	LH18/24-SP650_060722_AIX	07 Jun 2022 14:00			10 Jun 2022 14:08	1
HS22060382-03	LH18/24-SP650_060722_BIX	07 Jun 2022 14:00			10 Jun 2022 14:08	1
<b>Batch ID:</b> R410591 ( 0 )		<b>Test Name :</b> AMMONIA AS N BY E350.3(ISE)			<b>Matrix:</b> Water	
HS22060382-01	LH18/24-SP650_060722	07 Jun 2022 14:00			14 Jun 2022 11:45	1
<b>Batch ID:</b> R410595 ( 0 )		<b>Test Name :</b> TOTAL ORGANIC CARBON BY E415.1			<b>Matrix:</b> Water	
HS22060382-01	LH18/24-SP650_060722	07 Jun 2022 14:00			14 Jun 2022 04:57	1

## ALS Houston, US

Date: 15-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22060382

**QC BATCH REPORT**

Batch ID: R410281 ( 0 )		Instrument: UV-2450		Method: ORTHO PHOSPHATE (PO4) AS P BY E365.3-1978						
<b>MBLK</b>	Sample ID: MBLK-R410281	Units: mg/L		Analysis Date: 09-Jun-2022 11:45						
Client ID:	Run ID: UV-2450_410281		SeqNo: 6685217		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phosphorus, Total Orthophosphate (As P)	0.0125	0.0250								U
<b>LCS</b>	Sample ID: LCS-R410281	Units: mg/L		Analysis Date: 09-Jun-2022 11:45						
Client ID:	Run ID: UV-2450_410281		SeqNo: 6685216		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phosphorus, Total Orthophosphate (As P)	0.257	0.0250	0.25	0	103	85 - 115				
<b>MS</b>	Sample ID: HS22060382-01MS	Units: mg/L		Analysis Date: 09-Jun-2022 11:45						
Client ID: LH18/24-SP650_060722	Run ID: UV-2450_410281		SeqNo: 6685219		PrepDate:		DF: 10			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phosphorus, Total Orthophosphate (As P)	7.36	0.250	2.5	5.13	89.2	80 - 120				
<b>MSD</b>	Sample ID: HS22060382-01MSD	Units: mg/L		Analysis Date: 09-Jun-2022 11:45						
Client ID: LH18/24-SP650_060722	Run ID: UV-2450_410281		SeqNo: 6685218		PrepDate:		DF: 10			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phosphorus, Total Orthophosphate (As P)	7.37	0.250	2.5	5.13	89.6	80 - 120	7.36	0.136	20	
The following samples were analyzed in this batch: HS22060382-01										

ALS Houston, US

Date: 15-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22060382

**QC BATCH REPORT**

Batch ID: R410591 ( 0 )		Instrument: WetChem_HS		Method: AMMONIA AS N BY E350.3(ISE)					
<b>MBLK</b>	Sample ID: MBLK-R410591	Units: mg/L		Analysis Date: 14-Jun-2022 11:45					
Client ID:	Run ID: WetChem_HS_410591		SeqNo: 6691462		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Nitrogen, Ammonia (As N)	0.10	0.20							U
<b>LCS</b>	Sample ID: LCS-R410591	Units: mg/L		Analysis Date: 14-Jun-2022 11:45					
Client ID:	Run ID: WetChem_HS_410591		SeqNo: 6691461		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Nitrogen, Ammonia (As N)	9.876	0.20	10	0	98.8	80 - 120			
<b>MS</b>	Sample ID: HS22060182-01MS	Units: mg/L		Analysis Date: 14-Jun-2022 11:45					
Client ID:	Run ID: WetChem_HS_410591		SeqNo: 6691466		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Nitrogen, Ammonia (As N)	10.32	0.20	10	0.356	99.6	80 - 120			
<b>MSD</b>	Sample ID: HS22060182-01MSD	Units: mg/L		Analysis Date: 14-Jun-2022 11:45					
Client ID:	Run ID: WetChem_HS_410591		SeqNo: 6691465		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Nitrogen, Ammonia (As N)	10.32	0.20	10	0.356	99.7	80 - 120	10.32	0.0678	20
The following samples were analyzed in this batch: HS22060382-01									

## ALS Houston, US

Date: 15-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22060382

**QC BATCH REPORT**

Batch ID: R410595 ( 0 )		Instrument: TOC_04		Method: TOTAL ORGANIC CARBON BY E415.1						
<b>MBLK</b>	Sample ID: MBLK-06132022	Units: mg/L		Analysis Date: 14-Jun-2022 04:23						
Client ID:	Run ID: TOC_04_410595	SeqNo: 6691497		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	1.00	1.00								U
<b>LCS</b>	Sample ID: LCS-06132022	Units: mg/L		Analysis Date: 14-Jun-2022 04:35						
Client ID:	Run ID: TOC_04_410595	SeqNo: 6691498		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	8.814	1.00	10	0	88.1	85 - 115				
<b>LCSD</b>	Sample ID: LCSD-06132022	Units: mg/L		Analysis Date: 14-Jun-2022 04:46						
Client ID:	Run ID: TOC_04_410595	SeqNo: 6691499		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	8.758	1.00	10	0	87.6	85 - 115	8.814	0.637	20	
<b>MS</b>	Sample ID: HS22060382-01MS	Units: mg/L		Analysis Date: 14-Jun-2022 05:09						
Client ID: LH18/24-SP650_060722	Run ID: TOC_04_410595	SeqNo: 6691501		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	17.57	1.00	10	7.295	103	80 - 120				
The following samples were analyzed in this batch: HS22060382-01										



**ALS Houston, US**

Date: 15-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22060382

**QUALIFIERS,  
ACRONYMS, UNITS**

<b>Qualifier</b>	<b>Description</b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

<b>Acronym</b>	<b>Description</b>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

---

**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

---

Agency	Number	Expire Date
Dept of Defense	L21-682	31-Dec-2023
Florida	E87611-34	30-Jun-2022
Illinois	2000322022-9	09-May-2023
Kansas	E-10352 2021-2022	31-Jul-2022
Louisiana	03087, 2021-2022	30-Jun-2022
Maryland	343, 2021-2022	30-Jun-2022
North Carolina	624-2022	31-Dec-2022
Oklahoma	2021-080	31-Aug-2022
Texas	T104704231-22-29	30-Apr-2023
Utah	TX026932021-12	30-Jul-2022

ALS Houston, US

Date: 15-Jun-22

## Sample Receipt Checklist

Work Order ID: HS22060382

Date/Time Received: 08-Jun-2022 10:00

Client Name: Bhate Environmental

Received by: Pablo MartinezCompleted By: /S/ Pablo Martinez

08-Jun-2022 11:19

eSignature

Date/Time

Reviewed by: /S/ Ragen Giga

08-Jun-2022 14:30

eSignature

Date/Time

Matrices: **WATER**Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?

Yes ☒No ☐Not Present ☐

Custody seals intact on shipping container/cooler?

Yes ☒No ☐Not Present ☐

Custody seals intact on sample bottles?

Yes ☐No ☐Not Present ☒

VOA/TX1005/TX1006 Solids in hermetically sealed vials?

Yes ☐No ☐Not Present ☒

Chain of custody present?

Yes ☒No ☐

1 Page(s)

Chain of custody signed when relinquished and received?

Yes ☒No ☐

COC IDs: CLIENT

Samplers name present on COC?

Yes ☒No ☐

Chain of custody agrees with sample labels?

Yes ☒No ☐

Samples in proper container/bottle?

Yes ☒No ☐

Sample containers intact?

Yes ☒No ☐

Sufficient sample volume for indicated test?

Yes ☒No ☐

All samples received within holding time?

Yes ☒No ☐

Container/Temp Blank temperature in compliance?

Yes ☒No ☐

Temperature(s)/Thermometer(s):

0.8°C/1.3°C UC/C

IR 31

Cooler(s)/Kit(s):

BLUE

Date/Time sample(s) sent to storage:

6/8/22 11:25

Water - VOA vials have zero headspace?

Yes ☒No ☐No VOA vials submitted ☐

Water - pH acceptable upon receipt?

Yes ☒No ☐N/A ☐

pH adjusted?

Yes ☐No ☒N/A ☐

pH adjusted by:

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:

Corrective Action:



## CHAIN OF CUSTODY

Name Of Lab Shipping To: ALS 10450 Stancliff Rd, Suite 210 Houston, TX, 77099 (281) 530-5656 ATTN: Ragen Gigi

Page 1 of 1

<b>Project:</b> BHATE LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS						<b>Project No.</b>  NWO1312.0150.0 16.0001																													
<b>Job:</b> <b>GROUNDWATER TREATMENT PLANT WEEKLY SAMPLES</b>																										<b>HS22060382</b> Bhate Environmental Associates, Inc. Longhorn GW Treatment Plant Weekly Samples									
<b>Prepared By:</b>  Scott Beesinger													<b>P.O. Number</b>																						
Field Sample I.D.	Sample Matrix	Date / Time	MS / MSD	No. OF CONTAINERS	AMMONIA-N	TOTAL ORGANIC CARBON	ORTHO-PHOSPHATE	PERCHLORATE	Analyses							Remarks (Preservatives, etc.)	Lab I.D.#																		
LH18/24-SP650_060722	Water	06/07/22 / 14:00		3	X	X										H2SO4																			
LH18/24-SP650_060722	Water	06/07/22 / 14:00		1			X									NONE																			
LH18/24-SP650_060722_AIX	Water	06/07/22 / 14:00		1				X								NONE																			
LH18/24-SP650_060722_BIX	Water	06/07/22 / 14:00		1				X								NONE																			
<b>Additional Remarks:</b> <b>24 HOUR TAT on PERCHLORATE. Standard TAT on all other parameters</b>																																			
<b>Relinquished By:</b>		<b>Date</b>	<b>Time</b>	<b>Received By:</b>		<b>Date</b>	<b>Time</b>	<b>Relinquished By:</b>		<b>Date</b>	<b>Time</b>	<b>Received By:</b>		<b>Date</b>	<b>Time</b>																				
		06/07/22	14:30			6/22	10:20																												
<b>For Lab Use Only</b>																																			
<b>Received At Lab By:</b>		<b>Date</b>	<b>Time</b>	<b>Airbill No.</b>		<b>Opened By:</b>		<b>Date</b>	<b>Time</b>	<b>Temp of Container</b>	<b>Seal No.</b>	<b>Condition</b>																							
<b>Remarks:</b>																																			

Blue 0.2C  
in 31 1000s

 <b>ALS</b> 10450 Stancil Rd., Suite 10 Houston, Texas 77099 Tel. +1 281 530 5666 Fax. +1 281 530 5867	<b>CUSTODY SEAL</b>		Seal Broken By:  Date: 6/27/00
	Date: 6/27/00 Time: 11:30 No. of: 5000 No. of: 5000	No. of: 5000 No. of: 5000	

TX 5000 5000 5000  
 5000 5227 3830  
**AB SGRA** Blue 77099  
 TX-US  
 IAH



392391 1 07010700 0000 5000 5227 3830



June 10, 2022

Service Request No:E2200527

Dane Wacasey  
ALS Group USA, Corp.  
10450 Stancliff Road  
Suite 210  
Houston, TX 77099-4338

**Laboratory Results for: HS22060382**

Dear Dane,

Enclosed are the results of the sample(s) submitted to our laboratory June 08, 2022  
For your reference, these analyses have been assigned our service request number **E2200527**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current TNI standards, where applicable, and except as noted in the laboratory case narrative provided. All results are intended to be considered in their entirety and ALS Environmental is not responsible for use of less than the complete final report. Results apply only to the items submitted to the laboratory, as received for analysis. In accordance with the current TNI Standard, a statement on the estimated uncertainty of measurement of any quantitative analysis will be supplied upon request.

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Corey Grandits  
Project Manager

ADDRESS 10450 Stancliff Rd., Suite 210, Houston, TX 77099  
PHONE +1 281 530 5656 | FAX +1 281 530 5887  
ALS Group USA, Corp.  
dba ALS Environmental



# Certificate of Analysis

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

**ALS Environmental**

**Client:** ALS Houston  
**Project:** HS22060382  
**Sample Matrix:** W

**Service Request No.:** E2200527  
**Date Received:** 06/08/22

**CASE NARRATIVE**

All analyses were performed in adherence to the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II. When appropriate to the method, method blank results have been reported with each analytical test.

**Sample Receipt**

Two samples were received for analysis at ALS Environmental in Houston on 06/08/22.

The samples were received in good condition and are consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

**Data Validation Notes and Discussion****Precision and Accuracy:**

EQ2200238: Laboratory Control Spike/Duplicate Laboratory Control Spike (LCS/DLCS) samples were analyzed and reported in lieu of a MS/MSD for this extraction batch. LCS/DLCS RPD exceedance, the individual recoveries met acceptance criteria.

DoD Certification is held for the method/matrix/analytes provided in this report.

*The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.*

*Use of ALS group USA Corp dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.*



**Client:** ALS Environmental - US  
**Project:** HS22060382

**Service Request:**E2200527

**SAMPLE CROSS-REFERENCE**

<u>SAMPLE #</u>	<u>CLIENT SAMPLE ID</u>	<u>DATE</u>	<u>TIME</u>
E2200527-001	LH18/24-SP650_060722_AIX	6/7/2022	1400
E2200527-002	LH18/24-SP650_060722_BIX	6/7/2022	1400

**Service Request Summary**

**Folder #:** E2200527  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22060382  
**Project Number:**  
**Report To:** Dane Wacasey  
 ALS Group USA, Corp.  
 10450 Stancliff Road  
 Houston, TX 77099-4338  
 USA  
**Phone Number:** 281-575-2190  
**Cell Number:**  
**Fax Number:** 281-530-5887  
**E-mail:** dane.wacasey@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 06/08/22  
**Internal Due Date:** 6/9/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22060382  
**EDD:** No EDD Specified

2 120 mL-Plastic Bottle Natural WM Unpreserved

**Location:** EHRMS-AirArch 1

**Pressure Gas:**

**Rush**

				HOUSTON
Lab Samp No.	Client Samp No	Matrix	Collected	CIO4 DOD/6850
E2200527-001	LH18/24-SP650_060722_AIX	Water	06/07/22 1400	IV
E2200527-002	LH18/24-SP650_060722_BIX	Water	06/07/22 1400	II

**Service Request Summary**

**Folder #:** E2200527  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22060382  
**Project Number:**  
  
**Report To:** Dane Wacasey  
 ALS Group USA, Corp.  
 10450 Stancliff Road  
 Houston, TX 77099-4338  
 USA  
**Phone Number:** 281-575-2190  
**Cell Number:**  
**Fax Number:** 281-530-5887  
**E-mail:** dane.wacasey@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 06/08/22  
**Internal Due Date:** 6/9/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22060382  
**EDD:** No EDD Specified

2 120 mL-Plastic Bottle Natural WM Unpreserved  
**Location:** EHRMS-AirArch 1  
**Pressure Gas:**  
**Rush**

**Test Comments:**

Group	Test/Method	Samples	Comments
Semivola GCMS	CIO4 DOD/6850	2	IV Due 6/29

## Data Qualifiers

### Lab Standard

- + Possible Tedlar bag artifact.
- A TIC is a suspected aldol-condensation product
- B Analyte found in the associated method blank as well as in the sample.
- BC Reported results are not blank corrected.
- BH The back section of the tube yielded higher results than the front.
- BT Results indicated possible breakthrough; back section  $\geq 10\%$  front section.
- C Result identification confirmed.
- D Compound identified in an analysis at a secondary dilution factor
- D Spike was diluted out
- DE Reported results are corrected for desorption efficiency.
- E Estimated value. Concentration above calibration range
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- H1 Sample analysis performed past holding time. See case narrative.
- H2 Initial analysis within holding time. Reanalysis for the required dilution was past holding time.
- H3 Sample was received and analyzed past holding time.
- H4 Sample was extracted past required extraction holding time, but analyzed within analysis holding time. See case narrative.
- I Internal standard not within the specified limits. See case narrative.
- J Estimated Value. Concentration found below MRL.
- K (Auto) The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- K A deflection in the QC ion may indicate interference with the quantitation of this ion. The concentration of this analyte should be considered as an estimate.
- K Analyte was detected above the method reporting limit prior to normalization.
- K The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- L1 Laboratory control sample recovery outside the specified limits; results may be biased high.
- L2 Laboratory control sample recovery outside the specified limits; results may be biased low.
- L3 Laboratory control sample recovery outside the specified limits.
- M Matrix interference; results may be biased high.
- M The duplicate injection precision not met.
- M1 Matrix interference due to coelution with a non-target compound; results may be biased high.

## Data Qualifiers

### Lab Standard

- N Presumptive evidence of a compound for TICs that have been identified based on a mass spectral library search.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- P Indicates chlorodiphenyl ether interference present at the retention time of the target compound.
- P Pesticide/Aroclor target analyte > 40% difference for detected concentrations between GC columns
- Q Indicates as estimated value because the P and P + 2 theoretical abundance ratio does not meet method criteria.
- R Duplicate Precision not met.
- R1 Duplicate precision not within the specified limits; however, the results are below the MRL and considered estimated.
- S Surrogate recovery not within specified limits.
- S The reported value was determined by the Method of Standard Additions (MSA).
- T Analyte is a tentatively identified compound, result is estimated.
- U Compound was analyzed for, but was not detected (ND).
- V1 The continuing calibration verification standard was outside (biased high) the specified limits for this compound.
- V2 The continuing calibration verification standard was outside (biased low) the specified limits for this compound.
- W Result quantified, but the corresponding peak was detected outside the generated retention time window.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- X See case narrative.
- Y Recovery outside limits
- Y The chromatogram resembles a petroleum product but does not match the calibration standard.
- Z The chromatogram does not resemble a petroleum product.
- i The MRL/MDL has been elevated due to a matrix interference.

## ALS Laboratory Group

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### Acronyms

Cal	Calibration
Conc	CONCetration
Dioxin(s)	Polychlorinated dibenzo-p-dioxin(s)
EDL	Estimated Detection Limit
EMPC	Estimated Maximum Possible Concentration
Flags	Data qualifiers
Furan(s)	Polychlorinated dibenzofuran(s)
g	Grams
ICAL	Initial CALibration
ID	IDentifier
Ions	Masses monitored for the analyte during data acquisition
L	Liter (s)
LCS	Laboratory Control Sample
DLCS	Duplicate Laboratory Control Sample
MB	Method Blank
MCL	Method Calibration Limit
MDL	Method Detection Limit
mL	Milliliters
MS	Matrix Spiked sample
DMS	Duplicate Matrix Spiked sample
NO	Number of peaks meeting all identification criteria
PCDD(s)	Polychlorinated dibenzo-p-dioxin(s)
PCDF(s)	Polychlorinated dibenzofuran(s)
ppb	Parts per billion
ppm	Parts per million
ppq	Parts per quadrillion
ppt	Parts per trillion
QA	Quality Assurance
QC	Quality Control
Ratio	Ratio of areas from monitored ions for an analyte
% Rec.	Percent recovery
RPD	Relative Percent Difference
RRF	Relative Response Factor
RT	Retention Time
SDG	Sample Delivery Group
S/N	Signal-to-noise ratio
TEF	Toxicity Equivalence Factor
TEQ	Toxicity Equivalence Quotient



## State Certifications, Accreditations, and Licenses

Agency	Number	Expire Date
Arizona Department of Health Services	AZ0793	5/27/2023
Department of Defense	L22-90	3/31/2024
Florida Department of Health	E87611-34	6/30/2022
Hawaii Department of Health	2022	4/30/2023
Illinois Environmental Protection Agency	2000322022-9	5/9/2023
Kansas Department of Health and Environment	E-10352 2022	7/31/2022
Louisiana Department of Environmental Quality	03087-2021	6/30/2022
Louisiana Department of Health and Hospitals	LA028	12/31/2022
Maine Department of Health and Human Services	2022017	6/5/2024
Maryland Department of the Environment	343	6/30/2022
Michigan Department of Environmental Quality	9971-2022	4/30/2023
Minnesota Department of Health	2228443	12/31/2022
Nebraska Department of Health and Human Services	NE-OS-25-13	4/30/2023
Nevada Department of Conservation and Natural Resources	TX026932022-1	7/31/2022
New Hampshire Environmental Laboratory Accreditation Program	209422	4/24/2023
New Jersey Department of Environmental Protection	TX008	6/30/2022
New York Department of Health	11707	3/31/2023
Oklahoma Department of Environmental Quality	2021-080	8/31/2022
Oregon Environmental Laboratory Accreditation Program	TX200002	5/15/2023
Pennsylvania Department of Environmental Protection	68-03441-015	6/30/2022
Perry Johnson Laboratory Accreditation	L22-91	3/31/2024
Tennessee Department of Environment and Conservation	04016-2022	4/30/2023
Texas Commission on Environmental Quality	T104704231-22-29	4/30/2023
United States Department of Agriculture	P330-19-00299	10/10/2022
Utah Department of Health Environmental Laboratory Certification	TX026932021-12	7/31/2022
Washington Department of Health	C819-2022	11/14/2022



## Chain of Custody

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)





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F: +1 281 530 5887  
www.alsglobal.com

## Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 18905

**SUBCONTRACT TO:**

ALS Environmental  
10450 Stancliff Road Suite 210  
Houston, TX 77084

**Phone:** +1 281 530 5656

**CUSTOMER  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Dane J. Wacasey  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Email:** Dane.Wacasey@alsglobal.com  
**Alternate  
Contact:**  
**Email:**

**INVOICE  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Accounts Payable  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Reference:** HS22060382  
**TSR:** Houston House Acct

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS22060382-02	LH18/24-SP650_060722_AIX	Water	07 Jun 2022 14:00
	6850-Perch. DOD Level II & Level IV	in separate pdf	09 Jun 2022
2. HS22060382-03	LH18/24-SP650_060722_BIX	Water	07 Jun 2022 14:00
	6850-Perch. DOD Level II & Level IV	in separate pdf	09 Jun 2022

**Comments:** Please analyze for the analysis listed above.  
Send report to the emails shown above.

**QC Level:** DOD IV (DoD Data Package)

Relinquished By: Paul [Signature]

Date/Time: 6-8-22 11:30

Received By: [Signature] [Signature]

Date/Time: 6-8-22 11:40

Cooler ID(s): [Signature]

Temperature(s): \_\_\_\_\_

RIGHT SOLUTIONS | RIGHT PARTNER



## Cooler Receipt Form

Project Chemist CLClient/Project ALY-H Thermometer ID 1024Date/Time Received: 6-8-22 Initials: CL Date/Time Logged in: 6-8-22 Initials: CL1. Method of delivery: ☐ US Mail ☐ Fed Ex ☐ UPS ☐ DHL ☒ Courier ☐ Client2. Samples received in: ☒ Cooler ☐ Box ☐ Envelope ☐ Other \_\_\_\_\_3. Were custody seals on coolers? ☐ Yes ☒ No If yes, how many and where?Were they intact? ☐ Yes ☐ No ☒ N/AWere they signed and dated? ☐ Yes ☐ No ☒ N/A4. Packing Material: ☐ Inserts ☒ Baggies ☐ Bubble Wrap ☐ Gel Packs ☒ Wet Ice ☐ Sleeves ☐ Other \_\_\_\_\_5. Foreign or Regulated Soil? ☐ Yes ☐ No Location of Sampling: \_\_\_\_\_

Cooler Tracking Number	COC ID	Date Opened	Time Opened	Opened By	Temp. °C	Temp Blank?
NA		6-8-22	17:16	CL	1.2°C	<input checked="" type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>

6. Were custody papers properly filled out (ink, signed, dated, etc)? ☒ Yes ☐ No7. Did all bottles arrive in good condition (not broken, no signs of leakage)? ☒ Yes ☐ No8. Were all sample labels complete (i.e., sample ID, analysis, preservation, etc)? ☒ Yes ☐ No9. Were appropriate bottles/containers and volumes received for the requested tests? ☒ Yes ☐ No10. Did sample labels and tags agree with custody documents? ☒ Yes ☐ No

Notes, Discrepancies, &amp; Resolutions:

Service request Label:



---

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## SAMPLE ACCEPTANCE POLICY

This policy outlines the criteria samples must meet to be accepted by ALS Environmental – Houston HRMS.

### **Cooler Custody Seals (desirable, mandatory if specified in SAP):**

- ✓ Intact on outside of cooler, signed and dated

### **Chain-of-Custody (COC) documentation (mandatory):**

The following is required on each COC:

- ✓ Sample ID, the location, date and time of collection, collector's name, preservation type, sample type, and any other special remarks concerning the sample. The COC must be completed in ink.
- ✓ Signature and date of relinquishing party.

In the absence of a COC at sample receipt, the COC will be requested from the client.

### **Sample Integrity (mandatory):**

Samples are inspected upon arrival to ensure that sample integrity was not compromised during transfer to the laboratory.

- ✓ Sample containers must arrive in good condition (not broken or leaking).
- ✓ Samples must be labeled appropriately, including Sample IDs, and requested test using durable labels and indelible ink.
- ✓ The correct type of sample bottle must be used for the method requested.
- ✓ An appropriate sample volume, or weight, must be received.
- ✓ Sample IDs and number of containers must reconcile with the COC.
- ✓ Samples must be received within the method defined holding time.

### **Temperature Requirement (varies by sample matrix):**

- ✓ Aqueous and Non-aqueous samples must be shipped and stored cold, at 0 to 6°C.
- ✓ Tissue samples must be shipped and stored frozen, at -20 to -10°C.
- ✓ Air samples are shipped and stored cold, at 0 to 6°C
- ✓ The sample temperature must be recorded on the COC

All cooler inspections are documented on the Cooler Receipt Form (CRF). A separate CRF is completed for each service request. Any samples not meeting the above criteria are noted on the CRF and the Project Manager notified. The Project Manager must resolve any sample integrity issues with the client prior to proceeding with the analysis. Such resolutions are documented in writing and filed with the project folder. Data associated with samples received outside of this acceptance policy will be qualified on the case narrative of the final report



## Preparation Information Benchsheets

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

Preparation Information Benchsheet

Prep Run#: 401107

Team: Semivoa GCMS/GRIVERA

Prep WorkFlow: GenExt28Day

Prep Method: Method

Status: Prepped

Prep Date/Time: 6/9/22 09:03

#	Lab Code	Client ID	B#	Method /Test	pH	Cl	Matrix	Amt. Ext.	Sample Description
1	E2200527-001	LH18/24-SP650_060722_AIX	.01	6850/CIO4 DOD			Water	10mL	
2	E2200527-002	LH18/24-SP650_060722_BIX	.01	6850/CIO4 DOD			Water	10mL	
3	E2200528-001	LH18/24-SP650_060722_AIX	.01	6850/CIO4 DOD			Water	10mL	
4	E2200529-001	LH18/24-SP140_060722	.01	6850/CIO4 DOD			Water	10mL	
5	EQ2200238-01	MB		6850/CIO4 DOD			Liquid	10mL	
6	EQ2200238-02	LCS		6850/CIO4 DOD			Liquid	10mL	
7	EQ2200238-03	DLCS		6850/CIO4 DOD			Liquid	10mL	

Spiking Solutions

Name:	Perchlorate Intermediate Stock1	Inventory ID	222798	Logbook Ref:	Perchlorate (1st Source)	Expires On:	10/29/2022
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EQ2200238-02 1.00µL EQ2200238-03 1.00µL

Name:	Perchlorate Internal Standard 1ug/mL	Inventory ID	223118	Logbook Ref:	Perchlorate Internal Standard	Expires On:	10/31/2022
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E2200527-001 100.00µL E2200527-002 100.00µL E2200528-001 100.00µL E2200529-001 100.00µL EQ2200238-01 100.00µL EQ2200238-02 100.00µL  
EQ2200238-03 100.00µL

Preparation Materials

Water HPLC Grade02/16/2022 Water (221769)6850 Amber Glass screw vial2mL Screw Top Vial (221894)537M Glass Culture Tubes537M Glass Tubes (218064)

6850 0.45um syringe filters6850 Syringe Filters (222410)6850 Luer-Lok SyringesLuer-Lok Syringes (221305)6850 Pipette Tips 50-1000 uL6850 Pipette Tips (221929)

Preparation Steps

Step: Preparation  
Started: 6/9/22 09:03  
Finished: 6/9/22 09:36  
By: GRIVERA  
Comments

Comments:

Reviewed By: GR Date: 6/9/22

Chain of Custody

Relinquished By:	Date:	<u>Extracts Examined</u> Yes No
Received By:	Date:	



# Analytical Results

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22060382  
**Sample Matrix:** Water  
**Sample Name:** LH18/24-SP650\_060722\_AIX  
**Lab Code:** E2200527-001

**Service Request:** E2200527  
**Date Collected:** 6/ 7/22 1400  
**Date Received:** 6/ 8/22  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.505		0.200	0.100	0.0500	2	6/ 9/22	6/9/22 14:09	401107	766959	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22060382  
**Sample Matrix:** Water  
**Sample Name:** LH18/24-SP650\_060722\_BIX  
**Lab Code:** E2200527-002

**Service Request:** E2200527  
**Date Collected:** 6/ 7/22 1400  
**Date Received:** 6/ 8/22  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	24.8		0.200	0.100	0.0500	2	6/ 9/22	6/9/22 14:17	401107	766959	



## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22060382  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** EQ2200238-01

**Service Request:** E2200527  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	0.100	0.0500	0.0250	1	6/ 9/22	6/9/22 11:41	401107	766959	



## Accuracy & Precision

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Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS22060382  
**Sample Matrix:** Water

**Service Request:** E2200527  
**Date Analyzed:** 6/ 9/22

**Lab Control Sample Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**Analytical Method:** 6850  
**Prep Method:** Method

**Units:** µg/L  
**Basis:** NA

**Extraction Lot:** 401107

Analyte Name	Lab Control Sample EQ2200238-02			Duplicate Lab Control Sample EQ2200238-03			% Rec Limits	RPD	RPD Limit
	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Perchlorate	0.0914	0.100	91	0.112	0.100	112	84 - 119	21 *	15

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22060382  
**Sample Matrix:** Water  
**Sample Name:** Lab Control Sample  
**Lab Code:** EQ2200238-02

**Service Request:** E2200527  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.0914	J	0.100	0.0500	0.0250	1	6/ 9/22	6/9/22 12:21	401107	766959	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22060382  
**Sample Matrix:** Water  
**Sample Name:** Duplicate Lab Control Sample  
**Lab Code:** EQ2200238-03

**Service Request:** E2200527  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.112		0.100	0.0500	0.0250	1	6/ 9/22	6/9/22 12:52	401107	766959	



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10450 Stancliff Rd. Suite 210  
Houston, TX 77099  
T: +1 281 530 5656  
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June 20, 2022

Marcia Olive  
Bhate Environmental Associates, Inc.  
445 Union Blvd Ste 129  
Lakewood, CO 80228

Work Order: **HS22060383**

Laboratory Results for: **Longhorn GW Treatment Plant Monthly Effluent Samples**

Dear Marcia Olive,

ALS Environmental received 3 sample(s) on Jun 08, 2022 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: JUMOKE.LAWAL

Dane J. Wacasey

ALS Houston, US

Date: 20-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**Work Order:** HS22060383

**SAMPLE SUMMARY**

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS22060383-01	LH18/24-SP650_060722	Water		07-Jun-2022 14:00	08-Jun-2022 10:00	<input type="checkbox"/>
HS22060383-02	LH18/24-SP650_060722_AIX	Water		07-Jun-2022 14:00	08-Jun-2022 10:00	<input type="checkbox"/>
HS22060383-03	Trip Blank	Water	CG-041822 -84	07-Jun-2022 14:00	08-Jun-2022 10:00	<input type="checkbox"/>

ALS Houston, US

Date: 20-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**Work Order:** HS22060383

**CASE NARRATIVE**

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**Work Order Comments**

- The analysis for Perchlorate was subcontracted to ALS Houston High-Res Lab. Final report attached

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**GCMS Semivolatiles by Method SW8270SIM****Batch ID: 179750****Sample ID: LH18/24-SP650\_060722 (HS22060383-01)**

- The surrogate recoveries could not be determined due to dilution below the calibration range.

---

**GCMS Volatiles by Method SW8260****Batch ID: R410346**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

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**Metals by Method SW6020A****Batch ID: 180102****Sample ID: HS22060438-03MS**

- MS and MSD are for an unrelated sample

**Sample ID: HS22060438-03PDS**

- PDS is for an unrelated sample

---

**WetChemistry by Method SW7196****Batch ID: R410341**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-



## ALS Houston, US

Date: 20-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Monthly Effluent Samples  
 Sample ID: LH18/24-SP650\_060722  
 Collection Date: 07-Jun-2022 14:00

## ANALYTICAL REPORT

WorkOrder:HS22060383  
 Lab ID:HS22060383-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD</b>		<b>Method:SW8260</b>						Analyst: PC
<b>8260C</b>								
1,1,1,2-Tetrachloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:46
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:46
1,1,2,2-Tetrachloroethane	1.0	U	0.50	1.0	1.0	ug/L	1	09-Jun-2022 15:46
1,1,2-Trichloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:46
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:46
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:46
1,1-Dichloropropene	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:46
1,2,3-Trichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	09-Jun-2022 15:46
1,2,3-Trichloropropane	1.0	U	0.50	1.0	1.0	ug/L	1	09-Jun-2022 15:46
1,2,4-Trichlorobenzene	1.0	U	0.50	1.0	1.0	ug/L	1	09-Jun-2022 15:46
1,2,4-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:46
1,2-Dibromo-3-chloropropane	1.0	U	0.20	1.0	1.0	ug/L	1	09-Jun-2022 15:46
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:46
1,2-Dichlorobenzene	1.0	U	0.50	1.0	1.0	ug/L	1	09-Jun-2022 15:46
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:46
1,2-Dichloropropane	1.0	U	0.50	1.0	1.0	ug/L	1	09-Jun-2022 15:46
1,3,5-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:46
1,3-Dichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	09-Jun-2022 15:46
1,3-Dichloropropane	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:46
1,4-Dichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	09-Jun-2022 15:46
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:46
2-Butanone	1.0	U	0.50	1.0	2.0	ug/L	1	09-Jun-2022 15:46
2-Chlorotoluene	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:46
2-Hexanone	2.0	U	1.0	2.0	2.0	ug/L	1	09-Jun-2022 15:46
4-Chlorotoluene	1.0	U	0.40	1.0	1.0	ug/L	1	09-Jun-2022 15:46
4-Isopropyltoluene	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:46
4-Methyl-2-pentanone	2.0	U	0.70	2.0	2.0	ug/L	1	09-Jun-2022 15:46
Acetone	2.0	U	0.40	2.0	2.0	ug/L	1	09-Jun-2022 15:46
Benzene	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:46
Bromobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	09-Jun-2022 15:46
Bromochloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:46
Bromodichloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:46
Bromoform	1.0	U	0.40	1.0	1.0	ug/L	1	09-Jun-2022 15:46
Bromomethane	1.0	U	0.40	1.0	1.0	ug/L	1	09-Jun-2022 15:46
Carbon disulfide	2.0	U	0.60	2.0	2.0	ug/L	1	09-Jun-2022 15:46
Carbon tetrachloride	1.0	U	0.50	1.0	1.0	ug/L	1	09-Jun-2022 15:46
Chlorobenzene	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:46
Chloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:46
Chloroform	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:46

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 20-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Monthly Effluent Samples  
 Sample ID: LH18/24-SP650\_060722  
 Collection Date: 07-Jun-2022 14:00

## ANALYTICAL REPORT

WorkOrder:HS22060383  
 Lab ID:HS22060383-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD 8260C</b>			<b>Method:SW8260</b>					Analyst: PC
Chloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:46
<b>cis-1,2-Dichloroethene</b>	<b>2.5</b>		<b>0.20</b>	<b>0.50</b>	<b>1.0</b>	<b>ug/L</b>	1	09-Jun-2022 15:46
cis-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:46
Dibromochloromethane	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:46
Dibromomethane	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:46
Dichlorodifluoromethane	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:46
Ethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:46
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	ug/L	1	09-Jun-2022 15:46
Isopropylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:46
m,p-Xylene	1.0	U	0.50	1.0	2.0	ug/L	1	09-Jun-2022 15:46
Methylene chloride	2.0	U	0.40	2.0	2.0	ug/L	1	09-Jun-2022 15:46
n-Butylbenzene	1.0	U	0.40	1.0	1.0	ug/L	1	09-Jun-2022 15:46
n-Propylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:46
Naphthalene	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:46
o-Xylene	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:46
sec-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:46
Styrene	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:46
tert-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:46
Tetrachloroethene	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:46
Toluene	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:46
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:46
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:46
Trichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:46
Trichlorofluoromethane	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:46
Vinyl chloride	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:46
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>92.0</i>			<b>0</b>	<i>81-118</i>	<b>%REC</b>	<i>1</i>	<i>09-Jun-2022 15:46</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>93.8</i>			<b>0</b>	<i>85-114</i>	<b>%REC</b>	<i>1</i>	<i>09-Jun-2022 15:46</i>
<i>Surr: Dibromofluoromethane</i>	<i>95.2</i>			<b>0</b>	<i>80-119</i>	<b>%REC</b>	<i>1</i>	<i>09-Jun-2022 15:46</i>
<i>Surr: Toluene-d8</i>	<i>99.6</i>			<b>0</b>	<i>89-112</i>	<b>%REC</b>	<i>1</i>	<i>09-Jun-2022 15:46</i>
<b>SEMIVOLATILES SIM</b>			<b>Method:SW8270SIM</b>					Prep:SW3510 / 09-Jun-2022 Analyst: JLJ
<b>1,4-Dioxane</b>	<b>15</b>	a	<b>1.0</b>	<b>0</b>	<b>1.0</b>	<b>ug/L</b>	100	14-Jun-2022 13:33
<i>Surr: 2-Fluorobiphenyl</i>	<i>0</i>	S		0	<i>40-140</i>	<b>%REC</b>	<i>100</i>	<i>14-Jun-2022 13:33</i>
<i>Surr: 4-Terphenyl-d14</i>	<i>0</i>	S		0	<i>40-140</i>	<b>%REC</b>	<i>100</i>	<i>14-Jun-2022 13:33</i>
<i>Surr: Nitrobenzene-d5</i>	<i>0</i>	S		0	<i>40-140</i>	<b>%REC</b>	<i>100</i>	<i>14-Jun-2022 13:33</i>
<b>METALS BY ICPMS BY SW6020A</b>			<b>Method:SW6020A</b>					Prep:SW3010A / 17-Jun-2022 Analyst: JC
<b>Barium</b>	<b>0.315</b>		<b>0.00190</b>	<b>0.00250</b>	<b>0.00500</b>	<b>mg/L</b>	1	20-Jun-2022 13:02
Lead	0.00125	U	0.000600	0.00125	0.00500	mg/L	1	20-Jun-2022 13:02
Selenium	0.00250	U	0.00110	0.00250	0.00500	mg/L	1	20-Jun-2022 13:02
Silver	0.000500	U	0.000200	0.000500	0.00500	mg/L	1	20-Jun-2022 13:02

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 20-Jun-22

Client: Bhate Environmental Associates, Inc.  
Project: Longhorn GW Treatment Plant Monthly Effluent Samples  
Sample ID: LH18/24-SP650\_060722  
Collection Date: 07-Jun-2022 14:00

**ANALYTICAL REPORT**

WorkOrder:HS22060383  
Lab ID:HS22060383-01  
Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>HEXAVALENT CHROMIUM BY SW7196A</b>		<b>Method:SW7196</b>						Analyst: AP
Chromium, Hexavalent	0.00600	U	0.00600	0.00600	0.0100	mg/L	1	08-Jun-2022 12:32

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 20-Jun-22

Client: Bhate Environmental Associates, Inc.  
Project: Longhorn GW Treatment Plant Monthly Effluent Samples  
Sample ID: LH18/24-SP650\_060722\_AIX  
Collection Date: 07-Jun-2022 14:00

**ANALYTICAL REPORT**

WorkOrder:HS22060383  
Lab ID:HS22060383-02  
Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	10-Jun-2022 14:08

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 20-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Monthly Effluent Samples  
 Sample ID: Trip Blank  
 Collection Date: 07-Jun-2022 14:00

## ANALYTICAL REPORT

WorkOrder:HS22060383  
 Lab ID:HS22060383-03  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD</b>		<b>Method:SW8260</b>						Analyst: PC
<b>8260C</b>								
1,1,1,2-Tetrachloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:25
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:25
1,1,2,2-Tetrachloroethane	1.0	U	0.50	1.0	1.0	ug/L	1	09-Jun-2022 15:25
1,1,2-Trichloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:25
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:25
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:25
1,1-Dichloropropene	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:25
1,2,3-Trichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	09-Jun-2022 15:25
1,2,3-Trichloropropane	1.0	U	0.50	1.0	1.0	ug/L	1	09-Jun-2022 15:25
1,2,4-Trichlorobenzene	1.0	U	0.50	1.0	1.0	ug/L	1	09-Jun-2022 15:25
1,2,4-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:25
1,2-Dibromo-3-chloropropane	1.0	U	0.20	1.0	1.0	ug/L	1	09-Jun-2022 15:25
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:25
1,2-Dichlorobenzene	1.0	U	0.50	1.0	1.0	ug/L	1	09-Jun-2022 15:25
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:25
1,2-Dichloropropane	1.0	U	0.50	1.0	1.0	ug/L	1	09-Jun-2022 15:25
1,3,5-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:25
1,3-Dichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	09-Jun-2022 15:25
1,3-Dichloropropane	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:25
1,4-Dichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	09-Jun-2022 15:25
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:25
2-Butanone	1.0	U	0.50	1.0	2.0	ug/L	1	09-Jun-2022 15:25
2-Chlorotoluene	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:25
2-Hexanone	2.0	U	1.0	2.0	2.0	ug/L	1	09-Jun-2022 15:25
4-Chlorotoluene	1.0	U	0.40	1.0	1.0	ug/L	1	09-Jun-2022 15:25
4-Isopropyltoluene	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:25
4-Methyl-2-pentanone	2.0	U	0.70	2.0	2.0	ug/L	1	09-Jun-2022 15:25
Acetone	2.0	U	0.40	2.0	2.0	ug/L	1	09-Jun-2022 15:25
Benzene	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:25
Bromobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	09-Jun-2022 15:25
Bromochloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:25
Bromodichloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:25
Bromoform	1.0	U	0.40	1.0	1.0	ug/L	1	09-Jun-2022 15:25
Bromomethane	1.0	U	0.40	1.0	1.0	ug/L	1	09-Jun-2022 15:25
Carbon disulfide	2.0	U	0.60	2.0	2.0	ug/L	1	09-Jun-2022 15:25
Carbon tetrachloride	1.0	U	0.50	1.0	1.0	ug/L	1	09-Jun-2022 15:25
Chlorobenzene	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:25
Chloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:25
Chloroform	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:25

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 20-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Monthly Effluent Samples  
 Sample ID: Trip Blank  
 Collection Date: 07-Jun-2022 14:00

## ANALYTICAL REPORT

WorkOrder:HS22060383  
 Lab ID:HS22060383-03  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD 8260C</b>		<b>Method:SW8260</b>						Analyst: PC
Chloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:25
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:25
cis-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:25
Dibromochloromethane	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:25
Dibromomethane	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:25
Dichlorodifluoromethane	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:25
Ethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:25
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	ug/L	1	09-Jun-2022 15:25
Isopropylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:25
m,p-Xylene	1.0	U	0.50	1.0	2.0	ug/L	1	09-Jun-2022 15:25
Methylene chloride	2.0	U	0.40	2.0	2.0	ug/L	1	09-Jun-2022 15:25
n-Butylbenzene	1.0	U	0.40	1.0	1.0	ug/L	1	09-Jun-2022 15:25
n-Propylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:25
Naphthalene	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:25
o-Xylene	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:25
sec-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:25
Styrene	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:25
tert-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:25
Tetrachloroethene	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:25
Toluene	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:25
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:25
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:25
Trichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:25
Trichlorofluoromethane	1.0	U	0.30	1.0	1.0	ug/L	1	09-Jun-2022 15:25
Vinyl chloride	0.50	U	0.20	0.50	1.0	ug/L	1	09-Jun-2022 15:25
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>90.8</i>			<b>0</b>	<i>81-118</i>	<b>%REC</b>	<i>1</i>	<i>09-Jun-2022 15:25</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>93.3</i>			<b>0</b>	<i>85-114</i>	<b>%REC</b>	<i>1</i>	<i>09-Jun-2022 15:25</i>
<i>Surr: Dibromofluoromethane</i>	<i>93.3</i>			<b>0</b>	<i>80-119</i>	<b>%REC</b>	<i>1</i>	<i>09-Jun-2022 15:25</i>
<i>Surr: Toluene-d8</i>	<i>101</i>			<b>0</b>	<i>89-112</i>	<b>%REC</b>	<i>1</i>	<i>09-Jun-2022 15:25</i>

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## Weight / Prep Log

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS22060383

<b>Batch ID:</b> 179750	<b>Start Date:</b> 09 Jun 2022 07:00	<b>End Date:</b> 09 Jun 2022 11:30
<b>Method:</b> SV AQ SEP FUN EXTRACT-LOWLEV - 3510C	<b>Prep Code:</b> 3510_B_SIM	

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor	
HS22060383-01	1	1000 (mL)	1 (mL)	0.001	1-liter amber glass, Neat

<b>Batch ID:</b> 180102	<b>Start Date:</b> 17 Jun 2022 08:00	<b>End Date:</b> 17 Jun 2022 12:00
<b>Method:</b> WATER - SW3010A	<b>Prep Code:</b> 3010A	

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor	
HS22060383-01		10 (mL)	10 (mL)	1	120 plastic HNO3

ALS Houston, US

Date: 20-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS22060383

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> 179750 ( 0 )		<b>Test Name :</b> SEMIVOLATILES SIM			<b>Matrix:</b> Water	
HS22060383-01	LH18/24-SP650_060722	07 Jun 2022 14:00		09 Jun 2022 09:52	14 Jun 2022 13:33	100
<b>Batch ID:</b> 180102 ( 0 )		<b>Test Name :</b> METALS BY ICPMS BY SW6020A			<b>Matrix:</b> Water	
HS22060383-01	LH18/24-SP650_060722	07 Jun 2022 14:00		17 Jun 2022 08:00	20 Jun 2022 13:02	1
<b>Batch ID:</b> R410341 ( 0 )		<b>Test Name :</b> HEXAVALENT CHROMIUM BY SW7196A			<b>Matrix:</b> Water	
HS22060383-01	LH18/24-SP650_060722	07 Jun 2022 14:00			08 Jun 2022 12:32	1
<b>Batch ID:</b> R410346 ( 0 )		<b>Test Name :</b> VOLATILES ORGANICS BY METHOD 8260C			<b>Matrix:</b> Water	
HS22060383-01	LH18/24-SP650_060722	07 Jun 2022 14:00			09 Jun 2022 15:46	1
HS22060383-03	Trip Blank	07 Jun 2022 14:00			09 Jun 2022 15:25	1
<b>Batch ID:</b> R410399 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			<b>Matrix:</b> Water	
HS22060383-02	LH18/24-SP650_060722_AIX	07 Jun 2022 14:00			10 Jun 2022 14:08	1



## ALS Houston, US

Date: 20-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS22060383

**QC BATCH REPORT**

Batch ID: 180102 ( 0 )		Instrument: ICPMS06		Method: METALS BY ICPMS BY SW6020A					
<b>MBLK</b>	Sample ID: <b>MBLK-180102</b>	Units: <b>mg/L</b>		Analysis Date: <b>20-Jun-2022 12:58</b>					
Client ID:	Run ID: <b>ICPMS06_411043</b>	SeqNo: <b>6702267</b>		PrepDate: <b>17-Jun-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Barium	0.00250	0.00500							U
Lead	0.00125	0.00500							U
Selenium	0.00250	0.00500							U
Silver	0.000500	0.00500							U

<b>LCS</b>	Sample ID: <b>LCS-180102</b>	Units: <b>mg/L</b>		Analysis Date: <b>20-Jun-2022 13:00</b>					
Client ID:	Run ID: <b>ICPMS06_411043</b>	SeqNo: <b>6702252</b>		PrepDate: <b>17-Jun-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Barium	0.05139	0.00500	0.05	0	103	86 - 114			
Lead	0.05004	0.00500	0.05	0	100	88 - 115			
Selenium	0.05323	0.00500	0.05	0	106	80 - 120			
Silver	0.0491	0.00500	0.05	0	98.2	85 - 116			

<b>MS</b>	Sample ID: <b>HS22060438-03MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>20-Jun-2022 13:14</b>					
Client ID:	Run ID: <b>ICPMS06_411043</b>	SeqNo: <b>6702259</b>		PrepDate: <b>17-Jun-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Barium	0.6906	0.00500	0.05	0.6953	-9.43	86 - 114			SO
Lead	0.04528	0.00500	0.05	0.000072	90.4	88 - 115			
Selenium	0.0457	0.00500	0.05	-0.000296	92.0	80 - 120			

<b>MS</b>	Sample ID: <b>HS22060438-03MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>20-Jun-2022 13:44</b>					
Client ID:	Run ID: <b>ICPMS06_411043</b>	SeqNo: <b>6702286</b>		PrepDate: <b>17-Jun-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Silver	0.04644	0.00500	0.05	0	92.9	85 - 116			

## ALS Houston, US

Date: 20-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS22060383

**QC BATCH REPORT**

Batch ID: 180102 ( 0 )		Instrument: ICPMS06		Method: METALS BY ICPMS BY SW6020A						
<b>MSD</b>		Sample ID: HS22060438-03MSD		Units: mg/L		Analysis Date: 20-Jun-2022 13:16				
Client ID:		Run ID: ICPMS06_411043		SeqNo: 6702260		PrepDate: 17-Jun-2022		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Barium	0.7243	0.00500	0.05	0.6953	58.1	86 - 114	0.6906	4.77	20	SO
Lead	0.04877	0.00500	0.05	0.000072	97.4	88 - 115	0.04528	7.4	20	
Selenium	0.0507	0.00500	0.05	-0.000296	102	80 - 120	0.0457	10.4	20	
Silver	0.04628	0.00500	0.05	0.000027	92.5	85 - 116	0.04233	8.93	20	
<b>PDS</b>		Sample ID: HS22060438-03PDS		Units: mg/L		Analysis Date: 20-Jun-2022 13:18				
Client ID:		Run ID: ICPMS06_411043		SeqNo: 6702261		PrepDate: 17-Jun-2022		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Barium	0.8166	0.00500	0.1	0.6953	121	80 - 120				SO
Lead	0.1134	0.00500	0.1	0.000072	113	80 - 120				
Selenium	0.1184	0.00500	0.1	-0.000296	119	80 - 120				
Silver	0.1116	0.00500	0.1	0.000027	112	80 - 120				
<b>SD</b>		Sample ID: HS22060438-03SD		Units: mg/L		Analysis Date: 20-Jun-2022 13:12				
Client ID:		Run ID: ICPMS06_411043		SeqNo: 6702258		PrepDate: 17-Jun-2022		DF: 5		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%D	%D Limit	Qual
Barium	0.6765	0.0250					0.6953	2.7	10	
Lead	0.00625	0.0250					0.000072	0	10	U
Selenium	0.0125	0.0250					-0.000296	0	10	U
Silver	0.00250	0.0250					0.000027	0	10	U

The following samples were analyzed in this batch: HS22060383-01

## ALS Houston, US

Date: 20-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS22060383

**QC BATCH REPORT**

Batch ID: 179750 ( 0 )		Instrument: SV-6		Method: SEMIVOLATILES SIM					
<b>MBLK</b>	Sample ID: <b>MBLK-179750</b>	Units: <b>ug/L</b>		Analysis Date: <b>14-Jun-2022 10:35</b>					
Client ID:	Run ID: <b>SV-6_410872</b>	SeqNo: <b>6698109</b>		PrepDate: <b>09-Jun-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,4-Dioxane	0	0.010							U
Surr: 2-Fluorobiphenyl	0.07724	0	0.08	0	96.5	40 - 140			
Surr: 4-Terphenyl-d14	0.04364	0	0.08	0	54.5	40 - 140			
Surr: Nitrobenzene-d5	0.07611	0	0.08	0	95.1	40 - 140			

<b>LCS</b>	Sample ID: <b>LCS-179750</b>	Units: <b>ug/L</b>		Analysis Date: <b>14-Jun-2022 10:54</b>					
Client ID:	Run ID: <b>SV-6_410872</b>	SeqNo: <b>6698110</b>		PrepDate: <b>09-Jun-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,4-Dioxane	0.09542	0.010	0.08	0	119	40 - 140			
Surr: 2-Fluorobiphenyl	0.07555	0	0.08	0	94.4	40 - 140			
Surr: 4-Terphenyl-d14	0.04288	0	0.08	0	53.6	40 - 140			
Surr: Nitrobenzene-d5	0.07835	0	0.08	0	97.9	40 - 140			

<b>LCSD</b>	Sample ID: <b>LCSD-179750</b>	Units: <b>ug/L</b>		Analysis Date: <b>14-Jun-2022 11:12</b>					
Client ID:	Run ID: <b>SV-6_410872</b>	SeqNo: <b>6698111</b>		PrepDate: <b>09-Jun-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,4-Dioxane	0.1033	0.010	0.08	0	129	40 - 140	0.09542	7.97	20
Surr: 2-Fluorobiphenyl	0.07628	0	0.08	0	95.3	40 - 140	0.07555	0.954	20
Surr: 4-Terphenyl-d14	0.05196	0	0.08	0	64.9	40 - 140	0.04288	19.2	20
Surr: Nitrobenzene-d5	0.07509	0	0.08	0	93.9	40 - 140	0.07835	4.26	20

The following samples were analyzed in this batch: HS22060383-01

## ALS Houston, US

Date: 20-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS22060383

## QC BATCH REPORT

Batch ID: R410346 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
<b>MBLK</b>	Sample ID: VBLKW-220609	Units: ug/L		Analysis Date: 09-Jun-2022 12:37					
Client ID:	Run ID: VOA6_410346	SeqNo: 6685894		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	1.0	1.0							U
1,1,1-Trichloroethane	0.50	1.0							U
1,1,2,2-Tetrachloroethane	1.0	1.0							U
1,1,2-Trichloroethane	1.0	1.0							U
1,1-Dichloroethane	0.50	1.0							U
1,1-Dichloroethene	0.50	1.0							U
1,1-Dichloropropene	1.0	1.0							U
1,2,3-Trichlorobenzene	1.0	1.0							U
1,2,3-Trichloropropane	1.0	1.0							U
1,2,4-Trichlorobenzene	1.0	1.0							U
1,2,4-Trimethylbenzene	1.0	1.0							U
1,2-Dibromo-3-chloropropane	1.0	1.0							U
1,2-Dibromoethane	0.50	1.0							U
1,2-Dichlorobenzene	1.0	1.0							U
1,2-Dichloroethane	0.50	1.0							U
1,2-Dichloropropane	1.0	1.0							U
1,3,5-Trimethylbenzene	1.0	1.0							U
1,3-Dichlorobenzene	1.0	1.0							U
1,3-Dichloropropane	1.0	1.0							U
1,4-Dichlorobenzene	1.0	1.0							U
2,2-Dichloropropane	0.50	1.0							U
2-Butanone	1.0	2.0							U
2-Chlorotoluene	1.0	1.0							U
2-Hexanone	2.0	2.0							U
4-Chlorotoluene	1.0	1.0							U
4-Isopropyltoluene	1.0	1.0							U
4-Methyl-2-pentanone	2.0	2.0							U
Acetone	2.0	2.0							U
Benzene	0.50	1.0							U
Bromobenzene	1.0	1.0							U
Bromochloromethane	0.50	1.0							U
Bromodichloromethane	0.50	1.0							U
Bromoform	1.0	1.0							U
Bromomethane	1.0	1.0							U

## ALS Houston, US

Date: 20-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS22060383

## QC BATCH REPORT

Batch ID: R410346 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
<b>MBLK</b>	Sample ID: VBLKW-220609	Units: ug/L		Analysis Date: 09-Jun-2022 12:37					
Client ID:	Run ID: VOA6_410346	SeqNo: 6685894		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	2.0	2.0							U
Carbon tetrachloride	1.0	1.0							U
Chlorobenzene	1.0	1.0							U
Chloroethane	1.0	1.0							U
Chloroform	0.50	1.0							U
Chloromethane	0.50	1.0							U
cis-1,2-Dichloroethene	0.50	1.0							U
cis-1,3-Dichloropropene	0.50	1.0							U
Dibromochloromethane	1.0	1.0							U
Dibromomethane	0.50	1.0							U
Dichlorodifluoromethane	1.0	1.0							U
Ethylbenzene	1.0	1.0							U
Hexachlorobutadiene	1.0	1.0							U
Isopropylbenzene	1.0	1.0							U
m,p-Xylene	1.0	2.0							U
Methylene chloride	2.0	2.0							U
Naphthalene	1.0	1.0							U
n-Butylbenzene	1.0	1.0							U
n-Propylbenzene	1.0	1.0							U
o-Xylene	1.0	1.0							U
sec-Butylbenzene	1.0	1.0							U
Styrene	1.0	1.0							U
tert-Butylbenzene	1.0	1.0							U
Tetrachloroethene	1.0	1.0							U
Toluene	0.50	1.0							U
trans-1,2-Dichloroethene	0.50	1.0							U
trans-1,3-Dichloropropene	0.50	1.0							U
Trichloroethene	0.50	1.0							U
Trichlorofluoromethane	1.0	1.0							U
Vinyl chloride	0.50	1.0							U
Surr: 1,2-Dichloroethane-d4	44.8	1.0	50	0	89.6	81 - 118			
Surr: 4-Bromofluorobenzene	47.21	1.0	50	0	94.4	85 - 114			
Surr: Dibromofluoromethane	46.63	1.0	50	0	93.3	80 - 119			
Surr: Toluene-d8	50.38	1.0	50	0	101	89 - 112			

## ALS Houston, US

Date: 20-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS22060383

## QC BATCH REPORT

Batch ID: R410346 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
LCS		Sample ID: VLCSW-220609		Units: ug/L		Analysis Date: 09-Jun-2022 11:55			
Client ID:		Run ID: VOA6_410346		SeqNo: 6685893		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	19.79	1.0	20	0	98.9	78 - 124			
1,1,1-Trichloroethane	18.97	1.0	20	0	94.8	74 - 131			
1,1,2,2-Tetrachloroethane	18.88	1.0	20	0	94.4	71 - 121			
1,1,2-Trichloroethane	19.51	1.0	20	0	97.5	80 - 119			
1,1-Dichloroethane	19.8	1.0	20	0	99.0	77 - 125			
1,1-Dichloroethene	18.11	1.0	20	0	90.6	71 - 131			
1,1-Dichloropropene	19.23	1.0	20	0	96.2	78 - 125			
1,2,3-Trichlorobenzene	18.63	1.0	20	0	93.1	69 - 129			
1,2,3-Trichloropropane	19.56	1.0	20	0	97.8	73 - 122			
1,2,4-Trichlorobenzene	18.84	1.0	20	0	94.2	69 - 130			
1,2,4-Trimethylbenzene	20.06	1.0	20	0	100	76 - 124			
1,2-Dibromo-3-chloropropane	16.18	1.0	20	0	80.9	62 - 128			
1,2-Dibromoethane	19.37	1.0	20	0	96.8	77 - 121			
1,2-Dichlorobenzene	19.64	1.0	20	0	98.2	80 - 119			
1,2-Dichloroethane	19.63	1.0	20	0	98.1	73 - 128			
1,2-Dichloropropane	19.91	1.0	20	0	99.5	78 - 122			
1,3,5-Trimethylbenzene	19.75	1.0	20	0	98.8	75 - 124			
1,3-Dichlorobenzene	20.16	1.0	20	0	101	80 - 119			
1,3-Dichloropropane	19.42	1.0	20	0	97.1	80 - 119			
1,4-Dichlorobenzene	20.12	1.0	20	0	101	79 - 118			
2,2-Dichloropropane	19.79	1.0	20	0	98.9	60 - 139			
2-Butanone	34.57	2.0	40	0	86.4	56 - 143			
2-Chlorotoluene	19.84	1.0	20	0	99.2	79 - 122			
2-Hexanone	36.52	2.0	40	0	91.3	57 - 139			
4-Chlorotoluene	20.44	1.0	20	0	102	78 - 122			
4-Isopropyltoluene	20.55	1.0	20	0	103	77 - 127			
4-Methyl-2-pentanone	35.76	2.0	40	0	89.4	67 - 130			
Acetone	37.88	2.0	40	0	94.7	39 - 160			
Benzene	19.96	1.0	20	0	99.8	79 - 120			
Bromobenzene	20.53	1.0	20	0	103	80 - 120			
Bromochloromethane	19.39	1.0	20	0	96.9	78 - 123			
Bromodichloromethane	19.13	1.0	20	0	95.7	79 - 125			
Bromoform	19.11	1.0	20	0	95.5	66 - 130			
Bromomethane	17.49	1.0	20	0	87.4	53 - 141			

## ALS Houston, US

Date: 20-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS22060383

## QC BATCH REPORT

Batch ID: R410346 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
LCS		Sample ID: VLCSW-220609		Units: ug/L		Analysis Date: 09-Jun-2022 11:55			
Client ID:		Run ID: VOA6_410346		SeqNo: 6685893		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	38.24	2.0	40	0	95.6	64 - 133			
Carbon tetrachloride	17.8	1.0	20	0	89.0	72 - 136			
Chlorobenzene	20.52	1.0	20	0	103	82 - 118			
Chloroethane	18.78	1.0	20	0	93.9	60 - 138			
Chloroform	19.45	1.0	20	0	97.3	79 - 124			
Chloromethane	20.33	1.0	20	0	102	50 - 139			
cis-1,2-Dichloroethene	20.28	1.0	20	0	101	78 - 123			
cis-1,3-Dichloropropene	19.53	1.0	20	0	97.7	75 - 124			
Dibromochloromethane	19.64	1.0	20	0	98.2	74 - 126			
Dibromomethane	19.1	1.0	20	0	95.5	79 - 123			
Dichlorodifluoromethane	18.67	1.0	20	0	93.3	32 - 152			
Ethylbenzene	20.28	1.0	20	0	101	79 - 121			
Hexachlorobutadiene	20.97	1.0	20	0	105	66 - 134			
Isopropylbenzene	18.79	1.0	20	0	94.0	72 - 131			
m,p-Xylene	40.08	2.0	40	0	100	80 - 121			
Methylene chloride	18.73	2.0	20	0	93.6	74 - 124			
Naphthalene	17.06	1.0	20	0	85.3	61 - 128			
n-Butylbenzene	19.92	1.0	20	0	99.6	75 - 128			
n-Propylbenzene	20.16	1.0	20	0	101	76 - 126			
o-Xylene	20.18	1.0	20	0	101	78 - 122			
sec-Butylbenzene	19.61	1.0	20	0	98.1	77 - 126			
Styrene	20.03	1.0	20	0	100	78 - 123			
tert-Butylbenzene	20.13	1.0	20	0	101	78 - 124			
Tetrachloroethene	19.58	1.0	20	0	97.9	74 - 129			
Toluene	20.21	1.0	20	0	101	80 - 121			
trans-1,2-Dichloroethene	19.79	1.0	20	0	99.0	75 - 124			
trans-1,3-Dichloropropene	19.16	1.0	20	0	95.8	73 - 127			
Trichloroethene	19.98	1.0	20	0	99.9	79 - 123			
Trichlorofluoromethane	17.67	1.0	20	0	88.3	65 - 141			
Vinyl chloride	18.21	1.0	20	0	91.0	58 - 137			
Surr: 1,2-Dichloroethane-d4	47.91	1.0	50	0	95.8	81 - 118			
Surr: 4-Bromofluorobenzene	49.02	1.0	50	0	98.0	85 - 114			
Surr: Dibromofluoromethane	49.03	1.0	50	0	98.1	80 - 119			
Surr: Toluene-d8	48.38	1.0	50	0	96.8	89 - 112			

## ALS Houston, US

Date: 20-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS22060383

## QC BATCH REPORT

Batch ID: R410346 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MS		Sample ID: HS22060380-03MS		Units: ug/L		Analysis Date: 09-Jun-2022 13:19			
Client ID:		Run ID: VOA6_410346		SeqNo: 6685896		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	20.56	1.0	20	0	103	78 - 124			
1,1,1-Trichloroethane	19.55	1.0	20	0	97.7	74 - 131			
1,1,2,2-Tetrachloroethane	20.28	1.0	20	0	101	71 - 121			
1,1,2-Trichloroethane	19.76	1.0	20	0	98.8	80 - 119			
1,1-Dichloroethane	19.51	1.0	20	0	97.6	77 - 125			
1,1-Dichloroethene	18.86	1.0	20	0	94.3	71 - 131			
1,1-Dichloropropene	20.95	1.0	20	0	105	78 - 125			
1,2,3-Trichlorobenzene	17.61	1.0	20	0	88.1	69 - 129			
1,2,3-Trichloropropane	19.81	1.0	20	0	99.0	73 - 122			
1,2,4-Trichlorobenzene	19.45	1.0	20	0	97.2	69 - 130			
1,2,4-Trimethylbenzene	23.23	1.0	20	0	116	76 - 124			
1,2-Dibromo-3-chloropropane	15.7	1.0	20	0	78.5	62 - 128			
1,2-Dibromoethane	19.59	1.0	20	0	97.9	77 - 121			
1,2-Dichlorobenzene	21.94	1.0	20	0	110	80 - 119			
1,2-Dichloroethane	19.27	1.0	20	0	96.3	73 - 128			
1,2-Dichloropropane	19.92	1.0	20	0	99.6	78 - 122			
1,3,5-Trimethylbenzene	23.46	1.0	20	0	117	75 - 124			
1,3-Dichlorobenzene	22.42	1.0	20	0	112	80 - 119			
1,3-Dichloropropane	19.82	1.0	20	0	99.1	80 - 119			
1,4-Dichlorobenzene	22.56	1.0	20	0	113	79 - 118			
2,2-Dichloropropane	20.17	1.0	20	0	101	60 - 139			
2-Butanone	31.45	2.0	40	0	78.6	56 - 143			
2-Chlorotoluene	22.88	1.0	20	0	114	79 - 122			
2-Hexanone	35.07	2.0	40	0	87.7	57 - 139			
4-Chlorotoluene	23.16	1.0	20	0	116	78 - 122			
4-Isopropyltoluene	24.83	1.0	20	0	124	77 - 127			
4-Methyl-2-pentanone	36.53	2.0	40	0	91.3	67 - 130			
Acetone	24.25	2.0	40	0	60.6	39 - 160			
Benzene	20.49	1.0	20	0	102	79 - 120			
Bromobenzene	23.17	1.0	20	0	116	80 - 120			
Bromochloromethane	18.89	1.0	20	0	94.5	78 - 123			
Bromodichloromethane	18.77	1.0	20	0	93.8	79 - 125			
Bromoform	18.68	1.0	20	0	93.4	66 - 130			
Bromomethane	17.2	1.0	20	0	86.0	53 - 141			



## ALS Houston, US

Date: 20-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS22060383

## QC BATCH REPORT

Batch ID: R410346 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MS		Sample ID: HS22060380-03MS		Units: ug/L		Analysis Date: 09-Jun-2022 13:19			
Client ID:		Run ID: VOA6_410346		SeqNo: 6685896		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	39.34	2.0	40	0	98.4	64 - 133			
Carbon tetrachloride	19.93	1.0	20	0	99.6	72 - 136			
Chlorobenzene	21.46	1.0	20	0	107	82 - 118			
Chloroethane	18.25	1.0	20	0	91.2	60 - 138			
Chloroform	18.81	1.0	20	0	94.0	79 - 124			
Chloromethane	17.67	1.0	20	0	88.4	50 - 139			
cis-1,2-Dichloroethene	20.16	1.0	20	0	101	78 - 123			
cis-1,3-Dichloropropene	19.37	1.0	20	0	96.9	75 - 124			
Dibromochloromethane	19.74	1.0	20	0	98.7	74 - 126			
Dibromomethane	19.04	1.0	20	0	95.2	79 - 123			
Dichlorodifluoromethane	13.68	1.0	20	0	68.4	32 - 152			
Ethylbenzene	21.77	1.0	20	0	109	79 - 121			
Hexachlorobutadiene	23.9	1.0	20	0	119	66 - 134			
Isopropylbenzene	21.03	1.0	20	0	105	72 - 131			
m,p-Xylene	43.54	2.0	40	0	109	80 - 121			
Methylene chloride	17.55	2.0	20	0	87.8	74 - 124			
Naphthalene	14.78	1.0	20	0	73.9	61 - 128			
n-Butylbenzene	24.16	1.0	20	0	121	75 - 128			
n-Propylbenzene	24.22	1.0	20	0	121	76 - 126			
o-Xylene	21.33	1.0	20	0	107	78 - 122			
sec-Butylbenzene	24.17	1.0	20	0	121	77 - 126			
Styrene	21.04	1.0	20	0	105	78 - 123			
tert-Butylbenzene	24.38	1.0	20	0	122	78 - 124			
Tetrachloroethene	22.43	1.0	20	0	112	74 - 129			
Toluene	21.44	1.0	20	0	107	80 - 121			
trans-1,2-Dichloroethene	19.99	1.0	20	0	99.9	75 - 124			
trans-1,3-Dichloropropene	18.76	1.0	20	0	93.8	73 - 127			
Trichloroethene	20.85	1.0	20	0	104	79 - 123			
Trichlorofluoromethane	19.12	1.0	20	0	95.6	65 - 141			
Vinyl chloride	17.72	1.0	20	0	88.6	58 - 137			
Surr: 1,2-Dichloroethane-d4	44.49	1.0	50	0	89.0	81 - 118			
Surr: 4-Bromofluorobenzene	48.78	1.0	50	0	97.6	85 - 114			
Surr: Dibromofluoromethane	46.51	1.0	50	0	93.0	80 - 119			
Surr: Toluene-d8	50.35	1.0	50	0	101	89 - 112			

## ALS Houston, US

Date: 20-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS22060383

## QC BATCH REPORT

Batch ID: R410346 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MSD		Sample ID: HS22060380-03MSD		Units: ug/L		Analysis Date: 09-Jun-2022 13:40			
Client ID:		Run ID: VOA6_410346		SeqNo: 6685897		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	19.98	1.0	20	0	99.9	78 - 124	20.56	2.9	20
1,1,1-Trichloroethane	18.93	1.0	20	0	94.6	74 - 131	19.55	3.24	20
1,1,2,2-Tetrachloroethane	19.56	1.0	20	0	97.8	71 - 121	20.28	3.61	20
1,1,2-Trichloroethane	19	1.0	20	0	95.0	80 - 119	19.76	3.94	20
1,1-Dichloroethane	18.78	1.0	20	0	93.9	77 - 125	19.51	3.83	20
1,1-Dichloroethene	18.21	1.0	20	0	91.0	71 - 131	18.86	3.53	20
1,1-Dichloropropene	19.98	1.0	20	0	99.9	78 - 125	20.95	4.72	20
1,2,3-Trichlorobenzene	19.4	1.0	20	0	97.0	69 - 129	17.61	9.63	20
1,2,3-Trichloropropane	20.89	1.0	20	0	104	73 - 122	19.81	5.3	20
1,2,4-Trichlorobenzene	20.15	1.0	20	0	101	69 - 130	19.45	3.55	20
1,2,4-Trimethylbenzene	21.9	1.0	20	0	109	76 - 124	23.23	5.93	20
1,2-Dibromo-3-chloropropane	16.09	1.0	20	0	80.5	62 - 128	15.7	2.5	20
1,2-Dibromoethane	19.17	1.0	20	0	95.9	77 - 121	19.59	2.13	20
1,2-Dichlorobenzene	20.89	1.0	20	0	104	80 - 119	21.94	4.89	20
1,2-Dichloroethane	19.14	1.0	20	0	95.7	73 - 128	19.27	0.666	20
1,2-Dichloropropane	19.49	1.0	20	0	97.5	78 - 122	19.92	2.17	20
1,3,5-Trimethylbenzene	21.79	1.0	20	0	109	75 - 124	23.46	7.37	20
1,3-Dichlorobenzene	21.37	1.0	20	0	107	80 - 119	22.42	4.76	20
1,3-Dichloropropane	19.43	1.0	20	0	97.2	80 - 119	19.82	1.96	20
1,4-Dichlorobenzene	21.29	1.0	20	0	106	79 - 118	22.56	5.81	20
2,2-Dichloropropane	19.29	1.0	20	0	96.5	60 - 139	20.17	4.47	20
2-Butanone	28.78	2.0	40	0	72.0	56 - 143	31.45	8.85	20
2-Chlorotoluene	21.33	1.0	20	0	107	79 - 122	22.88	7.05	20
2-Hexanone	35.26	2.0	40	0	88.1	57 - 139	35.07	0.544	20
4-Chlorotoluene	21.61	1.0	20	0	108	78 - 122	23.16	6.95	20
4-Isopropyltoluene	22.95	1.0	20	0	115	77 - 127	24.83	7.87	20
4-Methyl-2-pentanone	36.28	2.0	40	0	90.7	67 - 130	36.53	0.703	20
Acetone	24.91	2.0	40	0	62.3	39 - 160	24.25	2.68	20
Benzene	19.56	1.0	20	0	97.8	79 - 120	20.49	4.61	20
Bromobenzene	21.78	1.0	20	0	109	80 - 120	23.17	6.15	20
Bromochloromethane	18.05	1.0	20	0	90.2	78 - 123	18.89	4.59	20
Bromodichloromethane	18.32	1.0	20	0	91.6	79 - 125	18.77	2.39	20
Bromoform	18.56	1.0	20	0	92.8	66 - 130	18.68	0.669	20
Bromomethane	16.44	1.0	20	0	82.2	53 - 141	17.2	4.51	20

## ALS Houston, US

Date: 20-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS22060383

## QC BATCH REPORT

Batch ID: R410346 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MSD		Sample ID: HS22060380-03MSD		Units: ug/L		Analysis Date: 09-Jun-2022 13:40			
Client ID:		Run ID: VOA6_410346		SeqNo: 6685897		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	36.95	2.0	40	0	92.4	64 - 133	39.34	6.28	20
Carbon tetrachloride	18.69	1.0	20	0	93.4	72 - 136	19.93	6.43	20
Chlorobenzene	20.75	1.0	20	0	104	82 - 118	21.46	3.36	20
Chloroethane	17.73	1.0	20	0	88.6	60 - 138	18.25	2.9	20
Chloroform	18.28	1.0	20	0	91.4	79 - 124	18.81	2.85	20
Chloromethane	16.9	1.0	20	0	84.5	50 - 139	17.67	4.46	20
cis-1,2-Dichloroethene	19.05	1.0	20	0	95.2	78 - 123	20.16	5.68	20
cis-1,3-Dichloropropene	18.88	1.0	20	0	94.4	75 - 124	19.37	2.55	20
Dibromochloromethane	19.34	1.0	20	0	96.7	74 - 126	19.74	2.1	20
Dibromomethane	18.5	1.0	20	0	92.5	79 - 123	19.04	2.92	20
Dichlorodifluoromethane	12.92	1.0	20	0	64.6	32 - 152	13.68	5.69	20
Ethylbenzene	21.07	1.0	20	0	105	79 - 121	21.77	3.29	20
Hexachlorobutadiene	23.11	1.0	20	0	116	66 - 134	23.9	3.34	20
Isopropylbenzene	20.3	1.0	20	0	101	72 - 131	21.03	3.56	20
m,p-Xylene	41.59	2.0	40	0	104	80 - 121	43.54	4.56	20
Methylene chloride	17.04	2.0	20	0	85.2	74 - 124	17.55	2.99	20
Naphthalene	17.16	1.0	20	0	85.8	61 - 128	14.78	14.9	20
n-Butylbenzene	22.56	1.0	20	0	113	75 - 128	24.16	6.87	20
n-Propylbenzene	22.54	1.0	20	0	113	76 - 126	24.22	7.21	20
o-Xylene	20.8	1.0	20	0	104	78 - 122	21.33	2.52	20
sec-Butylbenzene	22.64	1.0	20	0	113	77 - 126	24.17	6.55	20
Styrene	20.49	1.0	20	0	102	78 - 123	21.04	2.67	20
tert-Butylbenzene	22.76	1.0	20	0	114	78 - 124	24.38	6.85	20
Tetrachloroethene	21.31	1.0	20	0	107	74 - 129	22.43	5.13	20
Toluene	20.91	1.0	20	0	105	80 - 121	21.44	2.5	20
trans-1,2-Dichloroethene	18.92	1.0	20	0	94.6	75 - 124	19.99	5.5	20
trans-1,3-Dichloropropene	18.07	1.0	20	0	90.3	73 - 127	18.76	3.78	20
Trichloroethene	19.93	1.0	20	0	99.6	79 - 123	20.85	4.53	20
Trichlorofluoromethane	17.76	1.0	20	0	88.8	65 - 141	19.12	7.41	20
Vinyl chloride	16.82	1.0	20	0	84.1	58 - 137	17.72	5.22	20
Surr: 1,2-Dichloroethane-d4	46.26	1.0	50	0	92.5	81 - 118	44.49	3.91	20
Surr: 4-Bromofluorobenzene	48.12	1.0	50	0	96.2	85 - 114	48.78	1.35	20
Surr: Dibromofluoromethane	46.95	1.0	50	0	93.9	80 - 119	46.51	0.942	20
Surr: Toluene-d8	50.35	1.0	50	0	101	89 - 112	50.35	0	20

ALS Houston, US

Date: 20-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS22060383

**QC BATCH REPORT****Batch ID:** R410346 ( 0 )**Instrument:** VOA6**Method:** VOLATILES ORGANICS BY METHOD  
8260C

The following samples were analyzed in this batch:

HS22060383-01	HS22060383-03
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## ALS Houston, US

Date: 20-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS22060383

**QC BATCH REPORT**

Batch ID: R410341 ( 0 )		Instrument: UV-2450		Method: HEXAVALENT CHROMIUM BY SW7196A						
<b>MBLK</b>	Sample ID: MBLK-R410341	Units: mg/L		Analysis Date: 08-Jun-2022 12:32						
Client ID:	Run ID: UV-2450_410341	SeqNo: 6685771		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.00600	0.0100								U
<b>LCS</b>	Sample ID: LCS-R410341	Units: mg/L		Analysis Date: 08-Jun-2022 12:32						
Client ID:	Run ID: UV-2450_410341	SeqNo: 6685770		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.252	0.0100	0.25	0	101	90 - 111				
<b>MS</b>	Sample ID: HS22060383-01MS	Units: mg/L		Analysis Date: 08-Jun-2022 12:32						
Client ID: LH18/24-SP650_060722	Run ID: UV-2450_410341	SeqNo: 6685773		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.258	0.0100	0.25	0	103	90 - 111				
<b>MSD</b>	Sample ID: HS22060383-01MSD	Units: mg/L		Analysis Date: 08-Jun-2022 12:32						
Client ID: LH18/24-SP650_060722	Run ID: UV-2450_410341	SeqNo: 6685772		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.258	0.0100	0.25	0	103	90 - 111	0.258		0 20	
The following samples were analyzed in this batch: HS22060383-01										

**ALS Houston, US**

Date: 20-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS22060383

**QUALIFIERS,  
ACRONYMS, UNITS**

<b>Qualifier</b>	<b>Description</b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

<b>Acronym</b>	<b>Description</b>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

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**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

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Agency	Number	Expire Date
Dept of Defense	L21-682	31-Dec-2023
Florida	E87611-34	30-Jun-2022
Illinois	2000322022-9	09-May-2023
Kansas	E-10352 2021-2022	31-Jul-2022
Louisiana	03087, 2021-2022	30-Jun-2022
Maryland	343, 2022-2023	30-Jun-2023
North Carolina	624-2022	31-Dec-2022
Oklahoma	2021-080	31-Aug-2022
Texas	T104704231-22-29	30-Apr-2023
Utah	TX026932021-12	30-Jul-2022

ALS Houston, US

Date: 20-Jun-22

## Sample Receipt Checklist

Work Order ID: HS22060383

Date/Time Received: 08-Jun-2022 10:00

Client Name: Bhate Environmental

Received by: Pablo Martinez

Completed By: /S/ Pablo Martinez

08-Jun-2022 11:28

Reviewed by: /S/ Ragen Giga

08-Jun-2022 14:40

eSignature

Date/Time

eSignature

Date/Time

Matrices: **WATER**Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?

Yes ☒No ☐Not Present ☐

Custody seals intact on shipping container/cooler?

Yes ☐No ☐Not Present ☒

Custody seals intact on sample bottles?

Yes ☐No ☐Not Present ☒

VOA/TX1005/TX1006 Solids in hermetically sealed vials?

Yes ☐No ☐Not Present ☒

Chain of custody present?

Yes ☒No ☐

1 Page(s)

Chain of custody signed when relinquished and received?

Yes ☒No ☐

COC IDs: CLIENT

Samplers name present on COC?

Yes ☒No ☐

Chain of custody agrees with sample labels?

Yes ☒No ☐

Samples in proper container/bottle?

Yes ☒No ☐

Sample containers intact?

Yes ☒No ☐

Sufficient sample volume for indicated test?

Yes ☒No ☐

All samples received within holding time?

Yes ☒No ☐

Container/Temp Blank temperature in compliance?

Yes ☒No ☐

Temperature(s)/Thermometer(s):

0.8°C/1.3°C UC/C

IR 31

Cooler(s)/Kit(s):

BLUE

Date/Time sample(s) sent to storage:

6/8/22 11:30

Water - VOA vials have zero headspace?

Yes ☒No ☐No VOA vials submitted ☐

Water - pH acceptable upon receipt?

Yes ☒No ☐N/A ☐

pH adjusted?

Yes ☐No ☒N/A ☐

pH adjusted by:

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:



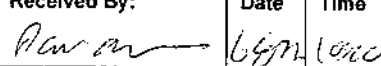
Comments:

Corrective Action:





## CHAIN OF CUSTODY


Name Of Lab Shipping To: ALS 10450 Standliff Rd., Suite 210 Houston, TX 77099 (281) 530 - 5656 ATTN: Ragen GigiPage 1 of 1

<b>Project:</b> BHATE LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS			<b>Project No.</b> NWO1312.0150.0 16.0001		<b>Analyses</b>										<b>HS22060383</b> Bhate Environmental Associates, Inc. Longhorn GW Treatment Plant Monthly Effluent Sample						
<b>Job:</b> <b>GROUNDWATER TREATMENT PLANT</b> <b>MONTHLY EFFLUENT SAMPLES</b>															<b>Remarks</b> (Preservatives, etc.)		<b>Lab I.D.#</b>				
<b>Prepared By:</b> Scott Beesinger			<b>P.O. Number</b>																		
<b>Field Sample I.D.</b>			<b>Sample Matrix</b>		<b>Date / Time</b>		<b>MS / MSD</b>		<b>No. OF CONTAINERS</b>		<b>VOLATILES</b>		<b>SILVER, SELENIUM, LEAD, BARIUM</b>		<b>HEXAVALENT CHROMIUM</b>		<b>1, 4 - DIOXANE</b>		<b>PERCHLORATE</b>		
LH18/24-SP650_060722			Water		06/07/22 / 14:00		3		X												
LH18/24-SP650_060722			Water		06/07/22 / 14:00		2						X		X						
LH18/24-SP650_060722_AIX			Water		06/07/22 / 14:00		1								X						
LH18/24-SP650_060722			Water		06/07/22 / 14:00		1				X										
Trip Blank			Water		06/07/22		2		X												
<b>Additional Remarks:</b> <u>Standard TAT on all parameters</u>																					
<b>Relinquished By:</b> 		<b>Date</b> 06/07/22	<b>Time</b> 14:30	<b>Received By:</b> 		<b>Date</b> 06/07/22	<b>Time</b> 14:30	<b>Relinquished By:</b>		<b>Date</b>	<b>Time</b>	<b>Received By:</b>		<b>Date</b>	<b>Time</b>						
<b>For Lab Use Only</b>																					
<b>Received At Lab By:</b>				<b>Date</b>	<b>Time</b>	<b>Airbill No.</b>		<b>Opened By:</b>				<b>Date</b>	<b>Time</b>	<b>Temp of Container</b>	<b>Seal No.</b>	<b>Condition</b>					
<b>Remarks:</b>																					

BWc UEL  
 123-1F605

 <b>ALS</b> 10450 Stancliff Rd., Suite 110 Houston, Texas 77059 Tel. +1 281 530 5656 Fax +1 281 530 5887	<b>CUSTOMER SEAL</b>		Sent Broken By:  Date: 6/22
	Date: 6/22 Time: 1430 Name: Susan S. S. S. Title: S. S. S.		

TRACK 5000 5007 0000  
 5000 5227 3830  
**AB SGRA** Blue 77099  
 TX-US  
 IAH



397326 073017877 GGA 50002 07347 C008



June 10, 2022

Service Request No:E2200528

Dane Wacasey  
ALS Group USA, Corp.  
10450 Stancliff Road  
Suite 210  
Houston, TX 77099-4338

**Laboratory Results for: HS22060383**

Dear Dane,

Enclosed are the results of the sample(s) submitted to our laboratory June 08, 2022  
For your reference, these analyses have been assigned our service request number **E2200528**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current TNI standards, where applicable, and except as noted in the laboratory case narrative provided. All results are intended to be considered in their entirety and ALS Environmental is not responsible for use of less than the complete final report. Results apply only to the items submitted to the laboratory, as received for analysis. In accordance with the current TNI Standard, a statement on the estimated uncertainty of measurement of any quantitative analysis will be supplied upon request.

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Corey Grandits  
Project Manager

ADDRESS 10450 Stancliff Rd., Suite 210, Houston, TX 77099  
PHONE +1 281 530 5656 | FAX +1 281 530 5887  
ALS Group USA, Corp.  
dba ALS Environmental



# Certificate of Analysis

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

**ALS Environmental**

**Client:** ALS Houston  
**Project:** HS22060383  
**Sample Matrix:** W

**Service Request No.:** E2200528  
**Date Received:** 06/08/22

**CASE NARRATIVE**

All analyses were performed in adherence to the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II. When appropriate to the method, method blank results have been reported with each analytical test.

**Sample Receipt**

One sample was received for analysis at ALS Environmental in Houston on 06/08/22.

The sample was received in good condition and is consistent with the accompanying chain of custody form. The sample was stored in a refrigerator at 4°C upon receipt at the laboratory.

**Data Validation Notes and Discussion****Precision and Accuracy:**

EQ2200238: Laboratory Control Spike/Duplicate Laboratory Control Spike (LCS/DLCS) samples were analyzed and reported in lieu of a MS/MSD for this extraction batch. LCS/DLCS RPD exceedance, the individual recoveries met acceptance criteria.

DoD Certification is held for the method/matrix/analytes provided in this report.

*The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.*

*Use of ALS group USA Corp dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.*

**Client:** ALS Environmental - US  
**Project:** HS22060383

**Service Request:** E2200528

**SAMPLE CROSS-REFERENCE**

<u>SAMPLE #</u>	<u>CLIENT SAMPLE ID</u>	<u>DATE</u>	<u>TIME</u>
E2200528-001	LH18/24-SP650_060722_AIX	6/7/2022	1400

**Service Request Summary**

**Folder #:** E2200528  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22060383  
**Project Number:**  
**Report To:** Dane Wacasey  
 ALS Group USA, Corp.  
 10450 Stancliff Road  
 Houston, TX 77099-4338  
 USA  
**Phone Number:** 281-575-2190  
**Cell Number:**  
**Fax Number:** 281-530-5887  
**E-mail:** dane.wacasey@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 06/08/22  
**Internal Due Date:** 6/22/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22060383  
**EDD:** No EDD Specified

1 120 mL-Plastic Bottle Natural WM Unpreserved

**Location:** EHRMS-AirArch 1

**Pressure Gas:**

				HOUSTON
Lab Samp No.	Client Samp No	Matrix	Collected	CIO4 DOD/6850
E2200528-001	LH18/24-SP650_060722_AIX	Water	06/07/22 1400	IV

**Service Request Summary**

**Folder #:** E2200528  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22060383  
**Project Number:**  
  
**Report To:** Dane Wacasey  
 ALS Group USA, Corp.  
 10450 Stancliff Road  
 Houston, TX 77099-4338  
 USA  
**Phone Number:** 281-575-2190  
**Cell Number:**  
**Fax Number:** 281-530-5887  
**E-mail:** dane.wacasey@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 06/08/22  
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**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22060383  
**EDD:** No EDD Specified

1 120 mL-Plastic Bottle Natural WM Unpreserved

**Location:** EHRMS-AirArch 1

**Pressure Gas:**

**Test Comments:**

Group	Test/Method	Samples	Comments
Semivoa GCMS	CIO4 DOD/6850	1	IV Due 6/29



## Data Qualifiers

### Lab Standard

- + Possible Tedlar bag artifact.
- A TIC is a suspected aldol-condensation product
- B Analyte found in the associated method blank as well as in the sample.
- BC Reported results are not blank corrected.
- BH The back section of the tube yielded higher results than the front.
- BT Results indicated possible breakthrough; back section  $\geq 10\%$  front section.
- C Result identification confirmed.
- D Compound identified in an analysis at a secondary dilution factor
- D Spike was diluted out
- DE Reported results are corrected for desorption efficiency.
- E Estimated value. Concentration above calibration range
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- H1 Sample analysis performed past holding time. See case narrative.
- H2 Initial analysis within holding time. Reanalysis for the required dilution was past holding time.
- H3 Sample was received and analyzed past holding time.
- H4 Sample was extracted past required extraction holding time, but analyzed within analysis holding time. See case narrative.
- I Internal standard not within the specified limits. See case narrative.
- J Estimated Value. Concentration found below MRL.
- K (Auto) The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- K A deflection in the QC ion may indicate interference with the quantitation of this ion. The concentration of this analyte should be considered as an estimate.
- K Analyte was detected above the method reporting limit prior to normalization.
- K The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- L1 Laboratory control sample recovery outside the specified limits; results may be biased high.
- L2 Laboratory control sample recovery outside the specified limits; results may be biased low.
- L3 Laboratory control sample recovery outside the specified limits.
- M Matrix interference; results may be biased high.
- M The duplicate injection precision not met.
- M1 Matrix interference due to coelution with a non-target compound; results may be biased high.

## Data Qualifiers

### Lab Standard

- N Presumptive evidence of a compound for TICs that have been identified based on a mass spectral library search.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- P Indicates chlorodiphenyl ether interference present at the retention time of the target compound.
- P Pesticide/Aroclor target analyte > 40% difference for detected concentrations between GC columns
- Q Indicates as estimated value because the P and P + 2 theoretical abundance ratio does not meet method criteria.
- R Duplicate Precision not met.
- R1 Duplicate precision not within the specified limits; however, the results are below the MRL and considered estimated.
- S Surrogate recovery not within specified limits.
- S The reported value was determined by the Method of Standard Additions (MSA).
- T Analyte is a tentatively identified compound, result is estimated.
- U Compound was analyzed for, but was not detected (ND).
- V1 The continuing calibration verification standard was outside (biased high) the specified limits for this compound.
- V2 The continuing calibration verification standard was outside (biased low) the specified limits for this compound.
- W Result quantified, but the corresponding peak was detected outside the generated retention time window.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- X See case narrative.
- Y Recovery outside limits
- Y The chromatogram resembles a petroleum product but does not match the calibration standard.
- Z The chromatogram does not resemble a petroleum product.
- i The MRL/MDL has been elevated due to a matrix interference.

## ALS Laboratory Group

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### Acronyms

Cal	Calibration
Conc	CONCetration
Dioxin(s)	Polychlorinated dibenzo-p-dioxin(s)
EDL	Estimated Detection Limit
EMPC	Estimated Maximum Possible Concentration
Flags	Data qualifiers
Furan(s)	Polychlorinated dibenzofuran(s)
g	Grams
ICAL	Initial CALibration
ID	IDentifier
Ions	Masses monitored for the analyte during data acquisition
L	Liter (s)
LCS	Laboratory Control Sample
DLCS	Duplicate Laboratory Control Sample
MB	Method Blank
MCL	Method Calibration Limit
MDL	Method Detection Limit
mL	Milliliters
MS	Matrix Spiked sample
DMS	Duplicate Matrix Spiked sample
NO	Number of peaks meeting all identification criteria
PCDD(s)	Polychlorinated dibenzo-p-dioxin(s)
PCDF(s)	Polychlorinated dibenzofuran(s)
ppb	Parts per billion
ppm	Parts per million
ppq	Parts per quadrillion
ppt	Parts per trillion
QA	Quality Assurance
QC	Quality Control
Ratio	Ratio of areas from monitored ions for an analyte
% Rec.	Percent recovery
RPD	Relative Percent Difference
RRF	Relative Response Factor
RT	Retention Time
SDG	Sample Delivery Group
S/N	Signal-to-noise ratio
TEF	Toxicity Equivalence Factor
TEQ	Toxicity Equivalence Quotient



### State Certifications, Accreditations, and Licenses

Agency	Number	Expire Date
Arizona Department of Health Services	AZ0793	5/27/2023
Department of Defense	L22-90	3/31/2024
Florida Department of Health	E87611-34	6/30/2022
Hawaii Department of Health	2022	4/30/2023
Illinois Environmental Protection Agency	2000322022-9	5/9/2023
Kansas Department of Health and Environment	E-10352 2022	7/31/2022
Louisiana Department of Environmental Quality	03087-2021	6/30/2022
Louisiana Department of Health and Hospitals	LA028	12/31/2022
Maine Department of Health and Human Services	2022017	6/5/2024
Maryland Department of the Environment	343	6/30/2022
Michigan Department of Environmental Quality	9971-2022	4/30/2023
Minnesota Department of Health	2228443	12/31/2022
Nebraska Department of Health and Human Services	NE-OS-25-13	4/30/2023
Nevada Department of Conservation and Natural Resources	TX026932022-1	7/31/2022
New Hampshire Environmental Laboratory Accreditation Program	209422	4/24/2023
New Jersey Department of Environmental Protection	TX008	6/30/2022
New York Department of Health	11707	3/31/2023
Oklahoma Department of Environmental Quality	2021-080	8/31/2022
Oregon Environmental Laboratory Accreditation Program	TX200002	5/15/2023
Pennsylvania Department of Environmental Protection	68-03441-015	6/30/2022
Perry Johnson Laboratory Accreditation	L22-91	3/31/2024
Tennessee Department of Environment and Conservation	04016-2022	4/30/2023
Texas Commission on Environmental Quality	T104704231-22-29	4/30/2023
United States Department of Agriculture	P330-19-00299	10/10/2022
Utah Department of Health Environmental Laboratory Certification	TX026932021-12	7/31/2022
Washington Department of Health	C819-2022	11/14/2022



## Chain of Custody

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)



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Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887  
www.alsglobal.com

## Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 18906

**SUBCONTRACT TO:**

ALS Environmental  
10450 Stancliff Road Suite 210  
Houston, TX 77084

**Phone:** +1 281 530 5656

**CUSTOMER  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Dane J. Wacasey  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Email:** Dane.Wacasey@alsglobal.com  
**Alternate  
Contact:**  
**Email:**

**INVOICE  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Accounts Payable  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Reference:** HS22060383  
**TSR:** Houston House Acct

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS22060383-02	LH18/24-SP650_060722_AIX	Water	07 Jun 2022 14:00
Provide Level II and Level IV reports in separate pdf			22 Jun 2022

**Comments:** Please analyze for the analysis listed above.  
Send report to the emails shown above.

**QC Level:** DOD IV (DoD Data Package)

Relinquished By: *[Signature]*  
Received By: *[Signature]*  
Cooler ID(s): *[Signature]*

Date/Time: 6-8-22 11:30  
Date/Time: 6-8-22 11:30  
Temperature(s): \_\_\_\_\_

RIGHT SOLUTIONS | RIGHT PARTNER



## Cooler Receipt Form

Project Chemist ELClient/Project ALY-H Thermometer ID 1024Date/Time Received: 6-8-22 Initials: EL Date/Time Logged in: 6-8-22 Initials: EL1. Method of delivery: ☐ US Mail ☐ Fed Ex ☐ UPS ☐ DHL ☒ <sup>ALS</sup>Courier ☐ Client2. Samples received in: ☒ Cooler ☐ Box ☐ Envelope ☐ Other \_\_\_\_\_3. Were custody seals on coolers? ☐ Yes ☒ No If yes, how many and where?Were they intact? ☐ Yes ☐ No ☒ N/AWere they signed and dated? ☐ Yes ☐ No ☒ N/A4. Packing Material: ☐ Inserts ☒ Baggies ☐ Bubble Wrap ☐ Gel Packs ☒ Wet Ice ☐ Sleeves ☐ Other \_\_\_\_\_5. Foreign or Regulated Soil? ☐ Yes ☐ No Location of Sampling: \_\_\_\_\_

Cooler Tracking Number	COC ID	Date Opened	Time Opened	Opened By	Temp. °C	Temp Blank?
NA		6-8-22	1146	EL	1.3°C	<input checked="" type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>

6. Were custody papers properly filled out (ink, signed, dated, etc)? ☒ Yes ☐ No7. Did all bottles arrive in good condition (not broken, no signs of leakage)? ☒ Yes ☐ No8. Were all sample labels complete (i.e., sample ID, analysis, preservation, etc)? ☒ Yes ☐ No9. Were appropriate bottles/containers and volumes received for the requested tests? ☒ Yes ☐ No10. Did sample labels and tags agree with custody documents? ☒ Yes ☐ No

Notes, Discrepancies, &amp; Resolutions:

Service request Label:



10450 Stancliff Rd., Suite 210  
Houston, TX 77099  
T: +1 713 266 1599  
F: +1 713 266 1599  
[www.alsglobal.com](http://www.alsglobal.com)

## SAMPLE ACCEPTANCE POLICY

This policy outlines the criteria samples must meet to be accepted by ALS Environmental – Houston HRMS.

### **Cooler Custody Seals (desirable, mandatory if specified in SAP):**

- ✓ Intact on outside of cooler, signed and dated

### **Chain-of-Custody (COC) documentation (mandatory):**

The following is required on each COC:

- ✓ Sample ID, the location, date and time of collection, collector's name, preservation type, sample type, and any other special remarks concerning the sample. The COC must be completed in ink.
- ✓ Signature and date of relinquishing party.

In the absence of a COC at sample receipt, the COC will be requested from the client.

### **Sample Integrity (mandatory):**

Samples are inspected upon arrival to ensure that sample integrity was not compromised during transfer to the laboratory.

- ✓ Sample containers must arrive in good condition (not broken or leaking).
- ✓ Samples must be labeled appropriately, including Sample IDs, and requested test using durable labels and indelible ink.
- ✓ The correct type of sample bottle must be used for the method requested.
- ✓ An appropriate sample volume, or weight, must be received.
- ✓ Sample IDs and number of containers must reconcile with the COC.
- ✓ Samples must be received within the method defined holding time.

### **Temperature Requirement (varies by sample matrix):**

- ✓ Aqueous and Non-aqueous samples must be shipped and stored cold, at 0 to 6°C.
- ✓ Tissue samples must be shipped and stored frozen, at -20 to -10°C.
- ✓ Air samples are shipped and stored cold, at 0 to 6°C
- ✓ The sample temperature must be recorded on the COC

All cooler inspections are documented on the Cooler Receipt Form (CRF). A separate CRF is completed for each service request. Any samples not meeting the above criteria are noted on the CRF and the Project Manager notified. The Project Manager must resolve any sample integrity issues with the client prior to proceeding with the analysis. Such resolutions are documented in writing and filed with the project folder. Data associated with samples received outside of this acceptance policy will be qualified on the case narrative of the final report





# Preparation Information Benchsheets

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

**Preparation Information Benchsheet**

**Prep Run#:** 401107  
**Team:** Semivoa GCMS/GRIVERA

**Prep WorkFlow:** GenExt28Day  
**Prep Method:** Method

**Status:** Prepped  
**Prep Date/Time:** 6/9/22 09:03

#	Lab Code	Client ID	B#	Method /Test	pH	Cl	Matrix	Amt. Ext.	Sample Description
1	E2200527-001	LH18/24-SP650_060722_AIX	.01	6850/CIO4 DOD			Water	10mL	
2	E2200527-002	LH18/24-SP650_060722_BIX	.01	6850/CIO4 DOD			Water	10mL	
3	E2200528-001	LH18/24-SP650_060722_AIX	.01	6850/CIO4 DOD			Water	10mL	
4	E2200529-001	LH18/24-SP140_060722	.01	6850/CIO4 DOD			Water	10mL	
5	EQ2200238-01	MB		6850/CIO4 DOD			Liquid	10mL	
6	EQ2200238-02	LCS		6850/CIO4 DOD			Liquid	10mL	
7	EQ2200238-03	DLCS		6850/CIO4 DOD			Liquid	10mL	

**Spiking Solutions**

Name: Perchlorate Intermediate Stock1      Inventory ID    222798      Logbook Ref: Perchlorate (1st Source)      Expires On:    10/29/2022

EQ2200238-02    1.00µL      EQ2200238-03    1.00µL

Name: Perchlorate Internal Standard 1ug/mL      Inventory ID    223118      Logbook Ref: Perchlorate Internal Standard      Expires On:    10/31/2022

E2200527-001    100.00µL      E2200527-002    100.00µL      E2200528-001    100.00µL      E2200529-001    100.00µL      EQ2200238-01    100.00µL      EQ2200238-02    100.00µL  
EQ2200238-03    100.00µL

**Preparation Materials**

Water HPLC Grade      02/16/2022 Water (221769)      6850 Amber Glass screw vial      2mL Screw Top Vial (221894)      537M Glass Culture Tubes      537M Glass Tubes (218064)  
6850 0.45um syringe filters      6850 Syringe Filters (222410)      6850 Luer-Lok Syringes      Luer-Lok Syringes (221305)      6850 Pipette Tips 50-1000 uL      6850 Pipette Tips (221929)

**Preparation Steps**

Step: Preparation  
Started: 6/9/22 09:03  
Finished: 6/9/22 09:36  
By: GRIVERA  
Comments

Comments: \_\_\_\_\_

Reviewed By: GR      Date: 6/9/22

Chain of Custody

Relinquished By: \_\_\_\_\_ Date: \_\_\_\_\_      Extracts Examined  
Received By: \_\_\_\_\_ Date: \_\_\_\_\_      Yes      No



# Analytical Results

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22060383  
**Sample Matrix:** Water  
**Sample Name:** LH18/24-SP650\_060722\_AIX  
**Lab Code:** E2200528-001

**Service Request:** E2200528  
**Date Collected:** 6/ 7/22 1400  
**Date Received:** 6/ 8/22  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.244		0.200	0.100	0.0500	2	6/ 9/22	6/9/22 14:24	401107	766959	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22060383  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** EQ2200238-01

**Service Request:** E2200528  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	0.100	0.0500	0.0250	1	6/ 9/22	6/9/22 11:41	401107	766959	



## Accuracy & Precision

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS22060383  
**Sample Matrix:** Water

**Service Request:** E2200528  
**Date Analyzed:** 6/ 9/22

**Lab Control Sample Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**Analytical Method:** 6850  
**Prep Method:** Method

**Units:** µg/L  
**Basis:** NA

**Extraction Lot:** 401107

Analyte Name	Lab Control Sample EQ2200238-02			Duplicate Lab Control Sample EQ2200238-03			% Rec Limits	RPD	RPD Limit
	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Perchlorate	0.0914	0.100	91	0.112	0.100	112	84 - 119	21 *	15

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22060383  
**Sample Matrix:** Water  
**Sample Name:** Lab Control Sample  
**Lab Code:** EQ2200238-02

**Service Request:** E2200528  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.0914	J	0.100	0.0500	0.0250	1	6/ 9/22	6/9/22 12:21	401107	766959	



## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22060383  
**Sample Matrix:** Water  
**Sample Name:** Duplicate Lab Control Sample  
**Lab Code:** EQ2200238-03

**Service Request:** E2200528  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.112		0.100	0.0500	0.0250	1	6/ 9/22	6/9/22 12:52	401107	766959	



---

10450 Stancliff Rd. Suite 210  
Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887

June 20, 2022

Marcia Olive  
Bhate Environmental Associates, Inc.  
445 Union Blvd Ste 129  
Lakewood, CO 80228

Work Order: **HS22060385**

Laboratory Results for: **Longhorn GW Treatment Plant Monthly Influent Samples**

Dear Marcia Olive,

ALS Environmental received 1 sample(s) on Jun 08, 2022 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: JUMOKE.LAWAL

Dane J. Wacasey

ALS Houston, US

Date: 20-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Influent Samples  
**Work Order:** HS22060385

**SAMPLE SUMMARY**

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS22060385-01	LH18/24-SP140_060722	Water		07-Jun-2022 14:00	08-Jun-2022 10:00	<input type="checkbox"/>

**ALS Houston, US**

Date: 20-Jun-22

---

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Influent Samples  
**Work Order:** HS22060385

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**CASE NARRATIVE**

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**Work Order Comments**

- The analysis for Perchlorate was subcontracted to ALS Houston High-Res Lab. Final report attached
- 

**Metals by Method SW6020A****Batch ID: 180102**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**WetChemistry by Method SW7196****Batch ID: R410341**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

## ALS Houston, US

Date: 20-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Monthly Influent Samples  
 Sample ID: LH18/24-SP140\_060722  
 Collection Date: 07-Jun-2022 14:00

**ANALYTICAL REPORT**

WorkOrder:HS22060385  
 Lab ID:HS22060385-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>METALS BY ICPMS BY SW6020A</b>		<b>Method:SW6020A</b>				Prep:SW3010A / 17-Jun-2022		Analyst: JC
Selenium	0.00250	U	0.00110	0.00250	0.00500	mg/L	1	20-Jun-2022 13:04
Silver	0.000500	U	0.000200	0.000500	0.00500	mg/L	1	20-Jun-2022 13:04
<b>HEXAVALENT CHROMIUM BY SW7196A</b>		<b>Method:SW7196</b>						Analyst: AP
Chromium, Hexavalent	0.00600	U	0.00600	0.00600	0.0100	mg/L	1	08-Jun-2022 12:32
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	10-Jun-2022 14:08

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## Weight / Prep Log

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Influent Samples  
**WorkOrder:** HS22060385

<b>Batch ID:</b> 180102	<b>Start Date:</b> 17 Jun 2022 08:00	<b>End Date:</b> 17 Jun 2022 12:00
<b>Method:</b> WATER - SW3010A	<b>Prep Code:</b> 3010A	

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor	
HS22060385-01		10 (mL)	10 (mL)	1	120 plastic HNO3

ALS Houston, US

Date: 20-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Influent Samples  
**WorkOrder:** HS22060385

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> 180102 ( 0 )		<b>Test Name :</b> METALS BY ICPMS BY SW6020A			<b>Matrix:</b> Water	
HS22060385-01	LH18/24-SP140_060722	07 Jun 2022 14:00		17 Jun 2022 08:00	20 Jun 2022 13:04	1
<b>Batch ID:</b> R410341 ( 0 )		<b>Test Name :</b> HEXAVALENT CHROMIUM BY SW7196A			<b>Matrix:</b> Water	
HS22060385-01	LH18/24-SP140_060722	07 Jun 2022 14:00			08 Jun 2022 12:32	1
<b>Batch ID:</b> R410399 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			<b>Matrix:</b> Water	
HS22060385-01	LH18/24-SP140_060722	07 Jun 2022 14:00			10 Jun 2022 14:08	1

## ALS Houston, US

Date: 20-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Influent Samples  
**WorkOrder:** HS22060385

**QC BATCH REPORT**

Batch ID: 180102 ( 0 )		Instrument: ICPMS06		Method: METALS BY ICPMS BY SW6020A					
<b>MBLK</b>	Sample ID: <b>MBLK-180102</b>	Units: <b>mg/L</b>		Analysis Date: <b>20-Jun-2022 12:58</b>					
Client ID:	Run ID: <b>ICPMS06_411043</b>	SeqNo: <b>6702267</b>		PrepDate: <b>17-Jun-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Selenium	0.00250	0.00500							U
Silver	0.000500	0.00500							U
<b>LCS</b>	Sample ID: <b>LCS-180102</b>	Units: <b>mg/L</b>		Analysis Date: <b>20-Jun-2022 13:00</b>					
Client ID:	Run ID: <b>ICPMS06_411043</b>	SeqNo: <b>6702252</b>		PrepDate: <b>17-Jun-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Selenium	0.05323	0.00500	0.05	0	106	80 - 120			
Silver	0.0491	0.00500	0.05	0	98.2	85 - 116			
<b>MS</b>	Sample ID: <b>HS22060438-03MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>20-Jun-2022 13:14</b>					
Client ID:	Run ID: <b>ICPMS06_411043</b>	SeqNo: <b>6702259</b>		PrepDate: <b>17-Jun-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Selenium	0.0457	0.00500	0.05	-0.000296	92.0	80 - 120			
<b>MS</b>	Sample ID: <b>HS22060438-03MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>20-Jun-2022 13:44</b>					
Client ID:	Run ID: <b>ICPMS06_411043</b>	SeqNo: <b>6702286</b>		PrepDate: <b>17-Jun-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Silver	0.04644	0.00500	0.05	0	92.9	85 - 116			
<b>MSD</b>	Sample ID: <b>HS22060438-03MSD</b>	Units: <b>mg/L</b>		Analysis Date: <b>20-Jun-2022 13:16</b>					
Client ID:	Run ID: <b>ICPMS06_411043</b>	SeqNo: <b>6702260</b>		PrepDate: <b>17-Jun-2022</b>		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Selenium	0.0507	0.00500	0.05	-0.000296	102	80 - 120	0.0457	10.4	20
Silver	0.04628	0.00500	0.05	0.000027	92.5	85 - 116	0.04233	8.93	20



ALS Houston, US

Date: 20-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Influent Samples  
**WorkOrder:** HS22060385

**QC BATCH REPORT**

Batch ID: 180102 ( 0 )		Instrument: ICPMS06		Method: METALS BY ICPMS BY SW6020A					
<b>PDS</b>		Sample ID: HS22060438-03PDS		Units: mg/L		Analysis Date: 20-Jun-2022 13:18			
Client ID:		Run ID: ICPMS06_411043		SeqNo: 6702261		PrepDate: 17-Jun-2022		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Selenium	0.1184	0.00500	0.1	-0.000296	119	80 - 120			
Silver	0.1116	0.00500	0.1	0.000027	112	80 - 120			
<b>SD</b>		Sample ID: HS22060438-03SD		Units: mg/L		Analysis Date: 20-Jun-2022 13:12			
Client ID:		Run ID: ICPMS06_411043		SeqNo: 6702258		PrepDate: 17-Jun-2022		DF: 5	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%D	%D Limit Qual
Selenium	0.0125	0.0250					-0.000296	0 10	U
Silver	0.00250	0.0250					0.000027	0 10	U
The following samples were analyzed in this batch: HS22060385-01									

## ALS Houston, US

Date: 20-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Influent Samples  
**WorkOrder:** HS22060385

**QC BATCH REPORT**

Batch ID: R410341 ( 0 )		Instrument: UV-2450		Method: HEXAVALENT CHROMIUM BY SW7196A						
<b>MBLK</b>	Sample ID: MBLK-R410341	Units: mg/L		Analysis Date: 08-Jun-2022 12:32						
Client ID:	Run ID: UV-2450_410341		SeqNo: 6685771		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.00600	0.0100								U
<b>LCS</b>	Sample ID: LCS-R410341	Units: mg/L		Analysis Date: 08-Jun-2022 12:32						
Client ID:	Run ID: UV-2450_410341		SeqNo: 6685770		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.252	0.0100	0.25	0	101	90 - 111				
<b>MS</b>	Sample ID: HS22060383-01MS	Units: mg/L		Analysis Date: 08-Jun-2022 12:32						
Client ID:	Run ID: UV-2450_410341		SeqNo: 6685773		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.258	0.0100	0.25	0	103	90 - 111				
<b>MSD</b>	Sample ID: HS22060383-01MSD	Units: mg/L		Analysis Date: 08-Jun-2022 12:32						
Client ID:	Run ID: UV-2450_410341		SeqNo: 6685772		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.258	0.0100	0.25	0	103	90 - 111	0.258		0 20	
The following samples were analyzed in this batch: HS22060385-01										

**ALS Houston, US**

Date: 20-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Influent Samples  
**WorkOrder:** HS22060385

**QUALIFIERS,  
ACRONYMS, UNITS**

<b>Qualifier</b>	<b>Description</b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

<b>Acronym</b>	<b>Description</b>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

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**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

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Agency	Number	Expire Date
Dept of Defense	L21-682	31-Dec-2023
Florida	E87611-34	30-Jun-2022
Illinois	2000322022-9	09-May-2023
Kansas	E-10352 2021-2022	31-Jul-2022
Louisiana	03087, 2021-2022	30-Jun-2022
Maryland	343, 2022-2023	30-Jun-2023
North Carolina	624-2022	31-Dec-2022
Oklahoma	2021-080	31-Aug-2022
Texas	T104704231-22-29	30-Apr-2023
Utah	TX026932021-12	30-Jul-2022

ALS Houston, US

Date: 20-Jun-22

## Sample Receipt Checklist

Work Order ID: HS22060385

Date/Time Received: 08-Jun-2022 10:00

Client Name: Bhate Environmental

Received by: Pablo Martinez

Completed By: /S/ Pablo Martinez

08-Jun-2022 11:40

Reviewed by: /S/ Ragen Giga

08-Jun-2022 13:22

eSignature

Date/Time

eSignature

Date/Time

Matrices: **WATER**Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?

Yes ☒No ☐Not Present ☐

Custody seals intact on shipping container/cooler?

Yes ☒No ☐Not Present ☐

Custody seals intact on sample bottles?

Yes ☐No ☐Not Present ☒

VOA/TX1005/TX1006 Solids in hermetically sealed vials?

Yes ☐No ☐Not Present ☒

Chain of custody present?

Yes ☒No ☐

1 Page(s)

Chain of custody signed when relinquished and received?

Yes ☒No ☐

COC IDs: CLIENT

Samplers name present on COC?

Yes ☒No ☐

Chain of custody agrees with sample labels?

Yes ☒No ☐

Samples in proper container/bottle?

Yes ☒No ☐

Sample containers intact?

Yes ☒No ☐

Sufficient sample volume for indicated test?

Yes ☒No ☐

All samples received within holding time?

Yes ☒No ☐

Container/Temp Blank temperature in compliance?

Yes ☒No ☐

Temperature(s)/Thermometer(s):

0.8°C/1.3°C UC/C

IR 31

Cooler(s)/Kit(s):

BLUE

Date/Time sample(s) sent to storage:

6/8/22 11:40

Water - VOA vials have zero headspace?

Yes ☐No ☐No VOA vials submitted ☒

Water - pH acceptable upon receipt?

Yes ☒No ☐N/A ☐

pH adjusted?

Yes ☐No ☒N/A ☐

pH adjusted by:

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:


Contacted By:

Regarding:

Comments:

Corrective Action:



 <b>ALS</b> 10450 Standliff Rd., Suite 110 Houston, Texas 77099 Tel. +1 281 530 5656 Fax. +1 281 530 5867	<b>CUSTOMER SEAL</b>		Seal Broken By:
	Date: 6/2/22	Time: 1430	Signature: [Signature]
	Name: [Signature] Title: [Signature]		

TRK# 5000 5007 0000  
 5000 5227 3830  
**AB SGRA** Blue 77099  
 TX-US  
 IAH

3973267-07JUN022 GGA 56002/77AT K000



June 10, 2022

Service Request No:E2200529

Dane Wacasey  
ALS Group USA, Corp.  
10450 Stancliff Road  
Suite 210  
Houston, TX 77099-4338

**Laboratory Results for: HS22060385**

Dear Dane,

Enclosed are the results of the sample(s) submitted to our laboratory June 08, 2022  
For your reference, these analyses have been assigned our service request number **E2200529**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current TNI standards, where applicable, and except as noted in the laboratory case narrative provided. All results are intended to be considered in their entirety and ALS Environmental is not responsible for use of less than the complete final report. Results apply only to the items submitted to the laboratory, as received for analysis. In accordance with the current TNI Standard, a statement on the estimated uncertainty of measurement of any quantitative analysis will be supplied upon request.

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Corey Grandits  
Project Manager

ADDRESS 10450 Stancliff Rd., Suite 210, Houston, TX 77099  
PHONE +1 281 530 5656 | FAX +1 281 530 5887  
ALS Group USA, Corp.  
dba ALS Environmental





# Certificate of Analysis

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

**ALS Environmental**

**Client:** ALS Houston  
**Project:** HS22060385  
**Sample Matrix:** W

**Service Request No.:** E2200529  
**Date Received:** 06/08/22

**CASE NARRATIVE**

All analyses were performed in adherence to the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II. When appropriate to the method, method blank results have been reported with each analytical test.

**Sample Receipt**

One sample was received for analysis at ALS Environmental in Houston on 06/08/22.

The sample was received in good condition and is consistent with the accompanying chain of custody form. The sample was stored in a refrigerator at 4°C upon receipt at the laboratory.

**Data Validation Notes and Discussion****Precision and Accuracy:**

EQ2200238: Laboratory Control Spike/Duplicate Laboratory Control Spike (LCS/DLCS) samples were analyzed and reported in lieu of a MS/MSD for this extraction batch. LCS/DLCS RPD exceedance, the individual recoveries met acceptance criteria.

DoD Certification is held for the method/matrix/analytes provided in this report.

*The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.*

*Use of ALS group USA Corp dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.*

**Client:** ALS Environmental - US  
**Project:** HS22060385

**Service Request:**E2200529

**SAMPLE CROSS-REFERENCE**

<u>SAMPLE #</u>	<u>CLIENT SAMPLE ID</u>	<u>DATE</u>	<u>TIME</u>
E2200529-001	LH18/24-SP140_060722	6/7/2022	1400

**Service Request Summary**

**Folder #:** E2200529  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22060385  
**Project Number:**  
**Report To:** Dane Wacasey  
 ALS Group USA, Corp.  
 10450 Stancliff Road  
 Houston, TX 77099-4338  
 USA  
**Phone Number:** 281-575-2190  
**Cell Number:**  
**Fax Number:** 281-530-5887  
**E-mail:** dane.wacasey@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 06/08/22  
**Internal Due Date:** 6/22/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22060385  
**EDD:** No EDD Specified

1 120 mL-Plastic Bottle Natural WM Unpreserved

**Location:** EHRMS-AirArch 1

**Pressure Gas:**

				HOUSTON
Lab Samp No.	Client Samp No	Matrix	Collected	CIO4 DOD/6850
E2200529-001	LH18/24-SP140_060722	Water	06/07/22 1400	IV

**Service Request Summary**

**Folder #:** E2200529  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22060385  
**Project Number:**  
  
**Report To:** Dane Wacasey  
 ALS Group USA, Corp.  
 10450 Stancliff Road  
 Houston, TX 77099-4338  
 USA  
**Phone Number:** 281-575-2190  
**Cell Number:**  
**Fax Number:** 281-530-5887  
**E-mail:** dane.wacasey@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 06/08/22  
**Internal Due Date:** 6/22/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22060385  
**EDD:** No EDD Specified

1 120 mL-Plastic Bottle Natural WM Unpreserved

**Location:** EHRMS-AirArch 1

**Pressure Gas:**

**Test Comments:**

Group	Test/Method	Samples	Comments
Semivoa GCMS	CIO4 DOD/6850	1	IV Due 6/29

## Data Qualifiers

### Lab Standard

- + Possible Tedlar bag artifact.
- A TIC is a suspected aldol-condensation product
- B Analyte found in the associated method blank as well as in the sample.
- BC Reported results are not blank corrected.
- BH The back section of the tube yielded higher results than the front.
- BT Results indicated possible breakthrough; back section  $\geq 10\%$  front section.
- C Result identification confirmed.
- D Compound identified in an analysis at a secondary dilution factor
- D Spike was diluted out
- DE Reported results are corrected for desorption efficiency.
- E Estimated value. Concentration above calibration range
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- H1 Sample analysis performed past holding time. See case narrative.
- H2 Initial analysis within holding time. Reanalysis for the required dilution was past holding time.
- H3 Sample was received and analyzed past holding time.
- H4 Sample was extracted past required extraction holding time, but analyzed within analysis holding time. See case narrative.
- I Internal standard not within the specified limits. See case narrative.
- J Estimated Value. Concentration found below MRL.
- K (Auto) The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- K A deflection in the QC ion may indicate interference with the quantitation of this ion. The concentration of this analyte should be considered as an estimate.
- K Analyte was detected above the method reporting limit prior to normalization.
- K The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- L1 Laboratory control sample recovery outside the specified limits; results may be biased high.
- L2 Laboratory control sample recovery outside the specified limits; results may be biased low.
- L3 Laboratory control sample recovery outside the specified limits.
- M Matrix interference; results may be biased high.
- M The duplicate injection precision not met.
- M1 Matrix interference due to coelution with a non-target compound; results may be biased high.

## Data Qualifiers

### Lab Standard

- N Presumptive evidence of a compound for TICs that have been identified based on a mass spectral library search.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- P Indicates chlorodiphenyl ether interference present at the retention time of the target compound.
- P Pesticide/Aroclor target analyte > 40% difference for detected concentrations between GC columns
- Q Indicates as estimated value because the P and P + 2 theoretical abundance ratio does not meet method criteria.
- R Duplicate Precision not met.
- R1 Duplicate precision not within the specified limits; however, the results are below the MRL and considered estimated.
- S Surrogate recovery not within specified limits.
- S The reported value was determined by the Method of Standard Additions (MSA).
- T Analyte is a tentatively identified compound, result is estimated.
- U Compound was analyzed for, but was not detected (ND).
- V1 The continuing calibration verification standard was outside (biased high) the specified limits for this compound.
- V2 The continuing calibration verification standard was outside (biased low) the specified limits for this compound.
- W Result quantified, but the corresponding peak was detected outside the generated retention time window.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- X See case narrative.
- Y Recovery outside limits
- Y The chromatogram resembles a petroleum product but does not match the calibration standard.
- Z The chromatogram does not resemble a petroleum product.
- i The MRL/MDL has been elevated due to a matrix interference.

## ALS Laboratory Group

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### Acronyms

Cal	Calibration
Conc	CONCetration
Dioxin(s)	Polychlorinated dibenzo-p-dioxin(s)
EDL	Estimated Detection Limit
EMPC	Estimated Maximum Possible Concentration
Flags	Data qualifiers
Furan(s)	Polychlorinated dibenzofuran(s)
g	Grams
ICAL	Initial CALibration
ID	IDentifier
Ions	Masses monitored for the analyte during data acquisition
L	Liter (s)
LCS	Laboratory Control Sample
DLCS	Duplicate Laboratory Control Sample
MB	Method Blank
MCL	Method Calibration Limit
MDL	Method Detection Limit
mL	Milliliters
MS	Matrix Spiked sample
DMS	Duplicate Matrix Spiked sample
NO	Number of peaks meeting all identification criteria
PCDD(s)	Polychlorinated dibenzo-p-dioxin(s)
PCDF(s)	Polychlorinated dibenzofuran(s)
ppb	Parts per billion
ppm	Parts per million
ppq	Parts per quadrillion
ppt	Parts per trillion
QA	Quality Assurance
QC	Quality Control
Ratio	Ratio of areas from monitored ions for an analyte
% Rec.	Percent recovery
RPD	Relative Percent Difference
RRF	Relative Response Factor
RT	Retention Time
SDG	Sample Delivery Group
S/N	Signal-to-noise ratio
TEF	Toxicity Equivalence Factor
TEQ	Toxicity Equivalence Quotient





### State Certifications, Accreditations, and Licenses

Agency	Number	Expire Date
Arizona Department of Health Services	AZ0793	5/27/2023
Department of Defense	L22-90	3/31/2024
Florida Department of Health	E87611-34	6/30/2022
Hawaii Department of Health	2022	4/30/2023
Illinois Environmental Protection Agency	2000322022-9	5/9/2023
Kansas Department of Health and Environment	E-10352 2022	7/31/2022
Louisiana Department of Environmental Quality	03087-2021	6/30/2022
Louisiana Department of Health and Hospitals	LA028	12/31/2022
Maine Department of Health and Human Services	2022017	6/5/2024
Maryland Department of the Environment	343	6/30/2022
Michigan Department of Environmental Quality	9971-2022	4/30/2023
Minnesota Department of Health	2228443	12/31/2022
Nebraska Department of Health and Human Services	NE-OS-25-13	4/30/2023
Nevada Department of Conservation and Natural Resources	TX026932022-1	7/31/2022
New Hampshire Environmental Laboratory Accreditation Program	209422	4/24/2023
New Jersey Department of Environmental Protection	TX008	6/30/2022
New York Department of Health	11707	3/31/2023
Oklahoma Department of Environmental Quality	2021-080	8/31/2022
Oregon Environmental Laboratory Accreditation Program	TX200002	5/15/2023
Pennsylvania Department of Environmental Protection	68-03441-015	6/30/2022
Perry Johnson Laboratory Accreditation	L22-91	3/31/2024
Tennessee Department of Environment and Conservation	04016-2022	4/30/2023
Texas Commission on Environmental Quality	T104704231-22-29	4/30/2023
United States Department of Agriculture	P330-19-00299	10/10/2022
Utah Department of Health Environmental Laboratory Certification	TX026932021-12	7/31/2022
Washington Department of Health	C819-2022	11/14/2022



## Chain of Custody

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)



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Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887  
www.alsglobal.com

## Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 18907

**SUBCONTRACT TO:**

ALS Environmental  
10450 Stancliff Road Suite 210  
Houston, TX 77084

**Phone:** +1 281 530 5656

**CUSTOMER  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Ragen Giga  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Email:** RagenP.Giga@ALSGlobal.com  
**Alternate  
Contact:**  
**Email:**


**INVOICE  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Accounts Payable  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Reference:** HS22060385  
**TSR:** Houston House Acct

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS22060385-01	LH18/24-SP140_060722	Water	07 Jun 2022 14:00
6850-Perch. DOD Level II & Level IV in separate pdf			22 Jun 2022

**Comments:** Please analyze for the analysis listed above.  
Send report to the emails shown above.

**QC Level:** DOD IV (DoD Data Package)

Relinquished By:   
Received By:   
Cooler ID(s): 

Date/Time: 6-8-22 16:30  
Date/Time: 6-8-22 11:30  
Temperature(s): \_\_\_\_\_

RIGHT SOLUTIONS | RIGHT PARTNER



## Cooler Receipt Form

Project Chemist ELClient/Project ALY-H Thermometer ID 1024Date/Time Received: 6.8.22 Initials: EL Date/Time Logged in: 6.8.22 Initials: EL1. Method of delivery: ☐ US Mail ☐ Fed Ex ☐ UPS ☐ DHL ☒ Courier ☐ Client2. Samples received in: ☒ Cooler ☐ Box ☐ Envelope ☐ Other \_\_\_\_\_

3. Were custody seals on coolers? ☐ Yes ☒ No If yes, how many and where?

Were they intact? ☐ Yes ☐ No ☒ N/A

Were they signed and dated? ☐ Yes ☐ No ☒ N/A

4. Packing Material: ☐ Inserts ☒ Baggies ☐ Bubble Wrap ☐ Gel Packs ☒ Wet Ice ☐ Sleeves ☐ Other \_\_\_\_\_5. Foreign or Regulated Soil? ☐ Yes ☐ No Location of Sampling: \_\_\_\_\_

Cooler Tracking Number	COC ID	Date Opened	Time Opened	Opened By	Temp. °C	Temp Blank?
NA		6.8.22	176	EL	1.7°C	<input checked="" type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>

6. Were custody papers properly filled out (ink, signed, dated, etc)? ☒ Yes ☐ No7. Did all bottles arrive in good condition (not broken, no signs of leakage)? ☒ Yes ☐ No8. Were all sample labels complete (i.e., sample ID, analysis, preservation, etc)? ☒ Yes ☐ No9. Were appropriate bottles/containers and volumes received for the requested tests? ☒ Yes ☐ No10. Did sample labels and tags agree with custody documents? ☒ Yes ☐ No

Notes, Discrepancies, &amp; Resolutions:

Service request Label:



10450 Stancliff Rd., Suite 210  
Houston, TX 77099  
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F: +1 713 266 1599  
[www.alsglobal.com](http://www.alsglobal.com)

## SAMPLE ACCEPTANCE POLICY

This policy outlines the criteria samples must meet to be accepted by ALS Environmental – Houston HRMS.

### **Cooler Custody Seals (desirable, mandatory if specified in SAP):**

- ✓ Intact on outside of cooler, signed and dated

### **Chain-of-Custody (COC) documentation (mandatory):**

The following is required on each COC:

- ✓ Sample ID, the location, date and time of collection, collector's name, preservation type, sample type, and any other special remarks concerning the sample. The COC must be completed in ink.
- ✓ Signature and date of relinquishing party.

In the absence of a COC at sample receipt, the COC will be requested from the client.

### **Sample Integrity (mandatory):**

Samples are inspected upon arrival to ensure that sample integrity was not compromised during transfer to the laboratory.

- ✓ Sample containers must arrive in good condition (not broken or leaking).
- ✓ Samples must be labeled appropriately, including Sample IDs, and requested test using durable labels and indelible ink.
- ✓ The correct type of sample bottle must be used for the method requested.
- ✓ An appropriate sample volume, or weight, must be received.
- ✓ Sample IDs and number of containers must reconcile with the COC.
- ✓ Samples must be received within the method defined holding time.

### **Temperature Requirement (varies by sample matrix):**

- ✓ Aqueous and Non-aqueous samples must be shipped and stored cold, at 0 to 6°C.
- ✓ Tissue samples must be shipped and stored frozen, at -20 to -10°C.
- ✓ Air samples are shipped and stored cold, at 0 to 6°C
- ✓ The sample temperature must be recorded on the COC

All cooler inspections are documented on the Cooler Receipt Form (CRF). A separate CRF is completed for each service request. Any samples not meeting the above criteria are noted on the CRF and the Project Manager notified. The Project Manager must resolve any sample integrity issues with the client prior to proceeding with the analysis. Such resolutions are documented in writing and filed with the project folder. Data associated with samples received outside of this acceptance policy will be qualified on the case narrative of the final report



# Preparation Information Benchsheets

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

**Preparation Information Benchsheet**

**Prep Run#:** 401107  
**Team:** Semivoa GCMS/GRIVERA

**Prep WorkFlow:** GenExt28Day  
**Prep Method:** Method

**Status:** Prepped  
**Prep Date/Time:** 6/9/22 09:03

#	Lab Code	Client ID	B#	Method /Test	pH	Cl	Matrix	Amt. Ext.	Sample Description
1	E2200527-001	LH18/24-SP650_060722_AIX	.01	6850/CIO4 DOD			Water	10mL	
2	E2200527-002	LH18/24-SP650_060722_BIX	.01	6850/CIO4 DOD			Water	10mL	
3	E2200528-001	LH18/24-SP650_060722_AIX	.01	6850/CIO4 DOD			Water	10mL	
4	E2200529-001	LH18/24-SP140_060722	.01	6850/CIO4 DOD			Water	10mL	
5	EQ2200238-01	MB		6850/CIO4 DOD			Liquid	10mL	
6	EQ2200238-02	LCS		6850/CIO4 DOD			Liquid	10mL	
7	EQ2200238-03	DLCS		6850/CIO4 DOD			Liquid	10mL	

**Spiking Solutions**

Name: Perchlorate Intermediate Stock1      Inventory ID    222798      Logbook Ref: Perchlorate (1st Source)      Expires On:    10/29/2022

EQ2200238-02    1.00µL      EQ2200238-03    1.00µL

Name: Perchlorate Internal Standard 1ug/mL      Inventory ID    223118      Logbook Ref: Perchlorate Internal Standard      Expires On:    10/31/2022

E2200527-001    100.00µL      E2200527-002    100.00µL      E2200528-001    100.00µL      E2200529-001    100.00µL      EQ2200238-01    100.00µL      EQ2200238-02    100.00µL  
EQ2200238-03    100.00µL

**Preparation Materials**

Water HPLC Grade      02/16/2022 Water (221769)      6850 Amber Glass screw vial      2mL Screw Top Vial (221894)      537M Glass Culture Tubes      537M Glass Tubes (218064)  
6850 0.45um syringe filters      6850 Syringe Filters (222410)      6850 Luer-Lok Syringes      Luer-Lok Syringes (221305)      6850 Pipette Tips 50-1000 uL      6850 Pipette Tips (221929)

**Preparation Steps**

Step: Preparation  
Started: 6/9/22 09:03  
Finished: 6/9/22 09:36  
By: GRIVERA  
Comments

Comments: \_\_\_\_\_

Reviewed By: GR      Date: 6/9/22

**Chain of Custody**

Relinquished By: \_\_\_\_\_ Date: \_\_\_\_\_      Extracts Examined  
Received By: \_\_\_\_\_ Date: \_\_\_\_\_      Yes      No



# Analytical Results

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)



## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22060385  
**Sample Matrix:** Water  
**Sample Name:** LH18/24-SP140\_060722  
**Lab Code:** E2200529-001

**Service Request:** E2200529  
**Date Collected:** 6/ 7/22 1400  
**Date Received:** 6/ 8/22  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	7010		50.0	25.0	12.5	500	6/ 9/22	6/9/22 14:32	401107	766959	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22060385  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** EQ2200238-01

**Service Request:** E2200529  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	0.100	0.0500	0.0250	1	6/ 9/22	6/9/22 11:41	401107	766959	



## Accuracy & Precision

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS22060385  
**Sample Matrix:** Water

**Service Request:** E2200529  
**Date Analyzed:** 6/ 9/22

**Lab Control Sample Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**Analytical Method:** 6850  
**Prep Method:** Method

**Units:** µg/L  
**Basis:** NA

**Extraction Lot:** 401107

Analyte Name	Lab Control Sample EQ2200238-02			Duplicate Lab Control Sample EQ2200238-03			% Rec Limits	RPD	RPD Limit
	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Perchlorate	0.0914	0.100	91	0.112	0.100	112	84 - 119	21 *	15

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22060385  
**Sample Matrix:** Water  
**Sample Name:** Lab Control Sample  
**Lab Code:** EQ2200238-02

**Service Request:** E2200529  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.0914	J	0.100	0.0500	0.0250	1	6/ 9/22	6/9/22 12:21	401107	766959	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22060385  
**Sample Matrix:** Water  
**Sample Name:** Duplicate Lab Control Sample  
**Lab Code:** EQ2200238-03

**Service Request:** E2200529  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.112		0.100	0.0500	0.0250	1	6/ 9/22	6/9/22 12:52	401107	766959	



---

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June 22, 2022

Marcia Olive  
Bhate Environmental Associates, Inc.  
445 Union Blvd Ste 129  
Lakewood, CO 80228

Work Order: **HS22060773**

Laboratory Results for: **Longhorn GW Treatment Plant Weekly Samples**

Dear Marcia Olive,

ALS Environmental received 3 sample(s) on Jun 15, 2022 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: JUMOKE.LAWAL

Dane J. Wacasey

ALS Houston, US

Date: 22-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**Work Order:** HS22060773

**SAMPLE SUMMARY**

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS22060773-01	LH18/24-SP650_061422	Water		14-Jun-2022 14:00	15-Jun-2022 10:10	<input type="checkbox"/>
HS22060773-02	LH18/24-SP650_061422_AIX	Water		14-Jun-2022 14:00	15-Jun-2022 10:10	<input type="checkbox"/>
HS22060773-03	LH18/24-SP650_061422_BIX	Water		14-Jun-2022 14:00	15-Jun-2022 10:10	<input type="checkbox"/>



ALS Houston, US

Date: 22-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**Work Order:** HS22060773

**CASE NARRATIVE**

---

**Work Order Comments**

- The analysis for Perchlorate was subcontracted to ALS Houston High-Res Lab. Final report attached

---

**WetChemistry by Method E350.3****Batch ID: R411236**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

---

**WetChemistry by Method E415.1****Batch ID: R411152**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

---

**WetChemistry by Method E365.3****Batch ID: R410871****Sample ID: LH18/24-SP650\_061422 (HS22060773-01MSD)**

- The recovery of the Matrix Spike Duplicate (MSD) associated to this analyte was outside of the established control limits. However, the LCS was within control limits. The failed recovery of the MSD may be due to sample matrix interference.
-

## ALS Houston, US

Date: 22-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Weekly Samples  
 Sample ID: LH18/24-SP650\_061422  
 Collection Date: 14-Jun-2022 14:00

**ANALYTICAL REPORT**

WorkOrder:HS22060773  
 Lab ID:HS22060773-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>AMMONIA AS N BY E350.3(ISE)</b>		<b>Method:E350.3</b>						Analyst: MZD
Nitrogen, Ammonia (As N)	13	a	0.10	0.10	0.20	mg/L	1	21-Jun-2022 17:10
<b>ORTHO PHOSPHATE (PO4) AS P BY E365.3-1978</b>		<b>Method:E365.3</b>						Analyst: MZD
Phosphorus, Total Orthophosphate (As P)	8.01	a	0.100	0.125	0.250	mg/L	10	15-Jun-2022 16:36
<b>TOTAL ORGANIC CARBON BY E415.1</b>		<b>Method:E415.1</b>						Analyst: SB
Organic Carbon, Total	17.8	a	0.500	1.00	1.00	mg/L	1	21-Jun-2022 02:44

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 22-Jun-22

Client: Bhate Environmental Associates, Inc.  
Project: Longhorn GW Treatment Plant Weekly Samples  
Sample ID: LH18/24-SP650\_061422\_AIX  
Collection Date: 14-Jun-2022 14:00

**ANALYTICAL REPORT**

WorkOrder:HS22060773  
Lab ID:HS22060773-02  
Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>						Analyst: GR
Subcontract Analysis	See Attached		0	0		NA	1	16-Jun-2022 16:23

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 22-Jun-22

Client: Bhate Environmental Associates, Inc.  
Project: Longhorn GW Treatment Plant Weekly Samples  
Sample ID: LH18/24-SP650\_061422\_BIX  
Collection Date: 14-Jun-2022 14:00

**ANALYTICAL REPORT**

WorkOrder:HS22060773  
Lab ID:HS22060773-03  
Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>						Analyst: GR
Subcontract Analysis	See Attached		0	0		NA	1	16-Jun-2022 16:23

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US

Date: 22-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22060773

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> R410837 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			<b>Matrix:</b> Water	
HS22060773-02	LH18/24-SP650_061422_AIX	14 Jun 2022 14:00			16 Jun 2022 16:23	1
HS22060773-03	LH18/24-SP650_061422_BIX	14 Jun 2022 14:00			16 Jun 2022 16:23	1
<b>Batch ID:</b> R410871 ( 0 )		<b>Test Name :</b> ORTHO PHOSPHATE (PO4) AS P BY E365.3-1978			<b>Matrix:</b> Water	
HS22060773-01	LH18/24-SP650_061422	14 Jun 2022 14:00			15 Jun 2022 16:36	10
<b>Batch ID:</b> R411152 ( 0 )		<b>Test Name :</b> TOTAL ORGANIC CARBON BY E415.1			<b>Matrix:</b> Water	
HS22060773-01	LH18/24-SP650_061422	14 Jun 2022 14:00			21 Jun 2022 02:44	1
<b>Batch ID:</b> R411236 ( 0 )		<b>Test Name :</b> AMMONIA AS N BY E350.3(ISE)			<b>Matrix:</b> Water	
HS22060773-01	LH18/24-SP650_061422	14 Jun 2022 14:00			21 Jun 2022 17:10	1

## ALS Houston, US

Date: 22-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22060773

**QC BATCH REPORT**

Batch ID: R410871 ( 0 )		Instrument: UV-2450		Method: ORTHO PHOSPHATE (PO4) AS P BY E365.3-1978						
<b>MBLK</b>	Sample ID: MBLK-R410871	Units: mg/L		Analysis Date: 15-Jun-2022 16:36						
Client ID:	Run ID: UV-2450_410871	SeqNo: 6698048		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phosphorus, Total Orthophosphate (As P)	0.0125	0.0250								U
<b>LCS</b>	Sample ID: LCS-R410871	Units: mg/L		Analysis Date: 15-Jun-2022 16:36						
Client ID:	Run ID: UV-2450_410871	SeqNo: 6698047		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phosphorus, Total Orthophosphate (As P)	0.245	0.0250	0.25	0	98.0	85 - 115				
<b>MS</b>	Sample ID: HS22060773-01MS	Units: mg/L		Analysis Date: 15-Jun-2022 16:36						
Client ID: LH18/24-SP650_061422	Run ID: UV-2450_410871	SeqNo: 6698050		PrepDate:		DF: 10				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phosphorus, Total Orthophosphate (As P)	10.03	0.250	2.5	8.01	80.8	80 - 120				E
<b>MSD</b>	Sample ID: HS22060773-01MSD	Units: mg/L		Analysis Date: 15-Jun-2022 16:36						
Client ID: LH18/24-SP650_061422	Run ID: UV-2450_410871	SeqNo: 6698049		PrepDate:		DF: 10				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phosphorus, Total Orthophosphate (As P)	9.79	0.250	2.5	8.01	71.2	80 - 120	10.03	2.42	20	S
The following samples were analyzed in this batch: HS22060773-01										

## ALS Houston, US

Date: 22-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22060773

**QC BATCH REPORT**

Batch ID: R411152 ( 0 )		Instrument: TOC_04		Method: TOTAL ORGANIC CARBON BY E415.1						
<b>MBLK</b>	Sample ID: MBLK-06202022	Units: mg/L		Analysis Date: 21-Jun-2022 01:58						
Client ID:	Run ID: TOC_04_411152		SeqNo: 6704603		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	1.00	1.00								U
<b>LCS</b>	Sample ID: LCS-06202022	Units: mg/L		Analysis Date: 21-Jun-2022 02:09						
Client ID:	Run ID: TOC_04_411152		SeqNo: 6704604		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	10.03	1.00	10	0	100	85 - 115				
<b>LCSD</b>	Sample ID: LCSD-06202022	Units: mg/L		Analysis Date: 21-Jun-2022 02:21						
Client ID:	Run ID: TOC_04_411152		SeqNo: 6704605		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	10.04	1.00	10	0	100	85 - 115	10.03	0.0997	20	
<b>MS</b>	Sample ID: HS22060773-01MS	Units: mg/L		Analysis Date: 21-Jun-2022 02:56						
Client ID: LH18/24-SP650_061422	Run ID: TOC_04_411152		SeqNo: 6704608		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	27.83	1.00	10	17.76	101	80 - 120				
The following samples were analyzed in this batch: HS22060773-01										

ALS Houston, US

Date: 22-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22060773

**QC BATCH REPORT**

Batch ID: R411236 ( 0 )		Instrument: WetChem_HS		Method: AMMONIA AS N BY E350.3(ISE)						
<b>MBLK</b>	Sample ID: MBLK-R411236	Units: mg/L		Analysis Date: 21-Jun-2022 17:10						
Client ID:	Run ID: WetChem_HS_411236		SeqNo: 6706403		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	0.10	0.20								U
<b>LCS</b>	Sample ID: LCS-R411236	Units: mg/L		Analysis Date: 21-Jun-2022 17:10						
Client ID:	Run ID: WetChem_HS_411236		SeqNo: 6706402		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	10.34	0.20	10	0	103	80 - 120				
<b>MS</b>	Sample ID: HS22060715-01MS	Units: mg/L		Analysis Date: 21-Jun-2022 17:10						
Client ID:	Run ID: WetChem_HS_411236		SeqNo: 6706407		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	9.952	0.20	10	0.319	96.3	80 - 120				
<b>MSD</b>	Sample ID: HS22060715-01MSD	Units: mg/L		Analysis Date: 21-Jun-2022 17:10						
Client ID:	Run ID: WetChem_HS_411236		SeqNo: 6706406		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	9.959	0.20	10	0.319	96.4	80 - 120	9.952	0.0703	20	
The following samples were analyzed in this batch: HS22060773-01										



**ALS Houston, US**

Date: 22-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22060773

**QUALIFIERS,  
ACRONYMS, UNITS**

<b>Qualifier</b>	<b>Description</b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

<b>Acronym</b>	<b>Description</b>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

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**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

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Agency	Number	Expire Date
California	2919 2022-2023	30-Apr-2023
Dept of Defense	L21-682	31-Dec-2023
Florida	E87611-34	30-Jun-2022
Illinois	2000322022-9	09-May-2023
Kansas	E-10352 2021-2022	31-Jul-2022
Kentucky	123043, 2022-2023	30-Apr-2023
Louisiana	03087, 2021-2022	30-Jun-2022
Maryland	343, 2022-2023	30-Jun-2023
North Carolina	624-2022	31-Dec-2022
Oklahoma	2021-080	31-Aug-2022
Texas	T104704231-22-29	30-Apr-2023
Utah	TX026932021-12	30-Jul-2022

ALS Houston, US

Date: 22-Jun-22

## Sample Receipt Checklist

Work Order ID: HS22060773

Date/Time Received: 15-Jun-2022 10:10

Client Name: Bhate Environmental

Received by: Pablo MartinezCompleted By: /S/ Pablo Martinez

15-Jun-2022 11:41

eSignature

Date/Time

Reviewed by: /S/ Dane J. Wacasey

16-Jun-2022 09:38

eSignature

Date/Time

Matrices: **WATER**Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?

Yes ☒No ☐Not Present ☐

Custody seals intact on shipping container/cooler?

Yes ☒No ☐Not Present ☐

Custody seals intact on sample bottles?

Yes ☐No ☐Not Present ☒

VOA/TX1005/TX1006 Solids in hermetically sealed vials?

Yes ☐No ☐Not Present ☒

Chain of custody present?

Yes ☒No ☐

1 Page(s)

Chain of custody signed when relinquished and received?

Yes ☒No ☐

COC IDs: CLIENT

Samplers name present on COC?

Yes ☒No ☐

Chain of custody agrees with sample labels?

Yes ☒No ☐

Samples in proper container/bottle?

Yes ☒No ☐

Sample containers intact?

Yes ☒No ☐

Sufficient sample volume for indicated test?

Yes ☒No ☐

All samples received within holding time?

Yes ☒No ☐

Container/Temp Blank temperature in compliance?

Yes ☒No ☐

Temperature(s)/Thermometer(s):

0.8°C/1.3°C UC/C

IR 31

Cooler(s)/Kit(s):

BLUE

Date/Time sample(s) sent to storage:

6/15/22 11:45

Water - VOA vials have zero headspace?

Yes ☒No ☐No VOA vials submitted ☐

Water - pH acceptable upon receipt?

Yes ☒No ☐N/A ☐

pH adjusted?

Yes ☐No ☒N/A ☐

pH adjusted by:

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:

Corrective Action:



 <b>ALS</b> 10450 Stanchfield Pkwy, Suite 211 Houston, Texas 77099 Tel: +1 281 530 5658 Fax: +1 281 530 5387	<b>CUSTODY SEAL</b>		Date: <i>6/15/22</i> Time: <i>1430</i> Signature: <i>[Signature]</i> Date: <i>6/15/22</i>
	Date:	Time:	
	Signature:		
	Comments:		

**FedEx**  
 9473 0838 9612

WED - 15 JUN AA  
 PRIORITY OVERNIGHT

**AB SGRA**

*Blue*

**77099**  
 TX-US  
 IAH



3973207 14Jun2022 555A 55062/274F/0088



June 16, 2022

Service Request No:E2200567

Dane Wacasey  
ALS Group USA, Corp.  
10450 Stancliff Road  
Suite 210  
Houston, TX 77099-4338

**Laboratory Results for: HS22060773**

Dear Dane,

Enclosed are the results of the sample(s) submitted to our laboratory June 15, 2022  
For your reference, these analyses have been assigned our service request number **E2200567**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current TNI standards, where applicable, and except as noted in the laboratory case narrative provided. All results are intended to be considered in their entirety and ALS Environmental is not responsible for use of less than the complete final report. Results apply only to the items submitted to the laboratory, as received for analysis. In accordance with the current TNI Standard, a statement on the estimated uncertainty of measurement of any quantitative analysis will be supplied upon request.

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Corey Grandits  
Project Manager

ADDRESS 10450 Stancliff Rd., Suite 210, Houston, TX 77099  
PHONE +1 281 530 5656 | FAX +1 281 530 5887  
ALS Group USA, Corp.  
dba ALS Environmental



# Certificate of Analysis

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

**ALS Environmental**

**Client:** ALS Houston  
**Project:** HS22060773  
**Sample Matrix:** W

**Service Request No.:** E2200567  
**Date Received:** 06/15/22

**CASE NARRATIVE**

All analyses were performed in adherence to the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II. When appropriate to the method, method blank results have been reported with each analytical test.

**Sample Receipt**

Two samples were received for analysis at ALS Environmental in Houston on 06/15/22.

The samples were received in good condition and are consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

**Data Validation Notes and Discussion****Precision and Accuracy:**

EQ2200247: Laboratory Control Spike/Duplicate Laboratory Control Spike (LCS/DLCS) samples were analyzed and reported in addition of a MS/MSD for this extraction batch. LCS/DLCS RPD exceedance, the individual recoveries met acceptance criteria. The MS/MSD was performed on an unrelated sample.

DoD Certification is held for the method/matrix/analytes provided in this report.

*The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.*

*Use of ALS group USA Corp dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.*



**Client:** ALS Environmental - US  
**Project:** HS22060773

**Service Request:**E2200567

### SAMPLE CROSS-REFERENCE

<u>SAMPLE #</u>	<u>CLIENT SAMPLE ID</u>	<u>DATE</u>	<u>TIME</u>
E2200567-001	LH18/24-SP650_061422_AIX	6/14/2022	1400
E2200567-002	LH18/24-SP650_061422_BIX	6/14/2022	1400

**Service Request Summary**

**Folder #:** E2200567  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22060773  
**Project Number:**  
**Report To:** Dane Wacasey  
 ALS Group USA, Corp.  
 10450 Stancliff Road  
 Houston, TX 77099-4338  
 USA  
**Phone Number:** 281-575-2190  
**Cell Number:**  
**Fax Number:** 281-530-5887  
**E-mail:** dane.wacasey@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 06/15/22  
**Internal Due Date:** 6/16/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22060773  
**EDD:** No EDD Specified

2 120 mL-Plastic Bottle Natural WM Unpreserved

**Location:** EHRMS-AirArch 1

**Pressure Gas:**

**Rush**

				HOUSTON
Lab Samp No.	Client Samp No	Matrix	Collected	CIO4 DOD/6850
E2200567-001	LH18/24-SP650_061422_AIX	Water	06/14/22 1400	IV
E2200567-002	LH18/24-SP650_061422_BIX	Water	06/14/22 1400	IV

**Service Request Summary**

**Folder #:** E2200567  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22060773  
**Project Number:**  
  
**Report To:** Dane Wacasey  
 ALS Group USA, Corp.  
 10450 Stancliff Road  
 Houston, TX 77099-4338  
 USA  
**Phone Number:** 281-575-2190  
**Cell Number:**  
**Fax Number:** 281-530-5887  
**E-mail:** dane.wacasey@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 06/15/22  
**Internal Due Date:** 6/16/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22060773  
**EDD:** No EDD Specified

2 120 mL-Plastic Bottle Natural WM Unpreserved  
**Location:** EHRMS-AirArch 1  
**Pressure Gas:**  
**Rush**

**Test Comments:**

Group	Test/Method	Samples	Comments
Semivola GCMS	CIO4 DOD/6850	2	IV Due 7/7

## Data Qualifiers

### Lab Standard

- + Possible Tedlar bag artifact.
- A TIC is a suspected aldol-condensation product
- B Analyte found in the associated method blank as well as in the sample.
- BC Reported results are not blank corrected.
- BH The back section of the tube yielded higher results than the front.
- BT Results indicated possible breakthrough; back section  $\geq 10\%$  front section.
- C Result identification confirmed.
- D Compound identified in an analysis at a secondary dilution factor
- D Spike was diluted out
- DE Reported results are corrected for desorption efficiency.
- E Estimated value. Concentration above calibration range
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- H1 Sample analysis performed past holding time. See case narrative.
- H2 Initial analysis within holding time. Reanalysis for the required dilution was past holding time.
- H3 Sample was received and analyzed past holding time.
- H4 Sample was extracted past required extraction holding time, but analyzed within analysis holding time. See case narrative.
- I Internal standard not within the specified limits. See case narrative.
- J Estimated Value. Concentration found below MRL.
- K (Auto) The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- K A deflection in the QC ion may indicate interference with the quantitation of this ion. The concentration of this analyte should be considered as an estimate.
- K Analyte was detected above the method reporting limit prior to normalization.
- K The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- L1 Laboratory control sample recovery outside the specified limits; results may be biased high.
- L2 Laboratory control sample recovery outside the specified limits; results may be biased low.
- L3 Laboratory control sample recovery outside the specified limits.
- M Matrix interference; results may be biased high.
- M The duplicate injection precision not met.
- M1 Matrix interference due to coelution with a non-target compound; results may be biased high.

## Data Qualifiers

### Lab Standard

- N Presumptive evidence of a compound for TICs that have been identified based on a mass spectral library search.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- P Indicates chlorodiphenyl ether interference present at the retention time of the target compound.
- P Pesticide/Aroclor target analyte > 40% difference for detected concentrations between GC columns
- Q Indicates as estimated value because the P and P + 2 theoretical abundance ratio does not meet method criteria.
- R Duplicate Precision not met.
- R1 Duplicate precision not within the specified limits; however, the results are below the MRL and considered estimated.
- S Surrogate recovery not within specified limits.
- S The reported value was determined by the Method of Standard Additions (MSA).
- T Analyte is a tentatively identified compound, result is estimated.
- U Compound was analyzed for, but was not detected (ND).
- V1 The continuing calibration verification standard was outside (biased high) the specified limits for this compound.
- V2 The continuing calibration verification standard was outside (biased low) the specified limits for this compound.
- W Result quantified, but the corresponding peak was detected outside the generated retention time window.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- X See case narrative.
- Y Recovery outside limits
- Y The chromatogram resembles a petroleum product but does not match the calibration standard.
- Z The chromatogram does not resemble a petroleum product.
- i The MRL/MDL has been elevated due to a matrix interference.

## ALS Laboratory Group

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### Acronyms

Cal	Calibration
Conc	CONCetration
Dioxin(s)	Polychlorinated dibenzo-p-dioxin(s)
EDL	Estimated Detection Limit
EMPC	Estimated Maximum Possible Concentration
Flags	Data qualifiers
Furan(s)	Polychlorinated dibenzofuran(s)
g	Grams
ICAL	Initial CALibration
ID	IDentifier
Ions	Masses monitored for the analyte during data acquisition
L	Liter (s)
LCS	Laboratory Control Sample
DLCS	Duplicate Laboratory Control Sample
MB	Method Blank
MCL	Method Calibration Limit
MDL	Method Detection Limit
mL	Milliliters
MS	Matrix Spiked sample
DMS	Duplicate Matrix Spiked sample
NO	Number of peaks meeting all identification criteria
PCDD(s)	Polychlorinated dibenzo-p-dioxin(s)
PCDF(s)	Polychlorinated dibenzofuran(s)
ppb	Parts per billion
ppm	Parts per million
ppq	Parts per quadrillion
ppt	Parts per trillion
QA	Quality Assurance
QC	Quality Control
Ratio	Ratio of areas from monitored ions for an analyte
% Rec.	Percent recovery
RPD	Relative Percent Difference
RRF	Relative Response Factor
RT	Retention Time
SDG	Sample Delivery Group
S/N	Signal-to-noise ratio
TEF	Toxicity Equivalence Factor
TEQ	Toxicity Equivalence Quotient



## State Certifications, Accreditations, and Licenses

Agency	Number	Expire Date
Arizona Department of Health Services	AZ0793	5/27/2023
Department of Defense	L22-90	3/31/2024
Florida Department of Health	E87611-34	6/30/2022
Hawaii Department of Health	2022	4/30/2023
Illinois Environmental Protection Agency	2000322022-9	5/9/2023
Kansas Department of Health and Environment	E-10352 2022	7/31/2022
Louisiana Department of Environmental Quality	03087-2021	6/30/2022
Louisiana Department of Health and Hospitals	LA028	12/31/2022
Maine Department of Health and Human Services	2022017	6/5/2024
Maryland Department of the Environment	343	6/30/2022
Michigan Department of Environmental Quality	9971-2022	4/30/2023
Minnesota Department of Health	2228443	12/31/2022
Nebraska Department of Health and Human Services	NE-OS-25-13	4/30/2023
Nevada Department of Conservation and Natural Resources	TX026932022-1	7/31/2022
New Hampshire Environmental Laboratory Accreditation Program	209422	4/24/2023
New Jersey Department of Environmental Protection	TX008	6/30/2022
New York Department of Health	11707	3/31/2023
Oklahoma Department of Environmental Quality	2021-080	8/31/2022
Oregon Environmental Laboratory Accreditation Program	TX200002	5/15/2023
Pennsylvania Department of Environmental Protection	68-03441-015	6/30/2022
Perry Johnson Laboratory Accreditation	L22-91	3/31/2024
Tennessee Department of Environment and Conservation	04016-2022	4/30/2023
Texas Commission on Environmental Quality	T104704231-22-29	4/30/2023
United States Department of Agriculture	P330-19-00299	10/10/2022
Utah Department of Health Environmental Laboratory Certification	TX026932021-12	7/31/2022
Washington Department of Health	C819-2022	11/14/2022



## Chain of Custody

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)





10450 Stancliff Rd, Ste 210  
Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887  
www.alsglobal.com

## Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 18960

**SUBCONTRACT TO:**

ALS Environmental  
10450 Stancliff Road Suite 210  
Houston, TX 77084

**Phone:** +1 281 530 5656

**CUSTOMER  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Dane J. Wacasey  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Email:** Dane.Wacasey@alsglobal.com  
**Alternate  
Contact:**  
**Email:**

**INVOICE  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Accounts Payable  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Reference:** HS22060773  
**TSR:** Houston House Acct

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS22060773-02	LH18/24-SP650_061422_AIX	Water	14 Jun 2022 14:00
	6850-Perch. DOD Level II & Level IV	in separate pdf	16 Jun 2022
2. HS22060773-03	LH18/24-SP650_061422_BIX	Water	14 Jun 2022 14:00
	6850-Perch. DOD Level II & Level IV	in separate pdf	16 Jun 2022

**Comments:** Please analyze for the analysis listed above.  
Send report to the emails shown above.

**QC Level:** DOD IV (DoD Data Package)

Relinquished By: Park [Signature]

Date/Time: 6/15/22 11:45

Received By: [Signature] COREY S

Date/Time: 6/15/22 11:45

Cooler ID(s): [Signature]

Temperature(s): \_\_\_\_\_

RIGHT SOLUTIONS | RIGHT PARTNER



## Cooler Receipt Form

Project Chemist

16

Client/Project

ALS-11

Thermometer ID

1031

Date/Time Received:

6-14-22

Initials:

16

Date/Time Logged in:

6-14-22

Initials

16

1. Method of delivery: ☐ US Mail ☐ Fed Ex ☐ UPS ☐ DHL ☒ <sup>ALS</sup> Courier ☐ Client2. Samples received in: ☒ Cooler ☐ Box ☐ Envelope ☐ Other3. Were custody seals on coolers? ☐ Yes ☒ No

If yes, how many and where?

Were they intact? ☐ Yes ☐ No ☒ N/AWere they signed and dated? ☐ Yes ☐ No ☒ N/A4. Packing Material: ☐ Inserts ☒ Baggies ☐ Bubble Wrap ☐ Gel Packs ☒ Wet Ice ☐ Sleeves ☐ Other

5. Foreign or Regulated Soil?

☐ Yes ☐ No

Location of Sampling:

Cooler Tracking Number	COC ID	Date Opened	Time Opened	Opened By	Temp. °C	Temp Blank?
NA		6-14-22	1145	16	3.0	<input checked="" type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>

6. Were custody papers properly filled out (ink, signed, dated, etc)? ☒ Yes ☐ No7. Did all bottles arrive in good condition (not broken, no signs of leakage)? ☒ Yes ☐ No8. Were all sample labels complete (i.e., sample ID, analysis, preservation, etc)? ☒ Yes ☐ No9. Were appropriate bottles/containers and volumes received for the requested tests? ☒ Yes ☐ No10. Did sample labels and tags agree with custody documents? ☒ Yes ☐ No

Notes, Discrepancies, &amp; Resolutions:

Service request Label:



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Houston, TX 77099  
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F: +1 713 266 1599  
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## SAMPLE ACCEPTANCE POLICY

This policy outlines the criteria samples must meet to be accepted by ALS Environmental – Houston HRMS.

### **Cooler Custody Seals (desirable, mandatory if specified in SAP):**

- ✓ Intact on outside of cooler, signed and dated

### **Chain-of-Custody (COC) documentation (mandatory):**

The following is required on each COC:

- ✓ Sample ID, the location, date and time of collection, collector's name, preservation type, sample type, and any other special remarks concerning the sample. The COC must be completed in ink.
- ✓ Signature and date of relinquishing party.

In the absence of a COC at sample receipt, the COC will be requested from the client.

### **Sample Integrity (mandatory):**

Samples are inspected upon arrival to ensure that sample integrity was not compromised during transfer to the laboratory.

- ✓ Sample containers must arrive in good condition (not broken or leaking).
- ✓ Samples must be labeled appropriately, including Sample IDs, and requested test using durable labels and indelible ink.
- ✓ The correct type of sample bottle must be used for the method requested.
- ✓ An appropriate sample volume, or weight, must be received.
- ✓ Sample IDs and number of containers must reconcile with the COC.
- ✓ Samples must be received within the method defined holding time.

### **Temperature Requirement (varies by sample matrix):**

- ✓ Aqueous and Non-aqueous samples must be shipped and stored cold, at 0 to 6°C.
- ✓ Tissue samples must be shipped and stored frozen, at -20 to -10°C.
- ✓ Air samples are shipped and stored cold, at 0 to 6°C
- ✓ The sample temperature must be recorded on the COC

All cooler inspections are documented on the Cooler Receipt Form (CRF). A separate CRF is completed for each service request. Any samples not meeting the above criteria are noted on the CRF and the Project Manager notified. The Project Manager must resolve any sample integrity issues with the client prior to proceeding with the analysis. Such resolutions are documented in writing and filed with the project folder. Data associated with samples received outside of this acceptance policy will be qualified on the case narrative of the final report.



## Preparation Information Benchsheets

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

**Preparation Information Benchsheet**

**Prep Run#:** 401413  
**Team:** Semivoa GCMS/GRIVERA

**Prep WorkFlow:** GenExt28Day  
**Prep Method:**

**Status:** Prepped  
**Prep Date/Time:** 6/16/22 08:57

#	Lab Code	Client ID	B#	Method /Test	pH	Cl	Matrix	Amt. Ext.	Sample Description
1	E2200549-001	508-RAW	.01	6850/CIO4 DOD			Water	10mL	
2	E2200567-001	LH18/24-SP650_061422_AIX	.01	6850/CIO4 DOD			Water	10mL	
3	E2200567-002	LH18/24-SP650_061422_BIXX	.01	6850/CIO4 DOD			Water	10mL	
4	E2200570-001	WO-EB01-053122	.01	6850/CIO4 DOD			Water	10mL	
5	E2200570-002	46GW134-0622	.01	6850/CIO4 DOD			Water	10mL	
6	E2200570-003	46GW134P-0622	.01	6850/CIO4 DOD			Water	10mL	
7	E2200570-004	46GW126-0622	.01	6850/CIO4 DOD			Water	10mL	
8	E2200570-005	WO-EB01-060122	.01	6850/CIO4 DOD			Water	10mL	
9	E2200571-001	WO-EB01-060222	.01	6850/CIO4 DOD			Water	10mL	
10	E2200571-002	46GW219-0622	.01	6850/CIO4 DOD			Water	10mL	
11	E2200571-003	46GW219P-0622	.01	6850/CIO4 DOD			Water	10mL	
12	EQ2200247-01	MB		6850/CIO4 DOD			Liquid	10mL	
13	EQ2200247-02	LCS		6850/CIO4 DOD			Liquid	10mL	
14	EQ2200247-03	DLCS		6850/CIO4 DOD			Liquid	10mL	
15	EQ2200247-04	46GW126-0622 MS	.02	6850/CIO4 DOD			Liquid	10mL	
16	EQ2200247-05	46GW126-0622 DMS	.02	6850/CIO4 DOD			Liquid	10mL	

**Spiking Solutions**

Name: Perchlorate Intermediate Stock1		Inventory ID 222798		Logbook Ref: Perchlorate (1st Source)				Expires On: 10/29/2022	
EQ2200247-02	1.00µL	EQ2200247-03	1.00µL	EQ2200247-04	1.00µL	EQ2200247-05	1.00µL		

Name: Perchlorate Internal Standard 1ug/mL		Inventory ID 223118		Logbook Ref: Perchlorate Internal Standard				Expires On: 10/31/2022	
--	--	---------------------	--	--	--	--	--	------------------------	--

E2200549-001	100.00µL	E2200567-001	100.00µL	E2200567-002	100.00µL	E2200570-001	100.00µL	E2200570-002	100.00µL	E2200570-003	100.00µL
E2200570-004	100.00µL	E2200570-005	100.00µL	E2200571-001	100.00µL	E2200571-002	100.00µL	E2200571-003	100.00µL	EQ2200247-01	100.00µL
EQ2200247-02	100.00µL	EQ2200247-03	100.00µL	EQ2200247-04	100.00µL	EQ2200247-05	100.00µL				

**Preparation Materials**

Water HPLC Grade	02/16/2022 Water (221769)	6850 Amber Glass screw vial	2mL Screw Top Vial (221308)	537M Glass Culture Tubes	537M Glass Tubes (218064)
6850 Luer-Lok Syringes	Luer-Lok Syringes (221305)	6850 Pipette Tips 50-1000 uL	6850 Pipette Tips (221929)	6850 0.45um syringe filters	6850 Syringe Filters (222410)

*Preparation Information Benchsheet*

**Prep Run#:** 401413  
**Team:** Semivoia GCMS/GRIVERA

**Prep WorkFlow:** GenExt28Day  
**Prep Method:**

**Status:** Prepped  
**Prep Date/Time:** 6/16/22 08:57

**Preparation Steps**

Step: Preparation  
Started: 6/16/22 08:57  
Finished: 6/16/22 09:30  
By: GRIVERA  
Comments

Comments: \_\_\_\_\_  
\_\_\_\_\_

Reviewed By: GR Date: 6/16/22

## Chain of Custody

Relinquished By: _____	Date: _____	<u>Extracts Examined</u>
Received By: _____	Date: _____	Yes No



# Analytical Results

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22060773  
**Sample Matrix:** Water  
**Sample Name:** LH18/24-SP650\_061422\_AIX  
**Lab Code:** E2200567-001

**Service Request:** E2200567  
**Date Collected:** 6/14/22 1400  
**Date Received:** 6/15/22  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.0960	J	0.200	0.100	0.0500	2	6/16/22	6/16/22 14:55	401413	767686	



## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22060773  
**Sample Matrix:** Water  
**Sample Name:** LH18/24-SP650\_061422\_BIX  
**Lab Code:** E2200567-002

**Service Request:** E2200567  
**Date Collected:** 6/14/22 1400  
**Date Received:** 6/15/22  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	26.1		0.100	0.0500	0.0250	1	6/16/22	6/16/22 13:49	401413	767686	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22060773  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** EQ2200247-01

**Service Request:** E2200567  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	0.100	0.0500	0.0250	1	6/16/22	6/16/22 12:07	401413	767686	



## Accuracy & Precision

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS22060773  
**Sample Matrix:** Water

**Service Request:** E2200567  
**Date Analyzed:** 6/16/22

**Lab Control Sample Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**Analytical Method:** 6850  
**Prep Method:**

**Units:** µg/L  
**Basis:** NA

**Extraction Lot:** 401413

Analyte Name	Lab Control Sample EQ2200247-02			Duplicate Lab Control Sample EQ2200247-03			% Rec Limits	RPD	RPD Limit
	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Perchlorate	0.0921	0.100	92	0.119	0.100	119	84 - 119	25 *	15

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22060773  
**Sample Matrix:** Water  
**Sample Name:** Lab Control Sample  
**Lab Code:** EQ2200247-02

**Service Request:** E2200567  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.0921	J	0.100	0.0500	0.0250	1	6/16/22	6/16/22 12:46	401413	767686	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22060773  
**Sample Matrix:** Water  
**Sample Name:** Duplicate Lab Control Sample  
**Lab Code:** EQ2200247-03

**Service Request:** E2200567  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.119		0.100	0.0500	0.0250	1	6/16/22	6/16/22 12:54	401413	767686	



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Houston, TX 77099  
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June 17, 2022

Marcia Olive  
Bhate Environmental Associates, Inc.  
445 Union Blvd Ste 129  
Lakewood, CO 80228

Work Order: **HS22060792**

Laboratory Results for: **Longhorn GW Treatment Plant Bi-Weekly Samples**

Dear Marcia Olive,

ALS Environmental received 2 sample(s) on Jun 15, 2022 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: DAYNA.FISHER

Dane J. Wacasey

ALS Houston, US

Date: 17-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**Work Order:** HS22060792

**SAMPLE SUMMARY**

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS22060792-01	LH18/24-SP650_061422	Water		14-Jun-2022 14:00	15-Jun-2022 10:10	<input type="checkbox"/>
HS22060792-02	Trip Blank	Water	CG-041822 -552	14-Jun-2022 14:00	15-Jun-2022 10:10	<input type="checkbox"/>



ALS Houston, US

Date: 17-Jun-22

---

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**Work Order:** HS22060792

---

**CASE NARRATIVE**

---

**GCMS Volatiles by Method SW8260****Batch ID: R410858****Sample ID: CCV**

- 4\_Isopropyltoluene exceeded %D limits for CCV .Samples are ND for this compound.

**Sample ID: LH18/24-SP650\_061422 (HS22060792-01MS)**

- MS and/or MSD recovered outside control limits for multiple compounds

---

**WetChemistry by Method SW9056****Batch ID: R410857**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

## ALS Houston, US

Date: 17-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Bi-Weekly Samples  
 Sample ID: LH18/24-SP650\_061422  
 Collection Date: 14-Jun-2022 14:00

## ANALYTICAL REPORT

WorkOrder:HS22060792  
 Lab ID:HS22060792-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD</b>		<b>Method:SW8260</b>						Analyst: PC
<b>8260C</b>								
1,1,1,2-Tetrachloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 12:16
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 12:16
1,1,2,2-Tetrachloroethane	1.0	U	0.50	1.0	1.0	ug/L	1	16-Jun-2022 12:16
1,1,2-Trichloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 12:16
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 12:16
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 12:16
1,1-Dichloropropene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 12:16
1,2,3-Trichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	16-Jun-2022 12:16
1,2,3-Trichloropropane	1.0	U	0.50	1.0	1.0	ug/L	1	16-Jun-2022 12:16
1,2,4-Trichlorobenzene	1.0	U	0.50	1.0	1.0	ug/L	1	16-Jun-2022 12:16
1,2,4-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 12:16
1,2-Dibromo-3-chloropropane	1.0	U	0.20	1.0	1.0	ug/L	1	16-Jun-2022 12:16
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 12:16
1,2-Dichlorobenzene	1.0	U	0.50	1.0	1.0	ug/L	1	16-Jun-2022 12:16
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 12:16
1,2-Dichloropropane	1.0	U	0.50	1.0	1.0	ug/L	1	16-Jun-2022 12:16
1,3,5-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 12:16
1,3-Dichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	16-Jun-2022 12:16
1,3-Dichloropropane	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 12:16
1,4-Dichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	16-Jun-2022 12:16
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 12:16
2-Butanone	1.0	U	0.50	1.0	2.0	ug/L	1	16-Jun-2022 12:16
2-Chlorotoluene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 12:16
2-Hexanone	2.0	U	1.0	2.0	2.0	ug/L	1	16-Jun-2022 12:16
4-Chlorotoluene	1.0	U	0.40	1.0	1.0	ug/L	1	16-Jun-2022 12:16
4-Isopropyltoluene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 12:16
4-Methyl-2-pentanone	2.0	U	0.70	2.0	2.0	ug/L	1	16-Jun-2022 12:16
Acetone	2.0	U	0.40	2.0	2.0	ug/L	1	16-Jun-2022 12:16
Benzene	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 12:16
Bromobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	16-Jun-2022 12:16
Bromochloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 12:16
Bromodichloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 12:16
Bromoform	1.0	U	0.40	1.0	1.0	ug/L	1	16-Jun-2022 12:16
Bromomethane	1.0	U	0.40	1.0	1.0	ug/L	1	16-Jun-2022 12:16
Carbon disulfide	2.0	U	0.60	2.0	2.0	ug/L	1	16-Jun-2022 12:16
Carbon tetrachloride	1.0	U	0.50	1.0	1.0	ug/L	1	16-Jun-2022 12:16
Chlorobenzene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 12:16
Chloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 12:16
Chloroform	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 12:16

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 17-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Bi-Weekly Samples  
 Sample ID: LH18/24-SP650\_061422  
 Collection Date: 14-Jun-2022 14:00

## ANALYTICAL REPORT

WorkOrder:HS22060792  
 Lab ID:HS22060792-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD 8260C</b>		<b>Method:SW8260</b>						Analyst: PC
Chloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 12:16
<b>cis-1,2-Dichloroethene</b>	<b>2.7</b>		<b>0.20</b>	<b>0.50</b>	<b>1.0</b>	<b>ug/L</b>	1	16-Jun-2022 12:16
cis-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 12:16
Dibromochloromethane	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 12:16
Dibromomethane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 12:16
Dichlorodifluoromethane	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 12:16
Ethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 12:16
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	ug/L	1	16-Jun-2022 12:16
Isopropylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 12:16
m,p-Xylene	1.0	U	0.50	1.0	2.0	ug/L	1	16-Jun-2022 12:16
Methylene chloride	2.0	U	0.40	2.0	2.0	ug/L	1	16-Jun-2022 12:16
n-Butylbenzene	1.0	U	0.40	1.0	1.0	ug/L	1	16-Jun-2022 12:16
n-Propylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 12:16
Naphthalene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 12:16
o-Xylene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 12:16
sec-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 12:16
Styrene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 12:16
tert-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 12:16
Tetrachloroethene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 12:16
Toluene	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 12:16
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 12:16
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 12:16
Trichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 12:16
Trichlorofluoromethane	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 12:16
Vinyl chloride	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 12:16
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>88.7</i>			<b>0</b>	<i>81-118</i>	<b>%REC</b>	<i>1</i>	<i>16-Jun-2022 12:16</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>94.0</i>			<b>0</b>	<i>85-114</i>	<b>%REC</b>	<i>1</i>	<i>16-Jun-2022 12:16</i>
<i>Surr: Dibromofluoromethane</i>	<i>92.7</i>			<b>0</b>	<i>80-119</i>	<b>%REC</b>	<i>1</i>	<i>16-Jun-2022 12:16</i>
<i>Surr: Toluene-d8</i>	<i>99.2</i>			<b>0</b>	<i>89-112</i>	<b>%REC</b>	<i>1</i>	<i>16-Jun-2022 12:16</i>
<b>ANIONS BY SW9056A</b>		<b>Method:SW9056</b>						Analyst: TH
<b>Chloride</b>	<b>842</b>		<b>4.00</b>	<b>10.0</b>	<b>10.0</b>	<b>mg/L</b>	20	16-Jun-2022 11:50
<b>Sulfate</b>	<b>22.5</b>		<b>0.200</b>	<b>0.500</b>	<b>0.500</b>	<b>mg/L</b>	1	16-Jun-2022 11:44

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 17-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Bi-Weekly Samples  
 Sample ID: Trip Blank  
 Collection Date: 14-Jun-2022 14:00

## ANALYTICAL REPORT

WorkOrder:HS22060792  
 Lab ID:HS22060792-02  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD</b>		<b>Method:SW8260</b>						Analyst: PC
<b>8260C</b>								
1,1,1,2-Tetrachloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 11:55
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 11:55
1,1,2,2-Tetrachloroethane	1.0	U	0.50	1.0	1.0	ug/L	1	16-Jun-2022 11:55
1,1,2-Trichloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 11:55
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 11:55
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 11:55
1,1-Dichloropropene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 11:55
1,2,3-Trichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	16-Jun-2022 11:55
1,2,3-Trichloropropane	1.0	U	0.50	1.0	1.0	ug/L	1	16-Jun-2022 11:55
1,2,4-Trichlorobenzene	1.0	U	0.50	1.0	1.0	ug/L	1	16-Jun-2022 11:55
1,2,4-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 11:55
1,2-Dibromo-3-chloropropane	1.0	U	0.20	1.0	1.0	ug/L	1	16-Jun-2022 11:55
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 11:55
1,2-Dichlorobenzene	1.0	U	0.50	1.0	1.0	ug/L	1	16-Jun-2022 11:55
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 11:55
1,2-Dichloropropane	1.0	U	0.50	1.0	1.0	ug/L	1	16-Jun-2022 11:55
1,3,5-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 11:55
1,3-Dichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	16-Jun-2022 11:55
1,3-Dichloropropane	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 11:55
1,4-Dichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	16-Jun-2022 11:55
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 11:55
2-Butanone	1.0	U	0.50	1.0	2.0	ug/L	1	16-Jun-2022 11:55
2-Chlorotoluene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 11:55
2-Hexanone	2.0	U	1.0	2.0	2.0	ug/L	1	16-Jun-2022 11:55
4-Chlorotoluene	1.0	U	0.40	1.0	1.0	ug/L	1	16-Jun-2022 11:55
4-Isopropyltoluene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 11:55
4-Methyl-2-pentanone	2.0	U	0.70	2.0	2.0	ug/L	1	16-Jun-2022 11:55
Acetone	2.0	U	0.40	2.0	2.0	ug/L	1	16-Jun-2022 11:55
Benzene	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 11:55
Bromobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	16-Jun-2022 11:55
Bromochloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 11:55
Bromodichloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 11:55
Bromoform	1.0	U	0.40	1.0	1.0	ug/L	1	16-Jun-2022 11:55
Bromomethane	1.0	U	0.40	1.0	1.0	ug/L	1	16-Jun-2022 11:55
Carbon disulfide	2.0	U	0.60	2.0	2.0	ug/L	1	16-Jun-2022 11:55
Carbon tetrachloride	1.0	U	0.50	1.0	1.0	ug/L	1	16-Jun-2022 11:55
Chlorobenzene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 11:55
Chloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 11:55
Chloroform	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 11:55

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 17-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Bi-Weekly Samples  
 Sample ID: Trip Blank  
 Collection Date: 14-Jun-2022 14:00

## ANALYTICAL REPORT

WorkOrder:HS22060792  
 Lab ID:HS22060792-02  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD</b>		<b>Method:SW8260</b>						Analyst: PC
<b>8260C</b>								
Chloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 11:55
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 11:55
cis-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 11:55
Dibromochloromethane	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 11:55
Dibromomethane	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 11:55
Dichlorodifluoromethane	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 11:55
Ethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 11:55
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	ug/L	1	16-Jun-2022 11:55
Isopropylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 11:55
m,p-Xylene	1.0	U	0.50	1.0	2.0	ug/L	1	16-Jun-2022 11:55
Methylene chloride	2.0	U	0.40	2.0	2.0	ug/L	1	16-Jun-2022 11:55
n-Butylbenzene	1.0	U	0.40	1.0	1.0	ug/L	1	16-Jun-2022 11:55
n-Propylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 11:55
Naphthalene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 11:55
o-Xylene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 11:55
sec-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 11:55
Styrene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 11:55
tert-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 11:55
Tetrachloroethene	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 11:55
Toluene	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 11:55
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 11:55
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 11:55
Trichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 11:55
Trichlorofluoromethane	1.0	U	0.30	1.0	1.0	ug/L	1	16-Jun-2022 11:55
Vinyl chloride	0.50	U	0.20	0.50	1.0	ug/L	1	16-Jun-2022 11:55
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>87.8</i>			<b>0</b>	<i>81-118</i>	<b>%REC</b>	<i>1</i>	<i>16-Jun-2022 11:55</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>92.4</i>			<b>0</b>	<i>85-114</i>	<b>%REC</b>	<i>1</i>	<i>16-Jun-2022 11:55</i>
<i>Surr: Dibromofluoromethane</i>	<i>92.3</i>			<b>0</b>	<i>80-119</i>	<b>%REC</b>	<i>1</i>	<i>16-Jun-2022 11:55</i>
<i>Surr: Toluene-d8</i>	<i>99.9</i>			<b>0</b>	<i>89-112</i>	<b>%REC</b>	<i>1</i>	<i>16-Jun-2022 11:55</i>

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US

Date: 17-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22060792

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> R410857 ( 0 )		<b>Test Name :</b> ANIONS BY SW9056A			<b>Matrix:</b> Water	
HS22060792-01	LH18/24-SP650_061422	14 Jun 2022 14:00			16 Jun 2022 11:50	20
HS22060792-01	LH18/24-SP650_061422	14 Jun 2022 14:00			16 Jun 2022 11:44	1
<b>Batch ID:</b> R410858 ( 0 )		<b>Test Name :</b> VOLATILES ORGANICS BY METHOD 8260C			<b>Matrix:</b> Water	
HS22060792-01	LH18/24-SP650_061422	14 Jun 2022 14:00			16 Jun 2022 12:16	1
HS22060792-02	Trip Blank	14 Jun 2022 14:00			16 Jun 2022 11:55	1

## ALS Houston, US

Date: 17-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22060792

## QC BATCH REPORT

Batch ID: R410858 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
<b>MBLK</b>	Sample ID: VBLKW-220616	Units: ug/L		Analysis Date: 16-Jun-2022 11:34					
Client ID:	Run ID: VOA6_410858	SeqNo: 6697633		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	1.0	1.0							U
1,1,1-Trichloroethane	0.50	1.0							U
1,1,2,2-Tetrachloroethane	1.0	1.0							U
1,1,2-Trichloroethane	1.0	1.0							U
1,1-Dichloroethane	0.50	1.0							U
1,1-Dichloroethene	0.50	1.0							U
1,1-Dichloropropene	1.0	1.0							U
1,2,3-Trichlorobenzene	1.0	1.0							U
1,2,3-Trichloropropane	1.0	1.0							U
1,2,4-Trichlorobenzene	1.0	1.0							U
1,2,4-Trimethylbenzene	1.0	1.0							U
1,2-Dibromo-3-chloropropane	1.0	1.0							U
1,2-Dibromoethane	0.50	1.0							U
1,2-Dichlorobenzene	1.0	1.0							U
1,2-Dichloroethane	0.50	1.0							U
1,2-Dichloropropane	1.0	1.0							U
1,3,5-Trimethylbenzene	1.0	1.0							U
1,3-Dichlorobenzene	1.0	1.0							U
1,3-Dichloropropane	1.0	1.0							U
1,4-Dichlorobenzene	1.0	1.0							U
2,2-Dichloropropane	0.50	1.0							U
2-Butanone	1.0	2.0							U
2-Chlorotoluene	1.0	1.0							U
2-Hexanone	2.0	2.0							U
4-Chlorotoluene	1.0	1.0							U
4-Isopropyltoluene	1.0	1.0							U
4-Methyl-2-pentanone	2.0	2.0							U
Acetone	2.0	2.0							U
Benzene	0.50	1.0							U
Bromobenzene	1.0	1.0							U
Bromochloromethane	0.50	1.0							U
Bromodichloromethane	0.50	1.0							U
Bromoform	1.0	1.0							U
Bromomethane	1.0	1.0							U

## ALS Houston, US

Date: 17-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22060792

## QC BATCH REPORT

Batch ID: R410858 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
<b>MBLK</b>	Sample ID: VBLKW-220616	Units: ug/L		Analysis Date: 16-Jun-2022 11:34					
Client ID:	Run ID: VOA6_410858	SeqNo: 6697633		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	2.0	2.0							U
Carbon tetrachloride	1.0	1.0							U
Chlorobenzene	1.0	1.0							U
Chloroethane	1.0	1.0							U
Chloroform	0.50	1.0							U
Chloromethane	0.50	1.0							U
cis-1,2-Dichloroethene	0.50	1.0							U
cis-1,3-Dichloropropene	0.50	1.0							U
Dibromochloromethane	1.0	1.0							U
Dibromomethane	0.50	1.0							U
Dichlorodifluoromethane	1.0	1.0							U
Ethylbenzene	1.0	1.0							U
Hexachlorobutadiene	1.0	1.0							U
Isopropylbenzene	1.0	1.0							U
m,p-Xylene	1.0	2.0							U
Methylene chloride	2.0	2.0							U
Naphthalene	1.0	1.0							U
n-Butylbenzene	1.0	1.0							U
n-Propylbenzene	1.0	1.0							U
o-Xylene	1.0	1.0							U
sec-Butylbenzene	1.0	1.0							U
Styrene	1.0	1.0							U
tert-Butylbenzene	1.0	1.0							U
Tetrachloroethene	1.0	1.0							U
Toluene	0.50	1.0							U
trans-1,2-Dichloroethene	0.50	1.0							U
trans-1,3-Dichloropropene	0.50	1.0							U
Trichloroethene	0.50	1.0							U
Trichlorofluoromethane	1.0	1.0							U
Vinyl chloride	0.50	1.0							U
Surr: 1,2-Dichloroethane-d4	43.52	1.0	50	0	87.0	81 - 118			
Surr: 4-Bromofluorobenzene	46.77	1.0	50	0	93.5	85 - 114			
Surr: Dibromofluoromethane	45.87	1.0	50	0	91.7	80 - 119			
Surr: Toluene-d8	50.15	1.0	50	0	100	89 - 112			



## ALS Houston, US

Date: 17-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22060792

## QC BATCH REPORT

Batch ID: R410858 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
LCS		Sample ID: VLCSW-220616		Units: ug/L		Analysis Date: 16-Jun-2022 10:52			
Client ID:		Run ID: VOA6_410858		SeqNo: 6697632		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	20.81	1.0	20	0	104	78 - 124			
1,1,1-Trichloroethane	18.78	1.0	20	0	93.9	74 - 131			
1,1,2,2-Tetrachloroethane	19.69	1.0	20	0	98.4	71 - 121			
1,1,2-Trichloroethane	20.21	1.0	20	0	101	80 - 119			
1,1-Dichloroethane	20.07	1.0	20	0	100	77 - 125			
1,1-Dichloroethene	17.69	1.0	20	0	88.5	71 - 131			
1,1-Dichloropropene	19.41	1.0	20	0	97.1	78 - 125			
1,2,3-Trichlorobenzene	19.92	1.0	20	0	99.6	69 - 129			
1,2,3-Trichloropropane	19.53	1.0	20	0	97.6	73 - 122			
1,2,4-Trichlorobenzene	19.48	1.0	20	0	97.4	69 - 130			
1,2,4-Trimethylbenzene	20.85	1.0	20	0	104	76 - 124			
1,2-Dibromo-3-chloropropane	16.79	1.0	20	0	84.0	62 - 128			
1,2-Dibromoethane	19.92	1.0	20	0	99.6	77 - 121			
1,2-Dichlorobenzene	20.78	1.0	20	0	104	80 - 119			
1,2-Dichloroethane	20.34	1.0	20	0	102	73 - 128			
1,2-Dichloropropane	21.16	1.0	20	0	106	78 - 122			
1,3,5-Trimethylbenzene	20.43	1.0	20	0	102	75 - 124			
1,3-Dichlorobenzene	20.9	1.0	20	0	105	80 - 119			
1,3-Dichloropropane	20.35	1.0	20	0	102	80 - 119			
1,4-Dichlorobenzene	21.16	1.0	20	0	106	79 - 118			
2,2-Dichloropropane	19.41	1.0	20	0	97.0	60 - 139			
2-Butanone	35.98	2.0	40	0	90.0	56 - 143			
2-Chlorotoluene	20.4	1.0	20	0	102	79 - 122			
2-Hexanone	37.76	2.0	40	0	94.4	57 - 139			
4-Chlorotoluene	20.91	1.0	20	0	105	78 - 122			
4-Isopropyltoluene	20.38	1.0	20	0	102	77 - 127			
4-Methyl-2-pentanone	37.95	2.0	40	0	94.9	67 - 130			
Acetone	38.27	2.0	40	0	95.7	39 - 160			
Benzene	21.05	1.0	20	0	105	79 - 120			
Bromobenzene	21.21	1.0	20	0	106	80 - 120			
Bromochloromethane	20.26	1.0	20	0	101	78 - 123			
Bromodichloromethane	19.94	1.0	20	0	99.7	79 - 125			
Bromoform	19.86	1.0	20	0	99.3	66 - 130			
Bromomethane	16.28	1.0	20	0	81.4	53 - 141			

## ALS Houston, US

Date: 17-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22060792

## QC BATCH REPORT

Batch ID: R410858 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
LCS		Sample ID: VLCSW-220616		Units: ug/L		Analysis Date: 16-Jun-2022 10:52			
Client ID:		Run ID: VOA6_410858		SeqNo: 6697632		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	37.86	2.0	40	0	94.6	64 - 133			
Carbon tetrachloride	17.89	1.0	20	0	89.4	72 - 136			
Chlorobenzene	21.01	1.0	20	0	105	82 - 118			
Chloroethane	20.3	1.0	20	0	101	60 - 138			
Chloroform	19.29	1.0	20	0	96.4	79 - 124			
Chloromethane	19.14	1.0	20	0	95.7	50 - 139			
cis-1,2-Dichloroethene	20.63	1.0	20	0	103	78 - 123			
cis-1,3-Dichloropropene	20.66	1.0	20	0	103	75 - 124			
Dibromochloromethane	20.64	1.0	20	0	103	74 - 126			
Dibromomethane	20.23	1.0	20	0	101	79 - 123			
Dichlorodifluoromethane	16.86	1.0	20	0	84.3	32 - 152			
Ethylbenzene	20.95	1.0	20	0	105	79 - 121			
Hexachlorobutadiene	20.1	1.0	20	0	101	66 - 134			
Isopropylbenzene	19.1	1.0	20	0	95.5	72 - 131			
m,p-Xylene	41.51	2.0	40	0	104	80 - 121			
Methylene chloride	19	2.0	20	0	95.0	74 - 124			
Naphthalene	18.42	1.0	20	0	92.1	61 - 128			
n-Butylbenzene	19.9	1.0	20	0	99.5	75 - 128			
n-Propylbenzene	20.16	1.0	20	0	101	76 - 126			
o-Xylene	20.8	1.0	20	0	104	78 - 122			
sec-Butylbenzene	19.31	1.0	20	0	96.6	77 - 126			
Styrene	20.98	1.0	20	0	105	78 - 123			
tert-Butylbenzene	19.94	1.0	20	0	99.7	78 - 124			
Tetrachloroethene	20.02	1.0	20	0	100	74 - 129			
Toluene	20.9	1.0	20	0	105	80 - 121			
trans-1,2-Dichloroethene	19.79	1.0	20	0	99.0	75 - 124			
trans-1,3-Dichloropropene	20.25	1.0	20	0	101	73 - 127			
Trichloroethene	20.75	1.0	20	0	104	79 - 123			
Trichlorofluoromethane	16.37	1.0	20	0	81.8	65 - 141			
Vinyl chloride	17.54	1.0	20	0	87.7	58 - 137			
Surr: 1,2-Dichloroethane-d4	49.6	1.0	50	0	99.2	81 - 118			
Surr: 4-Bromofluorobenzene	50.76	1.0	50	0	102	85 - 114			
Surr: Dibromofluoromethane	49.95	1.0	50	0	99.9	80 - 119			
Surr: Toluene-d8	50.12	1.0	50	0	100	89 - 112			

## ALS Houston, US

Date: 17-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22060792

## QC BATCH REPORT

Batch ID: R410858 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MS		Sample ID: HS22060792-01MS		Units: ug/L		Analysis Date: 16-Jun-2022 12:58			
Client ID: LH18/24-SP650_061422		Run ID: VOA6_410858		SeqNo: 6697636		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	20.54	1.0	20	0	103	78 - 124			
1,1,1-Trichloroethane	19.42	1.0	20	0	97.1	74 - 131			
1,1,2,2-Tetrachloroethane	19.57	1.0	20	0	97.9	71 - 121			
1,1,2-Trichloroethane	19.63	1.0	20	0	98.1	80 - 119			
1,1-Dichloroethane	19.13	1.0	20	0	95.7	77 - 125			
1,1-Dichloroethene	16.71	1.0	20	0	83.5	71 - 131			
1,1-Dichloropropene	20.4	1.0	20	0	102	78 - 125			
1,2,3-Trichlorobenzene	16.69	1.0	20	0	83.5	69 - 129			
1,2,3-Trichloropropane	19.79	1.0	20	0	98.9	73 - 122			
1,2,4-Trichlorobenzene	18.28	1.0	20	0	91.4	69 - 130			
1,2,4-Trimethylbenzene	21.51	1.0	20	0	108	76 - 124			
1,2-Dibromo-3-chloropropane	15.58	1.0	20	0	77.9	62 - 128			
1,2-Dibromoethane	19.86	1.0	20	0	99.3	77 - 121			
1,2-Dichlorobenzene	20.51	1.0	20	0	103	80 - 119			
1,2-Dichloroethane	19.67	1.0	20	0	98.4	73 - 128			
1,2-Dichloropropane	20.06	1.0	20	0	100	78 - 122			
1,3,5-Trimethylbenzene	21.68	1.0	20	0	108	75 - 124			
1,3-Dichlorobenzene	20.99	1.0	20	0	105	80 - 119			
1,3-Dichloropropane	19.74	1.0	20	0	98.7	80 - 119			
1,4-Dichlorobenzene	20.91	1.0	20	0	105	79 - 118			
2,2-Dichloropropane	19.61	1.0	20	0	98.0	60 - 139			
2-Butanone	30.06	2.0	40	0	75.2	56 - 143			
2-Chlorotoluene	20.68	1.0	20	0	103	79 - 122			
2-Hexanone	38.6	2.0	40	0	96.5	57 - 139			
4-Chlorotoluene	21.22	1.0	20	0	106	78 - 122			
4-Isopropyltoluene	22.47	1.0	20	0	112	77 - 127			
4-Methyl-2-pentanone	40	2.0	40	0	100	67 - 130			
Acetone	25.65	2.0	40	0	64.1	39 - 160			
Benzene	20.33	1.0	20	0	102	79 - 120			
Bromobenzene	21.24	1.0	20	0	106	80 - 120			
Bromochloromethane	19.19	1.0	20	0	96.0	78 - 123			
Bromodichloromethane	19.09	1.0	20	0	95.4	79 - 125			
Bromoform	19	1.0	20	0	95.0	66 - 130			
Bromomethane	8.856	1.0	20	0	44.3	53 - 141			S

## ALS Houston, US

Date: 17-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22060792

## QC BATCH REPORT

Batch ID: R410858 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MS		Sample ID: HS22060792-01MS		Units: ug/L		Analysis Date: 16-Jun-2022 12:58			
Client ID: LH18/24-SP650_061422		Run ID: VOA6_410858		SeqNo: 6697636		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	32.31	2.0	40	0	80.8	64 - 133			
Carbon tetrachloride	20.01	1.0	20	0	100	72 - 136			
Chlorobenzene	20.92	1.0	20	0	105	82 - 118			
Chloroethane	12.43	1.0	20	0	62.1	60 - 138			
Chloroform	18.78	1.0	20	0	93.9	79 - 124			
Chloromethane	19.64	1.0	20	0	98.2	50 - 139			
cis-1,2-Dichloroethene	22.8	1.0	20	2.705	100	78 - 123			
cis-1,3-Dichloropropene	19.51	1.0	20	0	97.5	75 - 124			
Dibromochloromethane	19.98	1.0	20	0	99.9	74 - 126			
Dibromomethane	19.34	1.0	20	0	96.7	79 - 123			
Dichlorodifluoromethane	2.823	1.0	20	0	14.1	32 - 152			S
Ethylbenzene	21.62	1.0	20	0	108	79 - 121			
Hexachlorobutadiene	22.09	1.0	20	0	110	66 - 134			
Isopropylbenzene	20.92	1.0	20	0	105	72 - 131			
m,p-Xylene	42.85	2.0	40	0	107	80 - 121			
Methylene chloride	16.95	2.0	20	0	84.8	74 - 124			
Naphthalene	14.34	1.0	20	0	71.7	61 - 128			
n-Butylbenzene	22.36	1.0	20	0	112	75 - 128			
n-Propylbenzene	21.95	1.0	20	0	110	76 - 126			
o-Xylene	21.2	1.0	20	0	106	78 - 122			
sec-Butylbenzene	22.38	1.0	20	0	112	77 - 126			
Styrene	22.47	1.0	20	0	112	78 - 123			
tert-Butylbenzene	22.19	1.0	20	0	111	78 - 124			
Tetrachloroethene	21.99	1.0	20	0	110	74 - 129			
Toluene	21.07	1.0	20	0	105	80 - 121			
trans-1,2-Dichloroethene	19.32	1.0	20	0	96.6	75 - 124			
trans-1,3-Dichloropropene	19.28	1.0	20	0	96.4	73 - 127			
Trichloroethene	21.03	1.0	20	0	105	79 - 123			
Trichlorofluoromethane	15.37	1.0	20	0	76.8	65 - 141			
Vinyl chloride	10.3	1.0	20	0	51.5	58 - 137			S
Surr: 1,2-Dichloroethane-d4	45.8	1.0	50	0	91.6	81 - 118			
Surr: 4-Bromofluorobenzene	49.03	1.0	50	0	98.1	85 - 114			
Surr: Dibromofluoromethane	47.26	1.0	50	0	94.5	80 - 119			
Surr: Toluene-d8	49.29	1.0	50	0	98.6	89 - 112			

## ALS Houston, US

Date: 17-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22060792

## QC BATCH REPORT

Batch ID: R410858 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
<b>MSD</b>		Sample ID: HS22060792-01MSD		Units: ug/L		Analysis Date: 16-Jun-2022 13:19			
Client ID: LH18/24-SP650_061422		Run ID: VOA6_410858		SeqNo: 6697637		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	20.2	1.0	20	0	101	78 - 124	20.54	1.66	20
1,1,1-Trichloroethane	18.83	1.0	20	0	94.2	74 - 131	19.42	3.08	20
1,1,2,2-Tetrachloroethane	19.49	1.0	20	0	97.4	71 - 121	19.57	0.438	20
1,1,2-Trichloroethane	19.71	1.0	20	0	98.6	80 - 119	19.63	0.422	20
1,1-Dichloroethane	18.61	1.0	20	0	93.0	77 - 125	19.13	2.77	20
1,1-Dichloroethene	15.96	1.0	20	0	79.8	71 - 131	16.71	4.58	20
1,1-Dichloropropene	19.83	1.0	20	0	99.1	78 - 125	20.4	2.82	20
1,2,3-Trichlorobenzene	19.46	1.0	20	0	97.3	69 - 129	16.69	15.3	20
1,2,3-Trichloropropane	19.37	1.0	20	0	96.8	73 - 122	19.79	2.14	20
1,2,4-Trichlorobenzene	20.18	1.0	20	0	101	69 - 130	18.28	9.85	20
1,2,4-Trimethylbenzene	20.73	1.0	20	0	104	76 - 124	21.51	3.71	20
1,2-Dibromo-3-chloropropane	16.61	1.0	20	0	83.0	62 - 128	15.58	6.39	20
1,2-Dibromoethane	19.89	1.0	20	0	99.4	77 - 121	19.86	0.164	20
1,2-Dichlorobenzene	20.03	1.0	20	0	100	80 - 119	20.51	2.4	20
1,2-Dichloroethane	19.56	1.0	20	0	97.8	73 - 128	19.67	0.549	20
1,2-Dichloropropane	19.79	1.0	20	0	99.0	78 - 122	20.06	1.32	20
1,3,5-Trimethylbenzene	20.73	1.0	20	0	104	75 - 124	21.68	4.49	20
1,3-Dichlorobenzene	20.5	1.0	20	0	102	80 - 119	20.99	2.4	20
1,3-Dichloropropane	19.8	1.0	20	0	99.0	80 - 119	19.74	0.324	20
1,4-Dichlorobenzene	20.61	1.0	20	0	103	79 - 118	20.91	1.44	20
2,2-Dichloropropane	19.06	1.0	20	0	95.3	60 - 139	19.61	2.82	20
2-Butanone	31.76	2.0	40	0	79.4	56 - 143	30.06	5.48	20
2-Chlorotoluene	19.81	1.0	20	0	99.0	79 - 122	20.68	4.33	20
2-Hexanone	39.5	2.0	40	0	98.7	57 - 139	38.6	2.3	20
4-Chlorotoluene	20.4	1.0	20	0	102	78 - 122	21.22	3.96	20
4-Isopropyltoluene	21.8	1.0	20	0	109	77 - 127	22.47	3.02	20
4-Methyl-2-pentanone	40.93	2.0	40	0	102	67 - 130	40	2.28	20
Acetone	25.49	2.0	40	0	63.7	39 - 160	25.65	0.61	20
Benzene	19.69	1.0	20	0	98.4	79 - 120	20.33	3.23	20
Bromobenzene	20.41	1.0	20	0	102	80 - 120	21.24	3.94	20
Bromochloromethane	18.72	1.0	20	0	93.6	78 - 123	19.19	2.47	20
Bromodichloromethane	19.01	1.0	20	0	95.0	79 - 125	19.09	0.42	20
Bromoform	18.91	1.0	20	0	94.6	66 - 130	19	0.445	20
Bromomethane	8.264	1.0	20	0	41.3	53 - 141	8.856	6.92	20 S

## ALS Houston, US

Date: 17-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22060792

## QC BATCH REPORT

Batch ID: R410858 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
<b>MSD</b>		Sample ID: HS22060792-01MSD		Units: ug/L		Analysis Date: 16-Jun-2022 13:19			
Client ID: LH18/24-SP650_061422		Run ID: VOA6_410858		SeqNo: 6697637		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	31.27	2.0	40	0	78.2	64 - 133	32.31	3.27	20
Carbon tetrachloride	19.13	1.0	20	0	95.6	72 - 136	20.01	4.48	20
Chlorobenzene	20.41	1.0	20	0	102	82 - 118	20.92	2.49	20
Chloroethane	12.07	1.0	20	0	60.3	60 - 138	12.43	2.95	20
Chloroform	18.45	1.0	20	0	92.2	79 - 124	18.78	1.77	20
Chloromethane	19.65	1.0	20	0	98.2	50 - 139	19.64	0.0477	20
cis-1,2-Dichloroethene	22.06	1.0	20	2.705	96.8	78 - 123	22.8	3.27	20
cis-1,3-Dichloropropene	19.1	1.0	20	0	95.5	75 - 124	19.51	2.14	20
Dibromochloromethane	19.62	1.0	20	0	98.1	74 - 126	19.98	1.79	20
Dibromomethane	19.36	1.0	20	0	96.8	79 - 123	19.34	0.109	20
Dichlorodifluoromethane	2.656	1.0	20	0	13.3	32 - 152	2.823	6.11	20 S
Ethylbenzene	20.94	1.0	20	0	105	79 - 121	21.62	3.23	20
Hexachlorobutadiene	21.98	1.0	20	0	110	66 - 134	22.09	0.527	20
Isopropylbenzene	20.51	1.0	20	0	103	72 - 131	20.92	1.99	20
m,p-Xylene	41.89	2.0	40	0	105	80 - 121	42.85	2.26	20
Methylene chloride	16.94	2.0	20	0	84.7	74 - 124	16.95	0.0717	20
Naphthalene	17.67	1.0	20	0	88.3	61 - 128	14.34	20.8	20 R
n-Butylbenzene	21.33	1.0	20	0	107	75 - 128	22.36	4.72	20
n-Propylbenzene	20.84	1.0	20	0	104	76 - 126	21.95	5.21	20
o-Xylene	20.83	1.0	20	0	104	78 - 122	21.2	1.76	20
sec-Butylbenzene	21.43	1.0	20	0	107	77 - 126	22.38	4.35	20
Styrene	20.97	1.0	20	0	105	78 - 123	22.47	6.9	20
tert-Butylbenzene	21.42	1.0	20	0	107	78 - 124	22.19	3.52	20
Tetrachloroethene	21.86	1.0	20	0	109	74 - 129	21.99	0.627	20
Toluene	20.71	1.0	20	0	104	80 - 121	21.07	1.73	20
trans-1,2-Dichloroethene	18.97	1.0	20	0	94.9	75 - 124	19.32	1.84	20
trans-1,3-Dichloropropene	18.98	1.0	20	0	94.9	73 - 127	19.28	1.6	20
Trichloroethene	20.29	1.0	20	0	101	79 - 123	21.03	3.55	20
Trichlorofluoromethane	14.95	1.0	20	0	74.7	65 - 141	15.37	2.75	20
Vinyl chloride	10.02	1.0	20	0	50.1	58 - 137	10.3	2.73	20 S
Surr: 1,2-Dichloroethane-d4	44.33	1.0	50	0	88.7	81 - 118	45.8	3.26	20
Surr: 4-Bromofluorobenzene	49.63	1.0	50	0	99.3	85 - 114	49.03	1.21	20
Surr: Dibromofluoromethane	46.46	1.0	50	0	92.9	80 - 119	47.26	1.7	20
Surr: Toluene-d8	48.85	1.0	50	0	97.7	89 - 112	49.29	0.911	20

ALS Houston, US

Date: 17-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22060792

**QC BATCH REPORT****Batch ID:** R410858 ( 0 )**Instrument:** VOA6**Method:** VOLATILES ORGANICS BY METHOD  
8260C

The following samples were analyzed in this batch:

HS22060792-01	HS22060792-02
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ALS Houston, US

Date: 17-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22060792

**QC BATCH REPORT**

Batch ID: R410857 ( 0 )		Instrument: ICS-Integrion		Method: ANIONS BY SW9056A					
<b>MBLK</b>	Sample ID: <b>MBLK</b>	Units: <b>mg/L</b>		Analysis Date: <b>16-Jun-2022 11:18</b>					
Client ID:	Run ID: <b>ICS-Integrion_410857</b>		SeqNo: <b>6697455</b>		PrepDate:		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	0.500	0.500							U
Sulfate	0.500	0.500							U

<b>LCS</b>	Sample ID: <b>LCS</b>	Units: <b>mg/L</b>		Analysis Date: <b>16-Jun-2022 11:23</b>					
Client ID:	Run ID: <b>ICS-Integrion_410857</b>		SeqNo: <b>6697456</b>		PrepDate:		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	19.41	0.500	20	0	97.0	80 - 120			
Sulfate	19.14	0.500	20	0	95.7	80 - 120			

<b>MS</b>	Sample ID: <b>HS22060796-01MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>16-Jun-2022 15:43</b>					
Client ID:	Run ID: <b>ICS-Integrion_410857</b>		SeqNo: <b>6697476</b>		PrepDate:		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	35.79	0.500	10	25.77	100	80 - 120			
Sulfate	25.73	0.500	10	15.85	98.8	80 - 120			

<b>MSD</b>	Sample ID: <b>HS22060796-01MSD</b>	Units: <b>mg/L</b>		Analysis Date: <b>16-Jun-2022 15:48</b>					
Client ID:	Run ID: <b>ICS-Integrion_410857</b>		SeqNo: <b>6697477</b>		PrepDate:		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	35.75	0.500	10	25.77	99.8	80 - 120	35.79	0.0951	20
Sulfate	25.72	0.500	10	15.85	98.7	80 - 120	25.73	0.0194	20

The following samples were analyzed in this batch: HS22060792-01



**ALS Houston, US**

Date: 17-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22060792

**QUALIFIERS,  
ACRONYMS, UNITS**

<b>Qualifier</b>	<b>Description</b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

<b>Acronym</b>	<b>Description</b>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

<b>Unit Reported</b>	<b>Description</b>
mg/L	Milligrams per Liter

ALS Houston, US

Date: 17-Jun-22

---

**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

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Agency	Number	Expire Date
Dept of Defense	L21-682	31-Dec-2023
Florida	E87611-34	30-Jun-2022
Illinois	2000322022-9	09-May-2023
Kansas	E-10352 2021-2022	31-Jul-2022
Louisiana	03087, 2021-2022	30-Jun-2022
Maryland	343, 2021-2022	30-Jun-2022
North Carolina	624-2022	31-Dec-2022
Oklahoma	2021-080	31-Aug-2022
Texas	T104704231-22-29	30-Apr-2023
Utah	TX026932021-12	30-Jul-2022

---

ALS Houston, US

Date: 17-Jun-22

## Sample Receipt Checklist

Work Order ID: HS22060792

Date/Time Received: 15-Jun-2022 10:10

Client Name: Bhate Environmental

Received by: Pablo Martinez

Completed By: <u>/S/ Pablo Martinez</u>	15-Jun-2022 13:48	Reviewed by: <u>/S/ Dane J. Wacasey</u>	17-Jun-2022 11:06
eSignature	Date/Time	eSignature	Date/Time

Matrices: **WATER**Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	1 Page(s)
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	COC IDs: CLIENT
Samplers name present on COC?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	

Temperature(s)/Thermometer(s):

0.8°C/1.3°C UC/C IR 31

Cooler(s)/Kit(s):

BLUE

Date/Time sample(s) sent to storage:

6/15/22 13:50

Water - VOA vials have zero headspace?

Yes ☒ No ☐ No VOA vials submitted ☐

Water - pH acceptable upon receipt?

Yes ☐ No ☐ N/A ☒

pH adjusted?

Yes ☐ No ☐ N/A ☒

pH adjusted by:

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:

Corrective Action:


Name Of Lab Shipping To: ALS 10450 Stancil Rd. Suite 210, Houston, Tx. 77099 ATTN: Ragen Gigi

## CHAIN OF CUSTODY

Page 1 of 1

[illegible]

Time 0.82  
1R31 2PM.5

 <b>ALS</b> 10450 Stanwall Blvd, Suite 200 Houston, Texas 77099 Tel. 281 530 5666 Fax. 281 530 1357	<b>CUSTODY SEAL</b>		Seal Broken By
	Date: 6/14/77	Time: 1430	By: [Signature]
	Description: [Signature]		Date: 6/15/77

FedEx  
 TRK#  
 0221 9473 0838 9612

WED - 15 JUN AA  
 PRIORITY OVERNIGHT

**AB SGRA**

Blue

77099  
 TX-US  
 IAH



3823267 14JUN07Z 0126 5405277741/0009



---

10450 Stancliff Rd. Suite 210  
Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887

June 30, 2022

Marcia Olive  
Bhate Environmental Associates, Inc.  
445 Union Blvd Ste 129  
Lakewood, CO 80228

Work Order: **HS22061138**

Laboratory Results for: **Longhorn GW Treatment Plant Weekly Samples**

Dear Marcia Olive,

ALS Environmental received 2 sample(s) on Jun 22, 2022 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: DAYNA.FISHER

Dane J. Wacasey

ALS Houston, US

Date: 30-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**Work Order:** HS22061138

**SAMPLE SUMMARY**

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS22061138-01	LH18/24-SP650_062122	Water		21-Jun-2022 14:00	22-Jun-2022 09:35	<input type="checkbox"/>
HS22061138-02	LH18/24-SP650_062122_AIX	Water		21-Jun-2022 14:00	22-Jun-2022 09:35	<input type="checkbox"/>

ALS Houston, US

Date: 30-Jun-22

---

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**Work Order:** HS22061138

---

**CASE NARRATIVE**

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**Work Order Comments**

- The analysis for Perchlorate was subcontracted to ALS Houston High-Res Lab. Final report attached
- 

**WetChemistry by Method E415.1****Batch ID: R411664****Sample ID: HS22060718-01MS**

- MS is for an unrelated sample
- 

**WetChemistry by Method E350.3****Batch ID: R411384**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**WetChemistry by Method E365.3****Batch ID: R411346**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-



## ALS Houston, US

Date: 30-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Weekly Samples  
 Sample ID: LH18/24-SP650\_062122  
 Collection Date: 21-Jun-2022 14:00

**ANALYTICAL REPORT**

WorkOrder:HS22061138  
 Lab ID:HS22061138-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>AMMONIA AS N BY E350.3(ISE)</b>		<b>Method:E350.3</b>						Analyst: MZD
Nitrogen, Ammonia (As N)	17	a	0.10	0.10	0.20	mg/L	1	23-Jun-2022 12:55
<b>ORTHO PHOSPHATE (PO4) AS P BY E365.3-1978</b>		<b>Method:E365.3</b>						Analyst: MZD
Phosphorus, Total Orthophosphate (As P)	0.308	a	0.0100	0.0125	0.0250	mg/L	1	22-Jun-2022 13:09
<b>TOTAL ORGANIC CARBON BY E415.1</b>		<b>Method:E415.1</b>						Analyst: SB
Organic Carbon, Total	16.6	a	0.500	1.00	1.00	mg/L	1	27-Jun-2022 22:35

ALS Houston, US

Date: 30-Jun-22

Client:	Bhate Environmental Associates, Inc.	<b>ANALYTICAL REPORT</b>
Project:	Longhorn GW Treatment Plant Weekly Samples	WorkOrder:HS22061138
Sample ID:	LH18/24-SP650_062122_AIX	Lab ID:HS22061138-02
Collection Date:	21-Jun-2022 14:00	Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		Method:NA						Analyst: GR
Subcontract Analysis	See Attached		0	0		NA	1	30-Jun-2022 18:07

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US

Date: 30-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22061138

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> R411346 ( 0 )		<b>Test Name :</b> ORTHO PHOSPHATE (PO4) AS P BY E365.3-1978			<b>Matrix:</b> Water	
HS22061138-01	LH18/24-SP650_062122	21 Jun 2022 14:00			22 Jun 2022 13:09	1
<b>Batch ID:</b> R411384 ( 0 )		<b>Test Name :</b> AMMONIA AS N BY E350.3(ISE)			<b>Matrix:</b> Water	
HS22061138-01	LH18/24-SP650_062122	21 Jun 2022 14:00			23 Jun 2022 12:55	1
<b>Batch ID:</b> R411664 ( 0 )		<b>Test Name :</b> TOTAL ORGANIC CARBON BY E415.1			<b>Matrix:</b> Water	
HS22061138-01	LH18/24-SP650_062122	21 Jun 2022 14:00			27 Jun 2022 22:35	1
<b>Batch ID:</b> R411959 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			<b>Matrix:</b> Water	
HS22061138-02	LH18/24-SP650_062122_AIX	21 Jun 2022 14:00			30 Jun 2022 18:07	1

ALS Houston, US

Date: 30-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22061138

**QC BATCH REPORT**

Batch ID: R411346 ( 0 )		Instrument: UV-2450		Method: ORTHO PHOSPHATE (PO4) AS P BY E365.3-1978					
<b>MBLK</b>	Sample ID: <b>MBLK-R411346</b>	Units: <b>mg/L</b>		Analysis Date: <b>22-Jun-2022 13:09</b>					
Client ID:	Run ID: <b>UV-2450_411346</b>	SeqNo: <b>6709048</b>		PrepDate:		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.0125	0.0250							U
<b>LCS</b>	Sample ID: <b>LCS-R411346</b>	Units: <b>mg/L</b>		Analysis Date: <b>22-Jun-2022 13:09</b>					
Client ID:	Run ID: <b>UV-2450_411346</b>	SeqNo: <b>6709047</b>		PrepDate:		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.254	0.0250	0.25	0	102	85 - 115			
<b>LCSD</b>	Sample ID: <b>LCSD-R411346</b>	Units: <b>mg/L</b>		Analysis Date: <b>22-Jun-2022 13:09</b>					
Client ID:	Run ID: <b>UV-2450_411346</b>	SeqNo: <b>6709054</b>		PrepDate:		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.255	0.0250	0.25	0	102	85 - 115	0.254	0.393	20
<b>MS</b>	Sample ID: <b>HS22061127-01MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>22-Jun-2022 13:09</b>					
Client ID:	Run ID: <b>UV-2450_411346</b>	SeqNo: <b>6709050</b>		PrepDate:		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.246	0.0250	0.25	0.005	96.4	80 - 120			
<b>MSD</b>	Sample ID: <b>HS22061127-01MSD</b>	Units: <b>mg/L</b>		Analysis Date: <b>22-Jun-2022 13:09</b>					
Client ID:	Run ID: <b>UV-2450_411346</b>	SeqNo: <b>6709049</b>		PrepDate:		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.246	0.0250	0.25	0.005	96.4	80 - 120	0.246	0	20

The following samples were analyzed in this batch: HS22061138-01





**ALS Houston, US**

Date: 30-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22061138

**QUALIFIERS,  
ACRONYMS, UNITS**

<b>Qualifier</b>	<b>Description</b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

<b>Acronym</b>	<b>Description</b>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

ALS Houston, US

Date: 30-Jun-22

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**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

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Agency	Number	Expire Date
California	2919 2022-2023	30-Apr-2023
Dept of Defense	L21-682	31-Dec-2023
Illinois	2000322022-9	09-May-2023
Kansas	E-10352 2021-2022	31-Jul-2022
Kentucky	123043, 2022-2023	30-Apr-2023
Maryland	343, 2022-2023	30-Jun-2023
North Carolina	624-2022	31-Dec-2022
North Dakota	R-193 2022-2023	30-Apr-2023
Oklahoma	2021-080	31-Aug-2022
Texas	T104704231-22-29	30-Apr-2023
Utah	TX026932021-12	30-Jul-2022

---



ALS Houston, US

Date: 30-Jun-22

## Sample Receipt Checklist

Work Order ID: HS22061138

Date/Time Received: **22-Jun-2022 09:35**

Client Name: Bhate Environmental

Received by: **Pablo Martinez**Completed By: /S/ Pablo Martinez

22-Jun-2022 10:37

eSignature

Date/Time

Reviewed by: /S/ Ragen Giga

28-Jun-2022 16:43

eSignature

Date/Time

Matrices: **WATER**Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?

Yes ☒No ☐Not Present ☐

Custody seals intact on shipping container/cooler?

Yes ☒No ☐Not Present ☐

Custody seals intact on sample bottles?

Yes ☐No ☐Not Present ☒

VOA/TX1005/TX1006 Solids in hermetically sealed vials?

Yes ☐No ☐Not Present ☒

Chain of custody present?

Yes ☒No ☐

1 Page(s)

Chain of custody signed when relinquished and received?

Yes ☒No ☐

COC IDs: CLIENT

Samplers name present on COC?

Yes ☒No ☐

Chain of custody agrees with sample labels?

Yes ☒No ☐

Samples in proper container/bottle?

Yes ☒No ☐

Sample containers intact?

Yes ☒No ☐

Sufficient sample volume for indicated test?

Yes ☒No ☐

All samples received within holding time?

Yes ☒No ☐

Container/Temp Blank temperature in compliance?

Yes ☒No ☐

Temperature(s)/Thermometer(s):

1.1°C/1.6°C UC/C

IR 31

Cooler(s)/Kit(s):

48635

Date/Time sample(s) sent to storage:

6/22/22 10:40

Water - VOA vials have zero headspace?

Yes ☒No ☐No VOA vials submitted ☐

Water - pH acceptable upon receipt?

Yes ☒No ☐N/A ☐

pH adjusted?

Yes ☐No ☒N/A ☐

pH adjusted by:

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:


Comments:

Corrective Action:


## CHAIN OF CUSTODY

Name Of Lab Shipping To: ALS 10450 Stanchiff Rd. Suite 210 Houston, TX. 77099 (281) 530-5656 ATTN: Ragen Gigi

Page 1 of 1

Project: BHATE LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS						Project No.  NWO1312.0150.0 16.0001																							
Job: <b>GROUNDWATER TREATMENT PLANT WEEKLY SAMPLES</b>								<b>HS22061138</b> Bhate Environmental Associates, Inc. Longhorn GW Treatment Plant Weekly Samples 																					
Prepared By:  Scott Beesinger				P.O. Number																									
Field Sample I.D.								Sample Matrix		Date / Time		MS / MSD		No. OF CONTAINERS		AMMONIA-N		TOTAL ORGANIC CARBON		ORTHO-PHOSPHATE		PERCHLORATE		Analyses		Remarks (Preservatives, etc.)		Lab I.D.#	
LH18/24-SP650_062122								Water		06/21/22 / 14:00		3		X		X										H2SO4			
LH18/24-SP650_062122								Water		06/21/22 / 14:00		1						X								NONE			
LH18/24-SP650_062122_AIX								Water		06/21/22 / 14:00		1								X						NONE			

48635 11231  
1.1C C# 10-3

 <b>ALS</b> 10450 GrandPine Rd., Suite 210 Houston, Texas 77099 Tel. +1 630 5656 Fax. +1 630 598-	<b>CUSTODY SEAL</b>		Date: <u>6/21/82</u> Time: <u>1430</u> Name: <u>48635</u> Company: <u>77099</u>
	Date: <u>6/21/82</u> Time: <u>1430</u>		

TRK# 0473 0838 9509  
 RETURNS MON. SAT  
**AB SGRA** 48635 77099  
 TX-US  
 IAH



3-23787 213m7672 CGA 5602/274F/0896



June 30, 2022

Service Request No:E2200588

Dane Wacasey  
ALS Group USA, Corp.  
10450 Stancliff Road  
Suite 210  
Houston, TX 77099-4338

**Laboratory Results for: HS22061138**

Dear Dane,

Enclosed are the results of the sample(s) submitted to our laboratory June 22, 2022  
For your reference, these analyses have been assigned our service request number **E2200588**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current TNI standards, where applicable, and except as noted in the laboratory case narrative provided. All results are intended to be considered in their entirety and ALS Environmental is not responsible for use of less than the complete final report. Results apply only to the items submitted to the laboratory, as received for analysis. In accordance with the current TNI Standard, a statement on the estimated uncertainty of measurement of any quantitative analysis will be supplied upon request.

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Corey Grandits  
Project Manager

ADDRESS 10450 Stancliff Rd., Suite 210, Houston, TX 77099  
PHONE +1 281 530 5656 | FAX +1 281 530 5887  
ALS Group USA, Corp.  
dba ALS Environmental



# Certificate of Analysis

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

**ALS Environmental**

**Client:** ALS-Houston  
**Project:** HS22061138  
**Sample Matrix:** W

**Service Request No.:** E2200588  
**Date Received:** 06/22/22

**CASE NARRATIVE**

All analyses were performed in adherence to the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II. When appropriate to the method, method blank results have been reported with each analytical test.

**Sample Receipt**

One sample was received for analysis at ALS Environmental in Houston on 06/22/22.

The sample was received in good condition and is consistent with the accompanying chain of custody form. The sample was stored in a refrigerator at 4°C upon receipt at the laboratory.

**Data Validation Notes and Discussion****Precision and Accuracy:**

EQ2200257: Laboratory Control Spike/Duplicate Laboratory Control Spike (LCS/DLCS) samples were analyzed and reported in lieu of a MS/MSD for this extraction batch. The LCS-DLCS recoveries met acceptance criteria.

DoD Certification is held for the method/matrix/analytes provided in this report.

*The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.*

*Use of ALS group USA Corp dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.*

**Client:** ALS Environmental - US  
**Project:** HS22061138

**Service Request:**E2200588

**SAMPLE CROSS-REFERENCE**

<u>SAMPLE #</u>	<u>CLIENT SAMPLE ID</u>	<u>DATE</u>	<u>TIME</u>
E2200588-001	LH18/24-SP650_062122_AIX	6/21/2022	1400

**Service Request Summary**

**Folder #:** E2200588  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22061138  
**Project Number:**  
**Report To:** Dane Wacasey  
 ALS Group USA, Corp.  
 10450 Stancliff Road  
 Houston, TX 77099-4338  
 USA  
**Phone Number:** 281-575-2190  
**Cell Number:**  
**Fax Number:** 281-530-5887  
**E-mail:** dane.wacasey@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 06/22/22  
**Internal Due Date:** 6/29/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22061138  
**EDD:** BASIC\_WQC\_CASNo  
 \_LOD

1 120 mL-Plastic Bottle Natural WM Unpreserved

**Location:** EHRMS-AirArch 1

**Pressure Gas:**

				HOUSTON
				CIO4 DOD/6850
Lab Samp No.	Client Samp No	Matrix	Collected	
E2200588-001	LH18/24-SP650_062122_AIX	Water	06/21/22 1400	IV



**Service Request Summary**

**Folder #:** E2200588  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22061138  
**Project Number:**  
  
**Report To:** Dane Wacasey  
ALS Group USA, Corp.  
10450 Stancliff Road  
Houston, TX 77099-4338  
USA  
**Phone Number:** 281-575-2190  
**Cell Number:**  
**Fax Number:** 281-530-5887  
**E-mail:** dane.wacasey@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 06/22/22  
**Internal Due Date:** 6/29/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22061138  
**EDD:** BASIC\_WQC\_CASNo  
\_LOD

1 120 mL-Plastic Bottle Natural WM Unpreserved  
**Location:** EHRMS-AirArch 1  
**Pressure Gas:**

## Data Qualifiers

### Lab Standard

- + Possible Tedlar bag artifact.
- A TIC is a suspected aldol-condensation product
- B Analyte found in the associated method blank as well as in the sample.
- BC Reported results are not blank corrected.
- BH The back section of the tube yielded higher results than the front.
- BT Results indicated possible breakthrough; back section  $\geq 10\%$  front section.
- C Result identification confirmed.
- D Compound identified in an analysis at a secondary dilution factor
- D Spike was diluted out
- DE Reported results are corrected for desorption efficiency.
- E Estimated value. Concentration above calibration range
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- H1 Sample analysis performed past holding time. See case narrative.
- H2 Initial analysis within holding time. Reanalysis for the required dilution was past holding time.
- H3 Sample was received and analyzed past holding time.
- H4 Sample was extracted past required extraction holding time, but analyzed within analysis holding time. See case narrative.
- I Internal standard not within the specified limits. See case narrative.
- J Estimated Value. Concentration found below MRL.
- K (Auto) The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- K A deflection in the QC ion may indicate interference with the quantitation of this ion. The concentration of this analyte should be considered as an estimate.
- K Analyte was detected above the method reporting limit prior to normalization.
- K The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- L1 Laboratory control sample recovery outside the specified limits; results may be biased high.
- L2 Laboratory control sample recovery outside the specified limits; results may be biased low.
- L3 Laboratory control sample recovery outside the specified limits.
- M Matrix interference; results may be biased high.
- M The duplicate injection precision not met.
- M1 Matrix interference due to coelution with a non-target compound; results may be biased high.

## Data Qualifiers

### Lab Standard

- N Presumptive evidence of a compound for TICs that have been identified based on a mass spectral library search.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- P Indicates chlorodiphenyl ether interference present at the retention time of the target compound.
- P Pesticide/Aroclor target analyte > 40% difference for detected concentrations between GC columns
- Q Indicates as estimated value because the P and P + 2 theoretical abundance ratio does not meet method criteria.
- R Duplicate Precision not met.
- R1 Duplicate precision not within the specified limits; however, the results are below the MRL and considered estimated.
- S Surrogate recovery not within specified limits.
- S The reported value was determined by the Method of Standard Additions (MSA).
- T Analyte is a tentatively identified compound, result is estimated.
- U Compound was analyzed for, but was not detected (ND).
- V1 The continuing calibration verification standard was outside (biased high) the specified limits for this compound.
- V2 The continuing calibration verification standard was outside (biased low) the specified limits for this compound.
- W Result quantified, but the corresponding peak was detected outside the generated retention time window.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- X See case narrative.
- Y Recovery outside limits
- Y The chromatogram resembles a petroleum product but does not match the calibration standard.
- Z The chromatogram does not resemble a petroleum product.
- i The MRL/MDL has been elevated due to a matrix interference.

## ALS Laboratory Group

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### Acronyms

Cal	Calibration
Conc	CONCetration
Dioxin(s)	Polychlorinated dibenzo-p-dioxin(s)
EDL	Estimated Detection Limit
EMPC	Estimated Maximum Possible Concentration
Flags	Data qualifiers
Furan(s)	Polychlorinated dibenzofuran(s)
g	Grams
ICAL	Initial CALibration
ID	IDentifier
Ions	Masses monitored for the analyte during data acquisition
L	Liter (s)
LCS	Laboratory Control Sample
DLCS	Duplicate Laboratory Control Sample
MB	Method Blank
MCL	Method Calibration Limit
MDL	Method Detection Limit
mL	Milliliters
MS	Matrix Spiked sample
DMS	Duplicate Matrix Spiked sample
NO	Number of peaks meeting all identification criteria
PCDD(s)	Polychlorinated dibenzo-p-dioxin(s)
PCDF(s)	Polychlorinated dibenzofuran(s)
ppb	Parts per billion
ppm	Parts per million
ppq	Parts per quadrillion
ppt	Parts per trillion
QA	Quality Assurance
QC	Quality Control
Ratio	Ratio of areas from monitored ions for an analyte
% Rec.	Percent recovery
RPD	Relative Percent Difference
RRF	Relative Response Factor
RT	Retention Time
SDG	Sample Delivery Group
S/N	Signal-to-noise ratio
TEF	Toxicity Equivalence Factor
TEQ	Toxicity Equivalence Quotient



## State Certifications, Accreditations, and Licenses

Agency	Number	Expire Date
Arizona Department of Health Services	AZ0793	5/27/2023
California Department of Health Services	2919-2023	4/30/2023
Department of Defense	L22-90	3/31/2024
Florida Department of Health	E87611-35	6/30/2023
Florida Department of Health	E87611-34	6/30/2022
Florida Department of Health	E87611-35	6/30/2023
Florida Department of Health	E87611-35	6/30/2023
Florida Department of Health	E87611-35	6/30/2023
Hawaii Department of Health	2022	4/30/2023
Illinois Environmental Protection Agency	2000322022-9	5/9/2023
Kansas Department of Health and Environment	E-10352 2022	7/31/2022
Louisiana Department of Environmental Quality	03087-2021	6/30/2022
Louisiana Department of Environmental Quality	03087-2022	6/30/2023
Louisiana Department of Health and Hospitals	LA028	12/31/2022
Maine Department of Health and Human Services	2022017	6/5/2024
Maryland Department of the Environment	343	6/30/2023
Michigan Department of Environmental Quality	9971-2022	4/30/2023
Minnesota Department of Health	2228443	12/31/2022
Nebraska Department of Health and Human Services	NE-OS-25-13	4/30/2023
Nevada Department of Conservation and Natural Resources	TX026932022-1	7/31/2022
New Hampshire Environmental Laboratory Accreditation Program	209422	4/24/2023
New Jersey Department of Environmental Protection	TX008	6/30/2022
New York Department of Health	11707	3/31/2023
Oklahoma Department of Environmental Quality	2021-080	8/31/2022
Oregon Environmental Laboratory Accreditation Program	TX200002	5/15/2023
Pennsylvania Department of Environmental Protection	68-03441-015	6/30/2022
Perry Johnson Laboratory Accreditation	L22-91	3/31/2024
Tennessee Department of Environment and Conservation	04016-2022	4/30/2023
Texas Commission on Environmental Quality	T104704231-22-29	4/30/2023
United States Department of Agriculture	P330-19-00299	10/10/2022
Utah Department of Health Environmental Laboratory Certification	TX026932021-12	7/31/2022
Washington Department of Health	C819-2022	11/14/2022



## Chain of Custody

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)



10450 Standcliff Rd, Ste 210  
Houston, TX 77099  
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F: +1 281 530 5887  
www.alsglobal.com

## Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 19004

**SUBCONTRACT TO:**

ALS Environmental  
10450 Standcliff Road Suite 210  
Houston, TX 77084

**Phone:** +1 281 530 5656

**CUSTOMER  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Dane J. Wacasey  
**Address:** 10450 Standcliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Email:** Dane.Wacasey@alsglobal.com  
**Alternate  
Contact:**  
**Email:**

**INVOICE  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Accounts Payable  
**Address:** 10450 Standcliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Reference:** HS22061138  
**TSR:** Houston House Acct

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS22061138-02	LH18/24-SP650_062122_AIX	Water	21 Jun 2022 14:00
	6850-Perch. DOD Level II & Level IV	in separate pdf	29 Jun 2022

**Comments:** Please analyze for the analysis listed above.  
Send report to the emails shown above.

**QC Level:** DOD IV (DoD Data Package)

Relinquished By: Patty Mann  
Received By: [Signature]  
Cooler ID(s): [Signature]

Date/Time: 6-22-22 12:30  
Date/Time: 6-22-22 12:46  
Temperature(s): \_\_\_\_\_

RIGHT SOLUTIONS | RIGHT PARTNER



## Cooler Receipt Form

Project Chemist CCClient/Project AL4-H Thermometer ID 1031Date/Time Received: 6-22-22 Initials: CC Date/Time Logged in: 6-22-22 Initials: CC1. Method of delivery: ☐ US Mail ☐ Fed Ex ☐ UPS ☐ DHL ☒ <sup>ALS</sup> Courier ☐ Client2. Samples received in: ☒ Cooler ☐ Box ☐ Envelope ☐ Other \_\_\_\_\_3. Were custody seals on coolers? ☐ Yes ☒ No If yes, how manyWere they intact? ☐ Yes ☐ No ☒ N/A and where?Were they signed and dated? ☐ Yes ☐ No ☒ N/A4. Packing Material: ☐ Inserts ☒ Baggies ☐ Bubble Wrap ☐ Gel Packs ☒ Wet Ice ☐ Sleeves ☐ Other \_\_\_\_\_5. Foreign or Regulated Soil? ☐ Yes ☐ No Location of Sampling: \_\_\_\_\_

Cooler Tracking Number	COC ID	Date Opened	Time Opened	Opened By	Temp. °C	Temp Blank?
<u>NA</u>		<u>6-22-22</u>	<u>1200</u>	<u>CC</u>	<u>1.2°C</u>	<input checked="" type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>

6. Were custody papers properly filled out (ink, signed, dated, etc)? ☒ Yes ☐ No7. Did all bottles arrive in good condition (not broken, no signs of leakage)? ☒ Yes ☐ No8. Were all sample labels complete (i.e., sample ID, analysis, preservation, etc)? ☒ Yes ☐ No9. Were appropriate bottles/containers and volumes received for the requested tests? ☒ Yes ☐ No10. Did sample labels and tags agree with custody documents? ☒ Yes ☐ No

Notes, Discrepancies, &amp; Resolutions:

Service request Label:





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[www.alsglobal.com](http://www.alsglobal.com)

## SAMPLE ACCEPTANCE POLICY

This policy outlines the criteria samples must meet to be accepted by ALS Environmental – Houston HRMS.

### **Cooler Custody Seals (desirable, mandatory if specified in SAP):**

- ✓ Intact on outside of cooler, signed and dated

### **Chain-of-Custody (COC) documentation (mandatory):**

The following is required on each COC:

- ✓ Sample ID, the location, date and time of collection, collector's name, preservation type, sample type, and any other special remarks concerning the sample. The COC must be completed in ink.
- ✓ Signature and date of relinquishing party.

In the absence of a COC at sample receipt, the COC will be requested from the client.

### **Sample Integrity (mandatory):**

Samples are inspected upon arrival to ensure that sample integrity was not compromised during transfer to the laboratory.

- ✓ Sample containers must arrive in good condition (not broken or leaking).
- ✓ Samples must be labeled appropriately, including Sample IDs, and requested test using durable labels and indelible ink.
- ✓ The correct type of sample bottle must be used for the method requested.
- ✓ An appropriate sample volume, or weight, must be received.
- ✓ Sample IDs and number of containers must reconcile with the COC.
- ✓ Samples must be received within the method defined holding time.

### **Temperature Requirement (varies by sample matrix):**

- ✓ Aqueous and Non-aqueous samples must be shipped and stored cold, at 0 to 6°C.
- ✓ Tissue samples must be shipped and stored frozen, at -20 to -10°C.
- ✓ Air samples are shipped and stored cold, at 0 to 6°C
- ✓ The sample temperature must be recorded on the COC

All cooler inspections are documented on the Cooler Receipt Form (CRF). A separate CRF is completed for each service request. Any samples not meeting the above criteria are noted on the CRF and the Project Manager notified. The Project Manager must resolve any sample integrity issues with the client prior to proceeding with the analysis. Such resolutions are documented in writing and filed with the project folder. Data associated with samples received outside of this acceptance policy will be qualified on the case narrative of the final report



# Preparation Information Benchsheets

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

**Preparation Information Benchsheet**

**Prep Run#:** 401767  
**Team:** Semivoa GCMS/GRIVERA

**Prep WorkFlow:** GenExt28Day  
**Prep Method:** Method

**Status:** Prepped  
**Prep Date/Time:** 6/23/22 09:36

#	Lab Code	Client ID	B#	Method /Test	pH	Cl	Matrix	Amt. Ext.	Sample Description
1	E2200587-001	16WW37_220620	.01	6850/CIO4 DOD			Ground Water	10mL	
2	E2200587-002	16WW38_220620	.01	6850/CIO4 DOD			Ground Water	10mL	
3	E2200587-003	16WW34_220620	.01	6850/CIO4 DOD			Ground Water	10mL	
4	E2200587-004	16WW34_220620_FD	.01	6850/CIO4 DOD			Ground Water	10mL	
5	E2200587-005	16WW33_220620	.01	6850/CIO4 DOD			Ground Water	10mL	
6	E2200587-006	16WW31_220620	.01	6850/CIO4 DOD			Ground Water	10mL	
7	E2200587-007	16WW32_220620	.01	6850/CIO4 DOD			Ground Water	10mL	
8	E2200587-008	16WW46_220620	.01	6850/CIO4 DOD			Ground Water	10mL	
9	E2200588-001	LH18/24-SP650_062122_AIX	.01	6850/CIO4 DOD			Water	10mL	
10	EQ2200257-01	MB		6850/CIO4 DOD			Liquid	10mL	
11	EQ2200257-02	LCS		6850/CIO4 DOD			Liquid	10mL	
12	EQ2200257-03	DLCS		6850/CIO4 DOD			Liquid	10mL	

**Spiking Solutions**

Name:	Perchlorate Intermediate Stock1	Inventory ID	222798	Logbook Ref:	Perchlorate (1st Source)	Expires On:	10/29/2022
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EQ2200257-02 1.00µL EQ2200257-03 1.00µL

Name:	Perchlorate Internal Standard 1ug/mL	Inventory ID	223118	Logbook Ref:	Perchlorate Internal Standard	Expires On:	10/31/2022
-------	--------------------------------------	--------------	--------	--------------	-------------------------------	-------------	------------

E2200587-001 100.00µL E2200587-002 100.00µL E2200587-003 100.00µL E2200587-004 100.00µL E2200587-005 100.00µL E2200587-006 100.00µL  
E2200587-007 100.00µL E2200587-008 100.00µL E2200588-001 100.00µL EQ2200257-01 100.00µL EQ2200257-02 100.00µL EQ2200257-03 100.00µL

**Preparation Materials**

Water HPLC Grade 02/16/2022 Water (221769) 6850 Amber Glass screw vial 2mL Screw Top Vial (221894) 537M Glass Culture Tubes 537M Glass Tubes (218064)  
6850 0.45um syringe filters 6850 Syringe Filters (222410) 6850 Luer-Lok Syringes Luer-Lok Syringes (221305) 6850 Pipette Tips 50-1000 uL 6850 Pipette Tips (221929)

**Preparation Steps**

Step: Preparation  
Started: 6/23/22 09:36  
Finished: 6/23/22 10:15  
By: GRIVERA  
Comments

Comments: \_\_\_\_\_

***Preparation Information Benchsheet***

**Prep Run#:** 401767  
**Team:** Semivoia GCMS/GRIVERA

**Prep WorkFlow:** GenExt28Day  
**Prep Method:** Method

**Status:** Prepped  
**Prep Date/Time:** 6/23/22 09:36

Reviewed By: GR Date: 6/23/22

Chain of Custody

Relinquished By: _____	Date: _____	<u>Extracts Examined</u> Yes      No
Received By: _____	Date: _____	



# Analytical Results

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Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22061138  
**Sample Matrix:** Water  
**Sample Name:** LH18/24-SP650\_062122\_AIX  
**Lab Code:** E2200588-001

**Service Request:** E2200588  
**Date Collected:** 6/21/22 1400  
**Date Received:** 6/22/22  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.246		0.100	0.0500	0.0250	1	6/23/22	6/24/22 17:03	401767	768766	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22061138  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** EQ2200257-01

**Service Request:** E2200588  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	0.100	0.0500	0.0250	1	6/23/22	6/24/22 15:21	401767	768766	



## Accuracy & Precision

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## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS22061138  
**Sample Matrix:** Water

**Service Request:** E2200588  
**Date Analyzed:** 6/24/22

**Lab Control Sample Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**Analytical Method:** 6850  
**Prep Method:** Method

**Units:** µg/L  
**Basis:** NA

**Extraction Lot:** 401767

Analyte Name	Lab Control Sample EQ2200257-02			Duplicate Lab Control Sample EQ2200257-03			% Rec Limits	RPD	RPD Limit
	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Perchlorate	0.118	0.100	118	0.103	0.100	103	84 - 119	13	15

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22061138  
**Sample Matrix:** Water  
**Sample Name:** Lab Control Sample  
**Lab Code:** EQ2200257-02

**Service Request:** E2200588  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.118		0.100	0.0500	0.0250	1	6/23/22	6/24/22 15:29	401767	768766	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22061138  
**Sample Matrix:** Water  
**Sample Name:** Duplicate Lab Control Sample  
**Lab Code:** EQ2200257-03

**Service Request:** E2200588  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.103		0.100	0.0500	0.0250	1	6/23/22	6/24/22 15:44	401767	768766	



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June 27, 2022

Marcia Olive  
Bhate Environmental Associates, Inc.  
445 Union Blvd Ste 129  
Lakewood, CO 80228

Work Order: **HS22061142**

Laboratory Results for: **Longhorn GW Treatment Plant Bi-Weekly Samples**

Dear Marcia Olive,

ALS Environmental received 2 sample(s) on Jun 22, 2022 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: DAYNA.FISHER

Dane J. Wacasey

ALS Houston, US

Date: 27-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**Work Order:** HS22061142

**SAMPLE SUMMARY**

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS22061142-01	LH18/24-SP650_062122	Water		21-Jun-2022 14:00	22-Jun-2022 09:35	<input type="checkbox"/>
HS22061142-02	Trip Blank	Water	CG-061322-06	21-Jun-2022 14:00	22-Jun-2022 09:35	<input type="checkbox"/>

**ALS Houston, US**

Date: 27-Jun-22

---

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**Work Order:** HS22061142

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**CASE NARRATIVE**

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**GCMS Volatiles by Method SW8260****Batch ID: R411321****Sample ID: LH18/24-SP650\_062122 (HS22061142-01MS)**

- MS and/or MSD recovered outside control limits for multiple compounds

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**WetChemistry by Method SW9056****Batch ID: R411433**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

## ALS Houston, US

Date: 27-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Bi-Weekly Samples  
 Sample ID: LH18/24-SP650\_062122  
 Collection Date: 21-Jun-2022 14:00

## ANALYTICAL REPORT

WorkOrder:HS22061142  
 Lab ID:HS22061142-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD</b>		<b>Method:SW8260</b>						Analyst: PC
<b>8260C</b>								
1,1,1,2-Tetrachloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 14:25
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 14:25
1,1,2,2-Tetrachloroethane	1.0	U	0.50	1.0	1.0	ug/L	1	22-Jun-2022 14:25
1,1,2-Trichloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 14:25
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 14:25
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 14:25
1,1-Dichloropropene	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 14:25
1,2,3-Trichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	22-Jun-2022 14:25
1,2,3-Trichloropropane	1.0	U	0.50	1.0	1.0	ug/L	1	22-Jun-2022 14:25
1,2,4-Trichlorobenzene	1.0	U	0.50	1.0	1.0	ug/L	1	22-Jun-2022 14:25
1,2,4-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 14:25
1,2-Dibromo-3-chloropropane	1.0	U	0.20	1.0	1.0	ug/L	1	22-Jun-2022 14:25
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 14:25
1,2-Dichlorobenzene	1.0	U	0.50	1.0	1.0	ug/L	1	22-Jun-2022 14:25
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 14:25
1,2-Dichloropropane	1.0	U	0.50	1.0	1.0	ug/L	1	22-Jun-2022 14:25
1,3,5-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 14:25
1,3-Dichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	22-Jun-2022 14:25
1,3-Dichloropropane	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 14:25
1,4-Dichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	22-Jun-2022 14:25
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 14:25
2-Butanone	1.0	U	0.50	1.0	2.0	ug/L	1	22-Jun-2022 14:25
2-Chlorotoluene	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 14:25
2-Hexanone	2.0	U	1.0	2.0	2.0	ug/L	1	22-Jun-2022 14:25
4-Chlorotoluene	1.0	U	0.40	1.0	1.0	ug/L	1	22-Jun-2022 14:25
4-Isopropyltoluene	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 14:25
4-Methyl-2-pentanone	2.0	U	0.70	2.0	2.0	ug/L	1	22-Jun-2022 14:25
Acetone	2.0	U	0.40	2.0	2.0	ug/L	1	22-Jun-2022 14:25
Benzene	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 14:25
Bromobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	22-Jun-2022 14:25
Bromochloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 14:25
Bromodichloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 14:25
Bromoform	1.0	U	0.40	1.0	1.0	ug/L	1	22-Jun-2022 14:25
Bromomethane	1.0	U	0.40	1.0	1.0	ug/L	1	22-Jun-2022 14:25
Carbon disulfide	2.0	U	0.60	2.0	2.0	ug/L	1	22-Jun-2022 14:25
Carbon tetrachloride	1.0	U	0.50	1.0	1.0	ug/L	1	22-Jun-2022 14:25
Chlorobenzene	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 14:25
Chloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 14:25
Chloroform	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 14:25

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 27-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Bi-Weekly Samples  
 Sample ID: LH18/24-SP650\_062122  
 Collection Date: 21-Jun-2022 14:00

## ANALYTICAL REPORT

WorkOrder:HS22061142  
 Lab ID:HS22061142-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD 8260C</b>		<b>Method:SW8260</b>						Analyst: PC
Chloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 14:25
<b>cis-1,2-Dichloroethene</b>	<b>2.8</b>		<b>0.20</b>	<b>0.50</b>	<b>1.0</b>	<b>ug/L</b>	1	22-Jun-2022 14:25
cis-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 14:25
Dibromochloromethane	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 14:25
Dibromomethane	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 14:25
Dichlorodifluoromethane	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 14:25
Ethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 14:25
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	ug/L	1	22-Jun-2022 14:25
Isopropylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 14:25
m,p-Xylene	1.0	U	0.50	1.0	2.0	ug/L	1	22-Jun-2022 14:25
Methylene chloride	2.0	U	0.40	2.0	2.0	ug/L	1	22-Jun-2022 14:25
n-Butylbenzene	1.0	U	0.40	1.0	1.0	ug/L	1	22-Jun-2022 14:25
n-Propylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 14:25
Naphthalene	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 14:25
o-Xylene	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 14:25
sec-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 14:25
Styrene	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 14:25
tert-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 14:25
Tetrachloroethene	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 14:25
Toluene	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 14:25
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 14:25
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 14:25
Trichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 14:25
Trichlorofluoromethane	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 14:25
Vinyl chloride	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 14:25
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>88.3</i>			<b>0</b>	<i>81-118</i>	<b>%REC</b>	<i>1</i>	22-Jun-2022 14:25
<i>Surr: 4-Bromofluorobenzene</i>	<i>90.2</i>			<b>0</b>	<i>85-114</i>	<b>%REC</b>	<i>1</i>	22-Jun-2022 14:25
<i>Surr: Dibromofluoromethane</i>	<i>92.7</i>			<b>0</b>	<i>80-119</i>	<b>%REC</b>	<i>1</i>	22-Jun-2022 14:25
<i>Surr: Toluene-d8</i>	<i>99.2</i>			<b>0</b>	<i>89-112</i>	<b>%REC</b>	<i>1</i>	22-Jun-2022 14:25
<b>ANIONS BY SW9056A</b>		<b>Method:SW9056</b>						Analyst: TH
<b>Chloride</b>	<b>892</b>		<b>4.00</b>	<b>10.0</b>	<b>10.0</b>	<b>mg/L</b>	20	23-Jun-2022 21:26
<b>Sulfate</b>	<b>18.5</b>		<b>0.400</b>	<b>1.00</b>	<b>1.00</b>	<b>mg/L</b>	2	23-Jun-2022 21:21

Note: See Qualifiers Page for a list of qualifiers and their explanation.



## ALS Houston, US

Date: 27-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Bi-Weekly Samples  
 Sample ID: Trip Blank  
 Collection Date: 21-Jun-2022 14:00

## ANALYTICAL REPORT

WorkOrder:HS22061142  
 Lab ID:HS22061142-02  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD</b>		<b>Method:SW8260</b>						Analyst: PC
<b>8260C</b>								
1,1,1,2-Tetrachloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 13:43
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 13:43
1,1,2,2-Tetrachloroethane	1.0	U	0.50	1.0	1.0	ug/L	1	22-Jun-2022 13:43
1,1,2-Trichloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 13:43
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 13:43
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 13:43
1,1-Dichloropropene	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 13:43
1,2,3-Trichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	22-Jun-2022 13:43
1,2,3-Trichloropropane	1.0	U	0.50	1.0	1.0	ug/L	1	22-Jun-2022 13:43
1,2,4-Trichlorobenzene	1.0	U	0.50	1.0	1.0	ug/L	1	22-Jun-2022 13:43
1,2,4-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 13:43
1,2-Dibromo-3-chloropropane	1.0	U	0.20	1.0	1.0	ug/L	1	22-Jun-2022 13:43
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 13:43
1,2-Dichlorobenzene	1.0	U	0.50	1.0	1.0	ug/L	1	22-Jun-2022 13:43
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 13:43
1,2-Dichloropropane	1.0	U	0.50	1.0	1.0	ug/L	1	22-Jun-2022 13:43
1,3,5-Trimethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 13:43
1,3-Dichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	22-Jun-2022 13:43
1,3-Dichloropropane	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 13:43
1,4-Dichlorobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	22-Jun-2022 13:43
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 13:43
2-Butanone	1.0	U	0.50	1.0	2.0	ug/L	1	22-Jun-2022 13:43
2-Chlorotoluene	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 13:43
2-Hexanone	2.0	U	1.0	2.0	2.0	ug/L	1	22-Jun-2022 13:43
4-Chlorotoluene	1.0	U	0.40	1.0	1.0	ug/L	1	22-Jun-2022 13:43
4-Isopropyltoluene	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 13:43
4-Methyl-2-pentanone	2.0	U	0.70	2.0	2.0	ug/L	1	22-Jun-2022 13:43
Acetone	2.0	U	0.40	2.0	2.0	ug/L	1	22-Jun-2022 13:43
Benzene	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 13:43
Bromobenzene	1.0	U	0.40	1.0	1.0	ug/L	1	22-Jun-2022 13:43
Bromochloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 13:43
Bromodichloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 13:43
Bromoform	1.0	U	0.40	1.0	1.0	ug/L	1	22-Jun-2022 13:43
Bromomethane	1.0	U	0.40	1.0	1.0	ug/L	1	22-Jun-2022 13:43
Carbon disulfide	2.0	U	0.60	2.0	2.0	ug/L	1	22-Jun-2022 13:43
Carbon tetrachloride	1.0	U	0.50	1.0	1.0	ug/L	1	22-Jun-2022 13:43
Chlorobenzene	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 13:43
Chloroethane	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 13:43
Chloroform	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 13:43

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 27-Jun-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Bi-Weekly Samples  
 Sample ID: Trip Blank  
 Collection Date: 21-Jun-2022 14:00

## ANALYTICAL REPORT

WorkOrder:HS22061142  
 Lab ID:HS22061142-02  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD</b>		<b>Method:SW8260</b>						Analyst: PC
<b>8260C</b>								
Chloromethane	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 13:43
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 13:43
cis-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 13:43
Dibromochloromethane	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 13:43
Dibromomethane	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 13:43
Dichlorodifluoromethane	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 13:43
Ethylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 13:43
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	ug/L	1	22-Jun-2022 13:43
Isopropylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 13:43
m,p-Xylene	1.0	U	0.50	1.0	2.0	ug/L	1	22-Jun-2022 13:43
Methylene chloride	2.0	U	0.40	2.0	2.0	ug/L	1	22-Jun-2022 13:43
n-Butylbenzene	1.0	U	0.40	1.0	1.0	ug/L	1	22-Jun-2022 13:43
n-Propylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 13:43
Naphthalene	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 13:43
o-Xylene	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 13:43
sec-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 13:43
Styrene	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 13:43
tert-Butylbenzene	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 13:43
Tetrachloroethene	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 13:43
Toluene	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 13:43
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 13:43
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 13:43
Trichloroethene	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 13:43
Trichlorofluoromethane	1.0	U	0.30	1.0	1.0	ug/L	1	22-Jun-2022 13:43
Vinyl chloride	0.50	U	0.20	0.50	1.0	ug/L	1	22-Jun-2022 13:43
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>89.4</i>			<b>0</b>	<i>81-118</i>	<b>%REC</b>	<i>1</i>	<i>22-Jun-2022 13:43</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>90.7</i>			<b>0</b>	<i>85-114</i>	<b>%REC</b>	<i>1</i>	<i>22-Jun-2022 13:43</i>
<i>Surr: Dibromofluoromethane</i>	<i>93.3</i>			<b>0</b>	<i>80-119</i>	<b>%REC</b>	<i>1</i>	<i>22-Jun-2022 13:43</i>
<i>Surr: Toluene-d8</i>	<i>99.3</i>			<b>0</b>	<i>89-112</i>	<b>%REC</b>	<i>1</i>	<i>22-Jun-2022 13:43</i>

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US

Date: 27-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22061142

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> R411321 ( 0 )		<b>Test Name :</b> VOLATILES ORGANICS BY METHOD 8260C			<b>Matrix:</b> Water	
HS22061142-01	LH18/24-SP650_062122	21 Jun 2022 14:00			22 Jun 2022 14:25	1
HS22061142-02	Trip Blank	21 Jun 2022 14:00			22 Jun 2022 13:43	1
<b>Batch ID:</b> R411433 ( 0 )		<b>Test Name :</b> ANIONS BY SW9056A			<b>Matrix:</b> Water	
HS22061142-01	LH18/24-SP650_062122	21 Jun 2022 14:00			23 Jun 2022 21:26	20
HS22061142-01	LH18/24-SP650_062122	21 Jun 2022 14:00			23 Jun 2022 21:21	2

## ALS Houston, US

Date: 27-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22061142

## QC BATCH REPORT

Batch ID: R411321 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
<b>MBLK</b>	Sample ID: VBLKW-220622	Units: ug/L		Analysis Date: 22-Jun-2022 13:22					
Client ID:	Run ID: VOA6_411321		SeqNo: 6708407		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	1.0	1.0							U
1,1,1-Trichloroethane	0.50	1.0							U
1,1,2,2-Tetrachloroethane	1.0	1.0							U
1,1,2-Trichloroethane	1.0	1.0							U
1,1-Dichloroethane	0.50	1.0							U
1,1-Dichloroethene	0.50	1.0							U
1,1-Dichloropropene	1.0	1.0							U
1,2,3-Trichlorobenzene	1.0	1.0							U
1,2,3-Trichloropropane	1.0	1.0							U
1,2,4-Trichlorobenzene	1.0	1.0							U
1,2,4-Trimethylbenzene	1.0	1.0							U
1,2-Dibromo-3-chloropropane	1.0	1.0							U
1,2-Dibromoethane	0.50	1.0							U
1,2-Dichlorobenzene	1.0	1.0							U
1,2-Dichloroethane	0.50	1.0							U
1,2-Dichloropropane	1.0	1.0							U
1,3,5-Trimethylbenzene	1.0	1.0							U
1,3-Dichlorobenzene	1.0	1.0							U
1,3-Dichloropropane	1.0	1.0							U
1,4-Dichlorobenzene	1.0	1.0							U
2,2-Dichloropropane	0.50	1.0							U
2-Butanone	1.0	2.0							U
2-Chlorotoluene	1.0	1.0							U
2-Hexanone	2.0	2.0							U
4-Chlorotoluene	1.0	1.0							U
4-Isopropyltoluene	1.0	1.0							U
4-Methyl-2-pentanone	2.0	2.0							U
Acetone	2.0	2.0							U
Benzene	0.50	1.0							U
Bromobenzene	1.0	1.0							U
Bromochloromethane	0.50	1.0							U
Bromodichloromethane	0.50	1.0							U
Bromoform	1.0	1.0							U
Bromomethane	1.0	1.0							U

## ALS Houston, US

Date: 27-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22061142

## QC BATCH REPORT

Batch ID: R411321 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
<b>MBLK</b>	Sample ID: VBLKW-220622	Units: ug/L		Analysis Date: 22-Jun-2022 13:22					
Client ID:	Run ID: VOA6_411321	SeqNo: 6708407		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	2.0	2.0							U
Carbon tetrachloride	1.0	1.0							U
Chlorobenzene	1.0	1.0							U
Chloroethane	1.0	1.0							U
Chloroform	0.50	1.0							U
Chloromethane	0.50	1.0							U
cis-1,2-Dichloroethene	0.50	1.0							U
cis-1,3-Dichloropropene	0.50	1.0							U
Dibromochloromethane	1.0	1.0							U
Dibromomethane	0.50	1.0							U
Dichlorodifluoromethane	1.0	1.0							U
Ethylbenzene	1.0	1.0							U
Hexachlorobutadiene	1.0	1.0							U
Isopropylbenzene	1.0	1.0							U
m,p-Xylene	1.0	2.0							U
Methylene chloride	2.0	2.0							U
Naphthalene	1.0	1.0							U
n-Butylbenzene	1.0	1.0							U
n-Propylbenzene	1.0	1.0							U
o-Xylene	1.0	1.0							U
sec-Butylbenzene	1.0	1.0							U
Styrene	1.0	1.0							U
tert-Butylbenzene	1.0	1.0							U
Tetrachloroethene	1.0	1.0							U
Toluene	0.50	1.0							U
trans-1,2-Dichloroethene	0.50	1.0							U
trans-1,3-Dichloropropene	0.50	1.0							U
Trichloroethene	0.50	1.0							U
Trichlorofluoromethane	1.0	1.0							U
Vinyl chloride	0.50	1.0							U
Surr: 1,2-Dichloroethane-d4	43.77	1.0	50	0	87.5	81 - 118			
Surr: 4-Bromofluorobenzene	46.56	1.0	50	0	93.1	85 - 114			
Surr: Dibromofluoromethane	46.39	1.0	50	0	92.8	80 - 119			
Surr: Toluene-d8	48.93	1.0	50	0	97.9	89 - 112			

## ALS Houston, US

Date: 27-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22061142

## QC BATCH REPORT

Batch ID: R411321 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
LCS		Sample ID: VLCSW-220622		Units: ug/L		Analysis Date: 22-Jun-2022 12:39			
Client ID:		Run ID: VOA6_411321		SeqNo: 6708406		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	19.4	1.0	20	0	97.0	78 - 124			
1,1,1-Trichloroethane	18.13	1.0	20	0	90.7	74 - 131			
1,1,2,2-Tetrachloroethane	17.99	1.0	20	0	89.9	71 - 121			
1,1,2-Trichloroethane	18.11	1.0	20	0	90.6	80 - 119			
1,1-Dichloroethane	18.4	1.0	20	0	92.0	77 - 125			
1,1-Dichloroethene	16.9	1.0	20	0	84.5	71 - 131			
1,1-Dichloropropene	18.57	1.0	20	0	92.9	78 - 125			
1,2,3-Trichlorobenzene	18.8	1.0	20	0	94.0	69 - 129			
1,2,3-Trichloropropane	18.34	1.0	20	0	91.7	73 - 122			
1,2,4-Trichlorobenzene	18.75	1.0	20	0	93.8	69 - 130			
1,2,4-Trimethylbenzene	18.62	1.0	20	0	93.1	76 - 124			
1,2-Dibromo-3-chloropropane	15.17	1.0	20	0	75.9	62 - 128			
1,2-Dibromoethane	18.84	1.0	20	0	94.2	77 - 121			
1,2-Dichlorobenzene	18.65	1.0	20	0	93.2	80 - 119			
1,2-Dichloroethane	18.78	1.0	20	0	93.9	73 - 128			
1,2-Dichloropropane	19.6	1.0	20	0	98.0	78 - 122			
1,3,5-Trimethylbenzene	18.33	1.0	20	0	91.6	75 - 124			
1,3-Dichlorobenzene	18.81	1.0	20	0	94.1	80 - 119			
1,3-Dichloropropane	18.71	1.0	20	0	93.6	80 - 119			
1,4-Dichlorobenzene	18.81	1.0	20	0	94.0	79 - 118			
2,2-Dichloropropane	18.63	1.0	20	0	93.1	60 - 139			
2-Butanone	30.98	2.0	40	0	77.4	56 - 143			
2-Chlorotoluene	18.11	1.0	20	0	90.5	79 - 122			
2-Hexanone	34.44	2.0	40	0	86.1	57 - 139			
4-Chlorotoluene	18.65	1.0	20	0	93.3	78 - 122			
4-Isopropyltoluene	18.74	1.0	20	0	93.7	77 - 127			
4-Methyl-2-pentanone	33.77	2.0	40	0	84.4	67 - 130			
Acetone	34.54	2.0	40	0	86.4	39 - 160			
Benzene	19.8	1.0	20	0	99.0	79 - 120			
Bromobenzene	19.64	1.0	20	0	98.2	80 - 120			
Bromochloromethane	18.69	1.0	20	0	93.5	78 - 123			
Bromodichloromethane	19	1.0	20	0	95.0	79 - 125			
Bromoform	18.13	1.0	20	0	90.7	66 - 130			
Bromomethane	16.88	1.0	20	0	84.4	53 - 141			

## ALS Houston, US

Date: 27-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22061142

## QC BATCH REPORT

Batch ID: R411321 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
LCS		Sample ID: VLCSW-220622		Units: ug/L		Analysis Date: 22-Jun-2022 12:39			
Client ID:		Run ID: VOA6_411321		SeqNo: 6708406		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	35.52	2.0	40	0	88.8	64 - 133			
Carbon tetrachloride	17.77	1.0	20	0	88.8	72 - 136			
Chlorobenzene	19.51	1.0	20	0	97.6	82 - 118			
Chloroethane	18.21	1.0	20	0	91.1	60 - 138			
Chloroform	18.52	1.0	20	0	92.6	79 - 124			
Chloromethane	18.07	1.0	20	0	90.4	50 - 139			
cis-1,2-Dichloroethene	19.26	1.0	20	0	96.3	78 - 123			
cis-1,3-Dichloropropene	19.44	1.0	20	0	97.2	75 - 124			
Dibromochloromethane	19.05	1.0	20	0	95.3	74 - 126			
Dibromomethane	18.9	1.0	20	0	94.5	79 - 123			
Dichlorodifluoromethane	16.35	1.0	20	0	81.8	32 - 152			
Ethylbenzene	18.94	1.0	20	0	94.7	79 - 121			
Hexachlorobutadiene	20.06	1.0	20	0	100	66 - 134			
Isopropylbenzene	17.58	1.0	20	0	87.9	72 - 131			
m,p-Xylene	37.66	2.0	40	0	94.1	80 - 121			
Methylene chloride	18.31	2.0	20	0	91.5	74 - 124			
Naphthalene	16.9	1.0	20	0	84.5	61 - 128			
n-Butylbenzene	18.03	1.0	20	0	90.1	75 - 128			
n-Propylbenzene	18.43	1.0	20	0	92.1	76 - 126			
o-Xylene	19.07	1.0	20	0	95.4	78 - 122			
sec-Butylbenzene	17.97	1.0	20	0	89.9	77 - 126			
Styrene	19.6	1.0	20	0	98.0	78 - 123			
tert-Butylbenzene	18.39	1.0	20	0	91.9	78 - 124			
Tetrachloroethene	19.31	1.0	20	0	96.5	74 - 129			
Toluene	19.55	1.0	20	0	97.7	80 - 121			
trans-1,2-Dichloroethene	18.99	1.0	20	0	94.9	75 - 124			
trans-1,3-Dichloropropene	18.61	1.0	20	0	93.1	73 - 127			
Trichloroethene	19.78	1.0	20	0	98.9	79 - 123			
Trichlorofluoromethane	16.59	1.0	20	0	83.0	65 - 141			
Vinyl chloride	16.35	1.0	20	0	81.7	58 - 137			
Surr: 1,2-Dichloroethane-d4	49.43	1.0	50	0	98.9	81 - 118			
Surr: 4-Bromofluorobenzene	50.72	1.0	50	0	101	85 - 114			
Surr: Dibromofluoromethane	50.04	1.0	50	0	100	80 - 119			
Surr: Toluene-d8	50.57	1.0	50	0	101	89 - 112			

## ALS Houston, US

Date: 27-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22061142

## QC BATCH REPORT

Batch ID: R411321 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MS		Sample ID: HS22061142-01MS		Units: ug/L		Analysis Date: 22-Jun-2022 16:10			
Client ID: LH18/24-SP650_062122		Run ID: VOA6_411321		SeqNo: 6708415		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	21.89	1.0	20	0	109	78 - 124			
1,1,1-Trichloroethane	20.43	1.0	20	0	102	74 - 131			
1,1,2,2-Tetrachloroethane	20.83	1.0	20	0	104	71 - 121			
1,1,2-Trichloroethane	20.48	1.0	20	0	102	80 - 119			
1,1-Dichloroethane	19.41	1.0	20	0	97.0	77 - 125			
1,1-Dichloroethene	17.05	1.0	20	0	85.2	71 - 131			
1,1-Dichloropropene	20.66	1.0	20	0	103	78 - 125			
1,2,3-Trichlorobenzene	17.81	1.0	20	0	89.1	69 - 129			
1,2,3-Trichloropropane	19.78	1.0	20	0	98.9	73 - 122			
1,2,4-Trichlorobenzene	19.24	1.0	20	0	96.2	69 - 130			
1,2,4-Trimethylbenzene	23.25	1.0	20	0	116	76 - 124			
1,2-Dibromo-3-chloropropane	15.45	1.0	20	0	77.3	62 - 128			
1,2-Dibromoethane	20.84	1.0	20	0	104	77 - 121			
1,2-Dichlorobenzene	22.32	1.0	20	0	112	80 - 119			
1,2-Dichloroethane	20.36	1.0	20	0	102	73 - 128			
1,2-Dichloropropane	20.77	1.0	20	0	104	78 - 122			
1,3,5-Trimethylbenzene	23.19	1.0	20	0	116	75 - 124			
1,3-Dichlorobenzene	23.05	1.0	20	0	115	80 - 119			
1,3-Dichloropropane	20.89	1.0	20	0	104	80 - 119			
1,4-Dichlorobenzene	22.98	1.0	20	0	115	79 - 118			
2,2-Dichloropropane	20.35	1.0	20	0	102	60 - 139			
2-Butanone	31.1	2.0	40	0	77.8	56 - 143			
2-Chlorotoluene	22.38	1.0	20	0	112	79 - 122			
2-Hexanone	39.56	2.0	40	0	98.9	57 - 139			
4-Chlorotoluene	22.93	1.0	20	0	115	78 - 122			
4-Isopropyltoluene	24.48	1.0	20	0	122	77 - 127			
4-Methyl-2-pentanone	41.32	2.0	40	0	103	67 - 130			
Acetone	25.7	2.0	40	0	64.3	39 - 160			
Benzene	21.02	1.0	20	0	105	79 - 120			
Bromobenzene	23.24	1.0	20	0	116	80 - 120			
Bromochloromethane	20.15	1.0	20	0	101	78 - 123			
Bromodichloromethane	20.29	1.0	20	0	101	79 - 125			
Bromoform	19.97	1.0	20	0	99.8	66 - 130			
Bromomethane	10.27	1.0	20	0	51.3	53 - 141			S



## ALS Houston, US

Date: 27-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22061142

## QC BATCH REPORT

Batch ID: R411321 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MS		Sample ID: HS22061142-01MS		Units: ug/L		Analysis Date: 22-Jun-2022 16:10			
Client ID: LH18/24-SP650_062122		Run ID: VOA6_411321		SeqNo: 6708415		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	32.22	2.0	40	0	80.5	64 - 133			
Carbon tetrachloride	21.08	1.0	20	0	105	72 - 136			
Chlorobenzene	22.11	1.0	20	0	111	82 - 118			
Chloroethane	13.13	1.0	20	0	65.7	60 - 138			
Chloroform	19.57	1.0	20	0	97.9	79 - 124			
Chloromethane	22.92	1.0	20	0	115	50 - 139			
cis-1,2-Dichloroethene	23.77	1.0	20	2.772	105	78 - 123			
cis-1,3-Dichloropropene	20.29	1.0	20	0	101	75 - 124			
Dibromochloromethane	21.2	1.0	20	0	106	74 - 126			
Dibromomethane	20.48	1.0	20	0	102	79 - 123			
Dichlorodifluoromethane	3.053	1.0	20	0	15.3	32 - 152			S
Ethylbenzene	22.48	1.0	20	0	112	79 - 121			
Hexachlorobutadiene	24.61	1.0	20	0	123	66 - 134			
Isopropylbenzene	21.94	1.0	20	0	110	72 - 131			
m,p-Xylene	44.39	2.0	40	0	111	80 - 121			
Methylene chloride	17.5	2.0	20	0	87.5	74 - 124			
Naphthalene	15.05	1.0	20	0	75.2	61 - 128			
n-Butylbenzene	23.64	1.0	20	0	118	75 - 128			
n-Propylbenzene	23.8	1.0	20	0	119	76 - 126			
o-Xylene	22.35	1.0	20	0	112	78 - 122			
sec-Butylbenzene	24.03	1.0	20	0	120	77 - 126			
Styrene	22.04	1.0	20	0	110	78 - 123			
tert-Butylbenzene	24.3	1.0	20	0	121	78 - 124			
Tetrachloroethene	23.39	1.0	20	0	117	74 - 129			
Toluene	22.09	1.0	20	0	110	80 - 121			
trans-1,2-Dichloroethene	19.95	1.0	20	0	99.7	75 - 124			
trans-1,3-Dichloropropene	19.79	1.0	20	0	98.9	73 - 127			
Trichloroethene	23.16	1.0	20	0	116	79 - 123			
Trichlorofluoromethane	16.07	1.0	20	0	80.4	65 - 141			
Vinyl chloride	9.702	1.0	20	0	48.5	58 - 137			S
Surr: 1,2-Dichloroethane-d4	44.39	1.0	50	0	88.8	81 - 118			
Surr: 4-Bromofluorobenzene	47.65	1.0	50	0	95.3	85 - 114			
Surr: Dibromofluoromethane	46.66	1.0	50	0	93.3	80 - 119			
Surr: Toluene-d8	49.29	1.0	50	0	98.6	89 - 112			

## ALS Houston, US

Date: 27-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22061142

## QC BATCH REPORT

Batch ID: R411321 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
<b>MSD</b>		Sample ID: HS22061142-01MSD		Units: ug/L		Analysis Date: 22-Jun-2022 16:31			
Client ID: LH18/24-SP650_062122		Run ID: VOA6_411321		SeqNo: 6708416		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	20.24	1.0	20	0	101	78 - 124	21.89	7.86	20
1,1,1-Trichloroethane	18.82	1.0	20	0	94.1	74 - 131	20.43	8.19	20
1,1,2,2-Tetrachloroethane	20.02	1.0	20	0	100	71 - 121	20.83	3.94	20
1,1,2-Trichloroethane	19.39	1.0	20	0	97.0	80 - 119	20.48	5.46	20
1,1-Dichloroethane	18.49	1.0	20	0	92.5	77 - 125	19.41	4.85	20
1,1-Dichloroethene	15.69	1.0	20	0	78.5	71 - 131	17.05	8.25	20
1,1-Dichloropropene	19.33	1.0	20	0	96.6	78 - 125	20.66	6.66	20
1,2,3-Trichlorobenzene	19.6	1.0	20	0	98.0	69 - 129	17.81	9.56	20
1,2,3-Trichloropropane	18.69	1.0	20	0	93.4	73 - 122	19.78	5.67	20
1,2,4-Trichlorobenzene	19.47	1.0	20	0	97.4	69 - 130	19.24	1.2	20
1,2,4-Trimethylbenzene	21.36	1.0	20	0	107	76 - 124	23.25	8.44	20
1,2-Dibromo-3-chloropropane	16.34	1.0	20	0	81.7	62 - 128	15.45	5.59	20
1,2-Dibromoethane	20.09	1.0	20	0	100	77 - 121	20.84	3.64	20
1,2-Dichlorobenzene	21	1.0	20	0	105	80 - 119	22.32	6.1	20
1,2-Dichloroethane	19.39	1.0	20	0	97.0	73 - 128	20.36	4.87	20
1,2-Dichloropropane	19.73	1.0	20	0	98.7	78 - 122	20.77	5.12	20
1,3,5-Trimethylbenzene	21.27	1.0	20	0	106	75 - 124	23.19	8.65	20
1,3-Dichlorobenzene	21.1	1.0	20	0	105	80 - 119	23.05	8.86	20
1,3-Dichloropropane	19.74	1.0	20	0	98.7	80 - 119	20.89	5.63	20
1,4-Dichlorobenzene	21.32	1.0	20	0	107	79 - 118	22.98	7.49	20
2,2-Dichloropropane	18.98	1.0	20	0	94.9	60 - 139	20.35	6.97	20
2-Butanone	29.18	2.0	40	0	72.9	56 - 143	31.1	6.39	20
2-Chlorotoluene	20.35	1.0	20	0	102	79 - 122	22.38	9.51	20
2-Hexanone	37.98	2.0	40	0	94.9	57 - 139	39.56	4.08	20
4-Chlorotoluene	20.85	1.0	20	0	104	78 - 122	22.93	9.47	20
4-Isopropyltoluene	22.4	1.0	20	0	112	77 - 127	24.48	8.87	20
4-Methyl-2-pentanone	40.42	2.0	40	0	101	67 - 130	41.32	2.19	20
Acetone	25.04	2.0	40	0	62.6	39 - 160	25.7	2.62	20
Benzene	19.57	1.0	20	0	97.8	79 - 120	21.02	7.16	20
Bromobenzene	21.48	1.0	20	0	107	80 - 120	23.24	7.88	20
Bromochloromethane	18.88	1.0	20	0	94.4	78 - 123	20.15	6.53	20
Bromodichloromethane	18.97	1.0	20	0	94.9	79 - 125	20.29	6.7	20
Bromoform	19.18	1.0	20	0	95.9	66 - 130	19.97	4.04	20
Bromomethane	8.62	1.0	20	0	43.1	53 - 141	10.27	17.4	20 S

## ALS Houston, US

Date: 27-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22061142

## QC BATCH REPORT

Batch ID: R411321 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MSD		Sample ID: HS22061142-01MSD		Units: ug/L		Analysis Date: 22-Jun-2022 16:31			
Client ID: LH18/24-SP650_062122		Run ID: VOA6_411321		SeqNo: 6708416		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	30.28	2.0	40	0	75.7	64 - 133	32.22	6.2	20
Carbon tetrachloride	19.38	1.0	20	0	96.9	72 - 136	21.08	8.38	20
Chlorobenzene	20.7	1.0	20	0	104	82 - 118	22.11	6.55	20
Chloroethane	11.46	1.0	20	0	57.3	60 - 138	13.13	13.6	20 S
Chloroform	18.57	1.0	20	0	92.8	79 - 124	19.57	5.27	20
Chloromethane	19.93	1.0	20	0	99.7	50 - 139	22.92	13.9	20
cis-1,2-Dichloroethene	22.35	1.0	20	2.772	97.9	78 - 123	23.77	6.13	20
cis-1,3-Dichloropropene	18.94	1.0	20	0	94.7	75 - 124	20.29	6.86	20
Dibromochloromethane	19.9	1.0	20	0	99.5	74 - 126	21.2	6.33	20
Dibromomethane	19.47	1.0	20	0	97.4	79 - 123	20.48	5.02	20
Dichlorodifluoromethane	2.725	1.0	20	0	13.6	32 - 152	3.053	11.3	20 S
Ethylbenzene	20.83	1.0	20	0	104	79 - 121	22.48	7.62	20
Hexachlorobutadiene	23.25	1.0	20	0	116	66 - 134	24.61	5.69	20
Isopropylbenzene	20.43	1.0	20	0	102	72 - 131	21.94	7.14	20
m,p-Xylene	41.48	2.0	40	0	104	80 - 121	44.39	6.78	20
Methylene chloride	16.94	2.0	20	0	84.7	74 - 124	17.5	3.3	20
Naphthalene	17.33	1.0	20	0	86.6	61 - 128	15.05	14.1	20
n-Butylbenzene	21.83	1.0	20	0	109	75 - 128	23.64	7.95	20
n-Propylbenzene	21.39	1.0	20	0	107	76 - 126	23.8	10.6	20
o-Xylene	20.71	1.0	20	0	104	78 - 122	22.35	7.61	20
sec-Butylbenzene	21.87	1.0	20	0	109	77 - 126	24.03	9.4	20
Styrene	20.78	1.0	20	0	104	78 - 123	22.04	5.88	20
tert-Butylbenzene	22.23	1.0	20	0	111	78 - 124	24.3	8.9	20
Tetrachloroethene	22.01	1.0	20	0	110	74 - 129	23.39	6.07	20
Toluene	20.47	1.0	20	0	102	80 - 121	22.09	7.61	20
trans-1,2-Dichloroethene	18.51	1.0	20	0	92.6	75 - 124	19.95	7.46	20
trans-1,3-Dichloropropene	18.57	1.0	20	0	92.8	73 - 127	19.79	6.37	20
Trichloroethene	20.45	1.0	20	0	102	79 - 123	23.16	12.4	20
Trichlorofluoromethane	14.82	1.0	20	0	74.1	65 - 141	16.07	8.09	20
Vinyl chloride	8.737	1.0	20	0	43.7	58 - 137	9.702	10.5	20 S
Surr: 1,2-Dichloroethane-d4	45.6	1.0	50	0	91.2	81 - 118	44.39	2.69	20
Surr: 4-Bromofluorobenzene	48.34	1.0	50	0	96.7	85 - 114	47.65	1.44	20
Surr: Dibromofluoromethane	46.94	1.0	50	0	93.9	80 - 119	46.66	0.602	20
Surr: Toluene-d8	49.27	1.0	50	0	98.5	89 - 112	49.29	0.0562	20

ALS Houston, US

Date: 27-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22061142

**QC BATCH REPORT****Batch ID:** R411321 ( 0 )**Instrument:** VOA6**Method:** VOLATILES ORGANICS BY METHOD  
8260C

The following samples were analyzed in this batch:

HS22061142-01	HS22061142-02
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ALS Houston, US

Date: 27-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22061142

**QC BATCH REPORT**

Batch ID: R411433 ( 0 )		Instrument: ICS-Integrion		Method: ANIONS BY SW9056A						
<b>MBLK</b>	Sample ID: <b>MBLK</b>	Units: <b>mg/L</b>		Analysis Date: <b>23-Jun-2022 21:11</b>						
Client ID:	Run ID: <b>ICS-Integrion_411433</b>		SeqNo: <b>6711086</b>		PrepDate:		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	0.500	0.500								U
Sulfate	0.500	0.500								U

<b>LCS</b>	Sample ID: <b>LCS</b>	Units: <b>mg/L</b>		Analysis Date: <b>23-Jun-2022 21:16</b>						
Client ID:	Run ID: <b>ICS-Integrion_411433</b>		SeqNo: <b>6711087</b>		PrepDate:		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	19.83	0.500	20	0	99.2	80 - 120				
Sulfate	19.49	0.500	20	0	97.4	80 - 120				

<b>MS</b>	Sample ID: <b>HS22061090-07MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>23-Jun-2022 22:41</b>						
Client ID:	Run ID: <b>ICS-Integrion_411433</b>		SeqNo: <b>6711099</b>		PrepDate:		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	51.18	0.500	10	41.66	95.2	80 - 120				O
Sulfate	20.88	0.500	10	11.11	97.7	80 - 120				

<b>MSD</b>	Sample ID: <b>HS22061090-07MSD</b>	Units: <b>mg/L</b>		Analysis Date: <b>23-Jun-2022 22:46</b>						
Client ID:	Run ID: <b>ICS-Integrion_411433</b>		SeqNo: <b>6711100</b>		PrepDate:		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	50.92	0.500	10	41.66	92.6	80 - 120	51.18	0.517	20	O
Sulfate	20.7	0.500	10	11.11	95.9	80 - 120	20.88	0.843	20	

The following samples were analyzed in this batch: HS22061142-01

**ALS Houston, US**

Date: 27-Jun-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS22061142

**QUALIFIERS,  
ACRONYMS, UNITS**

<b>Qualifier</b>	<b>Description</b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

<b>Acronym</b>	<b>Description</b>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

<b>Unit Reported</b>	<b>Description</b>
mg/L	Milligrams per Liter

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**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

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Agency	Number	Expire Date
California	2919 2022-2023	30-Apr-2023
Dept of Defense	L21-682	31-Dec-2023
Florida	E87611-34	30-Jun-2022
Illinois	2000322022-9	09-May-2023
Kansas	E-10352 2021-2022	31-Jul-2022
Kentucky	123043, 2022-2023	30-Apr-2023
Louisiana	03087, 2021-2022	30-Jun-2022
Maryland	343, 2022-2023	30-Jun-2023
North Carolina	624-2022	31-Dec-2022
Oklahoma	2021-080	31-Aug-2022
Texas	T104704231-22-29	30-Apr-2023
Utah	TX026932021-12	30-Jul-2022

---

ALS Houston, US

Date: 27-Jun-22

## Sample Receipt Checklist

Work Order ID: HS22061142

Date/Time Received: **22-Jun-2022 09:35**

Client Name: Bhate Environmental

Received by: **Pablo Martinez**Completed By: /S/ Pablo Martinez

22-Jun-2022 10:46

eSignature

Date/Time

Reviewed by: /S/ Dane J. Wacasey

24-Jun-2022 15:29

eSignature

Date/Time

Matrices: **WATER**Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?

Yes ☒No ☐Not Present ☐

Custody seals intact on shipping container/cooler?

Yes ☒No ☐Not Present ☐

Custody seals intact on sample bottles?

Yes ☐No ☐Not Present ☒

VOA/TX1005/TX1006 Solids in hermetically sealed vials?

Yes ☐No ☐Not Present ☒

Chain of custody present?

Yes ☒No ☐

1 Page(s)

Chain of custody signed when relinquished and received?

Yes ☒No ☐

COC IDs: CLIENT

Samplers name present on COC?

Yes ☒No ☐

Chain of custody agrees with sample labels?

Yes ☒No ☐

Samples in proper container/bottle?

Yes ☒No ☐

Sample containers intact?

Yes ☒No ☐

Sufficient sample volume for indicated test?

Yes ☒No ☐

All samples received within holding time?

Yes ☒No ☐

Container/Temp Blank temperature in compliance?

Yes ☒No ☐

Temperature(s)/Thermometer(s):

1.1°C/1.6°C UC/C

IR 31

Cooler(s)/Kit(s):

48635

Date/Time sample(s) sent to storage:

6/22/22 10:50

Water - VOA vials have zero headspace?

Yes ☒No ☐No VOA vials submitted ☐

Water - pH acceptable upon receipt?

Yes ☐No ☐N/A ☒

pH adjusted?

Yes ☐No ☐N/A ☒

pH adjusted by:

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:


Regarding:

Comments:

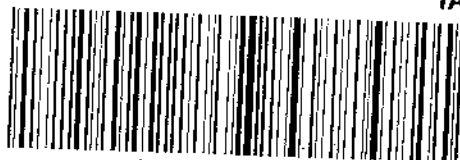
Corrective Action:





 <b>ALS</b> 10450 Macmillan Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530-5886 Fax. +1 281 530-5887	<b>CUSTODY SEAL</b>	
	Date: <u>6/21/87</u>	Time: <u>1430</u>
	Name: <u>SECURITY</u>	
	Company: <u>SECURITY</u>	

TRK# 0473 0838 9509  
 RETURNING MON. SAT  
**PRIORITY OVERNIGHT**  
**AB SGRA** 40635 77099  
 TX-US  
 IAH



34/3247 21JUN7872 55GA 58002172AC/008



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10450 Stancliff Rd. Suite 210  
Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887

July 11, 2022

Marcia Olive  
Bhate Environmental Associates, Inc.  
445 Union Blvd Ste 129  
Lakewood, CO 80228

Work Order: **HS22061602**

Laboratory Results for: **Longhorn GW Treatment Plant Weekly Samples**

Dear Marcia Olive,

ALS Environmental received 2 sample(s) on Jun 29, 2022 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: JUMOKE.LAWAL

Dane J. Wacasey

ALS Houston, US

Date: 11-Jul-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**Work Order:** HS22061602

**SAMPLE SUMMARY**

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS22061602-01	LH18/24-SP650_062822	Water		28-Jun-2022 14:00	29-Jun-2022 09:50	<input type="checkbox"/>
HS22061602-02	LH18/24-SP650_062822_AIX	Water		28-Jun-2022 14:00	29-Jun-2022 09:50	<input type="checkbox"/>

**ALS Houston, US**

Date: 11-Jul-22

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**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**Work Order:** HS22061602

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**CASE NARRATIVE**

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**Work Order Comments**

- The analysis for Perchlorate was subcontracted to ALS Houston High-Res Lab. Final report attached
- 

**WetChemistry by Method E365.3****Batch ID: R412258**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**WetChemistry by Method E415.1****Batch ID: R412252**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**WetChemistry by Method E350.3****Batch ID: R411872**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

## ALS Houston, US

Date: 11-Jul-22

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Weekly Samples  
 Sample ID: LH18/24-SP650\_062822  
 Collection Date: 28-Jun-2022 14:00

**ANALYTICAL REPORT**

WorkOrder:HS22061602  
 Lab ID:HS22061602-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>AMMONIA AS N BY E350.3(ISE)</b>		<b>Method:E350.3</b>						Analyst: MZD
Nitrogen, Ammonia (As N)	16	a	0.10	0.10	0.20	mg/L	1	30-Jun-2022 13:30
<b>ORTHO PHOSPHATE (PO4) AS P BY E365.3-1978</b>		<b>Method:E365.3</b>						Analyst: MZD
Phosphorus, Total Orthophosphate (As P)	4.15	a	0.100	0.125	0.250	mg/L	10	30-Jun-2022 12:24
<b>TOTAL ORGANIC CARBON BY E415.1</b>		<b>Method:E415.1</b>						Analyst: MZD
Organic Carbon, Total	12.1	a	0.500	1.00	1.00	mg/L	1	05-Jul-2022 21:46

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 11-Jul-22

Client: Bhate Environmental Associates, Inc.  
Project: Longhorn GW Treatment Plant Weekly Samples  
Sample ID: LH18/24-SP650\_062822\_AIX  
Collection Date: 28-Jun-2022 14:00

**ANALYTICAL REPORT**

WorkOrder:HS22061602  
Lab ID:HS22061602-02  
Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>						Analyst: GR
Subcontract Analysis	See Attached		0	0		NA	1	11-Jul-2022 16:34

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US

Date: 11-Jul-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22061602

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> R411872 ( 0 )		<b>Test Name :</b> AMMONIA AS N BY E350.3(ISE)			<b>Matrix:</b> Water	
HS22061602-01	LH18/24-SP650_062822	28 Jun 2022 14:00			30 Jun 2022 13:30	1
<b>Batch ID:</b> R412252 ( 0 )		<b>Test Name :</b> TOTAL ORGANIC CARBON BY E415.1			<b>Matrix:</b> Water	
HS22061602-01	LH18/24-SP650_062822	28 Jun 2022 14:00			05 Jul 2022 21:46	1
<b>Batch ID:</b> R412258 ( 0 )		<b>Test Name :</b> ORTHO PHOSPHATE (PO4) AS P BY E365.3-1978			<b>Matrix:</b> Water	
HS22061602-01	LH18/24-SP650_062822	28 Jun 2022 14:00			30 Jun 2022 12:24	10
<b>Batch ID:</b> R412658 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			<b>Matrix:</b> Water	
HS22061602-02	LH18/24-SP650_062822_AIX	28 Jun 2022 14:00			11 Jul 2022 16:34	1



ALS Houston, US

Date: 11-Jul-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22061602

**QC BATCH REPORT**

Batch ID: R411872 ( 0 )		Instrument: WetChem_HS		Method: AMMONIA AS N BY E350.3(ISE)						
<b>MBLK</b>	Sample ID: MBLK-R411872	Units: mg/L		Analysis Date: 30-Jun-2022 13:30						
Client ID:	Run ID: WetChem_HS_411872		SeqNo: 6723482		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	0.10	0.20								U
<b>LCS</b>	Sample ID: LCS-R411872	Units: mg/L		Analysis Date: 30-Jun-2022 13:30						
Client ID:	Run ID: WetChem_HS_411872		SeqNo: 6723481		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	9.845	0.20	10	0	98.4	80 - 120				
<b>MS</b>	Sample ID: HS22061080-01MS	Units: mg/L		Analysis Date: 30-Jun-2022 13:30						
Client ID:	Run ID: WetChem_HS_411872		SeqNo: 6723497		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	11.42	0.20	10	0.415	110	80 - 120				
<b>MSD</b>	Sample ID: HS22061080-01MSD	Units: mg/L		Analysis Date: 30-Jun-2022 13:30						
Client ID:	Run ID: WetChem_HS_411872		SeqNo: 6723496		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	11.42	0.20	10	0.415	110	80 - 120	11.42	0.0175	20	
The following samples were analyzed in this batch: HS22061602-01										

## ALS Houston, US

Date: 11-Jul-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22061602

**QC BATCH REPORT**

Batch ID: R412252 ( 0 )		Instrument: TOC_04		Method: TOTAL ORGANIC CARBON BY E415.1						
<b>MBLK</b>	Sample ID: MBLK2-07052022	Units: mg/L		Analysis Date: 05-Jul-2022 20:14						
Client ID:	Run ID: TOC_04_412252	SeqNo: 6730672		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	1.00	1.00								U
<b>LCS</b>	Sample ID: LCS2-07052022	Units: mg/L		Analysis Date: 05-Jul-2022 20:28						
Client ID:	Run ID: TOC_04_412252	SeqNo: 6730673		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	9.783	1.00	10	0	97.8	85 - 115				
<b>LCSD</b>	Sample ID: LCSD2-07052022	Units: mg/L		Analysis Date: 05-Jul-2022 20:41						
Client ID:	Run ID: TOC_04_412252	SeqNo: 6730674		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	9.461	1.00	10	0	94.6	85 - 115	9.783	3.35	20	
<b>MS</b>	Sample ID: HS22061238-01MS	Units: mg/L		Analysis Date: 05-Jul-2022 22:13						
Client ID:	Run ID: TOC_04_412252	SeqNo: 6730681		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	16.31	1.00	10	5.869	104	80 - 120				
The following samples were analyzed in this batch: HS22061602-01										

## ALS Houston, US

Date: 11-Jul-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22061602

**QC BATCH REPORT**

Batch ID: R412258 ( 0 )		Instrument: UV-2450		Method: ORTHO PHOSPHATE (PO4) AS P BY E365.3-1978					
<b>MBLK</b>	Sample ID: MBLK-R412258	Units: mg/L		Analysis Date: 30-Jun-2022 12:24					
Client ID:	Run ID: UV-2450_412258	SeqNo: 6730764		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.0125	0.0250							U
<b>LCS</b>	Sample ID: LCS-R412258	Units: mg/L		Analysis Date: 30-Jun-2022 12:24					
Client ID:	Run ID: UV-2450_412258	SeqNo: 6730763		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.249	0.0250	0.25	0	99.6	85 - 115			
<b>MS</b>	Sample ID: HS22061602-01MS	Units: mg/L		Analysis Date: 30-Jun-2022 12:24					
Client ID: LH18/24-SP650_062822	Run ID: UV-2450_412258	SeqNo: 6730766		PrepDate:		DF: 10			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	6.33	0.250	2.5	4.15	87.2	80 - 120			
<b>MSD</b>	Sample ID: HS22061602-01MSD	Units: mg/L		Analysis Date: 30-Jun-2022 12:24					
Client ID: LH18/24-SP650_062822	Run ID: UV-2450_412258	SeqNo: 6730765		PrepDate:		DF: 10			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	6.33	0.250	2.5	4.15	87.2	80 - 120	6.33	0	20
The following samples were analyzed in this batch: HS22061602-01									

**ALS Houston, US**

Date: 11-Jul-22

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Weekly Samples  
**WorkOrder:** HS22061602

**QUALIFIERS,  
ACRONYMS, UNITS**

<b>Qualifier</b>	<b>Description</b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

<b>Acronym</b>	<b>Description</b>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

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**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

---

Agency	Number	Expire Date
California	2919 2022-2023	30-Apr-2023
Dept of Defense	L21-682	31-Dec-2023
Florida	E87611-36	30-Jun-2023
Illinois	2000322022-9	09-May-2023
Kansas	E-10352 2021-2022	31-Jul-2022
Kentucky	123043, 2022-2023	30-Apr-2023
Louisiana	03087, 2022-2023	30-Jun-2023
Maryland	343, 2022-2023	30-Jun-2023
North Carolina	624-2022	31-Dec-2022
North Dakota	R-193 2022-2023	30-Apr-2023
Oklahoma	2021-080	31-Aug-2022
Texas	T104704231-22-29	30-Apr-2023
Utah	TX026932021-12	30-Jul-2022

ALS Houston, US

Date: 11-Jul-22

## Sample Receipt Checklist

Work Order ID: HS22061602

Date/Time Received: **29-Jun-2022 09:50**

Client Name: Bhate Environmental

Received by: **Pablo Martinez**Completed By: /S/ Pablo Martinez

29-Jun-2022 16:04

eSignature

Date/Time

Reviewed by: /S/ Ragen Giga

05-Jul-2022 13:37

eSignature

Date/Time

Matrices: **WATER**Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?

Yes ☒No ☐Not Present ☐

Custody seals intact on shipping container/cooler?

Yes ☒No ☐Not Present ☐

Custody seals intact on sample bottles?

Yes ☐No ☐Not Present ☒

VOA/TX1005/TX1006 Solids in hermetically sealed vials?

Yes ☐No ☐Not Present ☒

Chain of custody present?

Yes ☒No ☐

1 Page(s)

Chain of custody signed when relinquished and received?

Yes ☒No ☐

COC IDs: CLIENT

Samplers name present on COC?

Yes ☒No ☐

Chain of custody agrees with sample labels?

Yes ☒No ☐

Samples in proper container/bottle?

Yes ☒No ☐

Sample containers intact?

Yes ☒No ☐

Sufficient sample volume for indicated test?

Yes ☒No ☐

All samples received within holding time?

Yes ☒No ☐

Container/Temp Blank temperature in compliance?

Yes ☒No ☐

Temperature(s)/Thermometer(s):

1.1°C/1.6°C UC/C

IR 31

Cooler(s)/Kit(s):

BLUE

Date/Time sample(s) sent to storage:

6/29/22 16:05

Water - VOA vials have zero headspace?

Yes ☒No ☐No VOA vials submitted ☐

Water - pH acceptable upon receipt?

Yes ☒No ☐N/A ☐

pH adjusted?

Yes ☐No ☒N/A ☐

pH adjusted by:

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:


Comments:

Corrective Action:

## CHAIN OF CUSTODY

Name Of Lab Shipping To: ALS 10450 Stancliff Rd. Suite 210 Houston, TX. 77099 (281) 530-5656 ATTN: Dane Wacasey

Page 1 of 1

<b>Project:</b> BHATE LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS			<b>Project No.</b> NWO1312.0150.0 16.0001			<b>Analyses</b>		<div>HS22061602</div> <div>Bhate Environmental Associates, Inc. Longhorn GW Treatment Plant Weekly Samples</div> 																			
<b>Job:</b> <b>GROUNDWATER TREATMENT PLANT WEEKLY SAMPLES</b>																											
<b>Prepared By:</b> Scott Beesinger			<b>P.O. Number</b>																								
<b>Field Sample I.D.</b> LH18/24-SP650_062822																											
<b>Sample Matrix</b> Water			<b>Date / Time</b> 06/28/22 / 14:00			<b>MS / MSD</b> 3		<b>No. OF CONTAINERS</b> X		<b>AMMONIA-N</b> X		<b>TOTAL ORGANIC CARBON</b> X		<b>ORTHO-PHOSPHATE</b> X		<b>PERCHLORATE</b> X		<b>Remarks (Preservatives, etc.)</b> H2SO4		<b>Lab I.D.#</b>							
<b>Field Sample I.D.</b> LH18/24-SP650_062822			<b>Sample Matrix</b> Water			<b>Date / Time</b> 06/28/22 / 14:00			<b>MS / MSD</b> 1		<b>AMMONIA-N</b>		<b>TOTAL ORGANIC CARBON</b>		<b>ORTHO-PHOSPHATE</b> X		<b>PERCHLORATE</b>		<b>Remarks (Preservatives, etc.)</b> NONE		<b>Lab I.D.#</b>						
<b>Field Sample I.D.</b> LH18/24-SP650_062822_AIX			<b>Sample Matrix</b> Water			<b>Date / Time</b> 06/28/22 / 14:00			<b>MS / MSD</b> 1		<b>AMMONIA-N</b>		<b>TOTAL ORGANIC CARBON</b>		<b>ORTHO-PHOSPHATE</b>		<b>PERCHLORATE</b> X		<b>Remarks (Preservatives, etc.)</b> NONE		<b>Lab I.D.#</b>						
Additional Remarks: Standard TAT																											
<b>Relinquished By:</b> Scott Beesinger			<b>Date</b> 06/28/22		<b>Time</b> 14:30		<b>Received By:</b> Paul N...			<b>Date</b> 6/24/22		<b>Time</b> 9:50		<b>Relinquished By:</b>			<b>Date</b>		<b>Time</b>		<b>Received By:</b>			<b>Date</b>		<b>Time</b>	
<b>For Lab Use Only</b>																											
<b>Received At Lab By:</b>				<b>Date</b>		<b>Time</b>		<b>Airbill No.</b>				<b>Opened By:</b>				<b>Date</b>		<b>Time</b>		<b>Temp of Container</b>		<b>Seal No.</b>		<b>Condition</b>			
<b>Remarks:</b>																											

1310 1.1 C 1231 12/1/2015

 <b>ALS</b> 14400 Blarney Road Houston, Texas 77058 Tel. 41 281 530 1656 Fax 41 281 530 5687	Date: _____ Name: _____	<b>CUSTODY SEAL</b>		Ship Marking: <i>PA</i>
		Date: <i>28/12</i>	To: <i>SGRA</i>	Date: <i>1/3/01</i>

0473 0838 9597 **PRIORITY OVERNIGHT**  
**AB SGRA** *BLUE* **77099**  
 TX-US  
 IAH



NO 3787 78Jun2002 CGGA 56002/17747/C008





July 11, 2022

Service Request No:E2200635

Dane Wacasey  
ALS Group USA, Corp.  
10450 Stancliff Road  
Suite 210  
Houston, TX 77099-4338

**Laboratory Results for: HS22061602**

Dear Dane,

Enclosed are the results of the sample(s) submitted to our laboratory June 29, 2022  
For your reference, these analyses have been assigned our service request number **E2200635**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current TNI standards, where applicable, and except as noted in the laboratory case narrative provided. All results are intended to be considered in their entirety and ALS Environmental is not responsible for use of less than the complete final report. Results apply only to the items submitted to the laboratory, as received for analysis. In accordance with the current TNI Standard, a statement on the estimated uncertainty of measurement of any quantitative analysis will be supplied upon request.

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Corey Grandits  
Project Manager

ADDRESS 10450 Stancliff Rd., Suite 210, Houston, TX 77099  
PHONE +1 281 530 5656 | FAX +1 281 530 5887  
ALS Group USA, Corp.  
dba ALS Environmental



# Certificate of Analysis

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

**ALS Environmental**

**Client:** ALS  
**Project:** HS22061602  
**Sample Matrix:** W

**Service Request No.:** E2200635  
**Date Received:** 06/29/22

**CASE NARRATIVE**

All analyses were performed in adherence to the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II. When appropriate to the method, method blank results have been reported with each analytical test.

**Sample Receipt**

One sample was received for analysis at ALS Environmental in Houston on 06/29/22.

The sample was received in good condition and is consistent with the accompanying chain of custody form. The sample was stored in a refrigerator at 4°C upon receipt at the laboratory.

**Data Validation Notes and Discussion****Precision and Accuracy:**

EQ2200276: Laboratory Control Spike/Duplicate Laboratory Control Spike (LCS/DLCS) samples were analyzed and reported in addition to a MS/MSD for this extraction batch. The LCS-DLCS recoveries met acceptance criteria. The MS/MSD was performed on an unrelated sample.

*The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.*

*Use of ALS group USA Corp dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.*

**Client:** ALS Environmental - US  
**Project:** HS22061602

**Service Request:** E2200635

**SAMPLE CROSS-REFERENCE**

<u>SAMPLE #</u>	<u>CLIENT SAMPLE ID</u>	<u>DATE</u>	<u>TIME</u>
E2200635-001	LH18/24-SP650_062822_AIX	6/28/2022	1400

**Service Request Summary**

**Folder #:** E2200635  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22061602  
**Project Number:**  
**Report To:** Dane Wacasey  
 ALS Group USA, Corp.  
 10450 Stancliff Road  
 Houston, TX 77099-4338  
 USA  
**Phone Number:** 281-575-2190  
**Cell Number:**  
**Fax Number:** 281-530-5887  
**E-mail:** dane.wacasey@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
**Logged By:** CGRANDITS  
**Date Received:** 06/29/22  
**Internal Due Date:** 7/7/2022  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22061602  
**EDD:** BASIC\_WQC\_CASNo  
 \_LOD

1 120 mL-Plastic Bottle Natural WM Unpreserved

**Location:** EHRMS-AirArch 1

**Pressure Gas:**

				HOUSTON
Lab Samp No.	Client Samp No	Matrix	Collected	CIO4 DOD/6850
E2200635-001	LH18/24-SP650_062822_AIX	Water	06/28/22 1400	IV

**Service Request Summary**

**Folder #:** E2200635  
**Client Name:** ALS Environmental - US  
**Project Name:** HS22061602  
**Project Number:**  
**Report To:** Dane Wacasey  
 ALS Group USA, Corp.  
 10450 Stancliff Road  
 Houston, TX 77099-4338  
 USA  
**Phone Number:** 281-575-2190  
**Cell Number:**  
**Fax Number:** 281-530-5887  
**E-mail:** dane.wacasey@alsglobal.com

**Project Chemist:** Corey Grandits  
**Originating Lab:** HOUSTON  
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**Date Received:** 06/29/22  
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**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** HS22061602  
**EDD:** BASIC\_WQC\_CASNo  
 \_LOD

1 120 mL-Plastic Bottle Natural WM Unpreserved

**Location:** EHRMS-AirArch 1

**Pressure Gas:**

**Test Comments:**

Group	Test/Method	Samples	Comments
Semivoa GCMS	CIO4 DOD/6850	1	IV Due 7/21

## Data Qualifiers

### Lab Standard

- + Possible Tedlar bag artifact.
- A TIC is a suspected aldol-condensation product
- B Analyte found in the associated method blank as well as in the sample.
- BC Reported results are not blank corrected.
- BH The back section of the tube yielded higher results than the front.
- BT Results indicated possible breakthrough; back section  $\geq 10\%$  front section.
- C Result identification confirmed.
- D Compound identified in an analysis at a secondary dilution factor
- D Spike was diluted out
- DE Reported results are corrected for desorption efficiency.
- E Estimated value. Concentration above calibration range
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- H1 Sample analysis performed past holding time. See case narrative.
- H2 Initial analysis within holding time. Reanalysis for the required dilution was past holding time.
- H3 Sample was received and analyzed past holding time.
- H4 Sample was extracted past required extraction holding time, but analyzed within analysis holding time. See case narrative.
- I Internal standard not within the specified limits. See case narrative.
- J Estimated Value. Concentration found below MRL.
- K (Auto) The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- K A deflection in the QC ion may indicate interference with the quantitation of this ion. The concentration of this analyte should be considered as an estimate.
- K Analyte was detected above the method reporting limit prior to normalization.
- K The reference ion ratio was outside acceptance criteria, which may indicate a potential bias to this result.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- L1 Laboratory control sample recovery outside the specified limits; results may be biased high.
- L2 Laboratory control sample recovery outside the specified limits; results may be biased low.
- L3 Laboratory control sample recovery outside the specified limits.
- M Matrix interference; results may be biased high.
- M The duplicate injection precision not met.
- M1 Matrix interference due to coelution with a non-target compound; results may be biased high.

## Data Qualifiers

### Lab Standard

- N Presumptive evidence of a compound for TICs that have been identified based on a mass spectral library search.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- P Indicates chlorodiphenyl ether interference present at the retention time of the target compound.
- P Pesticide/Aroclor target analyte > 40% difference for detected concentrations between GC columns
- Q Indicates as estimated value because the P and P + 2 theoretical abundance ratio does not meet method criteria.
- R Duplicate Precision not met.
- R1 Duplicate precision not within the specified limits; however, the results are below the MRL and considered estimated.
- S Surrogate recovery not within specified limits.
- S The reported value was determined by the Method of Standard Additions (MSA).
- T Analyte is a tentatively identified compound, result is estimated.
- U Compound was analyzed for, but was not detected (ND).
- V1 The continuing calibration verification standard was outside (biased high) the specified limits for this compound.
- V2 The continuing calibration verification standard was outside (biased low) the specified limits for this compound.
- W Result quantified, but the corresponding peak was detected outside the generated retention time window.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- X See case narrative.
- Y Recovery outside limits
- Y The chromatogram resembles a petroleum product but does not match the calibration standard.
- Z The chromatogram does not resemble a petroleum product.
- i The MRL/MDL has been elevated due to a matrix interference.



## ALS Laboratory Group

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### Acronyms

Cal	Calibration
Conc	CONCEntration
Dioxin(s)	Polychlorinated dibenzo-p-dioxin(s)
EDL	Estimated Detection Limit
EMPC	Estimated Maximum Possible Concentration
Flags	Data qualifiers
Furan(s)	Polychlorinated dibenzofuran(s)
g	Grams
ICAL	Initial CALibration
ID	IDentifier
Ions	Masses monitored for the analyte during data acquisition
L	Liter (s)
LCS	Laboratory Control Sample
DLCS	Duplicate Laboratory Control Sample
MB	Method Blank
MCL	Method Calibration Limit
MDL	Method Detection Limit
mL	Milliliters
MS	Matrix Spiked sample
DMS	Duplicate Matrix Spiked sample
NO	Number of peaks meeting all identification criteria
PCDD(s)	Polychlorinated dibenzo-p-dioxin(s)
PCDF(s)	Polychlorinated dibenzofuran(s)
ppb	Parts per billion
ppm	Parts per million
ppq	Parts per quadrillion
ppt	Parts per trillion
QA	Quality Assurance
QC	Quality Control
Ratio	Ratio of areas from monitored ions for an analyte
% Rec.	Percent recovery
RPD	Relative Percent Difference
RRF	Relative Response Factor
RT	Retention Time
SDG	Sample Delivery Group
S/N	Signal-to-noise ratio
TEF	Toxicity Equivalence Factor
TEQ	Toxicity Equivalence Quotient



### State Certifications, Accreditations, and Licenses

Agency	Number	Expire Date
Arizona Department of Health Services	AZ0793	5/27/2023
California Department of Health Services	2919-2023	4/30/2023
Department of Defense	L22-90	3/31/2024
Florida Department of Health	E87611-35	6/30/2023
Florida Department of Health	E87611-35	6/30/2023
Florida Department of Health	E87611-35	6/30/2023
Florida Department of Health	E87611-35	6/30/2023
Hawaii Department of Health	2022	4/30/2023
Illinois Environmental Protection Agency	2000322022-9	5/9/2023
Kansas Department of Health and Environment	E-10352 2022	7/31/2022
Louisiana Department of Environmental Quality	03087-2022	6/30/2023
Louisiana Department of Health and Hospitals	LA028	12/31/2022
Maine Department of Health and Human Services	2022017	6/5/2024
Maryland Department of the Environment	343	6/30/2023
Michigan Department of Environmental Quality	9971-2022	4/30/2023
Minnesota Department of Health	2228443	12/31/2022
Nebraska Department of Health and Human Services	NE-OS-25-13	4/30/2023
Nevada Department of Conservation and Natural Resources	TX026932022-1	7/31/2022
New Hampshire Environmental Laboratory Accreditation Program	209422	4/24/2023
New Jersey Department of Environmental Protection	TX008-2023	6/30/2023
New York Department of Health	11707	3/31/2023
Oklahoma Department of Environmental Quality	2021-080	8/31/2022
Oregon Environmental Laboratory Accreditation Program	TX200002	5/15/2023
Pennsylvania Department of Environmental Protection	68-03441-016	6/30/2023
Perry Johnson Laboratory Accreditation	L22-91	3/31/2024
Tennessee Department of Environment and Conservation	04016-2022	4/30/2023
Texas Commission on Environmental Quality	T104704231-22-29	4/30/2023
United States Department of Agriculture	P330-19-00299	10/10/2022
Utah Department of Health Environmental Laboratory Certification	TX026932021-12	7/31/2022
Washington Department of Health	C819-2022	11/14/2022



## Chain of Custody

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
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[www.alsglobal.com](http://www.alsglobal.com)



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Houston, TX 77099  
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F: +1 281 530 5887  
www.alsglobal.com

## Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 19085

**SUBCONTRACT TO:**

ALS Environmental  
10450 Standcliff Road Suite 210  
Houston, TX 77084

**Phone:** +1 281 530 5656

**CUSTOMER  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Dane J. Wacasey  
**Address:** 10450 Standcliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Email:** Dane.Wacasey@alsglobal.com  
**Alternate  
Contact:**  
**Email:**

**INVOICE  
INFORMATION:**

**Company:** ALS Houston  
**Contact:** Accounts Payable  
**Address:** 10450 Standcliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Reference:** HS22061602  
**TSR:** Houston House Acct

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS22061602-02	LH18/24-SP650_062822_AIX	Water	28 Jun 2022 14:00
6850-Perch. DOD Level II & Level IV	in separate pdf		07 Jul 2022

**Comments:** Please analyze for the analysis listed above.  
Send report to the emails shown above.

**QC Level:** DOD IV (DoD Data Package)

Relinquished By: Pablo Acosta

Date/Time: 6-24-22 16:30

Received By: [Signature]

Date/Time: 6-24-22 16:30

Cooler ID(s): [Signature]

Temperature(s): \_\_\_\_\_

RIGHT SOLUTIONS | RIGHT PARTNER



## Cooler Receipt Form

Project Chemist EGClient/Project ALH-H Thermometer ID 1541Date/Time Received: 6-24-22 Initials: EG Date/Time Logged in: 6-24-22 Initials EG1. Method of delivery: ☐ US Mail ☐ Fed Ex ☐ UPS ☐ DHL ☒ <sup>ALS</sup> Courier ☐ Client2. Samples received in: ☒ Cooler ☐ Box ☐ Envelope ☐ Other3. Were custody seals on coolers? ☐ Yes ☒ No If yes, how manyWere they intact? ☐ Yes ☐ No ☒ N/A and where?Were they signed and dated? ☐ Yes ☐ No ☒ N/A4. Packing Material: ☐ Inserts ☒ Baggies ☐ Bubble Wrap ☐ Gel Packs ☒ Wet Ice ☐ Sleeves ☐ Other5. Foreign or Regulated Soil? ☐ Yes ☐ No Location of Sampling:

Cooler Tracking Number	COC ID	Date Opened	Time Opened	Opened By	Temp. °C	Temp Blank?
NA		6-24-22	1610	EG	32	<input checked="" type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>

6. Were custody papers properly filled out (ink, signed, dated, etc)? ☒ Yes ☐ No7. Did all bottles arrive in good condition (not broken, no signs of leakage)? ☒ Yes ☐ No8. Were all sample labels complete (i.e., sample ID, analysis, preservation, etc)? ☒ Yes ☐ No9. Were appropriate bottles/containers and volumes received for the requested tests? ☒ Yes ☐ No10. Did sample labels and tags agree with custody documents? ☒ Yes ☐ No

Notes, Discrepancies, &amp; Resolutions:

Service request Label:

HS-HRMSCoolerReceipt R1.0

ALS Environmental - Houston HRMS



10450 Stancliff Rd., Suite 210  
Houston, TX 77099  
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[www.alsglobal.com](http://www.alsglobal.com)

## SAMPLE ACCEPTANCE POLICY

This policy outlines the criteria samples must meet to be accepted by ALS Environmental – Houston HRMS.

### **Cooler Custody Seals (desirable, mandatory if specified in SAP):**

- ✓ Intact on outside of cooler, signed and dated

### **Chain-of-Custody (COC) documentation (mandatory):**

The following is required on each COC:

- ✓ Sample ID, the location, date and time of collection, collector's name, preservation type, sample type, and any other special remarks concerning the sample. The COC must be completed in ink.
- ✓ Signature and date of relinquishing party.

In the absence of a COC at sample receipt, the COC will be requested from the client.

### **Sample Integrity (mandatory):**

Samples are inspected upon arrival to ensure that sample integrity was not compromised during transfer to the laboratory.

- ✓ Sample containers must arrive in good condition (not broken or leaking).
- ✓ Samples must be labeled appropriately, including Sample IDs, and requested test using durable labels and indelible ink.
- ✓ The correct type of sample bottle must be used for the method requested.
- ✓ An appropriate sample volume, or weight, must be received.
- ✓ Sample IDs and number of containers must reconcile with the COC.
- ✓ Samples must be received within the method defined holding time.

### **Temperature Requirement (varies by sample matrix):**

- ✓ Aqueous and Non-aqueous samples must be shipped and stored cold, at 0 to 6°C.
- ✓ Tissue samples must be shipped and stored frozen, at -20 to -10°C.
- ✓ Air samples are shipped and stored cold, at 0 to 6°C
- ✓ The sample temperature must be recorded on the COC

All cooler inspections are documented on the Cooler Receipt Form (CRF). A separate CRF is completed for each service request. Any samples not meeting the above criteria are noted on the CRF and the Project Manager notified. The Project Manager must resolve any sample integrity issues with the client prior to proceeding with the analysis. Such resolutions are documented in writing and filed with the project folder. Data associated with samples received outside of this acceptance policy will be qualified on the case narrative of the final report



# Preparation Information Benchsheets

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

**Preparation Information Benchsheet****Prep Run#:** 402384**Prep WorkFlow:** GenExt28Day**Status:** Prepped**Team:** Semivoa GCMS/GRIVERA**Prep Method:** Method**Prep Date/Time:** 7/6/22 11:12

#	Lab Code	Client ID	B#	Method /Test	pH	Cl	Matrix	Amt. Ext.	Sample Description
1	E2200635-001	LH18/24-SP650_062822_AIX	.01	6850/ClO4 DOD			Water	10mL	
2	E2200636-001	16WW23-220627	.01	6850/ClO4 DOD			Water	10mL	
3	E2200636-002	16WW24-220627	.01	6850/ClO4 DOD			Water	10mL	
4	E2200636-003	16WW27-220627	.01	6850/ClO4 DOD			Water	10mL	
5	E2200636-004	16WW43-220627	.01	6850/ClO4 DOD			Water	10mL	
6	E2200636-005	16RW05-220627	.01	6850/ClO4 DOD			Water	10mL	
7	E2200636-006	16PM09-220627	.01	6850/ClO4 DOD			Water	10mL	
8	E2200636-007	16PM06-220627	.01	6850/ClO4 DOD			Water	10mL	
9	E2200636-008	16PM14-220627	.01	6850/ClO4 DOD			Water	10mL	
10	E2200638-001	16EW03-220629	.01	6850/ClO4 DOD			Water	10mL	
11	E2200638-002	16EW02-220629	.01	6850/ClO4 DOD			Water	10mL	
12	E2200638-003	16EW02-220629-FD	.01	6850/ClO4 DOD			Water	10mL	
13	E2200638-004	16IW26-220629	.01	6850/ClO4 DOD			Water	10mL	
14	E2200638-005	16WW41-220629	.01	6850/ClO4 DOD			Water	10mL	
15	E2200638-006	16WW41-220629-FD	.01	6850/ClO4 DOD			Water	10mL	
16	E2200638-007	16WW22-220629	.01	6850/ClO4 DOD			Water	10mL	
17	E2200638-008	16WW39-220629	.01	6850/ClO4 DOD			Water	10mL	
18	E2200638-009	16WW49-220629	.01	6850/ClO4 DOD			Water	10mL	
19	E2200638-010	16IW03-220629	.01	6850/ClO4 DOD			Water	10mL	
20	EQ2200276-01	MB		6850/ClO4 DOD			Liquid	10mL	
21	EQ2200276-02	LCS		6850/ClO4 DOD			Liquid	10mL	
22	EQ2200276-03	DLCS		6850/ClO4 DOD			Liquid	10mL	
23	EQ2200276-04	16WW24-220627 MS	.02	6850/ClO4 DOD			Liquid	10mL	
24	EQ2200276-05	16WW24-220627 DMS	.02	6850/ClO4 DOD			Liquid	10mL	

**Spiking Solutions**

Name:	Perchlorate Intermediate Stock1	Inventory ID	222798	Logbook Ref:	Perchlorate (1st Source)	Expires On:	10/29/2022
EQ2200276-02	1.00µL	EQ2200276-03	1.00µL	EQ2200276-04	1.00µL	EQ2200276-05	1.00µL
Name:	Perchlorate Internal Standard 1ug/mL	Inventory ID	223118	Logbook Ref:	Perchlorate Internal Standard	Expires On:	10/31/2022

E2200635-001	100.00µL	E2200636-001	100.00µL	E2200636-002	100.00µL	E2200636-003	100.00µL	E2200636-004	100.00µL	E2200636-005	100.00µL
E2200636-006	100.00µL	E2200636-007	100.00µL	E2200636-008	100.00µL	E2200638-001	100.00µL	E2200638-002	100.00µL	E2200638-003	100.00µL
E2200638-004	100.00µL	E2200638-005	100.00µL	E2200638-006	100.00µL	E2200638-007	100.00µL	E2200638-008	100.00µL	E2200638-009	100.00µL
E2200638-010	100.00µL	EQ2200276-01	100.00µL	EQ2200276-02	100.00µL	EQ2200276-03	100.00µL	EQ2200276-04	100.00µL	EQ2200276-05	100.00µL



Preparation Information Benchsheet

Prep Run#: 402384  
Team: Semivoa GCMS/GRIVERA

Prep WorkFlow: GenExt28Day  
Prep Method: Method

Status: Prepped  
Prep Date/Time: 7/6/22 11:12

Preparation Materials

Water HPLC Grade	5/12/2022 Water (223055)	6850 Amber Glass screw vial	2mL Screw Top Vial (221894)	537M Glass Culture Tubes	537M Glass Tubes (218064)
6850 Pipette Tips 50-1000 uL	6850 Pipette Tips (221929)	6850 Luer-Lok Syringes	Luer-Lok Syringes (221305)	6850 0.45um syringe filters	6850 Syringe Filters (222410)

Preparation Steps

Step: Preparation  
Started: 7/6/22 11:12  
Finished: 7/6/22 11:55  
By: GRIVERA  
Comments

Comments:

Reviewed By: GR Date: 7/6/22

Chain of Custody

Relinquished By:	Date:	<u>Extracts Examined</u> Yes No
Received By:	Date:	



# Analytical Results

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22061602  
**Sample Matrix:** Water  
**Sample Name:** LH18/24-SP650\_062822\_AIX  
**Lab Code:** E2200635-001

**Service Request:** E2200635  
**Date Collected:** 6/28/22 1400  
**Date Received:** 6/29/22  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	0.100	0.0500	0.0250	1	7/ 6/22	7/6/22 16:23	402384	769646	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22061602  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** EQ2200276-01

**Service Request:** E2200635  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	ND	U	0.100	0.0500	0.0250	1	7/ 6/22	7/6/22 15:18	402384	769646	



## Accuracy & Precision

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS22061602  
**Sample Matrix:** Water

**Service Request:** E2200635  
**Date Analyzed:** 7/ 6/22

**Lab Control Sample Summary**  
**Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry**

**Analytical Method:** 6850  
**Prep Method:** Method

**Units:** µg/L  
**Basis:** NA

**Extraction Lot:** 402384

Analyte Name	Lab Control Sample EQ2200276-02			Duplicate Lab Control Sample EQ2200276-03			% Rec Limits	RPD	RPD Limit
	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Perchlorate	0.109	0.100	109	0.0951	0.100	95	84 - 119	14	15

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22061602  
**Sample Matrix:** Water  
**Sample Name:** Lab Control Sample  
**Lab Code:** EQ2200276-02

**Service Request:** E2200635  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.109		0.100	0.0500	0.0250	1	7/ 6/22	7/6/22 15:51	402384	769646	

## ALS Group USA, Corp. dba ALS Environmental

## Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS22061602  
**Sample Matrix:** Water  
**Sample Name:** Duplicate Lab Control Sample  
**Lab Code:** EQ2200276-03

**Service Request:** E2200635  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** µg/L  
**Basis:** NA

## Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

**Analytical Method:** 6850  
**Prep Method:** Method

Analyte Name	Result	Q	LOQ	LOD	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Perchlorate	0.0951	J	0.100	0.0500	0.0250	1	7/ 6/22	7/6/22 15:59	402384	769646	



GWTP QUARTERLY EVALUATION REPORT – 2<sup>ND</sup> QUARTER 2022  
LONGHORN ARMY AMMUNITION PLANT

**APPENDIX D**  
**QUALITY CONTROL SUMMARY REPORT**

GWTP QUARTERLY EVALUATION REPORT – 2<sup>ND</sup> QUARTER 2022  
LONGHORN ARMY AMMUNITION PLANT

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**QUARTERLY CONTROL SUMMARY REPORT  
2<sup>nd</sup> QUARTER (APRIL- JUNE) 2022  
GROUNDWATER TREATMENT PLANT  
LONGHORN ARMY AMMUNITION PLANT  
KARNACK, TEXAS**

**September 2022**

*Prepared For:*



**Longhorn Army Ammunition Plant  
Karnack, Texas**

*Under Contract To:*



**U.S. Army Corps of Engineers  
Tulsa District  
Tulsa, Oklahoma**

**Contract Number: W9128F-13-D-0012**

**Task Order Number: W912BV17F0150**

*Prepared By:*



**1608 13<sup>th</sup> Avenue South, Suite 300  
Birmingham, Alabama 35205  
1-800-806-4001 • [www.bhate.com](http://www.bhate.com)**

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## 1 INTRODUCTION

Bhate reviewed 24 data packages from ALS Environmental, Houston, Texas. Groundwater samples were collected April 5, 2022 through June 28, 2022 at the Groundwater Treatment Plant (GWTP) at Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas. Data were reviewed for conformance to the requirements of the following guidance documents: *USEPA Contract Laboratory Program [CLP] National Functional Guidelines for Superfund Organic Methods Data Review* (USEPA, November 2020), *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review* (USEPA, November 2020) and the *Final Basewide Uniform Federal Policy [UFP] – Quality Assurance Project Plan [QAPP] Longhorn Army Ammunition Plant* which is in Appendix C of the *Final Installation-Wide Work Plan for Longhorn Army Ammunition Plant Karnack, Texas* (Bhate, May 2018).

### 1.1 Intended Use of Data

The objective of sampling at the GWTP is to monitor effluent streams to confirm compliance with discharge limits.

Analyses performed include:

- SW6850 – Perchlorate
- E350.3– Nitrogen, Ammonia
- E365.3– Orthophosphate
- E415.1 – Total Organic Carbon
- SW8260C- Volatile Organic Compound
- SW8270D SIM- 1,4-Dioxane
- SW6020A/7470A – Metals
- SW9056A – Chloride (Cl) and Sulfate (SO<sub>4</sub>)
- SW7196A – Hexavalent Chromium
- E410.4 – Chemical Oxygen Demand
- E1664A – Oil and Grease
- TO-15 – Volatiles in Air

**Table 1** lists the sample identification numbers (IDs) and their associated laboratory package.

**Table 2** lists qualified results with the qualification flag and reason code.

The following narrative is a brief synopsis of data that required qualification due to quality control discrepancies.

### 1.2 Preservation and Holding Times

Sample identification data were evaluated for agreement with the chain-of-custody (COC). All

samples were received in appropriate containers, within the proper temperature range, in good condition, and within the required hold times.

### 1.3 Calibrations

All analytes reported must be present in the initial and continuing calibration. The calibrations must meet the acceptance criteria specified in Worksheet 24 (Analytical Instrument Calibration) of the QAPP. All results reported must be within the calibration range. Samples were diluted, if necessary, to bring analyte responses within the calibration range.

#### 1.3.1 Continuing Calibration Verifications

The calibrations must meet the following criteria otherwise the compound is qualified J or UJ: The continuing calibration verification (CCV) criteria are 20 percent difference (%D) for volatile organic compounds (VOCs) and semi-volatile compounds (SVOCs) and 50% for closing CCVs. Metals and general chemistry - 10%D; perchlorate - 15%D; and volatiles in air - 30%D.

All samples were within control limits.

### 1.4 Blanks

If the analyte result for an associated sample was less than 5x (10x for common laboratory contaminants) the analyte concentration in the blank, that result was qualified "UB" and considered an artifact of blank contamination. Where the sample result for the affected analyte was non-detect or greater than 5X the amount in the blank, no qualifier was applied.

#### 1.4.1 Metals - SW6020

Quarterly effluent sample LH18/24-SP650\_052422 reported a detection of zinc <5x the method blank concentrations and was flagged "UB".

### 1.5 Surrogates

Surrogates were evaluated using limits defined by each method in Worksheet 28 of the project-specific QAPP.

No surrogates were outside control limits.

### 1.6 Laboratory Control Sample/Laboratory Control Sample Duplicate

The Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD) recoveries were evaluated using limits defined in Worksheet 15 of the project-specific QAPP.

The LCS/LCSD recoveries were within control limits.

## 1.7 Matrix Spike/Matrix Spike Duplicate Sample

The Matrix Spike (MS)/Matrix Spike Duplicate (MSD) recoveries were evaluated using limits defined in Worksheet 15 of the project-specific QAPP. When sample results were greater than 4x the spike amount, control limits were not applicable and require no qualification. Furthermore, if a MS/MSD analyses was performed on a batched (unrelated) sample no qualification was made to the sample data. Otherwise, only the sample used for spiking requires qualification.

### 1.7.1 Ortho-Phosphate – 365.3

Sample LH18/24-SP650\_061422 reported the MSD recovery below control limits. The result was considered estimated and flagged “J”.

### 1.7.2 Metals - SW6020

Sample LH18/24-SP650\_052422 reported the MS and MSD recoveries of potassium below control limits. This compound was flagged estimated “J”.

### 1.7.3 Volatiles – SW8260

Biweekly samples LH18/24-SP650\_061422 and LH18/24-SP650\_062122 reported the MS and MSD recoveries of vinyl chloride below control limits. Both results were considered estimated and flagged “UJ”.

## 1.8 Internal Standards

If the %R for an internal standard in a sample is not within the limit, the associated sample is qualified for those analytes associated with the internal standard(s) outside of the limit.

Internal standards were within acceptance criteria for the associated compounds.

## 1.9 Precision

Precision is the measure of variability of individual sample measurements. Evaluation of laboratory and/or field duplicates for precision was done using the relative percent difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. Field duplicate RPD limits were set at <30% for groundwater and air matrices. Laboratory duplicate RPD limits were set at <25% for air matrices.

### 1.9.1 Laboratory Duplicate

The laboratory duplicate results were within control limits.

### 1.9.2 Field Duplicate

The field duplicate RPDs between LH18/24-Air\_060622\_Stripper and its duplicate were outside control limits for 1,1-dichloroethene, CFC 113, cis-1,2-dichloroethene and trichloroethene. These compounds were flagged estimated “J”.

## 2 DATA USABILITY SUMMARY

The data are usable for the intended purposes of the project (Table 3). The data quality objectives have been met for the project.

**Table 1: Field Sample Identification and Laboratory Packages**

Client Sample ID	Lab Package	SW6850	E350.3	E365.3	E415.1	SIM	SW8270D	SW8260C	SW6020A	SW9056A	SW7196A	E410.4	1664A	TO-15
<b>GWTP Samples</b>														
LH18/24-SP650_040522_BIX/AIX	HS22040256	X	X	X	X									
LH18/24-SP650_040522	HS22040258							X		X				
LH18/24-SP650_041222_AIX	HS22040627	X				X		X	X		X			
LH18/24-SP140_041222	HS22040626	X							X		X			
LH18/24-SP650_041222_BIX/AIX	HS22040624	X	X	X	X									
LH18/24-SP650_042022_BIX/AIX	HS22041044	X	X	X	X									
LH18/24-SP650_042022	HS22041050							X		X				
LH18/24-SP650_042622_BIX/AIX	HS22041334	X	X	X	X									
LH18/24-SP650_051722_BIX/AIX	HS22050786	X	X	X	X									
LH18/24-SP650_051722	HS22050817							X		X				
LH18/24-SP650_052422_BIX/AIX	HS22051188	X	X	X	X									
LH18/24-SP650_052422_AIX	HS22051211	X				X	X	X	X			X	X	
LH18/24-SP140_052422	HS22051205	X				X	X	X	X			X	X	
LH18/24-SP650_060322	HS22060250							X		X				
LH18/24-SP650_060322_BIX/AIX	HS22060246	X	X	X	X									
LH18/24-SP650_060722_BIX/AIX	HS22060382	X	X	X	X									
LH18/24-SP650_060722_AIX	HS22060383	X				X	X	X			X			
LH18/24-SP140_060722	HS22060385	X							X		X			
LH18/24-SP650_061422_BIX/AIX	HS22060773	X	X	X	X									
LH18/24-SP650_061422	HS22060792							X		X				
LH18/24-SP650_062122_AIX	HS22061138	X	X	X	X									
LH18/24-SP650_062122	HS22061142							X		X				
LH18/24-SP650_062822_AIX	HS22061602	X	X	X	X									
<b>Air Samples</b>														
LH18/24-Air_060622_Stripper	P2202599													X
LH18/24-Air_060622_Stripper_a	P2202599													X
LH18/24-Air_060622_GWTP	P2202599													X
LH18/24-Air_060622_Downwind	P2202599													X
Notes: ID – Identification SM – Standard Method SW-846 – Test Methods for Evaluating Solid Waste, Physical/Chemical Methods. E – U.S. Environmental Protection Agency Method HS – Houston AIX/BIX – After/Before Ion Exchange a – duplicate sample														



**Table 2: Qualified Analytical Data**

Client Sample ID Laboratory	Laboratory Package	Analyte Name	Data Validation Qualifier	Reason for Qualification
LH18/24-SP650_052422	HS22051211	Zinc	0.00651 UB	MB
		Potassium	1.71 J	MS/MSD <
LH18/24-SP650_061422	HS22060773	Ortho-phosphate	8.01 J	MSD <
LH18/24-SP650_061422	HS22060792	Vinyl Chloride	0.50 UJ	MS/MSD <
LH18/24-SP650_062122	HS22061142	Vinyl Chloride	0.50 UJ	MS/MSD <
LH18/24-Air_060622_Stripper	P2202599	1,1-Dichloroethene CFC 113 cis-1,2-Dichloroethene Trichloroethene	140 J 6,400 J 15,000 J 17,000 J	FD RPD
LH18/24-Air_060622_Stripper_a	P2202599	1,1-Dichloroethene CFC 113 cis-1,2-Dichloroethene Trichloroethene	100 J 4,700 J 9,900 J 1,000 J	FD RPD
Notes: ID – identification J – Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria. UJ – Estimated not detected; The analyte was not detected but considered estimated due to discrepancies in meeting quality control criteria and reported to the limit of detection. UB – considered an artifact of blank contamination HS – Houston MB – Method Blank contamination MS/MSD <– Matrix spike/Matrix spike duplicate below control limits FD RPD – Field Duplicate Relative Percent Difference outside control limits				

**Table 3: Completeness by Method**

Method	No. of Rejected Results	% Completeness
SW6850	0	100
E350.1	0	100
E365.2	0	100
E415.1	0	100
SW8270D	0	100
SW8260B	0	100
SW6020A	0	100
SW9056	0	100
SW7196A	0	100
E410.4	0	100
E1664	0	100
TO-15	0	100

E – U.S. Environmental Protection Agency method.

SW-846 - Test Methods for Evaluating Solid Waste, Physical/Chemical Methods

GWTP QUARTERLY EVALUATION REPORT – 2<sup>ND</sup> QUARTER 2022  
LONGHORN ARMY AMMUNITION PLANT

**APPENDIX E**  
**AIR MONITORING ANALYTICAL LABORATORY REPORT**

GWTP QUARTERLY EVALUATION REPORT – 2<sup>ND</sup> QUARTER 2022  
LONGHORN ARMY AMMUNITION PLANT

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**ALS Environmental**

2655 Park Center Dr., Suite A  
Simi Valley, CA 93065  
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## LABORATORY REPORT

---

June 29, 2022

Marcia Olive  
Bhate Environmental Associates, Inc.  
445 Union Blvd., Suite 129  
Lakewood, CO 80228

**RE: LHAAP-GWTP / NWO1312.0150**

Dear Marcia:

Enclosed are the results of the samples submitted to our laboratory on June 13, 2022. For your reference, these analyses have been assigned our service request number P2202599.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

  
By Sue Anderson at 3:12 pm, Jun 29, 2022  
ALS | Environmental

Sue Anderson  
Project Manager



## ALS Environmental

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 Simi Valley, CA 93065  
 T +1 805 526 7161

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Client: Bhate Environmental Associates, Inc.  
 Project: LHAAP-GWTP / NWO1312.0150

Service Request No: P2202599

## CASE NARRATIVE

The samples were received intact under chain of custody on June 13, 2022 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

### Volatile Organic Compound Analysis

The samples were analyzed for volatile organic compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. This procedure is described in laboratory SOP VOA-TO15. The analytical system was comprised of a gas chromatograph/mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. This method is included on the laboratory's NELAP and DoD-ELAP scope of accreditation. Any analytes flagged with an X are not included on the NELAP or DoD-ELAP accreditation.

The upper control criterion was exceeded for ethyl acetate in the Continuing Calibration Verification (CCV) analyzed on June 16, 2022. Therefore, a potential for a high bias exists for those associated sample concentrations reported with positive results. The data has been qualified accordingly.

The containers were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. For projects requiring DoD QSM 5.3 compliance canisters were cleaned to <1/2 the MRL. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

*The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.*

*Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.*



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 Simi Valley, CA 93065  
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## CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
Alaska DEC	<a href="http://dec.alaska.gov/eh/lab.aspx">http://dec.alaska.gov/eh/lab.aspx</a>	17-019
Arizona DHS	<a href="http://www.azdhs.gov/preparedness/state-laboratory/lab-licensure-certification/index.php#laboratory-licensure-home">http://www.azdhs.gov/preparedness/state-laboratory/lab-licensure-certification/index.php#laboratory-licensure-home</a>	AZ0694
Florida DOH (NELAP)	<a href="http://www.floridahealth.gov/licensing-and-regulation/environmental-laboratories/index.html">http://www.floridahealth.gov/licensing-and-regulation/environmental-laboratories/index.html</a>	E871020
Louisiana DEQ (NELAP)	<a href="http://www.deq.louisiana.gov/page/la-lab-accreditation">http://www.deq.louisiana.gov/page/la-lab-accreditation</a>	05071
Maine DHHS	<a href="http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/professionals/labCert.shtml">http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/professionals/labCert.shtml</a>	2018027
Minnesota DOH (NELAP)	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	1776326
New Jersey DEP (NELAP)	<a href="http://www.nj.gov/dep/enforcement/oqa.html">http://www.nj.gov/dep/enforcement/oqa.html</a>	CA009
New York DOH (NELAP)	<a href="http://www.wadsworth.org/labcert/elap/elap.html">http://www.wadsworth.org/labcert/elap/elap.html</a>	11221
Oregon PHD (NELAP)	<a href="http://www.oregon.gov/oha/ph/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://www.oregon.gov/oha/ph/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	4068-008
Pennsylvania DEP	<a href="http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx">http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx</a>	68-03307 (Registration)
PJLA (DoD ELAP)	<a href="http://www.pjlabs.com/search-accredited-labs">http://www.pjlabs.com/search-accredited-labs</a>	65818 (Testing)
Texas CEQ (NELAP)	<a href="http://www.tceq.texas.gov/agency/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/agency/qa/env_lab_accreditation.html</a>	T104704413-19-10
Utah DOH (NELAP)	<a href="http://health.utah.gov/lab/lab_cert_env">http://health.utah.gov/lab/lab_cert_env</a>	CA016272019-10
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C946
<p>Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at <a href="http://www.alsglobal.com">www.alsglobal.com</a>, or at the accreditation body's website.</p> <p>Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.</p>		

## ALS ENVIRONMENTAL

## DETAIL SUMMARY REPORT

Client: Bhate Environmental Associates, Inc.  
Project ID: LHAAP-GWTP / NWO1312.0150

Service Request: P2202599

Date Received: 6/13/2022  
Time Received: 10:12

TO-15 - VOC Cans

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	
LH18/24-Air_060622_Stripper	P2202599-001	Air	6/6/2022	14:00	AC02412	-0.18	3.70	X
LH18/24-Air_060622_Stripper_a	P2202599-002	Air	6/6/2022	14:00	AC01079	-0.15	3.89	X
LH18/24-Air_060622_GWTP	P2202599-003	Air	6/6/2022	14:30	AC01935	-3.24	3.62	X
LH18/24-Air_060722_Downwind	P2202599-004	Air	6/7/2022	07:00	AC01241	0.37	3.50	X

## Page 1 of 1

2655 Park Center Drive, Suite A  
Simi Valley, California 93065  
Phone (805) 526-7161  
Fax (805) 526-7270

P2202599

Requested Turnaround Time in Business Days (Surcharges) please circle  
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10-Day-Standard

ALS Project No

[illegible]





## ALS ENVIRONMENTAL

## RESULTS OF ANALYSIS

Page 1 of 3

**Client:** Bhate Environmental Associates, Inc.**Client Sample ID:** LH18/24-Air\_060622\_Stripper**Client Project ID:** LHAAP-GWTP / NWO1312.0150

ALS Project ID: P2202599

ALS Sample ID: P2202599-001

Test Code: EPA TO-15

Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16

Analyst: Wida Ang

Sample Type: 6.0 L Summa Canister

Test Notes:

Container ID: AC02412

Date Collected: 6/6/22

Date Received: 6/13/22

Date Analyzed: 6/16/22

Volume(s) Analyzed: 0.010 Liter(s)

0.0040 Liter(s)

Initial Pressure (psig): -0.18 Final Pressure (psig): 3.70

Canister Dilution Factor: 1.27

CAS #	Compound	Result µg/m <sup>3</sup>	MRL µg/m <sup>3</sup>	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	ND	66	ND	38	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	67	ND	14	
74-87-3	Chloromethane	ND	65	ND	31	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	69	ND	9.8	
75-01-4	Vinyl Chloride	<b>650</b>	66	<b>260</b>	26	
106-99-0	1,3-Butadiene	ND	66	ND	30	
74-83-9	Bromomethane	ND	65	ND	17	
75-00-3	Chloroethane	ND	65	ND	25	
64-17-5	Ethanol	ND	640	ND	340	
75-05-8	Acetonitrile	ND	130	ND	76	
107-02-8	Acrolein	ND	130	ND	55	
67-64-1	Acetone	ND	660	ND	280	
75-69-4	Trichlorofluoromethane (CFC 11)	ND	66	ND	12	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	130	ND	52	
107-13-1	Acrylonitrile	ND	130	ND	59	
75-35-4	1,1-Dichloroethene	<b>140</b>	69	<b>34</b>	17	
75-09-2	Methylene Chloride	ND	66	ND	19	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	67	ND	22	
76-13-1	Trichlorotrifluoroethane (CFC 113)	<b>6,400</b>	69	<b>840</b>	9.0	
75-15-0	Carbon Disulfide	ND	140	ND	45	
156-60-5	trans-1,2-Dichloroethene	ND	67	ND	17	
75-34-3	1,1-Dichloroethane	ND	67	ND	17	
1634-04-4	Methyl tert-Butyl Ether	ND	67	ND	19	
108-05-4	Vinyl Acetate	ND	640	ND	180	
78-93-3	2-Butanone (MEK)	ND	130	ND	43	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

## ALS ENVIRONMENTAL

## RESULTS OF ANALYSIS

Page 2 of 3

**Client:** Bhate Environmental Associates, Inc.**Client Sample ID:** LH18/24-Air\_060622\_Stripper**Client Project ID:** LHAAP-GWTP / NWO1312.0150

ALS Project ID: P2202599

ALS Sample ID: P2202599-001

Test Code: EPA TO-15

Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16

Analyst: Wida Ang

Sample Type: 6.0 L Summa Canister

Test Notes:

Container ID: AC02412

Date Collected: 6/6/22

Date Received: 6/13/22

Date Analyzed: 6/16/22

Volume(s) Analyzed: 0.010 Liter(s)

0.0040 Liter(s)

Initial Pressure (psig): -0.18 Final Pressure (psig): 3.70

Canister Dilution Factor: 1.27

CAS #	Compound	Result µg/m <sup>3</sup>	MRL µg/m <sup>3</sup>	Result ppbV	MRL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	15,000	170	3,900	42	D
141-78-6	Ethyl Acetate	ND	270	ND	74	
110-54-3	n-Hexane	ND	67	ND	19	
67-66-3	Chloroform	ND	69	ND	14	
109-99-9	Tetrahydrofuran (THF)	ND	130	ND	43	
107-06-2	1,2-Dichloroethane	160	67	39	17	
71-55-6	1,1,1-Trichloroethane	ND	66	ND	12	
71-43-2	Benzene	ND	64	ND	20	
56-23-5	Carbon Tetrachloride	ND	64	ND	10	
110-82-7	Cyclohexane	ND	140	ND	41	
78-87-5	1,2-Dichloropropane	ND	64	ND	14	
75-27-4	Bromodichloromethane	ND	67	ND	10	
79-01-6	Trichloroethene	17,000	170	3,200	31	D
123-91-1	1,4-Dioxane	ND	66	ND	18	
80-62-6	Methyl Methacrylate	ND	140	ND	34	
142-82-5	n-Heptane	ND	67	ND	16	
10061-01-5	cis-1,3-Dichloropropene	ND	64	ND	14	
108-10-1	4-Methyl-2-pentanone	ND	140	ND	34	
10061-02-6	trans-1,3-Dichloropropene	ND	65	ND	14	
79-00-5	1,1,2-Trichloroethane	ND	66	ND	12	
108-88-3	Toluene	ND	66	ND	18	
591-78-6	2-Hexanone	ND	140	ND	34	
124-48-1	Dibromochloromethane	ND	67	ND	7.9	
106-93-4	1,2-Dibromoethane	ND	66	ND	8.6	
123-86-4	n-Butyl Acetate	ND	140	ND	29	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

D = The reported result is from a dilution.

## ALS ENVIRONMENTAL

## RESULTS OF ANALYSIS

Page 3 of 3

**Client:** Bhate Environmental Associates, Inc.**Client Sample ID:** LH18/24-Air\_060622\_Stripper**Client Project ID:** LHAAP-GWTP / NWO1312.0150

ALS Project ID: P2202599

ALS Sample ID: P2202599-001

Test Code: EPA TO-15

Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16

Analyst: Wida Ang

Sample Type: 6.0 L Summa Canister

Test Notes:

Container ID: AC02412

Date Collected: 6/6/22

Date Received: 6/13/22

Date Analyzed: 6/16/22

Volume(s) Analyzed: 0.010 Liter(s)

0.0040 Liter(s)

Initial Pressure (psig): -0.18 Final Pressure (psig): 3.70

Canister Dilution Factor: 1.27

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	ND	67	ND	14	
127-18-4	Tetrachloroethene	68	66	10	9.7	
108-90-7	Chlorobenzene	ND	66	ND	14	
100-41-4	Ethylbenzene	ND	66	ND	15	
179601-23-1	m,p-Xylenes	ND	140	ND	32	
75-25-2	Bromoform	ND	66	ND	6.4	
100-42-5	Styrene	ND	64	ND	15	
95-47-6	o-Xylene	ND	66	ND	15	
111-84-2	n-Nonane	ND	66	ND	13	
79-34-5	1,1,2,2-Tetrachloroethane	ND	66	ND	9.6	
98-82-8	Cumene	ND	66	ND	13	
80-56-8	alpha-Pinene	ND	69	ND	12	
103-65-1	n-Propylbenzene	ND	67	ND	14	
622-96-8	4-Ethyltoluene	ND	67	ND	14	
108-67-8	1,3,5-Trimethylbenzene	ND	66	ND	13	
95-63-6	1,2,4-Trimethylbenzene	ND	66	ND	13	
100-44-7	Benzyl Chloride	ND	140	ND	27	
541-73-1	1,3-Dichlorobenzene	ND	66	ND	11	
106-46-7	1,4-Dichlorobenzene	ND	66	ND	11	
95-50-1	1,2-Dichlorobenzene	ND	67	ND	11	
5989-27-5	d-Limonene	ND	64	ND	11	
96-12-8	1,2-Dibromo-3-chloropropane	ND	130	ND	13	
120-82-1	1,2,4-Trichlorobenzene	ND	140	ND	19	
91-20-3	Naphthalene	ND	66	ND	13	
87-68-3	Hexachlorobutadiene	ND	66	ND	6.2	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

## ALS ENVIRONMENTAL

## RESULTS OF ANALYSIS

Page 1 of 3

**Client:** Bhate Environmental Associates, Inc.**Client Sample ID:** LH18/24-Air\_060622\_Stripper\_a**Client Project ID:** LHAAP-GWTP / NWO1312.0150

ALS Project ID: P2202599

ALS Sample ID: P2202599-002

Test Code: EPA TO-15

Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16

Analyst: Wida Ang

Sample Type: 6.0 L Summa Canister

Test Notes:

Container ID: AC01079

Date Collected: 6/6/22

Date Received: 6/13/22

Date Analyzed: 6/16/22

Volume(s) Analyzed: 0.010 Liter(s)

Initial Pressure (psig): -0.15 Final Pressure (psig): 3.89

Canister Dilution Factor: 1.28

CAS #	Compound	Result µg/m <sup>3</sup>	MRL µg/m <sup>3</sup>	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	ND	67	ND	39	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	68	ND	14	
74-87-3	Chloromethane	ND	65	ND	32	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	69	ND	9.9	
75-01-4	Vinyl Chloride	490	67	190	26	
106-99-0	1,3-Butadiene	ND	67	ND	30	
74-83-9	Bromomethane	ND	65	ND	17	
75-00-3	Chloroethane	ND	65	ND	25	
64-17-5	Ethanol	ND	640	ND	340	
75-05-8	Acetonitrile	ND	130	ND	76	
107-02-8	Acrolein	ND	130	ND	56	
67-64-1	Acetone	ND	670	ND	280	
75-69-4	Trichlorofluoromethane (CFC 11)	ND	67	ND	12	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	130	ND	52	
107-13-1	Acrylonitrile	ND	130	ND	59	
75-35-4	1,1-Dichloroethene	100	69	25	17	
75-09-2	Methylene Chloride	ND	67	ND	19	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	68	ND	22	
76-13-1	Trichlorotrifluoroethane (CFC 113)	4,700	69	620	9.0	
75-15-0	Carbon Disulfide	ND	140	ND	45	
156-60-5	trans-1,2-Dichloroethene	ND	68	ND	17	
75-34-3	1,1-Dichloroethane	ND	68	ND	17	
1634-04-4	Methyl tert-Butyl Ether	ND	68	ND	19	
108-05-4	Vinyl Acetate	ND	640	ND	180	
78-93-3	2-Butanone (MEK)	ND	130	ND	43	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

## ALS ENVIRONMENTAL

## RESULTS OF ANALYSIS

Page 2 of 3

**Client:** Bhate Environmental Associates, Inc.**Client Sample ID:** LH18/24-Air\_060622\_Stripper\_a**Client Project ID:** LHAAP-GWTP / NWO1312.0150

ALS Project ID: P2202599

ALS Sample ID: P2202599-002

Test Code: EPA TO-15

Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16

Analyst: Wida Ang

Sample Type: 6.0 L Summa Canister

Test Notes:

Container ID: AC01079

Date Collected: 6/6/22

Date Received: 6/13/22

Date Analyzed: 6/16/22

Volume(s) Analyzed: 0.010 Liter(s)

Initial Pressure (psig): -0.15 Final Pressure (psig): 3.89

Canister Dilution Factor: 1.28

CAS #	Compound	Result µg/m <sup>3</sup>	MRL µg/m <sup>3</sup>	Result ppbV	MRL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	9,900	67	2,500	17	
141-78-6	Ethyl Acetate	ND	270	ND	75	
110-54-3	n-Hexane	ND	68	ND	19	
67-66-3	Chloroform	ND	69	ND	14	
109-99-9	Tetrahydrofuran (THF)	ND	130	ND	43	
107-06-2	1,2-Dichloroethane	120	68	29	17	
71-55-6	1,1,1-Trichloroethane	ND	67	ND	12	
71-43-2	Benzene	ND	64	ND	20	
56-23-5	Carbon Tetrachloride	ND	64	ND	10	
110-82-7	Cyclohexane	ND	140	ND	41	
78-87-5	1,2-Dichloropropane	ND	64	ND	14	
75-27-4	Bromodichloromethane	ND	68	ND	10	
79-01-6	Trichloroethene	11,000	67	2,100	12	
123-91-1	1,4-Dioxane	ND	67	ND	18	
80-62-6	Methyl Methacrylate	ND	140	ND	34	
142-82-5	n-Heptane	ND	68	ND	17	
10061-01-5	cis-1,3-Dichloropropene	ND	64	ND	14	
108-10-1	4-Methyl-2-pentanone	ND	140	ND	34	
10061-02-6	trans-1,3-Dichloropropene	ND	65	ND	14	
79-00-5	1,1,2-Trichloroethane	ND	67	ND	12	
108-88-3	Toluene	ND	67	ND	18	
591-78-6	2-Hexanone	ND	140	ND	34	
124-48-1	Dibromochloromethane	ND	68	ND	8.0	
106-93-4	1,2-Dibromoethane	ND	67	ND	8.7	
123-86-4	n-Butyl Acetate	ND	140	ND	30	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

## ALS ENVIRONMENTAL

## RESULTS OF ANALYSIS

Page 3 of 3

**Client:** Bhate Environmental Associates, Inc.**Client Sample ID:** LH18/24-Air\_060622\_Stripper\_a**Client Project ID:** LHAAP-GWTP / NWO1312.0150

ALS Project ID: P2202599

ALS Sample ID: P2202599-002

**Test Code:** EPA TO-15

Date Collected: 6/6/22

**Instrument ID:** Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16

Date Received: 6/13/22

**Analyst:** Wida Ang

Date Analyzed: 6/16/22

**Sample Type:** 6.0 L Summa Canister

Volume(s) Analyzed: 0.010 Liter(s)

**Test Notes:****Container ID:** AC01079

Initial Pressure (psig): -0.15      Final Pressure (psig): 3.89

Canister Dilution Factor: 1.28

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	ND	68	ND	15	
127-18-4	Tetrachloroethene	ND	67	ND	9.8	
108-90-7	Chlorobenzene	ND	67	ND	14	
100-41-4	Ethylbenzene	ND	67	ND	15	
179601-23-1	m,p-Xylenes	ND	140	ND	32	
75-25-2	Bromoform	ND	67	ND	6.4	
100-42-5	Styrene	ND	64	ND	15	
95-47-6	o-Xylene	ND	67	ND	15	
111-84-2	n-Nonane	ND	67	ND	13	
79-34-5	1,1,2,2-Tetrachloroethane	ND	67	ND	9.7	
98-82-8	Cumene	ND	67	ND	14	
80-56-8	alpha-Pinene	ND	69	ND	12	
103-65-1	n-Propylbenzene	ND	68	ND	14	
622-96-8	4-Ethyltoluene	ND	68	ND	14	
108-67-8	1,3,5-Trimethylbenzene	ND	67	ND	14	
95-63-6	1,2,4-Trimethylbenzene	ND	67	ND	14	
100-44-7	Benzyl Chloride	ND	140	ND	27	
541-73-1	1,3-Dichlorobenzene	ND	67	ND	11	
106-46-7	1,4-Dichlorobenzene	ND	67	ND	11	
95-50-1	1,2-Dichlorobenzene	ND	68	ND	11	
5989-27-5	d-Limonene	ND	64	ND	11	
96-12-8	1,2-Dibromo-3-chloropropane	ND	130	ND	13	
120-82-1	1,2,4-Trichlorobenzene	ND	140	ND	19	
91-20-3	Naphthalene	ND	67	ND	13	
87-68-3	Hexachlorobutadiene	ND	67	ND	6.2	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

## ALS ENVIRONMENTAL

## RESULTS OF ANALYSIS

Page 1 of 3

**Client:** Bhate Environmental Associates, Inc.**Client Sample ID:** LH18/24-Air\_060622\_GWTP**Client Project ID:** LHAAP-GWTP / NWO1312.0150

ALS Project ID: P2202599

ALS Sample ID: P2202599-003

Test Code: EPA TO-15

Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16

Analyst: Wida Ang

Sample Type: 6.0 L Summa Canister

Test Notes:

Container ID: AC01935

Date Collected: 6/6/22

Date Received: 6/13/22

Date Analyzed: 6/16/22

Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -3.24 Final Pressure (psig): 3.62

Canister Dilution Factor: 1.60

CAS #	Compound	Result µg/m <sup>3</sup>	MRL µg/m <sup>3</sup>	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	14	0.83	8.1	0.48	
75-71-8	Dichlorodifluoromethane (CFC 12)	2.8	0.85	0.56	0.17	
74-87-3	Chloromethane	ND	0.82	ND	0.40	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	0.86	ND	0.12	
75-01-4	Vinyl Chloride	ND	0.83	ND	0.33	
106-99-0	1,3-Butadiene	ND	0.83	ND	0.38	
74-83-9	Bromomethane	ND	0.82	ND	0.21	
75-00-3	Chloroethane	ND	0.82	ND	0.31	
64-17-5	Ethanol	16	8.0	8.6	4.2	
75-05-8	Acetonitrile	ND	1.6	ND	0.95	
107-02-8	Acrolein	ND	1.6	ND	0.70	
67-64-1	Acetone	22	8.3	9.2	3.5	
75-69-4	Trichlorofluoromethane (CFC 11)	3.0	0.83	0.54	0.15	
67-63-0	2-Propanol (Isopropyl Alcohol)	29	1.6	12	0.65	
107-13-1	Acrylonitrile	ND	1.6	ND	0.74	
75-35-4	1,1-Dichloroethene	ND	0.86	ND	0.22	
75-09-2	Methylene Chloride	ND	0.83	ND	0.24	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	0.85	ND	0.27	
76-13-1	Trichlorotrifluoroethane (CFC 113)	4.8	0.86	0.63	0.11	
75-15-0	Carbon Disulfide	ND	1.8	ND	0.57	
156-60-5	trans-1,2-Dichloroethene	ND	0.85	ND	0.21	
75-34-3	1,1-Dichloroethane	ND	0.85	ND	0.21	
1634-04-4	Methyl tert-Butyl Ether	ND	0.85	ND	0.24	
108-05-4	Vinyl Acetate	ND	8.0	ND	2.3	
78-93-3	2-Butanone (MEK)	2.3	1.6	0.78	0.54	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.



## ALS ENVIRONMENTAL

## RESULTS OF ANALYSIS

Page 2 of 3

**Client:** Bhate Environmental Associates, Inc.**Client Sample ID:** LH18/24-Air\_060622\_GWTP**Client Project ID:** LHAAP-GWTP / NWO1312.0150

ALS Project ID: P2202599

ALS Sample ID: P2202599-003

Test Code: EPA TO-15

Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16

Analyst: Wida Ang

Sample Type: 6.0 L Summa Canister

Test Notes:

Container ID: AC01935

Date Collected: 6/6/22

Date Received: 6/13/22

Date Analyzed: 6/16/22

Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -3.24 Final Pressure (psig): 3.62

Canister Dilution Factor: 1.60

CAS #	Compound	Result µg/m <sup>3</sup>	MRL µg/m <sup>3</sup>	Result ppbV	MRL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	5.9	0.83	1.5	0.21	V
141-78-6	Ethyl Acetate	4.4	3.4	1.2	0.93	
110-54-3	n-Hexane	8.8	0.85	2.5	0.24	
67-66-3	Chloroform	ND	0.86	ND	0.18	
109-99-9	Tetrahydrofuran (THF)	2.5	1.6	0.83	0.54	
107-06-2	1,2-Dichloroethane	ND	0.85	ND	0.21	
71-55-6	1,1,1-Trichloroethane	ND	0.83	ND	0.15	
71-43-2	Benzene	ND	0.80	ND	0.25	
56-23-5	Carbon Tetrachloride	ND	0.80	ND	0.13	
110-82-7	Cyclohexane	ND	1.8	ND	0.51	
78-87-5	1,2-Dichloropropane	ND	0.80	ND	0.17	
75-27-4	Bromodichloromethane	ND	0.85	ND	0.13	
79-01-6	Trichloroethene	7.0	0.83	1.3	0.15	
123-91-1	1,4-Dioxane	ND	0.83	ND	0.23	
80-62-6	Methyl Methacrylate	ND	1.8	ND	0.43	
142-82-5	n-Heptane	ND	0.85	ND	0.21	
10061-01-5	cis-1,3-Dichloropropene	ND	0.80	ND	0.18	
108-10-1	4-Methyl-2-pentanone	ND	1.8	ND	0.43	
10061-02-6	trans-1,3-Dichloropropene	ND	0.82	ND	0.18	
79-00-5	1,1,2-Trichloroethane	ND	0.83	ND	0.15	
108-88-3	Toluene	2.3	0.83	0.62	0.22	
591-78-6	2-Hexanone	ND	1.8	ND	0.43	
124-48-1	Dibromochloromethane	ND	0.85	ND	0.10	
106-93-4	1,2-Dibromoethane	ND	0.83	ND	0.11	
123-86-4	n-Butyl Acetate	ND	1.8	ND	0.37	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

V = The continuing calibration verification standard was outside (biased high) the specified limits for this compound.

## ALS ENVIRONMENTAL

## RESULTS OF ANALYSIS

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**Client:** Bhate Environmental Associates, Inc.**Client Sample ID:** LH18/24-Air\_060622\_GWTP**Client Project ID:** LHAAP-GWTP / NWO1312.0150

ALS Project ID: P2202599

ALS Sample ID: P2202599-003

Test Code: EPA TO-15

Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16

Analyst: Wida Ang

Sample Type: 6.0 L Summa Canister

Test Notes:

Container ID: AC01935

Date Collected: 6/6/22

Date Received: 6/13/22

Date Analyzed: 6/16/22

Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -3.24 Final Pressure (psig): 3.62

Canister Dilution Factor: 1.60

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	ND	0.85	ND	0.18	
127-18-4	Tetrachloroethene	ND	0.83	ND	0.12	
108-90-7	Chlorobenzene	ND	0.83	ND	0.18	
100-41-4	Ethylbenzene	ND	0.83	ND	0.19	
179601-23-1	m,p-Xylenes	ND	1.8	ND	0.41	
75-25-2	Bromoform	ND	0.83	ND	0.081	
100-42-5	Styrene	ND	0.80	ND	0.19	
95-47-6	o-Xylene	ND	0.83	ND	0.19	
111-84-2	n-Nonane	ND	0.83	ND	0.16	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.83	ND	0.12	
98-82-8	Cumene	ND	0.83	ND	0.17	
80-56-8	alpha-Pinene	1.1	0.86	0.20	0.16	
103-65-1	n-Propylbenzene	ND	0.85	ND	0.17	
622-96-8	4-Ethyltoluene	ND	0.85	ND	0.17	
108-67-8	1,3,5-Trimethylbenzene	ND	0.83	ND	0.17	
95-63-6	1,2,4-Trimethylbenzene	ND	0.83	ND	0.17	
100-44-7	Benzyl Chloride	ND	1.8	ND	0.34	
541-73-1	1,3-Dichlorobenzene	ND	0.83	ND	0.14	
106-46-7	1,4-Dichlorobenzene	ND	0.83	ND	0.14	
95-50-1	1,2-Dichlorobenzene	ND	0.85	ND	0.14	
5989-27-5	d-Limonene	ND	0.80	ND	0.14	
96-12-8	1,2-Dibromo-3-chloropropane	ND	1.6	ND	0.17	
120-82-1	1,2,4-Trichlorobenzene	ND	1.8	ND	0.24	
91-20-3	Naphthalene	ND	0.83	ND	0.16	
87-68-3	Hexachlorobutadiene	ND	0.83	ND	0.078	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

## ALS ENVIRONMENTAL

## RESULTS OF ANALYSIS

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**Client:** Bhate Environmental Associates, Inc.**Client Sample ID:** LH18/24-Air\_060722\_Downwind**Client Project ID:** LHAAP-GWTP / NWO1312.0150

ALS Project ID: P2202599

ALS Sample ID: P2202599-004

Test Code: EPA TO-15

Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16

Analyst: Wida Ang

Sample Type: 6.0 L Summa Canister

Test Notes:

Container ID: AC01241

Date Collected: 6/7/22

Date Received: 6/13/22

Date Analyzed: 6/16/22

Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): 0.37 Final Pressure (psig): 3.50

Canister Dilution Factor: 1.21

CAS #	Compound	Result µg/m <sup>3</sup>	MRL µg/m <sup>3</sup>	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	27	0.63	16	0.37	
75-71-8	Dichlorodifluoromethane (CFC 12)	4.4	0.64	0.90	0.13	
74-87-3	Chloromethane	ND	0.62	ND	0.30	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	0.65	ND	0.094	
75-01-4	Vinyl Chloride	ND	0.63	ND	0.25	
106-99-0	1,3-Butadiene	ND	0.63	ND	0.28	
74-83-9	Bromomethane	ND	0.62	ND	0.16	
75-00-3	Chloroethane	ND	0.62	ND	0.23	
64-17-5	Ethanol	67	6.1	36	3.2	
75-05-8	Acetonitrile	ND	1.2	ND	0.72	
107-02-8	Acrolein	2.4	1.2	1.0	0.53	
67-64-1	Acetone	46	6.3	19	2.6	
75-69-4	Trichlorofluoromethane (CFC 11)	10	0.63	1.8	0.11	
67-63-0	2-Propanol (Isopropyl Alcohol)	63	1.2	26	0.49	
107-13-1	Acrylonitrile	ND	1.2	ND	0.56	
75-35-4	1,1-Dichloroethene	ND	0.65	ND	0.16	
75-09-2	Methylene Chloride	ND	0.63	ND	0.18	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	0.64	ND	0.20	
76-13-1	Trichlorotrifluoroethane (CFC 113)	0.70	0.65	0.092	0.085	
75-15-0	Carbon Disulfide	ND	1.3	ND	0.43	
156-60-5	trans-1,2-Dichloroethene	ND	0.64	ND	0.16	
75-34-3	1,1-Dichloroethane	ND	0.64	ND	0.16	
1634-04-4	Methyl tert-Butyl Ether	ND	0.64	ND	0.18	
108-05-4	Vinyl Acetate	ND	6.1	ND	1.7	
78-93-3	2-Butanone (MEK)	7.8	1.2	2.6	0.41	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

## ALS ENVIRONMENTAL

## RESULTS OF ANALYSIS

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**Client:** Bhate Environmental Associates, Inc.**Client Sample ID:** LH18/24-Air\_060722\_Downwind**Client Project ID:** LHAAP-GWTP / NWO1312.0150

ALS Project ID: P2202599

ALS Sample ID: P2202599-004

Test Code: EPA TO-15

Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16

Analyst: Wida Ang

Sample Type: 6.0 L Summa Canister

Test Notes:

Container ID: AC01241

Date Collected: 6/7/22

Date Received: 6/13/22

Date Analyzed: 6/16/22

Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): 0.37 Final Pressure (psig): 3.50

Canister Dilution Factor: 1.21

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	ND	0.63	ND	0.16	V
141-78-6	Ethyl Acetate	7.2	2.5	2.0	0.71	
110-54-3	n-Hexane	43	0.64	12	0.18	
67-66-3	Chloroform	ND	0.65	ND	0.13	
109-99-9	Tetrahydrofuran (THF)	12	1.2	4.1	0.41	
107-06-2	1,2-Dichloroethane	ND	0.64	ND	0.16	
71-55-6	1,1,1-Trichloroethane	ND	0.63	ND	0.12	
71-43-2	Benzene	1.3	0.61	0.40	0.19	
56-23-5	Carbon Tetrachloride	ND	0.61	ND	0.096	
110-82-7	Cyclohexane	3.4	1.3	0.99	0.39	
78-87-5	1,2-Dichloropropane	ND	0.61	ND	0.13	
75-27-4	Bromodichloromethane	ND	0.64	ND	0.096	
79-01-6	Trichloroethene	ND	0.63	ND	0.12	
123-91-1	1,4-Dioxane	ND	0.63	ND	0.17	
80-62-6	Methyl Methacrylate	ND	1.3	ND	0.33	
142-82-5	n-Heptane	1.9	0.64	0.48	0.16	
10061-01-5	cis-1,3-Dichloropropene	ND	0.61	ND	0.13	
108-10-1	4-Methyl-2-pentanone	ND	1.3	ND	0.32	
10061-02-6	trans-1,3-Dichloropropene	ND	0.62	ND	0.14	
79-00-5	1,1,2-Trichloroethane	ND	0.63	ND	0.12	
108-88-3	Toluene	7.9	0.63	2.1	0.17	
591-78-6	2-Hexanone	ND	1.3	ND	0.33	
124-48-1	Dibromochloromethane	ND	0.64	ND	0.075	
106-93-4	1,2-Dibromoethane	ND	0.63	ND	0.082	
123-86-4	n-Butyl Acetate	ND	1.3	ND	0.28	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

V = The continuing calibration verification standard was outside (biased high) the specified limits for this compound.

## ALS ENVIRONMENTAL

## RESULTS OF ANALYSIS

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**Client:** Bhate Environmental Associates, Inc.**Client Sample ID:** LH18/24-Air\_060722\_Downwind**Client Project ID:** LHAAP-GWTP / NWO1312.0150

ALS Project ID: P2202599

ALS Sample ID: P2202599-004

Test Code: EPA TO-15

Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16

Analyst: Wida Ang

Sample Type: 6.0 L Summa Canister

Test Notes:

Container ID: AC01241

Date Collected: 6/7/22

Date Received: 6/13/22

Date Analyzed: 6/16/22

Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): 0.37 Final Pressure (psig): 3.50

Canister Dilution Factor: 1.21

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	ND	0.64	ND	0.14	
127-18-4	Tetrachloroethene	ND	0.63	ND	0.093	
108-90-7	Chlorobenzene	ND	0.63	ND	0.14	
100-41-4	Ethylbenzene	1.2	0.63	0.29	0.14	
179601-23-1	m,p-Xylenes	3.9	1.3	0.90	0.31	
75-25-2	Bromoform	ND	0.63	ND	0.061	
100-42-5	Styrene	ND	0.61	ND	0.14	
95-47-6	o-Xylene	1.3	0.63	0.30	0.14	
111-84-2	n-Nonane	0.69	0.63	0.13	0.12	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.63	ND	0.092	
98-82-8	Cumene	ND	0.63	ND	0.13	
80-56-8	alpha-Pinene	2.1	0.65	0.37	0.12	
103-65-1	n-Propylbenzene	ND	0.64	ND	0.13	
622-96-8	4-Ethyltoluene	ND	0.64	ND	0.13	
108-67-8	1,3,5-Trimethylbenzene	ND	0.63	ND	0.13	
95-63-6	1,2,4-Trimethylbenzene	0.76	0.63	0.15	0.13	
100-44-7	Benzyl Chloride	ND	1.3	ND	0.26	
541-73-1	1,3-Dichlorobenzene	ND	0.63	ND	0.10	
106-46-7	1,4-Dichlorobenzene	ND	0.63	ND	0.10	
95-50-1	1,2-Dichlorobenzene	ND	0.64	ND	0.11	
5989-27-5	d-Limonene	0.77	0.61	0.14	0.11	
96-12-8	1,2-Dibromo-3-chloropropane	ND	1.2	ND	0.13	
120-82-1	1,2,4-Trichlorobenzene	ND	1.3	ND	0.18	
91-20-3	Naphthalene	ND	0.63	ND	0.12	
87-68-3	Hexachlorobutadiene	ND	0.63	ND	0.059	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

## ALS ENVIRONMENTAL

## RESULTS OF ANALYSIS

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**Client:** Bhate Environmental Associates, Inc.**Client Sample ID:** Method Blank**Client Project ID:** LHAAP-GWTP / NWO1312.0150

ALS Project ID: P2202599

ALS Sample ID: P220616-MB

**Test Code:** EPA TO-15**Instrument ID:** Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16**Analyst:** Wida Ang**Sample Type:** 6.0 L Summa Canister**Test Notes:**

Date Collected: NA

Date Received: NA

Date Analyzed: 6/16/22

Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m <sup>3</sup>	MRL µg/m <sup>3</sup>	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	ND	0.52	ND	0.30	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	0.53	ND	0.11	
74-87-3	Chloromethane	ND	0.51	ND	0.25	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	0.54	ND	0.077	
75-01-4	Vinyl Chloride	ND	0.52	ND	0.20	
106-99-0	1,3-Butadiene	ND	0.52	ND	0.24	
74-83-9	Bromomethane	ND	0.51	ND	0.13	
75-00-3	Chloroethane	ND	0.51	ND	0.19	
64-17-5	Ethanol	ND	5.0	ND	2.7	
75-05-8	Acetonitrile	ND	1.0	ND	0.60	
107-02-8	Acrolein	ND	1.0	ND	0.44	
67-64-1	Acetone	ND	5.2	ND	2.2	
75-69-4	Trichlorofluoromethane (CFC 11)	ND	0.52	ND	0.093	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	1.0	ND	0.41	
107-13-1	Acrylonitrile	ND	1.0	ND	0.46	
75-35-4	1,1-Dichloroethene	ND	0.54	ND	0.14	
75-09-2	Methylene Chloride	ND	0.52	ND	0.15	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	0.53	ND	0.17	
76-13-1	Trichlorotrifluoroethane (CFC 113)	ND	0.54	ND	0.070	
75-15-0	Carbon Disulfide	ND	1.1	ND	0.35	
156-60-5	trans-1,2-Dichloroethene	ND	0.53	ND	0.13	
75-34-3	1,1-Dichloroethane	ND	0.53	ND	0.13	
1634-04-4	Methyl tert-Butyl Ether	ND	0.53	ND	0.15	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	ND	1.0	ND	0.34	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

## ALS ENVIRONMENTAL

## RESULTS OF ANALYSIS

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**Client:** Bhate Environmental Associates, Inc.**Client Sample ID:** Method Blank**Client Project ID:** LHAAP-GWTP / NWO1312.0150

ALS Project ID: P2202599

ALS Sample ID: P220616-MB

Test Code: EPA TO-15

Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16

Analyst: Wida Ang

Sample Type: 6.0 L Summa Canister

Test Notes:

Date Collected: NA

Date Received: NA

Date Analyzed: 6/16/22

Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m <sup>3</sup>	MRL µg/m <sup>3</sup>	Result ppbV	MRL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	ND	0.52	ND	0.13	
141-78-6	Ethyl Acetate	ND	2.1	ND	0.58	
110-54-3	n-Hexane	ND	0.53	ND	0.15	
67-66-3	Chloroform	ND	0.54	ND	0.11	
109-99-9	Tetrahydrofuran (THF)	ND	1.0	ND	0.34	
107-06-2	1,2-Dichloroethane	ND	0.53	ND	0.13	
71-55-6	1,1,1-Trichloroethane	ND	0.52	ND	0.095	
71-43-2	Benzene	ND	0.50	ND	0.16	
56-23-5	Carbon Tetrachloride	ND	0.50	ND	0.080	
110-82-7	Cyclohexane	ND	1.1	ND	0.32	
78-87-5	1,2-Dichloropropane	ND	0.50	ND	0.11	
75-27-4	Bromodichloromethane	ND	0.53	ND	0.079	
79-01-6	Trichloroethene	ND	0.52	ND	0.097	
123-91-1	1,4-Dioxane	ND	0.52	ND	0.14	
80-62-6	Methyl Methacrylate	ND	1.1	ND	0.27	
142-82-5	n-Heptane	ND	0.53	ND	0.13	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	ND	0.11	
108-10-1	4-Methyl-2-pentanone	ND	1.1	ND	0.27	
10061-02-6	trans-1,3-Dichloropropene	ND	0.51	ND	0.11	
79-00-5	1,1,2-Trichloroethane	ND	0.52	ND	0.095	
108-88-3	Toluene	ND	0.52	ND	0.14	
591-78-6	2-Hexanone	ND	1.1	ND	0.27	
124-48-1	Dibromochloromethane	ND	0.53	ND	0.062	
106-93-4	1,2-Dibromoethane	ND	0.52	ND	0.068	
123-86-4	n-Butyl Acetate	ND	1.1	ND	0.23	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

## ALS ENVIRONMENTAL

## RESULTS OF ANALYSIS

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**Client:** Bhate Environmental Associates, Inc.**Client Sample ID:** Method Blank**Client Project ID:** LHAAP-GWTP / NWO1312.0150

ALS Project ID: P2202599

ALS Sample ID: P220616-MB

Test Code: EPA TO-15

Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16

Analyst: Wida Ang

Sample Type: 6.0 L Summa Canister

Test Notes:

Date Collected: NA

Date Received: NA

Date Analyzed: 6/16/22

Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m <sup>3</sup>	MRL µg/m <sup>3</sup>	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	ND	0.53	ND	0.11	
127-18-4	Tetrachloroethene	ND	0.52	ND	0.077	
108-90-7	Chlorobenzene	ND	0.52	ND	0.11	
100-41-4	Ethylbenzene	ND	0.52	ND	0.12	
179601-23-1	m,p-Xylenes	ND	1.1	ND	0.25	
75-25-2	Bromoform	ND	0.52	ND	0.050	
100-42-5	Styrene	ND	0.50	ND	0.12	
95-47-6	o-Xylene	ND	0.52	ND	0.12	
111-84-2	n-Nonane	ND	0.52	ND	0.099	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.52	ND	0.076	
98-82-8	Cumene	ND	0.52	ND	0.11	
80-56-8	alpha-Pinene	ND	0.54	ND	0.097	
103-65-1	n-Propylbenzene	ND	0.53	ND	0.11	
622-96-8	4-Ethyltoluene	ND	0.53	ND	0.11	
108-67-8	1,3,5-Trimethylbenzene	ND	0.52	ND	0.11	
95-63-6	1,2,4-Trimethylbenzene	ND	0.52	ND	0.11	
100-44-7	Benzyl Chloride	ND	1.1	ND	0.21	
541-73-1	1,3-Dichlorobenzene	ND	0.52	ND	0.087	
106-46-7	1,4-Dichlorobenzene	ND	0.52	ND	0.087	
95-50-1	1,2-Dichlorobenzene	ND	0.53	ND	0.088	
5989-27-5	d-Limonene	ND	0.50	ND	0.090	
96-12-8	1,2-Dibromo-3-chloropropane	ND	1.0	ND	0.10	
120-82-1	1,2,4-Trichlorobenzene	ND	1.1	ND	0.15	
91-20-3	Naphthalene	ND	0.52	ND	0.099	
87-68-3	Hexachlorobutadiene	ND	0.52	ND	0.049	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.



## ALS ENVIRONMENTAL

## SURROGATE SPIKE RECOVERY RESULTS

Page 1 of 1

**Client:** Bhate Environmental Associates, Inc.  
**Client Project ID:** LHAAP-GWTP / NWO1312.0150

ALS Project ID: P2202599

**Test Code:** EPA TO-15  
**Instrument ID:** Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16  
**Analyst:** Wida Ang  
**Sample Type:** 6.0 L Summa Canister(s)  
**Test Notes:**

Date(s) Collected: 6/6 - 6/7/22

Date(s) Received: 6/13/22

Date(s) Analyzed: 6/16/22

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4	Toluene-d8	Bromofluorobenzene	Acceptance Limits	Data Qualifier
		Percent Recovered	Percent Recovered	Percent Recovered		
Method Blank	P220616-MB	103	91	86	70-130	
Lab Control Sample	P220616-LCS	105	86	86	70-130	
Duplicate Lab Control Sample	P220616-DLCS	105	86	85	70-130	
LH18/24-Air_060622_Stripper	P2202599-001	103	90	85	70-130	
LH18/24-Air_060622_Stripper_a	P2202599-002	104	91	84	70-130	
LH18/24-Air_060622_GWTP	P2202599-003	104	90	83	70-130	
LH18/24-Air_060722_Downwind	P2202599-004	104	90	84	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.

Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

## ALS ENVIRONMENTAL

## LABORATORY CONTROL SAMPLE / DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Page 1 of 3

**Client:** Bhate Environmental Associates, Inc.**Client Sample ID:** Duplicate Lab Control Sample**Client Project ID:** LHAAP-GWTP / NWO1312.0150

ALS Project ID: P2202599

ALS Sample ID: P220616-DLCS

Test Code: EPA TO-15

Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16

Analyst: Wida Ang

Sample Type: 6.0 L Summa Canister

Test Notes:

Date Collected: NA

Date Received: NA

Date Analyzed: 6/16/22

Volume(s) Analyzed: 0.125 Liter(s)

CAS #	Compound	Spike Amount	Result		% Recovery		ALS	RPD	RPD	Data
		LCS / DLCS µg/m³	LCS µg/m³	DLCS µg/m³	LCS	DLCS	Acceptance Limits			
115-07-1	Propene	206	218	228	106	111	56-128	5	25	
75-71-8	Dichlorodifluoromethane (CFC 12)	208	198	197	95	95	71-112	0	25	
74-87-3	Chloromethane	206	213	210	103	102	53-126	1	25	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	208	206	200	99	96	62-121	3	25	
75-01-4	Vinyl Chloride	208	223	222	107	107	63-123	0	25	
106-99-0	1,3-Butadiene	206	220	223	107	108	63-135	0.9	25	
74-83-9	Bromomethane	206	195	193	95	94	71-112	1	25	
75-00-3	Chloroethane	206	203	204	99	99	66-117	0	25	
64-17-5	Ethanol	832	863	882	104	106	57-117	2	25	
75-05-8	Acetonitrile	202	196	200	97	99	59-131	2	25	
107-02-8	Acrolein	416	381	383	92	92	71-123	0	25	
67-64-1	Acetone	1,020	1080	1070	106	105	60-117	0.9	25	
75-69-4	Trichlorofluoromethane (CFC 11)	202	197	193	98	96	71-114	2	25	
67-63-0	2-Propanol (Isopropyl Alcohol)	400	423	422	106	106	61-124	0	25	
107-13-1	Acrylonitrile	402	415	418	103	104	65-130	1	25	
75-35-4	1,1-Dichloroethene	210	196	195	93	93	74-114	0	25	
75-09-2	Methylene Chloride	208	192	191	92	92	75-112	0	25	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	204	213	216	104	106	57-127	2	25	
76-13-1	Trichlorotrifluoroethane (CFC 113)	216	197	192	91	89	73-114	2	25	
75-15-0	Carbon Disulfide	414	406	410	98	99	70-113	1	25	
156-60-5	trans-1,2-Dichloroethene	208	207	206	100	99	76-119	1	25	
75-34-3	1,1-Dichloroethane	214	206	206	96	96	70-114	0	25	
1634-04-4	Methyl tert-Butyl Ether	206	193	192	94	93	72-118	1	25	
108-05-4	Vinyl Acetate	942	1240	1220	132	130	56-137	2	25	
78-93-3	2-Butanone (MEK)	408	405	410	99	100	74-121	1	25	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.

Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

## ALS ENVIRONMENTAL

## LABORATORY CONTROL SAMPLE / DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Page 2 of 3

**Client:** Bhate Environmental Associates, Inc.**Client Sample ID:** Duplicate Lab Control Sample**Client Project ID:** LHAAP-GWTP / NWO1312.0150

ALS Project ID: P2202599

ALS Sample ID: P220616-DLCS

Test Code: EPA TO-15

Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16

Analyst: Wida Ang

Sample Type: 6.0 L Summa Canister

Test Notes:

Date Collected: NA

Date Received: NA

Date Analyzed: 6/16/22

Volume(s) Analyzed: 0.125 Liter(s)

CAS #	Compound	Spike Amount	Result		% Recovery		ALS	RPD	RPD	Data
		LCS / DLCS µg/m³	LCS µg/m³	DLCS µg/m³	LCS	DLCS	Acceptance Limits			
156-59-2	cis-1,2-Dichloroethene	206	204	203	99	99	73-117	0	25	
141-78-6	Ethyl Acetate	580	731	735	126	127	59-161	0.8	25	
110-54-3	n-Hexane	208	238	237	114	114	55-130	0	25	
67-66-3	Chloroform	210	212	212	101	101	71-114	0	25	
109-99-9	Tetrahydrofuran (THF)	404	400	401	99	99	73-114	0	25	
107-06-2	1,2-Dichloroethane	210	210	208	100	99	71-119	1	25	
71-55-6	1,1,1-Trichloroethane	208	198	198	95	95	73-119	0	25	
71-43-2	Benzene	208	202	206	97	99	72-113	2	25	
56-23-5	Carbon Tetrachloride	202	191	190	95	94	67-123	1	25	
110-82-7	Cyclohexane	412	410	413	100	100	70-119	0	25	
78-87-5	1,2-Dichloropropane	206	205	211	100	102	70-118	2	25	
75-27-4	Bromodichloromethane	208	208	209	100	100	74-119	0	25	
79-01-6	Trichloroethene	204	201	201	99	99	74-115	0	25	
123-91-1	1,4-Dioxane	206	202	203	98	99	77-124	1	25	
80-62-6	Methyl Methacrylate	410	415	417	101	102	78-126	1	25	
142-82-5	n-Heptane	206	198	202	96	98	70-119	2	25	
10061-01-5	cis-1,3-Dichloropropene	208	211	214	101	103	81-126	2	25	
108-10-1	4-Methyl-2-pentanone	412	452	459	110	111	73-129	0.9	25	
10061-02-6	trans-1,3-Dichloropropene	200	204	206	102	103	80-127	1	25	
79-00-5	1,1,2-Trichloroethane	208	198	201	95	97	78-117	2	25	
108-88-3	Toluene	206	175	174	85	84	70-118	1	25	
591-78-6	2-Hexanone	406	416	418	102	103	74-132	1	25	
124-48-1	Dibromochloromethane	210	175	170	83	81	69-137	2	25	
106-93-4	1,2-Dibromoethane	208	173	169	83	81	76-128	2	25	
123-86-4	n-Butyl Acetate	406	424	427	104	105	75-134	1	25	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.

Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

## ALS ENVIRONMENTAL

## LABORATORY CONTROL SAMPLE / DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Page 3 of 3

**Client:** Bhate Environmental Associates, Inc.**Client Sample ID:** Duplicate Lab Control Sample**Client Project ID:** LHAAP-GWTP / NWO1312.0150

ALS Project ID: P2202599

ALS Sample ID: P220616-DLCS

Test Code: EPA TO-15

Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16

Analyst: Wida Ang

Sample Type: 6.0 L Summa Canister

Test Notes:

Date Collected: NA

Date Received: NA

Date Analyzed: 6/16/22

Volume(s) Analyzed: 0.125 Liter(s)

CAS #	Compound	Spike Amount	Result		% Recovery		ALS	RPD	RPD	Data
		LCS / DLCS µg/m³	LCS µg/m³	DLCS µg/m³	LCS	DLCS	Acceptance Limits			
111-65-9	n-Octane	208	175	176	84	85	68-120	1	25	
127-18-4	Tetrachloroethene	212	172	167	81	79	63-130	3	25	
108-90-7	Chlorobenzene	206	178	174	86	84	70-118	2	25	
100-41-4	Ethylbenzene	206	180	177	87	86	71-123	1	25	
179601-23-1	m,p-Xylenes	416	374	367	90	88	67-127	2	25	
75-25-2	Bromoform	210	176	170	84	81	65-149	4	25	
100-42-5	Styrene	202	175	173	87	86	76-132	1	25	
95-47-6	o-Xylene	208	187	185	90	89	69-124	1	25	
111-84-2	n-Nonane	208	209	211	100	101	64-127	1	25	
79-34-5	1,1,2,2-Tetrachloroethane	208	189	188	91	90	69-128	1	25	
98-82-8	Cumene	206	185	182	90	88	69-125	2	25	
80-56-8	alpha-Pinene	210	187	184	89	88	68-129	1	25	
103-65-1	n-Propylbenzene	208	189	187	91	90	70-127	1	25	
622-96-8	4-Ethyltoluene	208	189	187	91	90	69-127	1	25	
108-67-8	1,3,5-Trimethylbenzene	208	190	187	91	90	66-129	1	25	
95-63-6	1,2,4-Trimethylbenzene	206	210	207	102	100	63-142	2	25	
100-44-7	Benzyl Chloride	416	410	407	99	98	73-145	1	25	
541-73-1	1,3-Dichlorobenzene	208	193	189	93	91	67-136	2	25	
106-46-7	1,4-Dichlorobenzene	210	179	176	85	84	63-134	1	25	
95-50-1	1,2-Dichlorobenzene	210	194	189	92	90	64-139	2	25	
5989-27-5	d-Limonene	206	210	208	102	101	63-137	1	25	
96-12-8	1,2-Dibromo-3-chloropropane	404	355	347	88	86	72-145	2	25	
120-82-1	1,2,4-Trichlorobenzene	420	359	350	85	83	62-154	2	25	
91-20-3	Naphthalene	210	177	174	84	83	62-156	1	25	
87-68-3	Hexachlorobutadiene	212	160	156	75	74	55-142	1	25	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.

Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

## ALS ENVIRONMENTAL

## RESULTS OF ANALYSIS

Page 1 of 1

**Client:** Bhate Environmental Associates, Inc.  
**Client Project ID:** LHAAP-GWTP / NWO1312.0150

ALS Project ID: P2202599

## Internal Standard Area and RT Summary

Test Code: EPA TO-15  
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16  
Analyst: Wida Ang  
Sample Type: 6.0 L Summa Canister(s)  
Test Notes:

Lab File ID: 06162204.D  
Date Analyzed: 6/16/22  
Time Analyzed: 05:13

	IS1 (BCM)		IS2 (DFB)		IS3 (CBZ)	
	AREA	#	RT	#	AREA	#
<b>24 Hour Standard</b>	139120	11.32	613367	13.43	163194	17.73
<b>Upper Limit</b>	194768	11.65	858714	13.76	228472	18.06
<b>Lower Limit</b>	83472	10.99	368020	13.10	97916	17.40

Client Sample ID		IS1 (BCM)		IS2 (DFB)		IS3 (CBZ)	
		AREA	#	RT	#	AREA	#
01	Method Blank	126192	11.29	553767	13.42	136726	17.73
02	Lab Control Sample	134233	11.32	594478	13.43	154021	17.73
03	LH18/24-Air_060622_Stripper	137334	11.30	592803	13.43	146417	17.73
04	LH18/24-Air_060622_Stripper (Dilution)	129338	11.30	563495	13.43	138447	17.73
05	LH18/24-Air_060622_Stripper_a	125535	11.30	549825	13.43	135254	17.73
06	LH18/24-Air_060622_GWTP	119532	11.30	532873	13.43	134687	17.73
07	LH18/24-Air_060722_Downwind	123475	11.31	552050	13.43	138267	17.73
08	Duplicate Lab Control Sample	130126	11.32	567984	13.43	150519	17.73
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

IS1 (BCM) = Bromochloromethane

IS2 (DFB) = 1,4-Difluorobenzene

IS3 (CBZ) = Chlorobenzene-d5

AREA UPPER LIMIT = 140% of internal standard area

AREA LOWER LIMIT = 60% of internal standard area

RT UPPER LIMIT = 0.33 minutes of internal standard RT

RT LOWER LIMIT = 0.33 minutes of internal standard RT

# Column used to flag values outside QC limits with an I.

I = Internal standard not within the specified limits.

Data File : I:\MS16\DATA\2022\_06\16\06162208.D  
 Acq On : 16 Jun 2022 7:46  
 Sample : P2202599-001 (10mL)  
 Misc : S35-04032201

Vial: 1  
 Operator: WA  
 Inst : GCMS-16

Quant Time: Jun 17 11:16:34 2022

Quant Method : I:\MS16\METHODS\R16051022.M

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 19:05:32 2022

WA 6/19/22

Response via : Initial Calibration

DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.30	130	137334	12.500	ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.43	114	592803	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	17.73	54	146417	12.500	ng	0.00

#### System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...)	12.15	65	251083	12.818	ng	-0.02
Spiked Amount	12.500	Range 70 - 130	Recovery	=	102.56%	
57) Toluene-d8 (SS2)	15.88	98	621078	11.206	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	89.68%	
73) Bromofluorobenzene (SS3)	19.11	174	214321	10.609	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	84.88%	

#### Target Compounds

						Qvalue
2) Propene	4.22	42	570	N.D.		
3) Dichlorodifluoromethan...	4.36	85	415	N.D.		
4) Chloromethane	4.64	50	469	N.D.		
5) 1,2-Dichloro-1,1,2,2-t...	0.00	135	0	N.D.		
6) Vinyl Chloride	5.06	62	123319	5.147	ng	100
7) 1,3-Butadiene	0.00	54	0	N.D.		
8) Bromomethane	0.00	94	0	N.D.		
9) Chloroethane	0.00	64	0	N.D.		
10) Ethanol	6.49	45	3633	N.D.		
11) Acetonitrile	6.78	41	2034	N.D.		
12) Acrolein	6.98	56	185	N.D.		
13) Acetone	7.20	58	3980	N.D.		
14) Trichlorofluoromethane	7.40	101	101	N.D.		
15) 2-Propanol (Isopropanol)	7.71	45	1618	N.D.		
16) Acrylonitrile	7.94	53	691	N.D.		
17) 1,1-Dichloroethene	8.36	96	15204	1.072	ng	91
18) 2-Methyl-2-Propanol (t...	8.36	59	900	N.D.		
19) Methylene Chloride	8.56	84	5531	N.D.		
20) 3-Chloro-1-propene (Al...	0.00	41	0	N.D.		
21) Trichlorotrifluoroethane	9.00	151	654783	50.756	ng	94
22) Carbon Disulfide	8.85	76	2549	N.D.		
23) trans-1,2-Dichloroethene	9.86	61	5151	N.D.		
24) 1,1-Dichloroethane	10.11	63	5781	N.D.		
25) Methyl tert-Butyl Ether	0.00	73	0	N.D.		
26) Vinyl Acetate	0.00	86	0	N.D.		
27) 2-Butanone (MEK)	10.66	72	301	N.D.		
28) cis-1,2-Dichloroethene	11.12	61	2344641	105.330	ng	97
29) Diisopropyl Ether	11.47	87	318	N.D.		
30) Ethyl Acetate	11.59	61	110	N.D.		
31) n-Hexane	11.42	57	247	N.D.		
32) Chloroform	11.47	83	5529	N.D.		
34) Tetrahydrofuran (THF)	0.00	72	0	N.D.		
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.		
36) 1,2-Dichloroethane	12.27	62	27142	1.237	ng	99
38) 1,1,1-Trichloroethane	12.56	97	362	N.D.		
39) Isopropyl Acetate	0.00	61	0	N.D.		
40) 1-Butanol	0.00	56	0	N.D.		
41) Benzene	13.04	78	2317	N.D.		
42) Carbon Tetrachloride	13.19	117	950	N.D.		
43) Cyclohexane	13.32	84	1209	N.D.		
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.		
45) 1,2-Dichloropropane	0.00	63	0	N.D.		
46) Bromodichloromethane	0.00	83	0	N.D.	d	
47) Trichloroethene	14.13	130	1967583	124.777	ng	99
48) 1,4-Dioxane	14.14	88	191	N.D.		
49) 2,2,4-Trimethylpentane...	14.13	57	369	N.D.		
50) Methyl Methacrylate	0.00	100	0	N.D.	d	

Data File : I:\MS16\DATA\2022\_06\16\06162208.D  
 Acq On : 16 Jun 2022 7:46  
 Sample : P2202599-001 (10mL)  
 Misc : S35-04032201

Vial: 1  
 Operator: WA  
 Inst : GCMS-16

Quant Time: Jun 17 11:16:34 2022  
 Quant Method : I:\MS16\METHODS\R16051022.M  
 Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
 QLast Update : Tue May 10 19:05:32 2022  
 Response via : Initial Calibration  
 DataAcq Meth:TO15.M

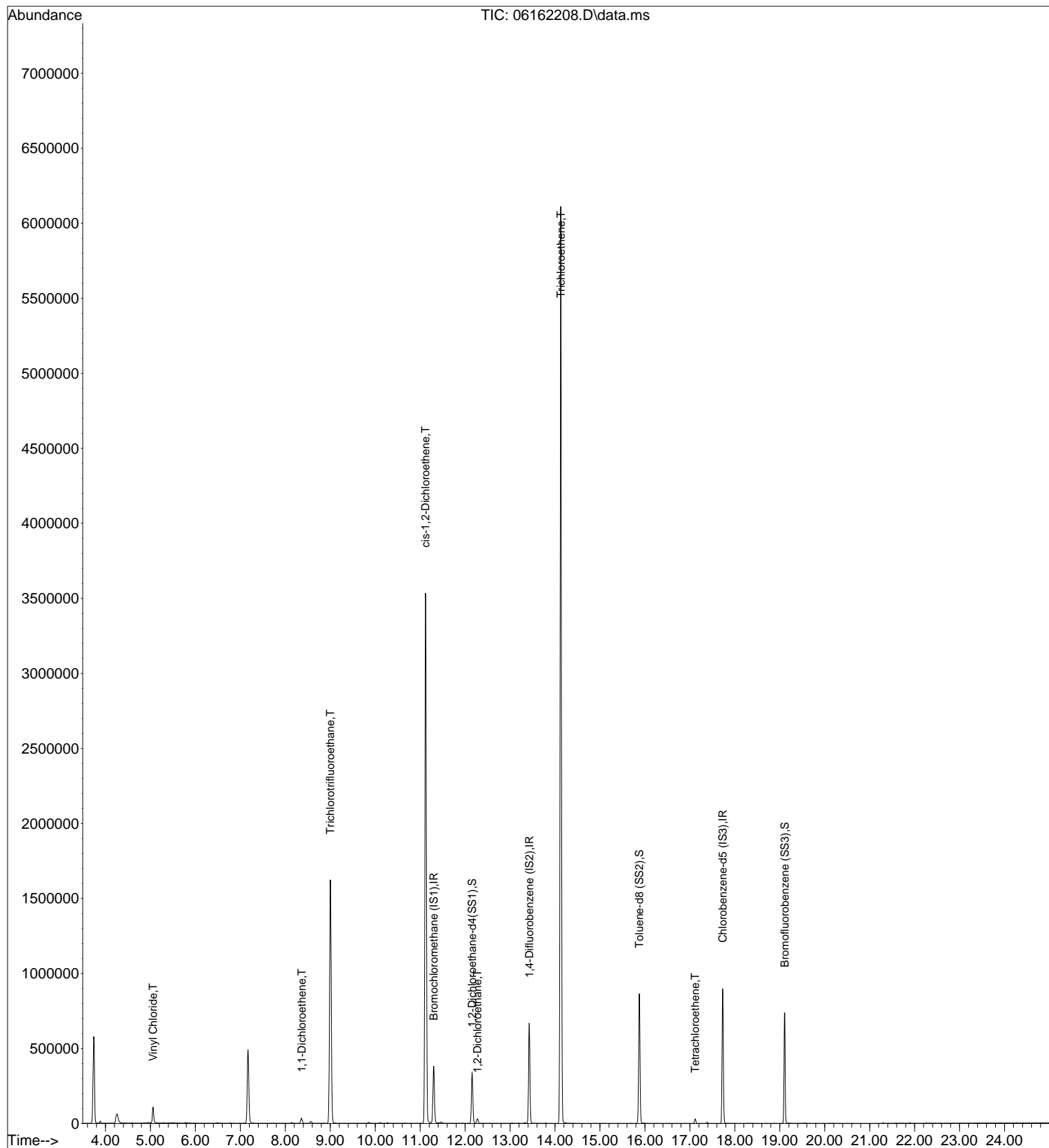
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	0.00	71	0	N.D.		
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.		
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.		
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.		
55) 1,1,2-Trichloroethane	15.68	97	285	N.D.		
58) Toluene	15.98	91	2182	N.D.		
59) 2-Hexanone	16.25	43	1453	N.D.		
60) Dibromochloromethane	0.00	129	0	N.D.		
61) 1,2-Dibromoethane	0.00	107	0	N.D.		
62) n-Butyl Acetate	16.88	43	734	N.D.		
63) n-Octane	0.00	57	0	N.D.		
64) Tetrachloroethene	17.12	166	9816	0.535 ng		97
65) Chlorobenzene	0.00	112	0	N.D.		
66) Ethylbenzene	18.13	91	675	N.D.		
67) m- & p-Xylenes	18.27	91	870	N.D.		
68) Bromoform	0.00	173	0	N.D.		
69) Styrene	0.00	104	0	N.D.		
70) o-Xylene	18.71	91	489	N.D.		
71) n-Nonane	18.90	43	104	N.D.		
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.		
74) Cumene	19.23	105	1883	N.D.		
75) alpha-Pinene	0.00	93	0	N.D.		
76) n-Propylbenzene	19.70	91	364	N.D.		
77) 3-Ethyltoluene	19.81	105	221	No Calib	#	
78) 4-Ethyltoluene	19.81	105	221	N.D.		
79) 1,3,5-Trimethylbenzene	19.88	105	143	N.D.		
80) alpha-Methylstyrene	0.00	118	0	N.D.		
81) 2-Ethyltoluene	19.88	105	143	No Calib	#	
82) 1,2,4-Trimethylbenzene	20.23	105	300	N.D.		
83) n-Decane	0.00	58	0	N.D.		
84) Benzyl Chloride	20.35	91	630	N.D.		
85) 1,3-Dichlorobenzene	20.43	146	264	N.D.		
86) 1,4-Dichlorobenzene	20.43	146	264	N.D.		
87) sec-Butylbenzene	0.00	105	0	N.D.		
88) 4-Isopropyltoluene (p-...	20.61	119	464	N.D.		
89) 1,2,3-Trimethylbenzene	0.00	105	0	N.D.		
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.		
91) d-Limonene	0.00	68	0	N.D.		
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.		
93) n-Undecane	22.26	57	239	No Calib	#	
94) 1,2,4-Trichlorobenzene	22.24	180	713	N.D.		
95) Naphthalene	22.35	128	1899	N.D.		
96) n-Dodecane	22.33	57	299	No Calib	#	
97) Hexachlorobutadiene	0.00	225	0	N.D.		
98) Cyclohexanone	18.43	55	174	No Calib	#	
99) tert-Butylbenzene	0.00	119	0	N.D.		
100) n-Butylbenzene	20.97	91	175	N.D.		
101) 1,1,1,2-Tetrachloroethane	0.00	131	0	N.D.		

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Data File : I:\MS16\DATA\2022\_06\16\06162208.D  
Acq On : 16 Jun 2022 7:46  
Sample : P2202599-001 (10mL)  
Misc : S35-04032201

Vial: 1  
Operator: WA  
Inst : GCMS-16

Quant Time: Jun 17 11:16:34 2022  
Quant Method : I:\MS16\METHODS\R16051022.M  
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
QLast Update : Tue May 10 19:05:32 2022  
Response via : Initial Calibration  
DataAcq Meth:TO15.M





Data File: I:\MS16\DATA\2022\_06\16\06162208.D

Sample : P2202599-001 (10mL)

Acq On : 16 Jun 2022 7:46

Misc : S35-04032201

ALS Vial : 1 Sample Multiplier: 1

Inst : GCMS-16

Operator: WA

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

Quant Time: Jun 17 11:16:34 2022

Quant Method : I:\MS16\METHODS\R16051022.M

QLast Update : Tue May 10 19:05:32 2022

Response via : Initial Calibration

USA 6/19/22

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.30	130	137334	12.500	ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.43	114	592803	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	17.73	54	146417	12.500	ng	0.00

## System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...)	12.15	65	251083	12.818	ng	-0.02
Spiked Amount	12.500	Range 70 - 130	Recovery	=	102.56%	
57) Toluene-d8 (SS2)	15.88	98	621078	11.206	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	89.68%	
73) Bromofluorobenzene (SS3)	19.11	174	214321	10.609	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	84.88%	

## Target Compounds

						Qvalue
6) Vinyl Chloride	5.06	62	123319	5.147	ng	100
17) 1,1-Dichloroethene	8.36	96	15204	1.072	ng	91
21) Trichlorotrifluoroethane	9.00	151	654783	50.756	ng	94
28) cis-1,2-Dichloroethene	11.12	61	2344641	105.330	ng	97
36) 1,2-Dichloroethane	12.27	62	27142	1.237	ng	99
47) Trichloroethene	14.13	130	1967583	124.777	ng	99
64) Tetrachloroethene	17.12	166	9816	0.535	ng	97

(#)= qualifier out of range (m)= manual integration (+)= signals summed

Data File: I:\MS16\DATA\2022\_06\16\06162208.D

Sample : P2202599-001 (10mL)

Acq On : 16 Jun 2022 7:46

Misc : S35-04032201

ALS Vial : 1 Sample Multiplier: 1

Inst : GCMS-16

Operator: WA

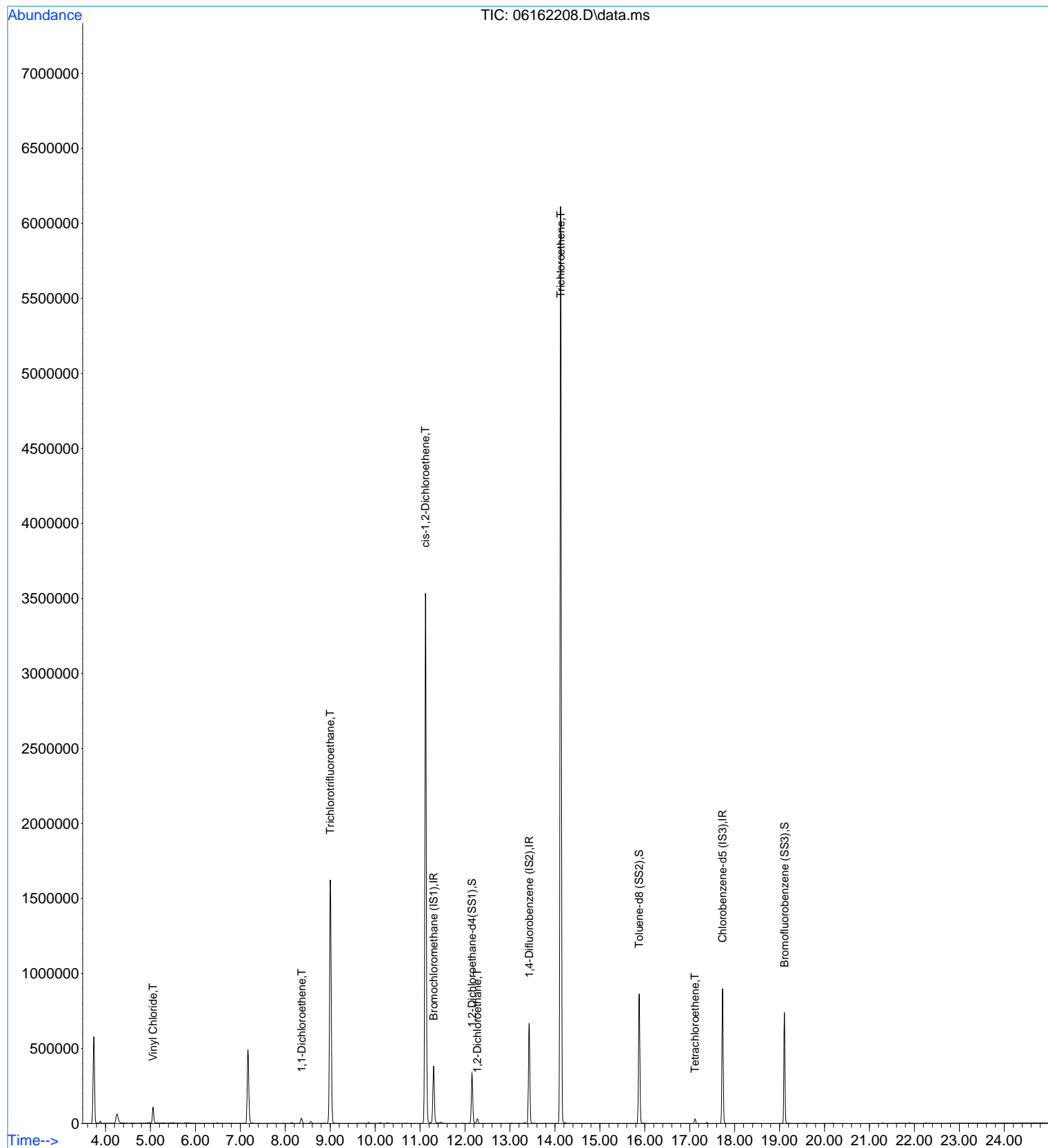
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

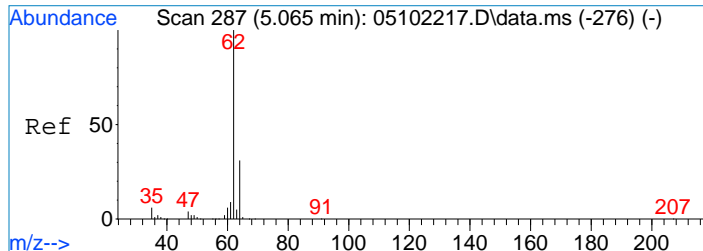
Quant Time: Jun 17 11:16:34 2022

Quant Method : I:\MS16\METHODS\R16051022.M

QLast Update : Tue May 10 19:05:32 2022

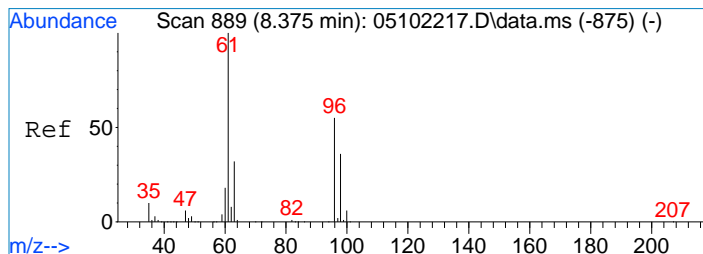
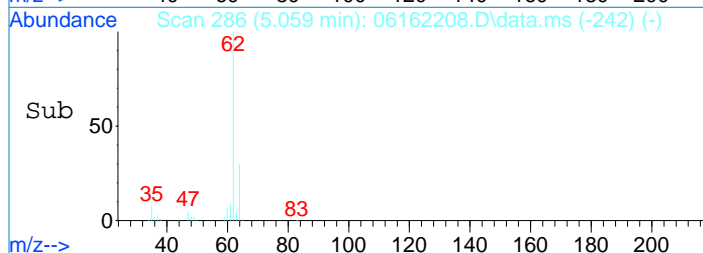
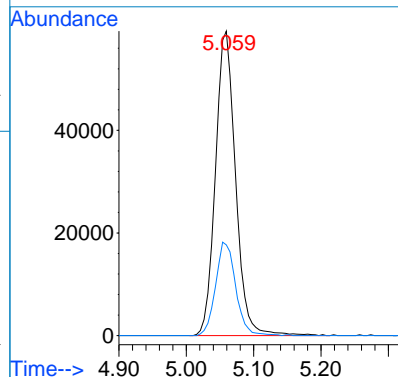
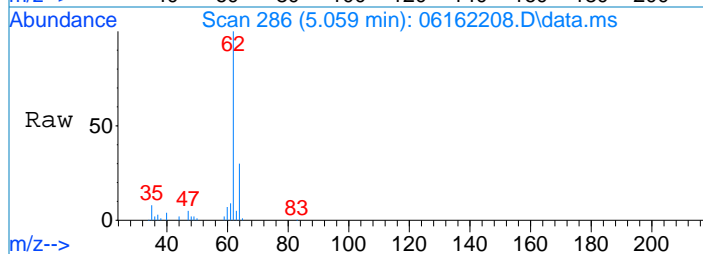
Response via : Initial Calibration





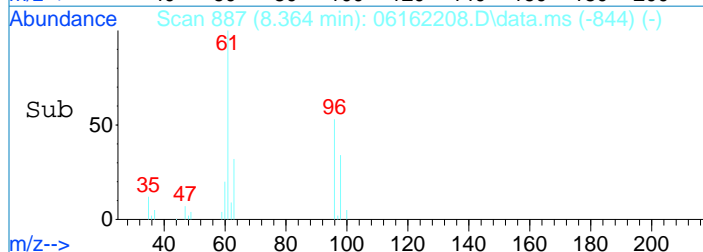
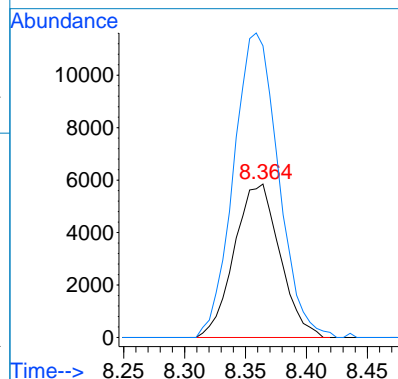
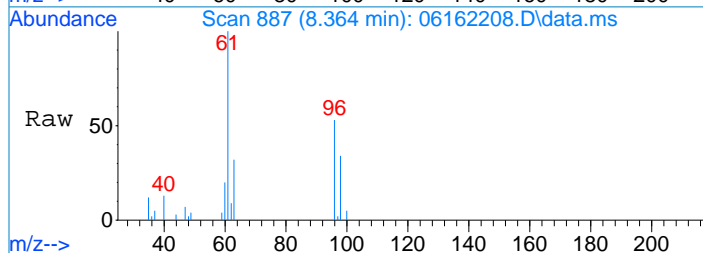
#6  
Vinyl Chloride  
Concen: 5.15 ng  
RT: 5.06 min Scan# 286  
Delta R.T. -0.006 min  
Lab File: 06162208.D  
Acq: 16 Jun 2022 7:46

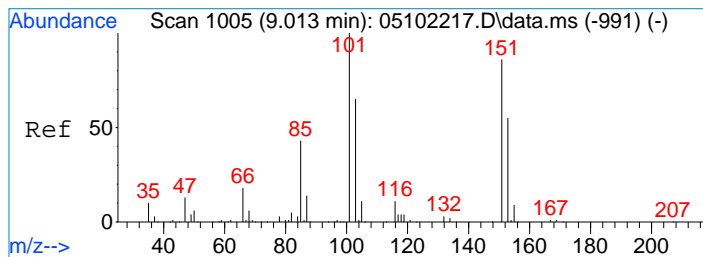
Tgt Ion:	62	Resp:	123319
Ion Ratio	Lower	Upper	
62	100		
64	30.6	10.7	50.7



#17  
1,1-Dichloroethene  
Concen: 1.07 ng  
RT: 8.36 min Scan# 887  
Delta R.T. -0.011 min  
Lab File: 06162208.D  
Acq: 16 Jun 2022 7:46

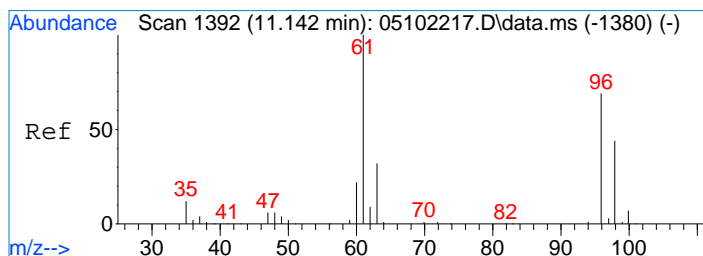
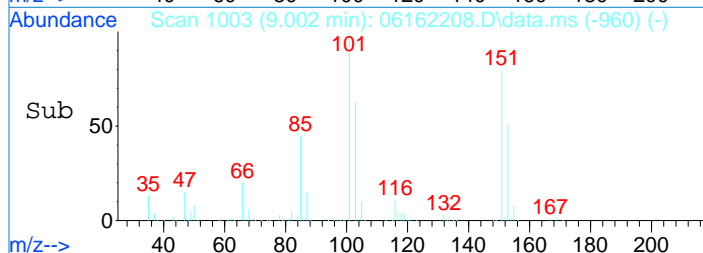
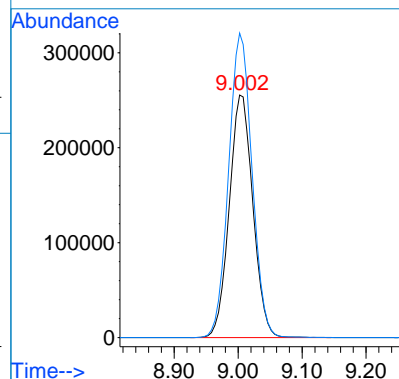
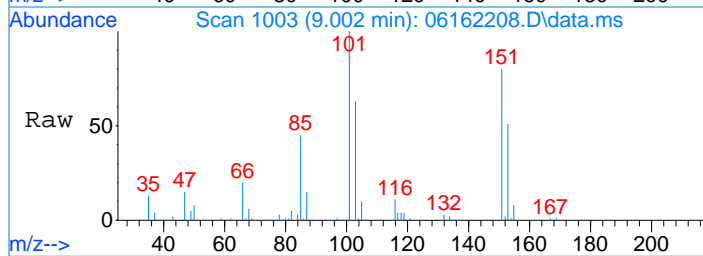
Tgt Ion:	96	Resp:	15204
Ion Ratio	Lower	Upper	
96	100		
61	195.3	162.3	202.3





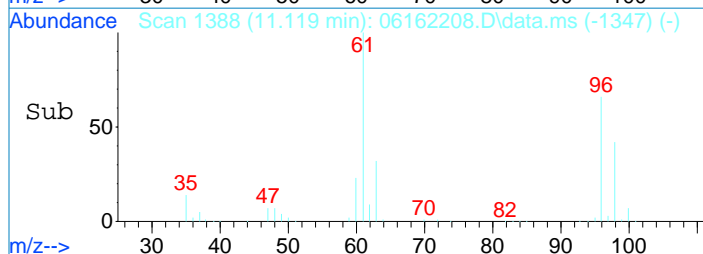
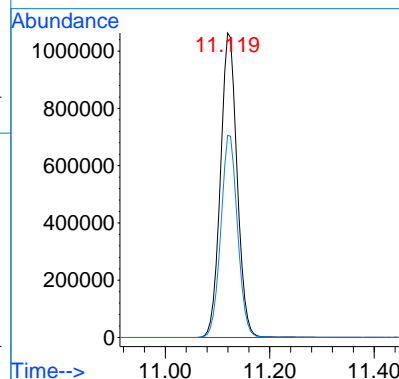
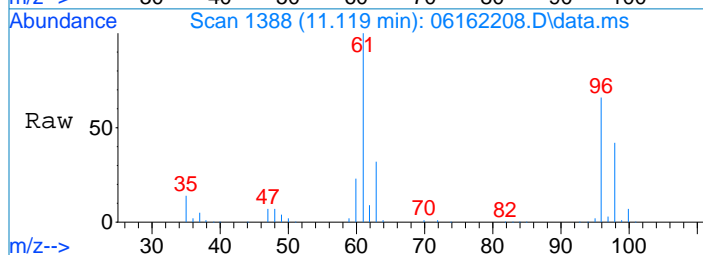
#21  
Trichlorotrifluoroethane  
Concen: 50.76 ng  
RT: 9.00 min Scan# 1003  
Delta R.T. -0.011 min  
Lab File: 06162208.D  
Acq: 16 Jun 2022 7:46

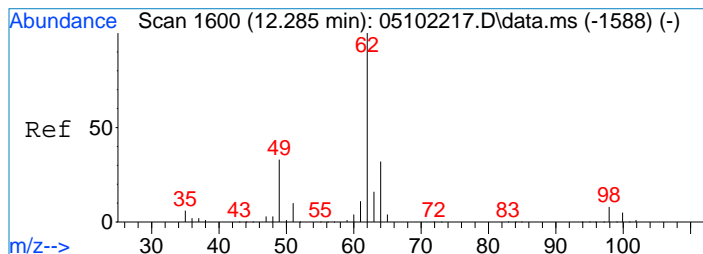
Tgt Ion	151	Resp	654783
Ion Ratio	Lower	Upper	
151	100		
101	124.7	98.2	138.2



#28  
cis-1,2-Dichloroethene  
Concen: 105.33 ng  
RT: 11.12 min Scan# 1388  
Delta R.T. -0.022 min  
Lab File: 06162208.D  
Acq: 16 Jun 2022 7:46

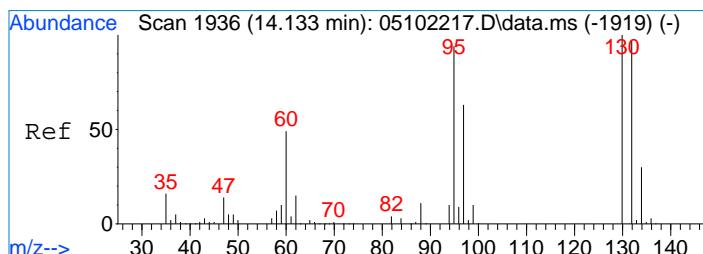
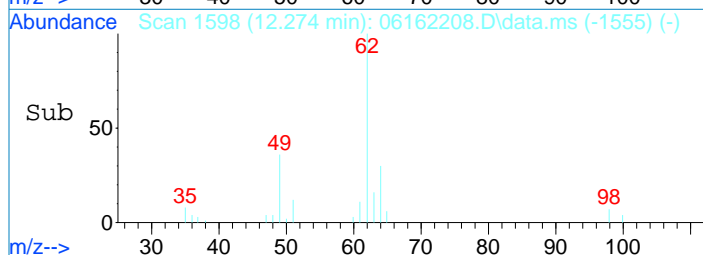
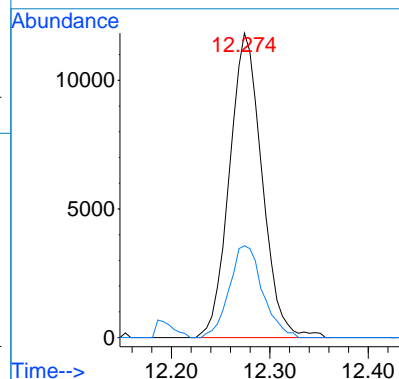
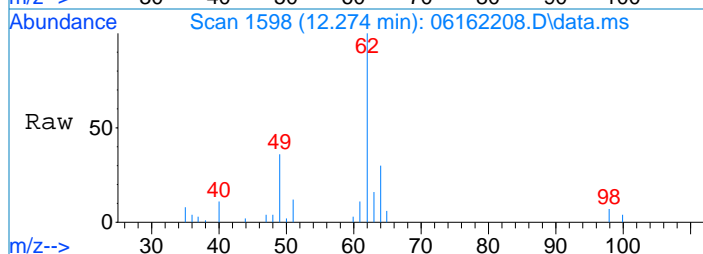
Tgt Ion	61	Resp	2344641
Ion Ratio	Lower	Upper	
61	100		
96	66.9	49.3	89.3





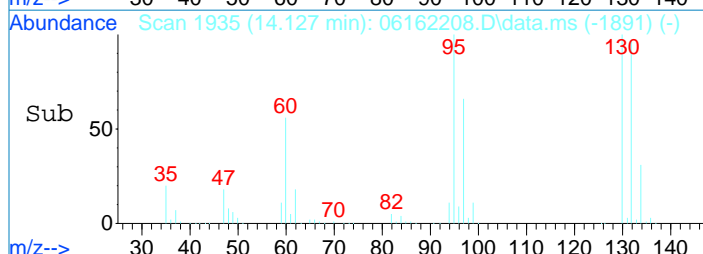
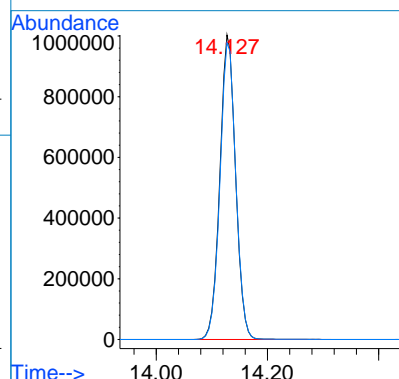
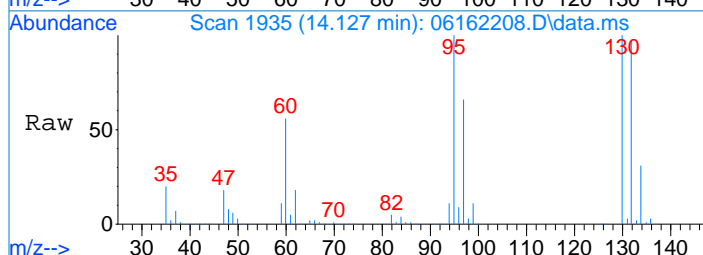
#36  
1,2-Dichloroethane  
Concen: 1.24 ng  
RT: 12.27 min Scan# 1598  
Delta R.T. -0.011 min  
Lab File: 06162208.D  
Acq: 16 Jun 2022 7:46

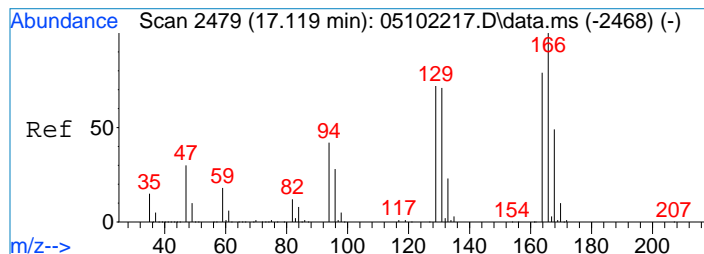
Tgt Ion	62	Resp	27142
Ion Ratio	Lower	Upper	
62	100		
64	30.9	11.5	51.5



#47  
Trichloroethene  
Concen: 124.78 ng  
RT: 14.13 min Scan# 1935  
Delta R.T. -0.006 min  
Lab File: 06162208.D  
Acq: 16 Jun 2022 7:46

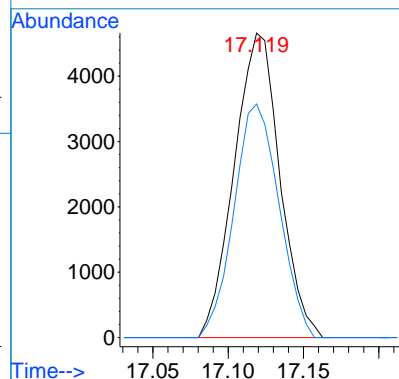
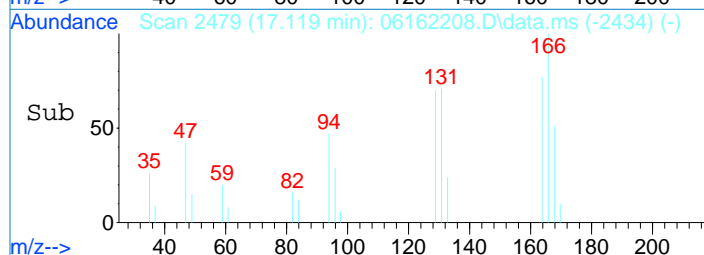
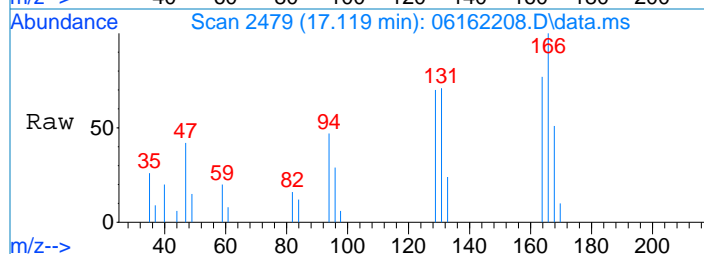
Tgt Ion	130	Resp	1967583
Ion Ratio	Lower	Upper	
130	100		
132	98.4	77.6	117.6





#64  
Tetrachloroethene  
Concen: 0.54 ng  
RT: 17.12 min Scan# 2479  
Delta R.T. -0.000 min  
Lab File: 06162208.D  
Acq: 16 Jun 2022 7:46

Tgt Ion: 166 Resp: 9816  
Ion Ratio Lower Upper  
166 100  
164 75.8 58.8 98.8



Data File : I:\MS16\DATA\2022\_06\16\06162209.D  
 Acq On : 16 Jun 2022 8:20  
 Sample : P2202599-001dil (4.0mL)  
 Misc : S35-04032201

Vial: 1  
 Operator: WA  
 Inst : GCMS-16

Quant Time: Jun 17 11:18:37 2022

Quant Method : I:\MS16\METHODS\R16051022.M

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 19:05:32 2022

Response via : Initial Calibration

DataAcq Meth:TO15.M

6/19/22

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.30	130	129338	12.500	ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.43	114	563495	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	17.73	54	138447	12.500	ng	0.00

#### System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...)	12.15	65	239623	12.989	ng	-0.02
Spiked Amount	12.500	Range 70 - 130	Recovery	=	103.92%	
57) Toluene-d8 (SS2)	15.88	98	597316	11.398	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	91.20%	
73) Bromofluorobenzene (SS3)	19.11	174	203628	10.660	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	85.28%	

#### Target Compounds

						Qvalue
2) Propene	4.22	42	694	N.D.		
3) Dichlorodifluoromethan...	4.37	85	146	N.D.		
4) Chloromethane	4.64	50	274	N.D.		
5) 1,2-Dichloro-1,1,2,2-t...	0.00	135	0	N.D.		
6) Vinyl Chloride	5.06	62	57877	2.565	ng	99
7) 1,3-Butadiene	0.00	54	0	N.D.		
8) Bromomethane	0.00	94	0	N.D.		
9) Chloroethane	0.00	64	0	N.D.		
10) Ethanol	6.49	45	3141	N.D.		
11) Acetonitrile	6.77	41	1492	N.D.		
12) Acrolein	6.99	56	314	N.D.		
13) Acetone	7.20	58	3874	N.D.		
14) Trichlorofluoromethane	7.18	101	918	N.D.		
15) 2-Propanol (Isopropanol)	7.72	45	1207	N.D.		
16) Acrylonitrile	7.93	53	545	N.D.		
17) 1,1-Dichloroethene	8.36	96	7045	0.527	ng	89
18) 2-Methyl-2-Propanol (t...	8.36	59	285	N.D.		
19) Methylene Chloride	8.57	84	2886	N.D.		
20) 3-Chloro-1-propene (Al...	0.00	41	0	N.D.		
21) Trichlorotrifluoroethane	9.00	151	294266	24.220	ng	93
22) Carbon Disulfide	8.85	76	7918	N.D.		
23) trans-1,2-Dichloroethene	9.85	61	3069	N.D.		
24) 1,1-Dichloroethane	10.11	63	2832	N.D.		
25) Methyl tert-Butyl Ether	0.00	73	0	N.D.		
26) Vinyl Acetate	0.00	86	0	N.D.		
27) 2-Butanone (MEK)	10.66	72	133	N.D.		
28) cis-1,2-Dichloroethene	11.12	61	1017912	48.555	ng	97
29) Diisopropyl Ether	0.00	87	0	N.D.		
30) Ethyl Acetate	11.36	61	519	N.D.		
31) n-Hexane	11.42	57	5268	N.D.		
32) Chloroform	11.47	83	2627	N.D.		
34) Tetrahydrofuran (THF)	0.00	72	0	N.D.		
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.		
36) 1,2-Dichloroethane	12.28	62	12301	0.595	ng	98
38) 1,1,1-Trichloroethane	0.00	97	0	N.D.		
39) Isopropyl Acetate	0.00	61	0	N.D.		
40) 1-Butanol	0.00	56	0	N.D.		
41) Benzene	13.03	78	1703	N.D.		
42) Carbon Tetrachloride	13.19	117	391	N.D.		
43) Cyclohexane	13.33	84	3531	N.D.		
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.		
45) 1,2-Dichloropropane	0.00	63	0	N.D.		
46) Bromodichloromethane	0.00	83	0	N.D.	d	
47) Trichloroethene	14.13	130	809598	54.012	ng	99
48) 1,4-Dioxane	0.00	88	0	N.D.		
49) 2,2,4-Trimethylpentane...	0.00	57	0	N.D.		
50) Methyl Methacrylate	14.46	100	444	N.D.		

Data File : I:\MS16\DATA\2022\_06\16\06162209.D  
 Acq On : 16 Jun 2022 8:20  
 Sample : P2202599-001dil (4.0mL)  
 Misc : S35-04032201

Vial: 1  
 Operator: WA  
 Inst : GCMS-16

Quant Time: Jun 17 11:18:37 2022

Quant Method : I:\MS16\METHODS\R16051022.M

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 19:05:32 2022

Response via : Initial Calibration

DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.47	71	2262	N.D.		
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.		
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.		
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.		
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.		
58) Toluene	15.98	91	1909	N.D.		
59) 2-Hexanone	16.26	43	787	N.D.		
60) Dibromochloromethane	0.00	129	0	N.D.		
61) 1,2-Dibromoethane	0.00	107	0	N.D.		
62) n-Butyl Acetate	16.87	43	470	N.D.		
63) n-Octane	16.98	57	2234	N.D.		
64) Tetrachloroethene	17.12	166	4563	N.D.		
65) Chlorobenzene	0.00	112	0	N.D.		
66) Ethylbenzene	18.12	91	516	N.D.		
67) m- & p-Xylenes	18.29	91	523	N.D.		
68) Bromoform	0.00	173	0	N.D.		
69) Styrene	0.00	104	0	N.D.		
70) o-Xylene	18.71	91	221	N.D.		
71) n-Nonane	18.91	43	6248	N.D.		
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.		
74) Cumene	19.23	105	10603	N.D.		
75) alpha-Pinene	0.00	93	0	N.D.		
76) n-Propylbenzene	19.65	91	666	N.D.		
77) 3-Ethyltoluene	19.77	105	9030	No Calib		
78) 4-Ethyltoluene	19.77	105	9030	N.D.		
79) 1,3,5-Trimethylbenzene	19.87	105	7564	N.D.		
80) alpha-Methylstyrene	0.00	118	0	N.D.		
81) 2-Ethyltoluene	19.87	105	7564	No Calib		
82) 1,2,4-Trimethylbenzene	20.23	105	426	N.D.		
83) n-Decane	0.00	58	0	N.D.		
84) Benzyl Chloride	20.35	91	105	N.D.		
85) 1,3-Dichlorobenzene	20.37	146	265	N.D.		
86) 1,4-Dichlorobenzene	20.43	146	345	N.D.		
87) sec-Butylbenzene	20.61	105	7968	N.D.		
88) 4-Isopropyltoluene (p-...	20.61	119	9994	N.D.		
89) 1,2,3-Trimethylbenzene	20.61	105	7968	No Calib	#	
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.		
91) d-Limonene	20.83	68	240	N.D.		
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.		
93) n-Undecane	22.26	57	355	No Calib	#	
94) 1,2,4-Trichlorobenzene	22.24	180	702	N.D.		
95) Naphthalene	22.35	128	1839	N.D.		
96) n-Dodecane	22.33	57	6894	No Calib	#	
97) Hexachlorobutadiene	0.00	225	0	N.D.		
98) Cyclohexanone	18.20	55	1444	No Calib	#	
99) tert-Butylbenzene	0.00	119	0	N.D.		
100) n-Butylbenzene	20.97	91	253	N.D.		
101) 1,1,1,2-Tetrachloroethane	0.00	131	0	N.D.		

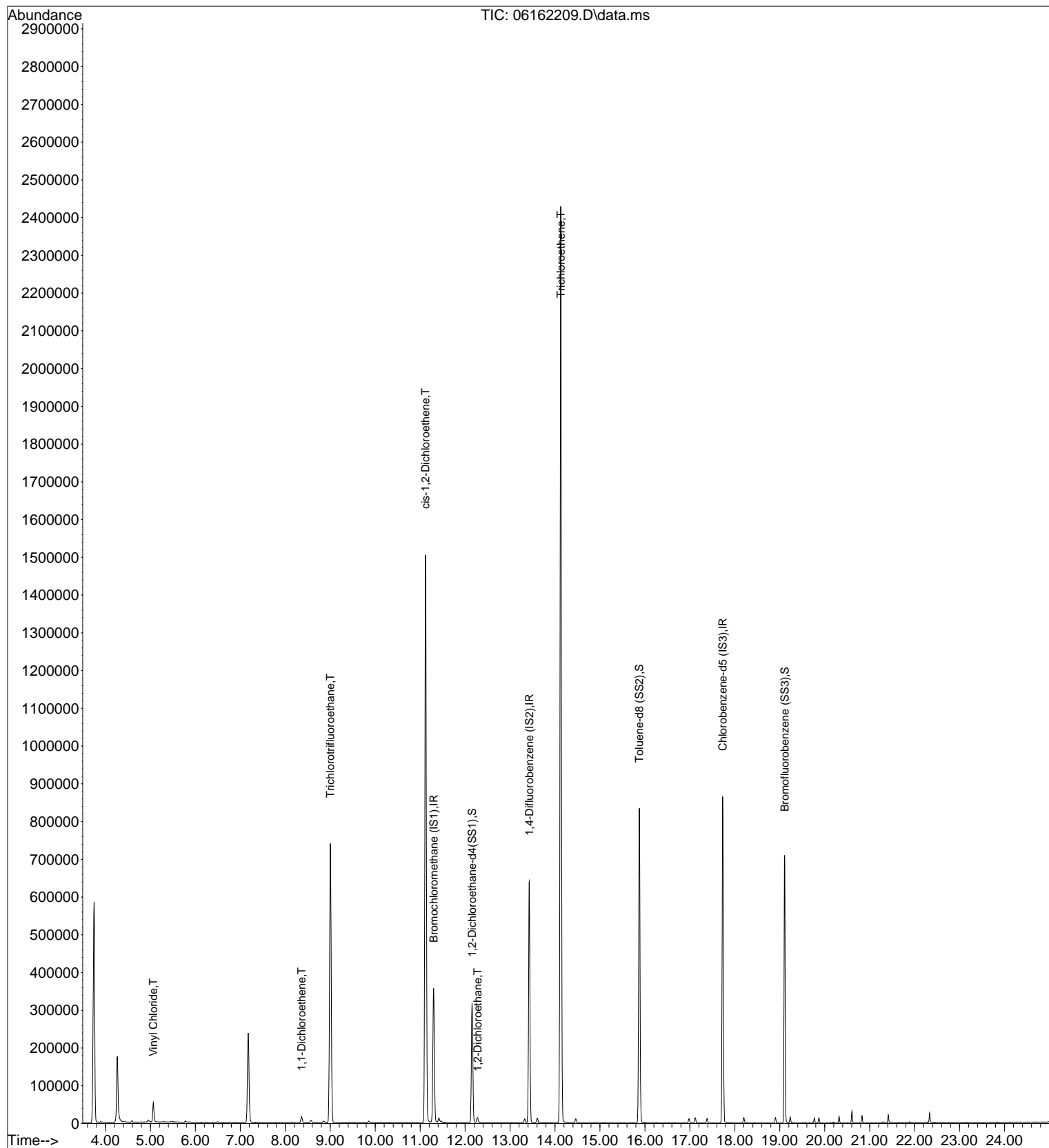
(#) = qualifier out of range (m) = manual integration (+) = signals summed



Data File : I:\MS16\DATA\2022\_06\16\06162209.D  
Acq On : 16 Jun 2022 8:20  
Sample : P2202599-001dil (4.0mL)  
Misc : S35-04032201

Vial: 1  
Operator: WA  
Inst : GCMS-16

Quant Time: Jun 17 11:18:37 2022  
Quant Method : I:\MS16\METHODS\R16051022.M  
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
QLast Update : Tue May 10 19:05:32 2022  
Response via : Initial Calibration  
DataAcq Meth:TO15.M



Data File: I:\MS16\DATA\2022\_06\16\06162209.D

Sample : P2202599-001dil (4.0mL)

Acq On : 16 Jun 2022 8:20

Misc : S35-04032201

ALS Vial : 1 Sample Multiplier: 1

Inst : GCMS-16

Operator: WA

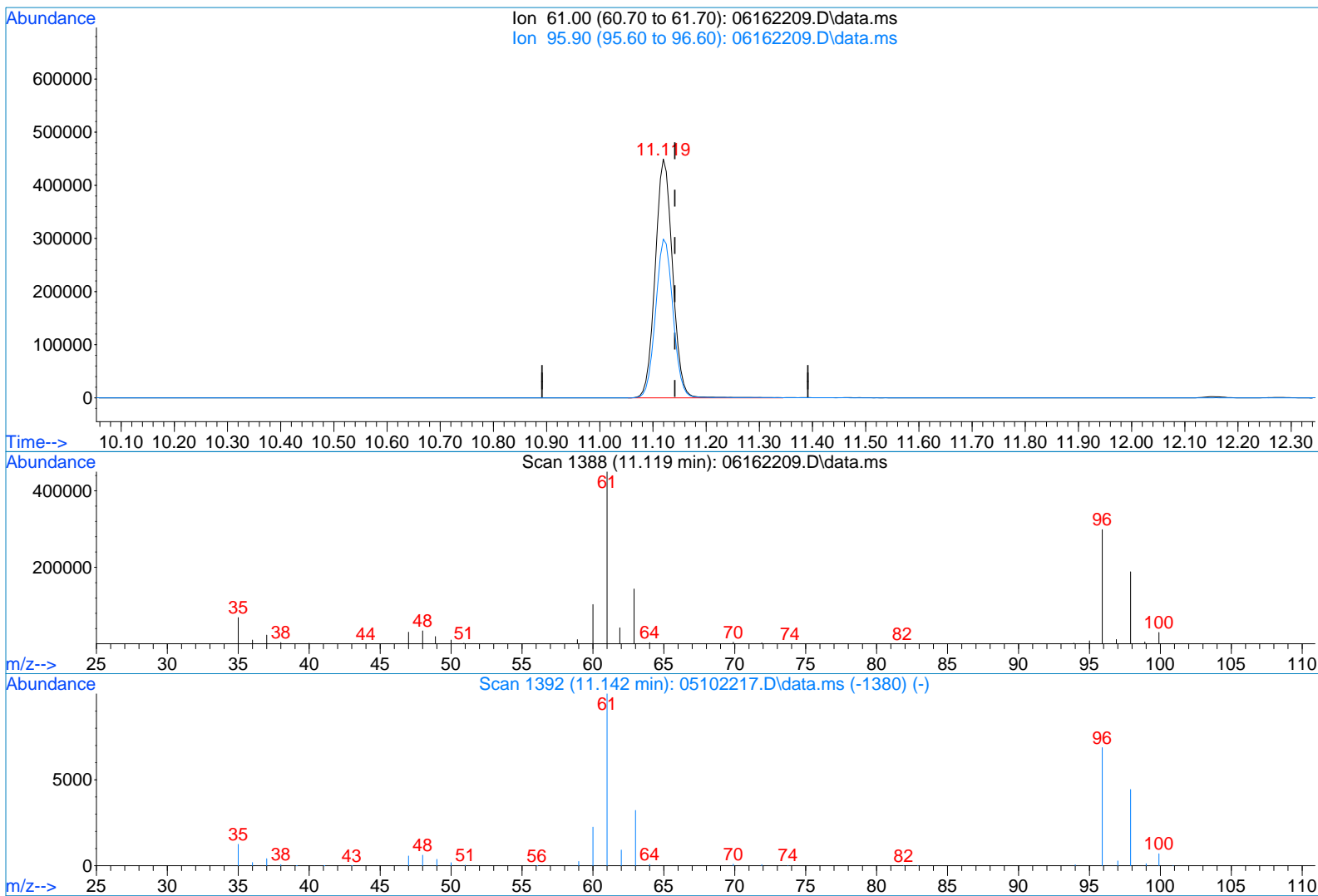
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

Quant Time: Jun 16 09:26:39 2022

Quant Method : I:\MS16\METHODS\R16051022.M

QLast Update : Tue May 10 19:05:32 2022

Response via : Initial Calibration



TIC: 06162209.D\data.ms

(28) cis-1,2-Dichloroethene (T)

11.119min (-0.022) 48.56ng

response 1017912

Ion	Exp%	Act%
61.00	100	100
95.90	69.30	66.75
0.00	0.00	0.00
0.00	0.00	0.00

Data File: I:\MS16\DATA\2022\_06\16\06162209.D

Sample : P2202599-001dil (4.0mL)

Acq On : 16 Jun 2022 8:20

Misc : S35-04032201

ALS Vial : 1 Sample Multiplier: 1

Inst : GCMS-16

Operator: WA

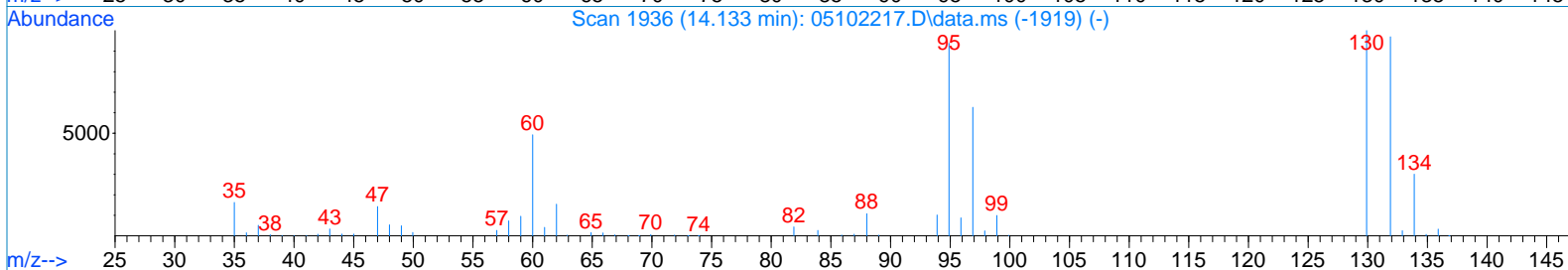
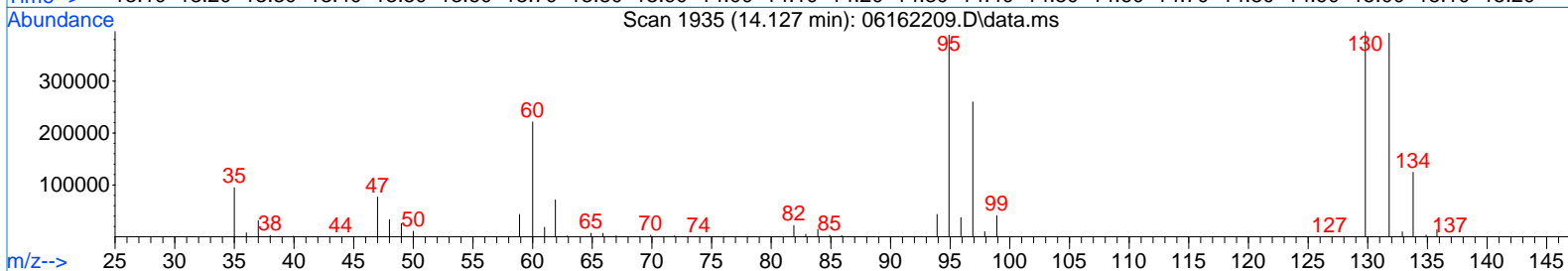
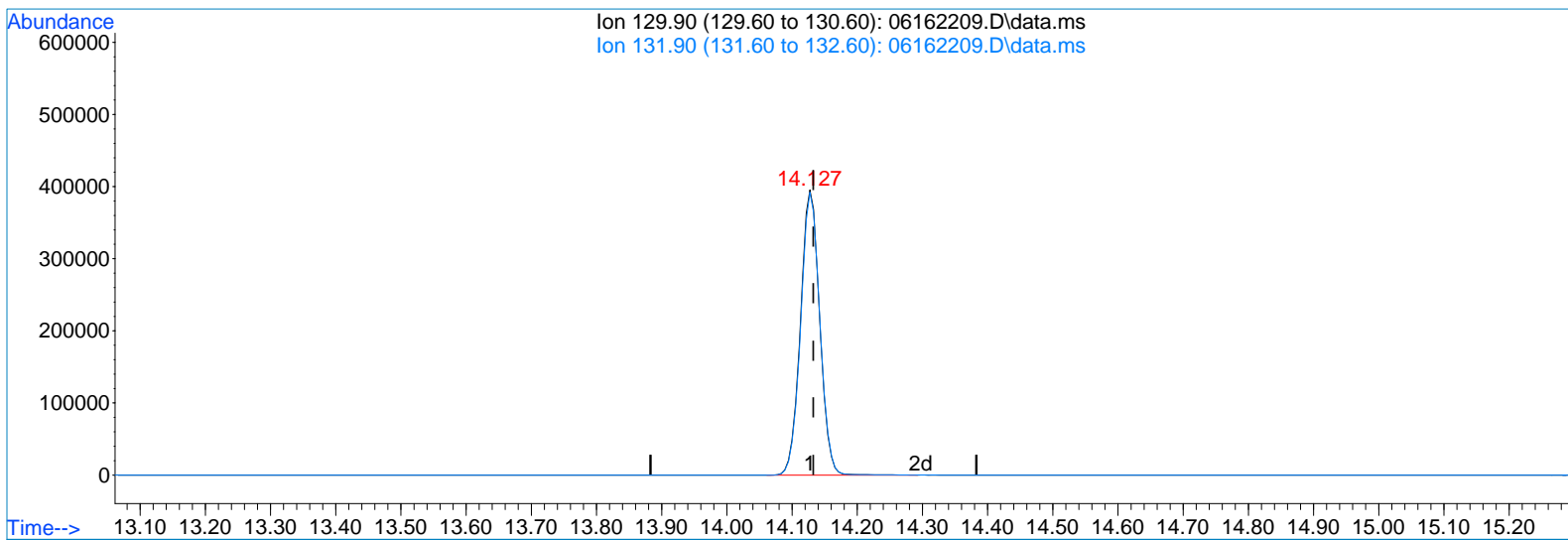
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

Quant Time: Jun 16 09:26:39 2022

Quant Method : I:\MS16\METHODS\R16051022.M

QLast Update : Tue May 10 19:05:32 2022

Response via : Initial Calibration



TIC: 06162209.D\data.ms

(47) Trichloroethene (T)

14.127min (-0.006) 54.01ng

response 809598

Ion	Exp%	Act%
-----	------	------

129.90	100	100
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131.90	97.60	98.67
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0.00	0.00	0.00
------	------	------

0.00	0.00	0.00
------	------	------

Data File : I:\MS16\DATA\2022\_06\16\06162210.D  
 Acq On : 16 Jun 2022 8:54  
 Sample : P2202599-002 (10mL)  
 Misc : S35-04032201

Vial: 1  
 Operator: WA  
 Inst : GCMS-16

Quant Time: Jun 17 11:25:52 2022

Quant Method : I:\MS16\METHODS\R16051022.M

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 19:05:32 2022

Response via : Initial Calibration

DataAcq Meth:TO15.M

6/19/22

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.30	130	125535	12.500	ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.43	114	549825	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	17.73	54	135254	12.500	ng	0.00

#### System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...)	12.16	65	231753	12.943	ng	-0.01
Spiked Amount	12.500	Range 70 - 130	Recovery	=	103.52%	
57) Toluene-d8 (SS2)	15.88	98	583864	11.404	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	91.20%	
73) Bromofluorobenzene (SS3)	19.11	174	195598	10.481	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	83.84%	

#### Target Compounds

						Qvalue
2) Propene	4.21	42	1390	N.D.		
3) Dichlorodifluoromethan...	4.36	85	1002	N.D.		
4) Chloromethane	4.64	50	522	N.D.		
5) 1,2-Dichloro-1,1,2,2-t...	0.00	135	0	N.D.		
6) Vinyl Chloride	5.06	62	83927	3.832	ng	100
7) 1,3-Butadiene	0.00	54	0	N.D.		
8) Bromomethane	0.00	94	0	N.D.		
9) Chloroethane	0.00	64	0	N.D.		
10) Ethanol	6.48	45	9437	0.627	ng	98
11) Acetonitrile	6.76	41	936	N.D.		
12) Acrolein	6.98	56	224	N.D.		
13) Acetone	7.19	58	11754	0.996	ng	# 68
14) Trichlorofluoromethane	7.40	101	1918	N.D.		
15) 2-Propanol (Isopropanol)	7.67	45	17098	N.D.		
16) Acrylonitrile	8.14	53	1523	N.D.		
17) 1,1-Dichloroethene	8.36	96	10091	0.778	ng	89
18) 2-Methyl-2-Propanol (t...	8.36	59	628	N.D.		
19) Methylene Chloride	8.57	84	4095	N.D.		
20) 3-Chloro-1-propene (Al...	0.00	41	0	N.D.		
21) Trichlorotrifluoroethane	9.00	151	434606	36.855	ng	93
22) Carbon Disulfide	8.86	76	2637	N.D.		
23) trans-1,2-Dichloroethene	9.85	61	3884	N.D.		
24) 1,1-Dichloroethane	10.11	63	3993	N.D.		
25) Methyl tert-Butyl Ether	0.00	73	0	N.D.		
26) Vinyl Acetate	0.00	86	0	N.D.		
27) 2-Butanone (MEK)	10.66	72	581	N.D.		
28) cis-1,2-Dichloroethene	11.12	61	1567782	77.050	ng	97
29) Diisopropyl Ether	11.48	87	159	N.D.		
30) Ethyl Acetate	0.00	61	0	N.D.		
31) n-Hexane	11.42	57	8341	N.D.		
32) Chloroform	11.47	83	3866	N.D.		
34) Tetrahydrofuran (THF)	11.93	72	755	N.D.		
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.		
36) 1,2-Dichloroethane	12.27	62	18583	0.927	ng	97
38) 1,1,1-Trichloroethane	0.00	97	0	N.D.		
39) Isopropyl Acetate	0.00	61	0	N.D.		
40) 1-Butanol	0.00	56	0	N.D.		
41) Benzene	13.04	78	2054	N.D.		
42) Carbon Tetrachloride	13.19	117	681	N.D.		
43) Cyclohexane	13.33	84	1306	N.D.		
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.		
45) 1,2-Dichloropropane	0.00	63	0	N.D.		
46) Bromodichloromethane	0.00	83	0	N.D.	d	
47) Trichloroethene	14.13	130	1287654	88.041	ng	99
48) 1,4-Dioxane	0.00	88	0	N.D.		
49) 2,2,4-Trimethylpentane...	14.20	57	1075	N.D.		
50) Methyl Methacrylate	0.00	100	0	N.D.	d	

Data File : I:\MS16\DATA\2022\_06\16\06162210.D  
 Acq On : 16 Jun 2022 8:54  
 Sample : P2202599-002 (10mL)  
 Misc : S35-04032201

Vial: 1  
 Operator: WA  
 Inst : GCMS-16

Quant Time: Jun 17 11:25:52 2022

Quant Method : I:\MS16\METHODS\R16051022.M

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 19:05:32 2022

Response via : Initial Calibration

DataAcq Meth:TO15.M

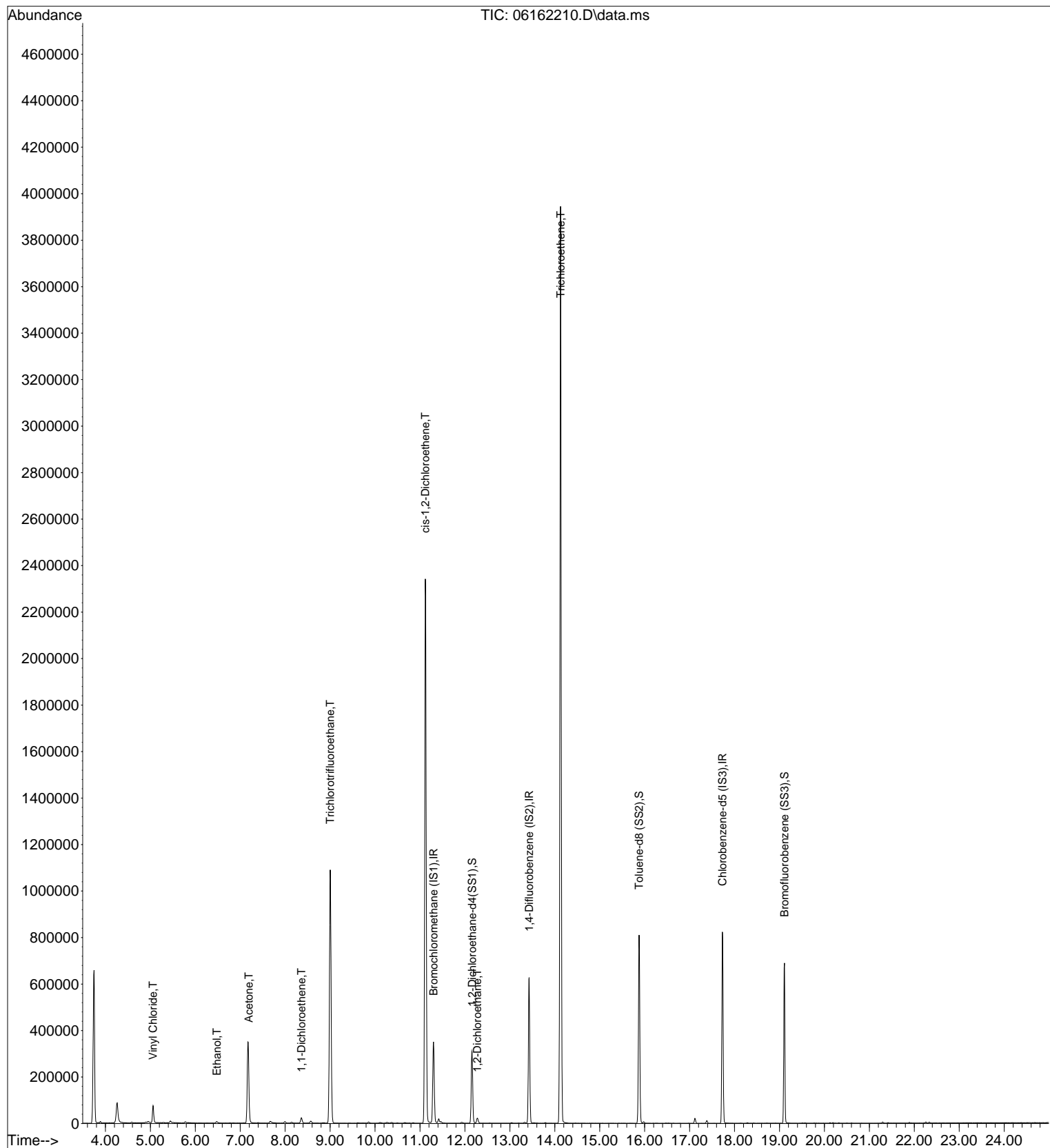
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	0.00	71	0	N.D.		
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.		
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.		
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.		
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.		
58) Toluene	15.98	91	5069	N.D.		
59) 2-Hexanone	16.26	43	862	N.D.		
60) Dibromochloromethane	0.00	129	0	N.D.		
61) 1,2-Dibromoethane	0.00	107	0	N.D.		
62) n-Butyl Acetate	16.99	43	384	N.D.		
63) n-Octane	0.00	57	0	N.D.		
64) Tetrachloroethene	17.12	166	6629	N.D.		
65) Chlorobenzene	0.00	112	0	N.D.		
66) Ethylbenzene	18.12	91	794	N.D.		
67) m- & p-Xylenes	18.28	91	2084	N.D.		
68) Bromoform	0.00	173	0	N.D.		
69) Styrene	0.00	104	0	N.D.		
70) o-Xylene	18.71	91	877	N.D.		
71) n-Nonane	18.91	43	472	N.D.		
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.		
74) Cumene	19.24	105	140	N.D.		
75) alpha-Pinene	19.58	93	111	N.D.		
76) n-Propylbenzene	19.68	91	176	N.D.		
77) 3-Ethyltoluene	19.81	105	336	No Calib	#	
78) 4-Ethyltoluene	19.81	105	336	N.D.		
79) 1,3,5-Trimethylbenzene	19.87	105	394	N.D.		
80) alpha-Methylstyrene	0.00	118	0	N.D.		
81) 2-Ethyltoluene	19.87	105	394	No Calib	#	
82) 1,2,4-Trimethylbenzene	20.24	105	669	N.D.		
83) n-Decane	0.00	58	0	N.D.		
84) Benzyl Chloride	0.00	91	0	N.D.		
85) 1,3-Dichlorobenzene	20.43	146	139	N.D.		
86) 1,4-Dichlorobenzene	20.43	146	139	N.D.		
87) sec-Butylbenzene	20.61	105	542	N.D.		
88) 4-Isopropyltoluene (p-...	20.61	119	610	N.D.		
89) 1,2,3-Trimethylbenzene	20.61	105	542	No Calib	#	
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.		
91) d-Limonene	0.00	68	0	N.D.		
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.		
93) n-Undecane	22.26	57	644	No Calib	#	
94) 1,2,4-Trichlorobenzene	22.24	180	321	N.D.		
95) Naphthalene	22.35	128	1018	N.D.		
96) n-Dodecane	22.33	57	933	No Calib	#	
97) Hexachlorobutadiene	0.00	225	0	N.D.		
98) Cyclohexanone	18.43	55	483	No Calib	#	
99) tert-Butylbenzene	0.00	119	0	N.D.		
100) n-Butylbenzene	0.00	91	0	N.D.		
101) 1,1,1,2-Tetrachloroethane	0.00	131	0	N.D.		

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Data File : I:\MS16\DATA\2022\_06\16\06162210.D  
Acq On : 16 Jun 2022 8:54  
Sample : P2202599-002 (10mL)  
Misc : S35-04032201

Vial: 1  
Operator: WA  
Inst : GCMS-16

Quant Time: Jun 17 11:25:52 2022  
Quant Method : I:\MS16\METHODS\R16051022.M  
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
QLast Update : Tue May 10 19:05:32 2022  
Response via : Initial Calibration  
DataAcq Meth:TO15.M



Data File : I:\MS16\DATA\2022\_06\16\06162210.D  
 Acq On : 16 Jun 2022 8:54  
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 Inst : GCMS-16

 6/19/22

Quant Time: Jun 17 11:25:52 2022  
 Quant Method : I:\MS16\METHODS\R16051022.M  
 Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
 QLast Update : Tue May 10 19:05:32 2022  
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 DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.30	130	125535	12.500	ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.43	114	549825	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	17.73	54	135254	12.500	ng	0.00

## System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...)	12.16	65	231753	12.943	ng	-0.01
Spiked Amount	12.500	Range 70 - 130	Recovery	=	103.52%	
57) Toluene-d8 (SS2)	15.88	98	583864	11.404	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	91.20%	
73) Bromofluorobenzene (SS3)	19.11	174	195598	10.481	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	83.84%	

## Target Compounds

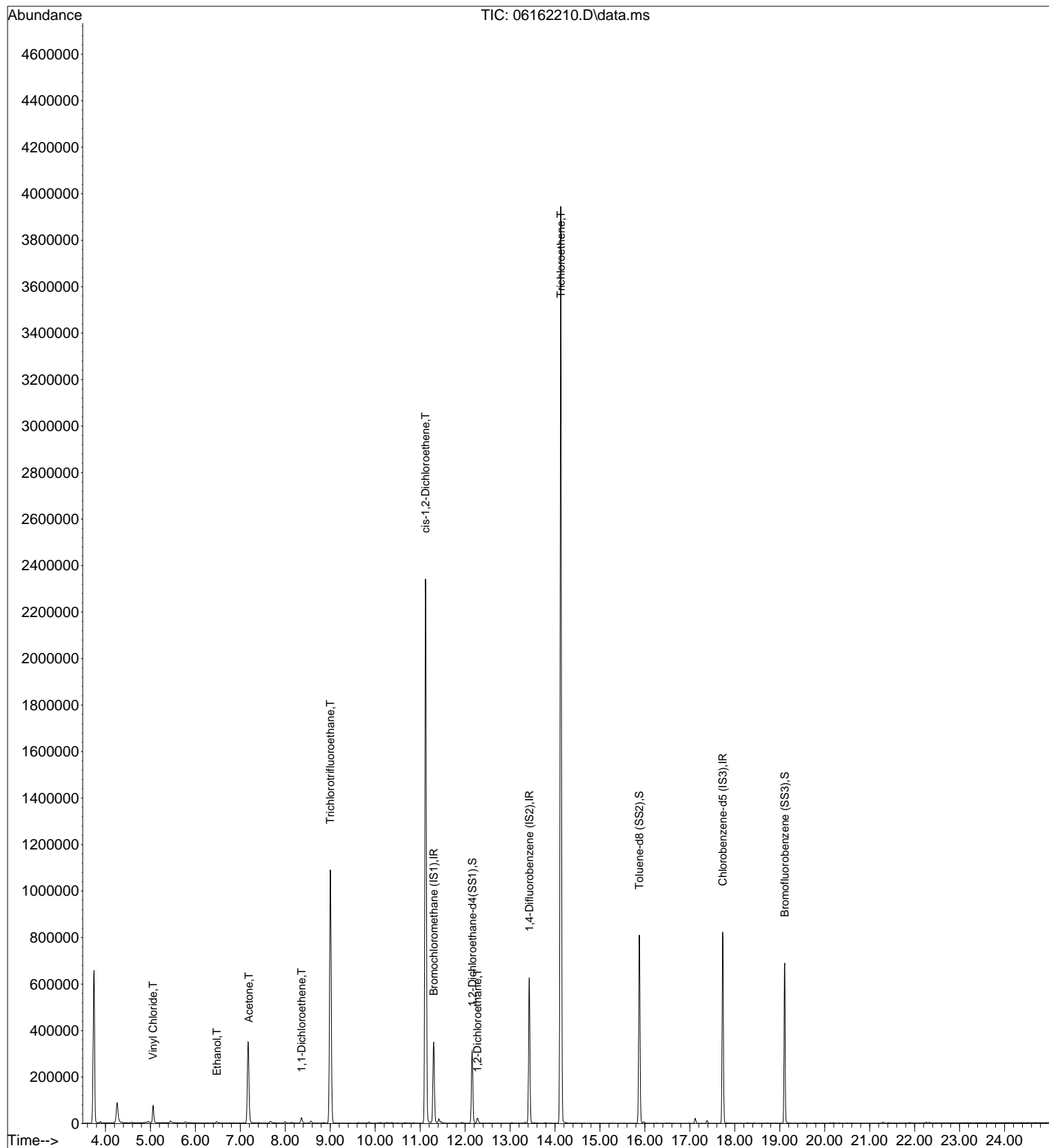
						Qvalue
6) Vinyl Chloride	5.06	62	83927	3.832	ng	100
10) Ethanol	6.48	45	9437	0.627	ng	98
13) Acetone	7.19	58	11754	0.996	ng	# 68
17) 1,1-Dichloroethene	8.36	96	10091	0.778	ng	89
21) Trichlorotrifluoroethane	9.00	151	434606	36.855	ng	93
28) cis-1,2-Dichloroethene	11.12	61	1567782	77.050	ng	97
36) 1,2-Dichloroethane	12.27	62	18583	0.927	ng	97
47) Trichloroethene	14.13	130	1287654	88.041	ng	99

(#) = qualifier out of range (m) = manual integration (+) = signals summed

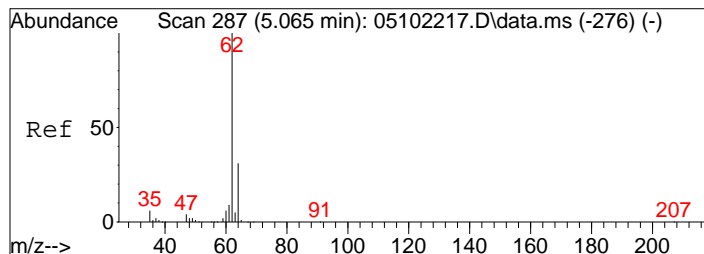
Data File : I:\MS16\DATA\2022\_06\16\06162210.D  
Acq On : 16 Jun 2022 8:54  
Sample : P2202599-002 (10mL)  
Misc : S35-04032201

Vial: 1  
Operator: WA  
Inst : GCMS-16

Quant Time: Jun 17 11:25:52 2022  
Quant Method : I:\MS16\METHODS\R16051022.M  
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
QLast Update : Tue May 10 19:05:32 2022  
Response via : Initial Calibration  
DataAcq Meth:TO15.M

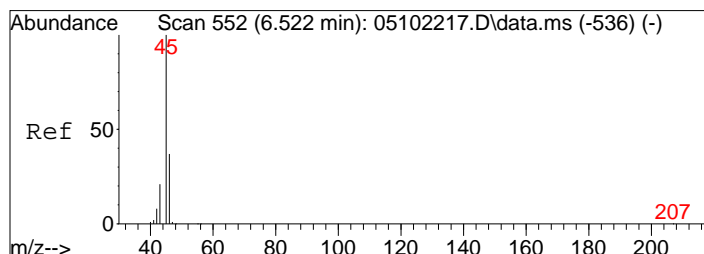
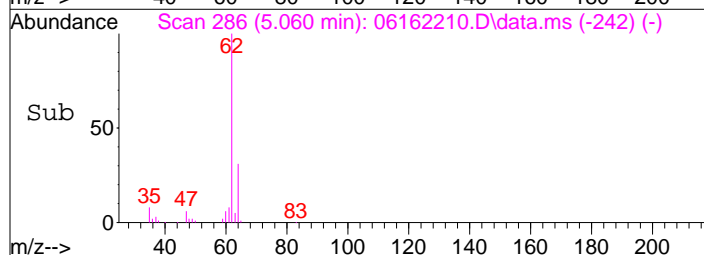
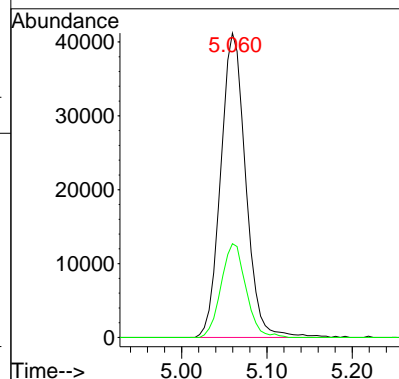
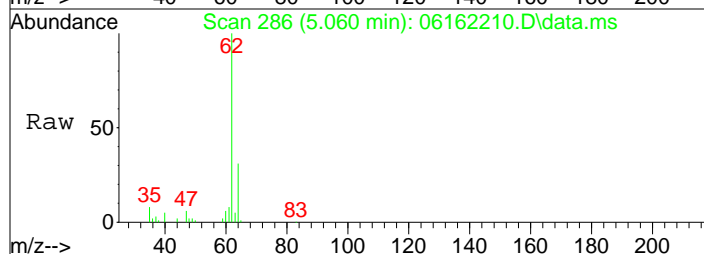






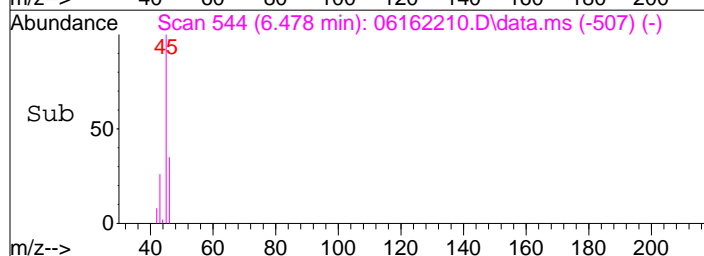
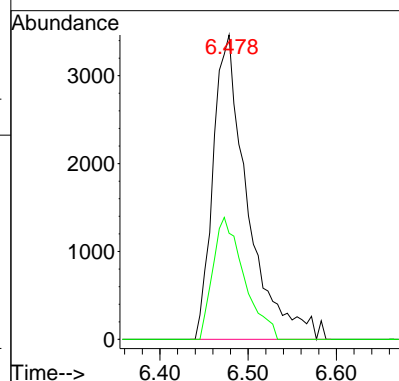
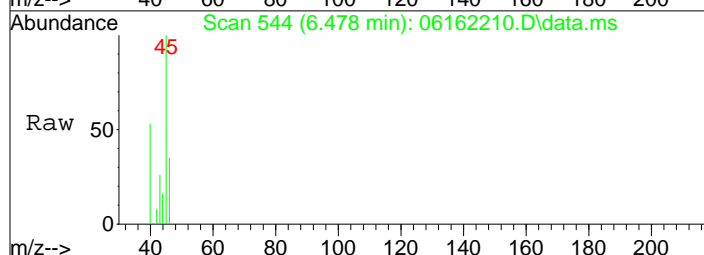
#6  
Vinyl Chloride  
Concen: 3.83 ng  
RT: 5.06 min Scan# 286  
Delta R.T. -0.005 min  
Lab File: 06162210.D  
Acq: 16 Jun 2022 8:54

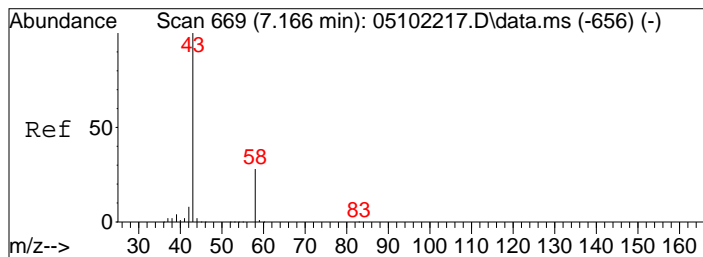
Tgt Ion: 62 Resp: 83927  
Ion Ratio Lower Upper  
62 100  
64 30.7 10.7 50.7



#10  
Ethanol  
Concen: 0.63 ng  
RT: 6.48 min Scan# 544  
Delta R.T. -0.044 min  
Lab File: 06162210.D  
Acq: 16 Jun 2022 8:54

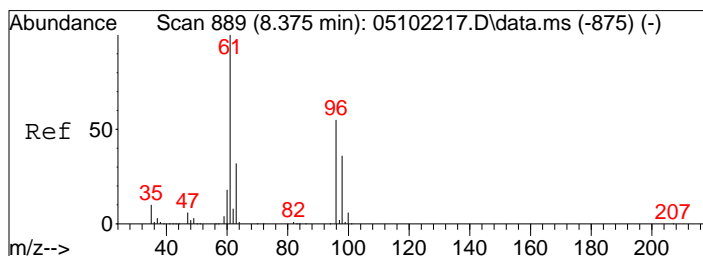
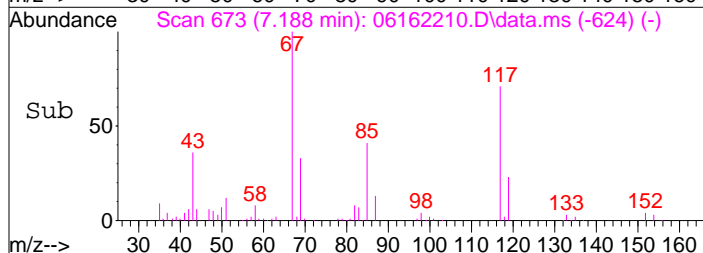
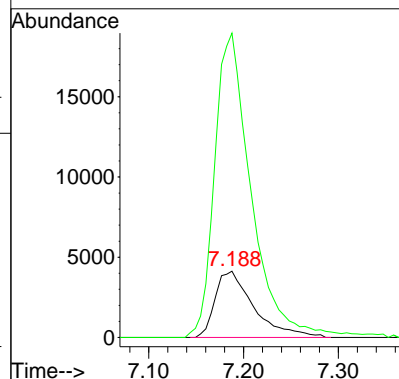
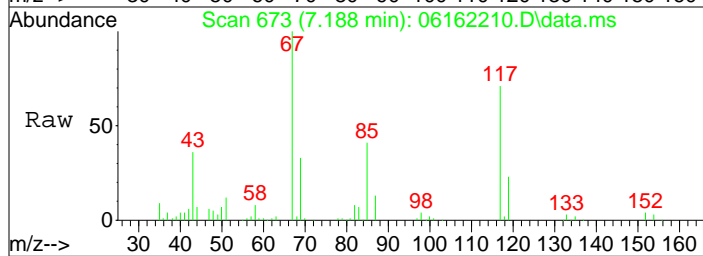
Tgt Ion: 45 Resp: 9437  
Ion Ratio Lower Upper  
45 100  
46 36.2 17.2 57.2





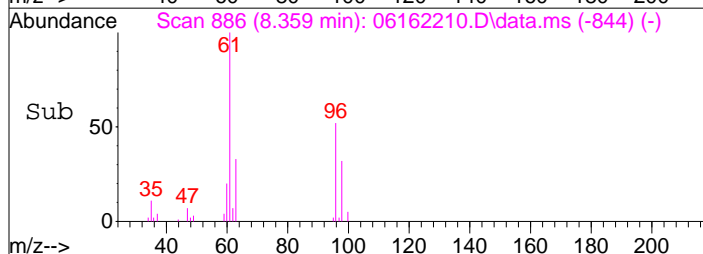
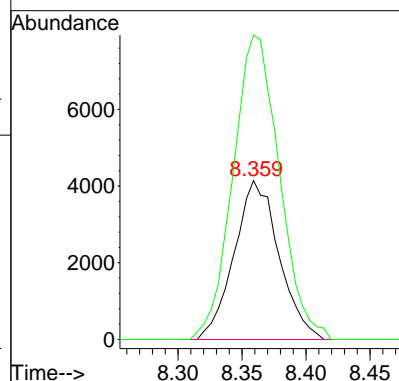
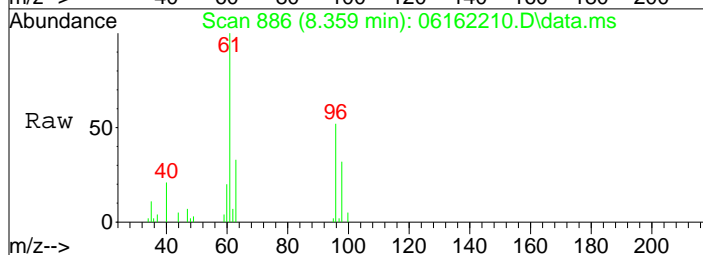
#13  
Acetone  
Concen: 1.00 ng  
RT: 7.19 min Scan# 673  
Delta R.T. 0.022 min  
Lab File: 06162210.D  
Acq: 16 Jun 2022 8:54

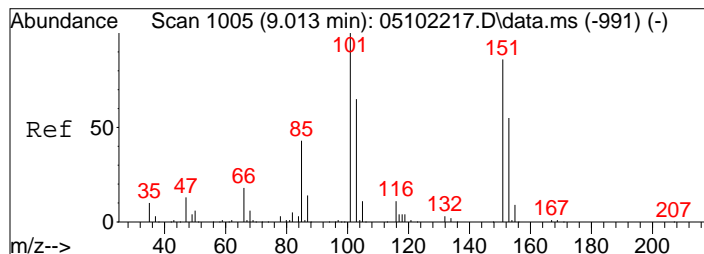
Tgt Ion	58	Resp	11754
Ion Ratio	Lower	Upper	
58	100		
43	436.2	334.7	394.7#



#17  
1,1-Dichloroethene  
Concen: 0.78 ng  
RT: 8.36 min Scan# 886  
Delta R.T. -0.016 min  
Lab File: 06162210.D  
Acq: 16 Jun 2022 8:54

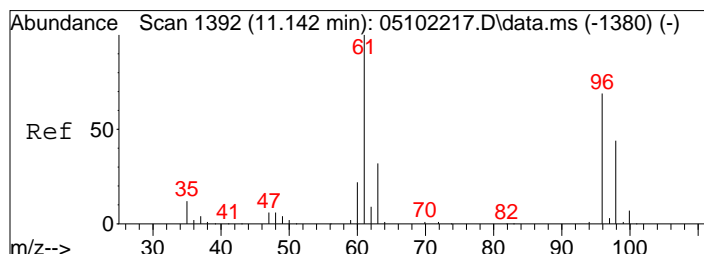
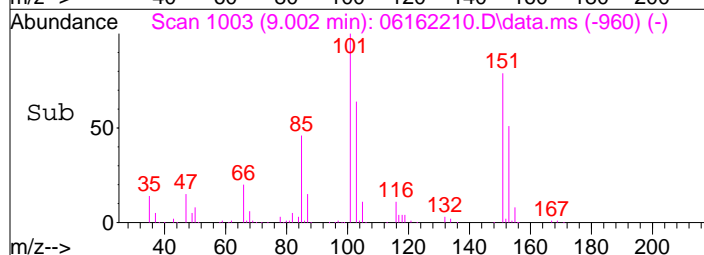
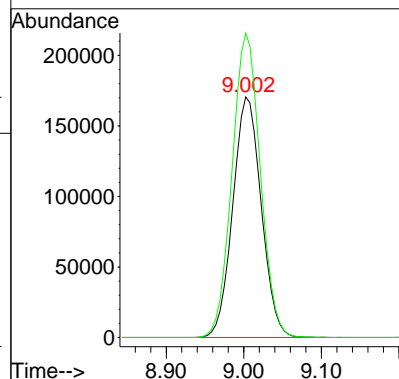
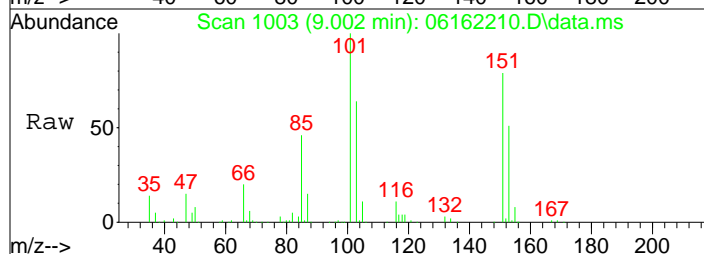
Tgt Ion	96	Resp	10091
Ion Ratio	Lower	Upper	
96	100		
61	198.3	162.3	202.3





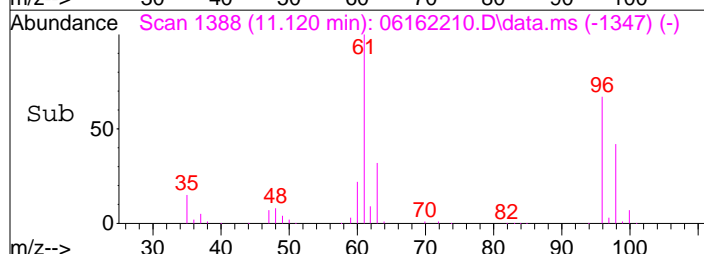
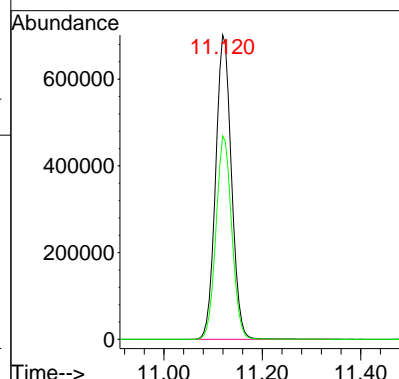
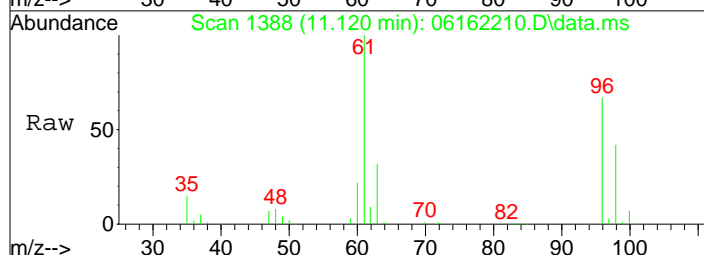
#21  
Trichlorotrifluoroethane  
Concen: 36.86 ng  
RT: 9.00 min Scan# 1003  
Delta R.T. -0.011 min  
Lab File: 06162210.D  
Acq: 16 Jun 2022 8:54

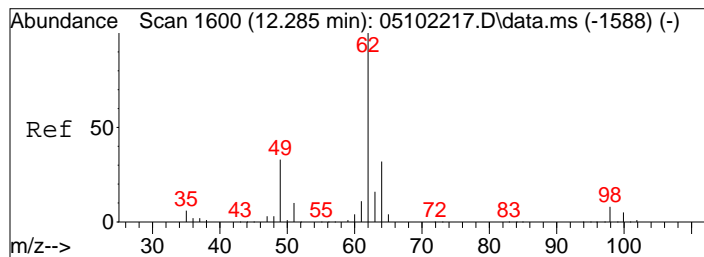
Tgt Ion: 151 Resp: 434606  
Ion Ratio Lower Upper  
151 100  
101 125.9 98.2 138.2



#28  
cis-1,2-Dichloroethene  
Concen: 77.05 ng  
RT: 11.12 min Scan# 1388  
Delta R.T. -0.022 min  
Lab File: 06162210.D  
Acq: 16 Jun 2022 8:54

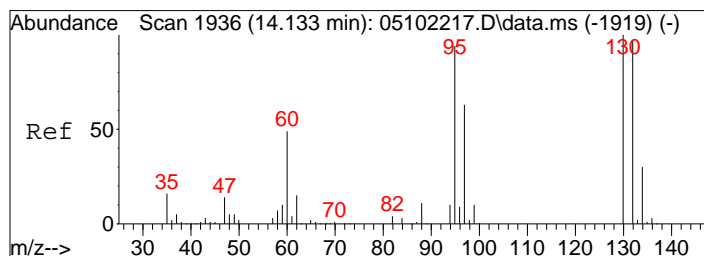
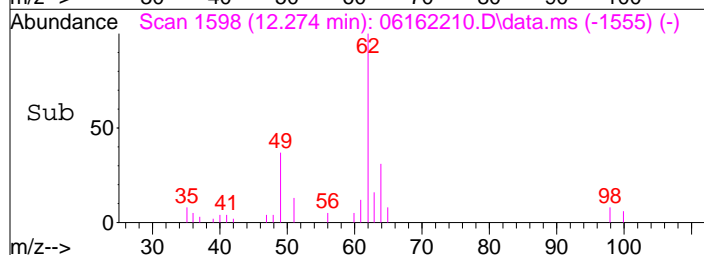
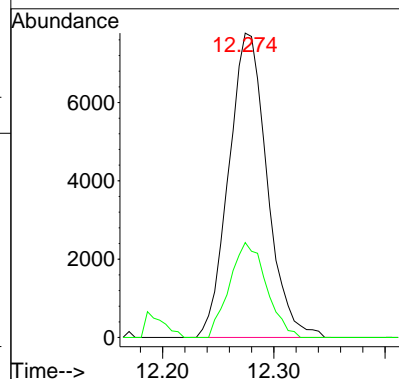
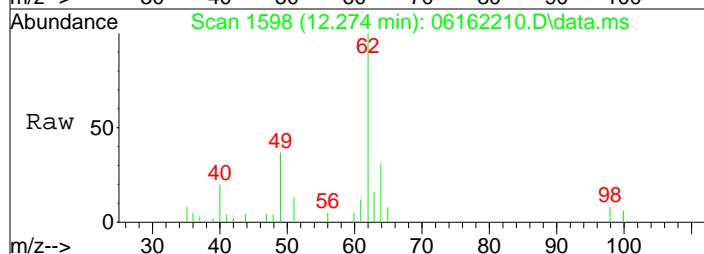
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Ion Ratio Lower Upper  
61 100  
96 66.6 49.3 89.3





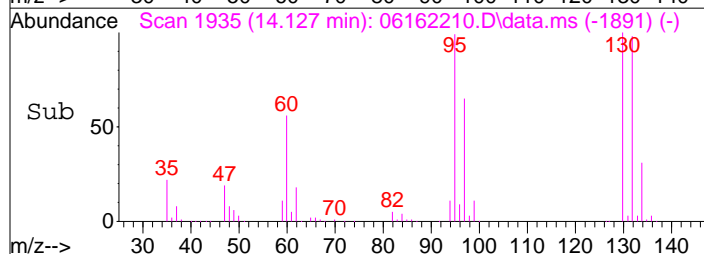
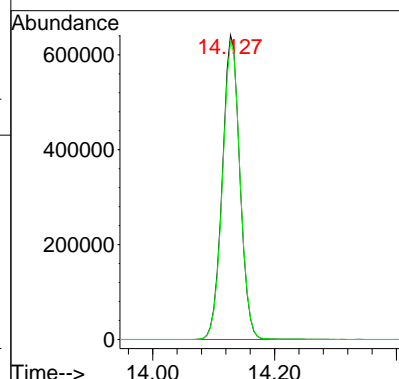
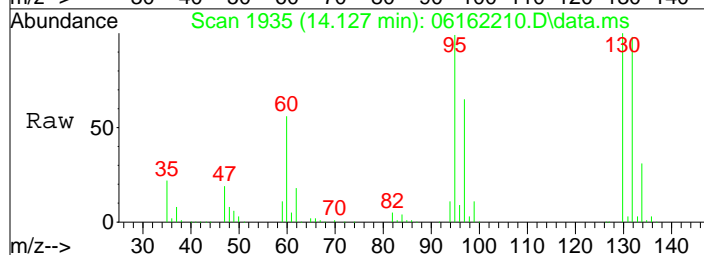
#36  
1,2-Dichloroethane  
Concen: 0.93 ng  
RT: 12.27 min Scan# 1598  
Delta R.T. -0.011 min  
Lab File: 06162210.D  
Acq: 16 Jun 2022 8:54

Tgt Ion:	62	Resp:	18583
Ion Ratio	Lower	Upper	
62	100		
64	30.0	11.5	51.5



#47  
Trichloroethene  
Concen: 88.04 ng  
RT: 14.13 min Scan# 1935  
Delta R.T. -0.005 min  
Lab File: 06162210.D  
Acq: 16 Jun 2022 8:54

Tgt Ion:	130	Resp:	1287654
Ion Ratio	Lower	Upper	
130	100		
132	98.4	77.6	117.6



Data File : I:\MS16\DATA\2022\_06\16\06162211.D  
 Acq On : 16 Jun 2022 9:28  
 Sample : P2202599-003 (1000mL)  
 Misc : S35-04032201

Vial: 3  
 Operator: WA  
 Inst : GCMS-16

Quant Time: Jun 16 10:30:41 2022

Quant Method : I:\MS16\METHODS\R16051022.M

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 19:05:32 2022

Response via : Initial Calibration

WA 6/19/22

DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.30	130	119532	12.500	ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.43	114	532873	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	17.73	54	134687	12.500	ng	0.00

#### System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...)	12.16	65	222009	13.021	ng	-0.01
Spiked Amount	12.500	Range 70 - 130	Recovery	=	104.16%	
57) Toluene-d8 (SS2)	15.88	98	572930	11.238	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	89.92%	
73) Bromofluorobenzene (SS3)	19.11	174	193215	10.397	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	83.20%	

#### Target Compounds

						Qvalue
2) Propene	4.18	42	203446	8.735	ng	94
3) Dichlorodifluoromethan...	4.36	85	46752	1.742	ng	99
4) Chloromethane	4.64	50	6315	N.D.		
5) 1,2-Dichloro-1,1,2,2-t...	4.92	135	1018	N.D.		
6) Vinyl Chloride	5.07	62	5439	N.D.		
7) 1,3-Butadiene	0.00	54	0	N.D.		
8) Bromomethane	5.78	94	791	N.D.		
9) Chloroethane	0.00	64	0	N.D.		
10) Ethanol	6.48	45	144441	10.071	ng	100
11) Acetonitrile	6.75	41	8677	N.D.		
12) Acrolein	6.94	56	2945	N.D.		
13) Acetone	7.15	58	153375	13.653	ng	# 65
14) Trichlorofluoromethane	7.40	101	44628	1.886	ng	100
15) 2-Propanol (Isopropanol)	7.65	45	742714	18.260	ng	97
16) Acrylonitrile	7.92	53	370	N.D.		
17) 1,1-Dichloroethene	8.36	96	489	N.D.		
18) 2-Methyl-2-Propanol (t...	8.59	59	1485	N.D.		
19) Methylene Chloride	8.58	84	2236	N.D.		
20) 3-Chloro-1-propene (Al...	8.67	41	1154	N.D.		
21) Trichlorotrifluoroethane	9.01	151	33795	3.010	ng	94
22) Carbon Disulfide	8.85	76	13371	N.D.		
23) trans-1,2-Dichloroethene	9.85	61	411	N.D.		
24) 1,1-Dichloroethane	0.00	63	0	N.D.		
25) Methyl tert-Butyl Ether	10.26	73	253	N.D.		
26) Vinyl Acetate	10.34	86	3313	1.620	ng	# 6
27) 2-Butanone (MEK)	10.63	72	12410	1.432	ng	# 63
28) cis-1,2-Dichloroethene	11.13	61	71240	3.677	ng	97
29) Diisopropyl Ether	11.42	87	1443	N.D.		
30) Ethyl Acetate	11.44	61	15744	2.751	ng	96
31) n-Hexane	11.42	57	146691	5.507	ng	100
32) Chloroform	11.48	83	1315	N.D.		
34) Tetrahydrofuran (THF)	11.89	72	12667	1.537	ng	# 76
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.		
36) 1,2-Dichloroethane	12.28	62	2029	N.D.		
38) 1,1,1-Trichloroethane	0.00	97	0	N.D.		
39) Isopropyl Acetate	0.00	61	0	N.D.		
40) 1-Butanol	13.01	56	10635	No Calib	#	
41) Benzene	13.03	78	21446	N.D.		
42) Carbon Tetrachloride	13.19	117	4753	N.D.		
43) Cyclohexane	13.32	84	10250	0.521	ng	94
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.		
45) 1,2-Dichloropropane	0.00	63	0	N.D.		
46) Bromodichloromethane	14.13	83	952	N.D.		
47) Trichloroethene	14.13	130	62023	4.376	ng	99
48) 1,4-Dioxane	14.14	88	196	N.D.		
49) 2,2,4-Trimethylpentane...	14.20	57	16598	N.D.		
50) Methyl Methacrylate	14.34	100	4324	0.817	ng	97

Data File : I:\MS16\DATA\2022\_06\16\06162211.D  
 Acq On : 16 Jun 2022 9:28  
 Sample : P2202599-003 (1000mL)  
 Misc : S35-04032201

Vial: 3  
 Operator: WA  
 Inst : GCMS-16

Quant Time: Jun 16 10:30:41 2022

Quant Method : I:\MS16\METHODS\R16051022.M

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 19:05:32 2022

Response via : Initial Calibration

DataAcq Meth:TO15.M

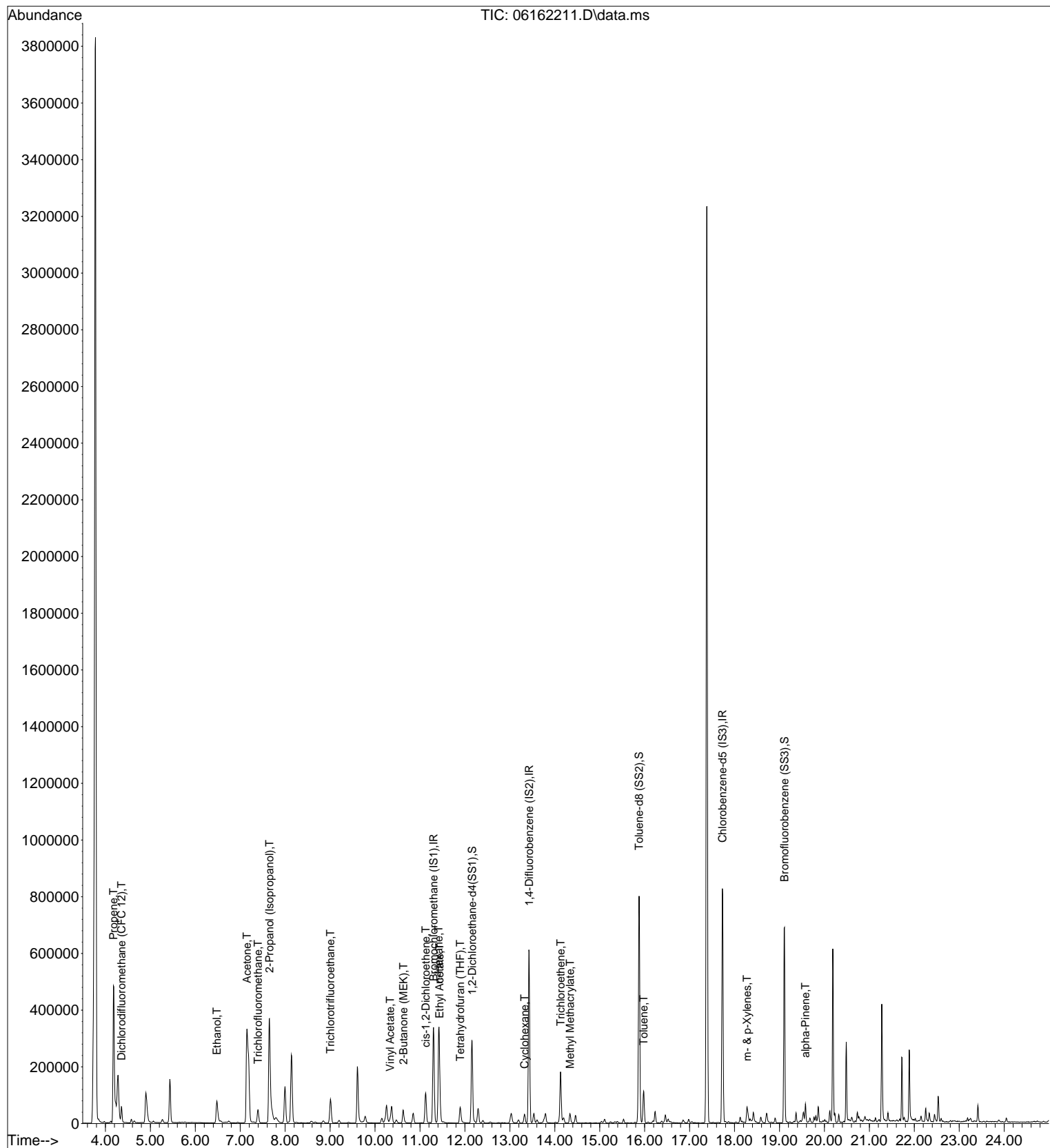
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.46	71	5314	N.D.		
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.		
53) 4-Methyl-2-pentanone	15.04	58	1249	N.D.		
54) trans-1,3-Dichloropropene	15.53	75	565	N.D.		
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.		
58) Toluene	15.98	91	86549	1.452 ng		99
59) 2-Hexanone	16.23	43	5335	N.D.		
60) Dibromochloromethane	0.00	129	0	N.D.		
61) 1,2-Dibromoethane	0.00	107	0	N.D.		
62) n-Butyl Acetate	16.86	43	10430	N.D.		
63) n-Octane	16.98	57	2501	N.D.		
64) Tetrachloroethene	17.12	166	504	N.D.		
65) Chlorobenzene	17.79	112	108	N.D.		
66) Ethylbenzene	18.13	91	15087	N.D.		
67) m- & p-Xylenes	18.28	91	42437	0.782 ng		99
68) Bromoform	0.00	173	0	N.D.		
69) Styrene	18.61	104	2134	N.D.		
70) o-Xylene	18.71	91	15328	N.D.		
71) n-Nonane	18.90	43	7461	N.D.		
72) 1,1,2,2-Tetrachloroethane	18.74	83	556	N.D.		
74) Cumene	19.24	105	1719	N.D.		
75) alpha-Pinene	19.58	93	23259	0.695 ng		99
76) n-Propylbenzene	19.68	91	4147	N.D.		
77) 3-Ethyltoluene	19.81	105	4814	No Calib		
78) 4-Ethyltoluene	19.81	105	4814	N.D.		
79) 1,3,5-Trimethylbenzene	19.87	105	3879	N.D.		
80) alpha-Methylstyrene	20.01	118	2937	No Calib	#	
81) 2-Ethyltoluene	19.87	105	3879	No Calib		
82) 1,2,4-Trimethylbenzene	20.23	105	13908	N.D.		
83) n-Decane	20.23	58	477	No Calib	#	
84) Benzyl Chloride	20.34	91	361	N.D.		
85) 1,3-Dichlorobenzene	20.37	146	108	N.D.		
86) 1,4-Dichlorobenzene	20.43	146	1078	N.D.		
87) sec-Butylbenzene	20.47	105	610	N.D.		
88) 4-Isopropyltoluene (p-...	20.61	119	4237	N.D.		
89) 1,2,3-Trimethylbenzene	20.61	105	3854	No Calib	#	
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.		
91) d-Limonene	20.73	68	7397	N.D.		
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.		
93) n-Undecane	22.26	57	6314	No Calib	#	
94) 1,2,4-Trichlorobenzene	22.24	180	433	N.D.		
95) Naphthalene	22.35	128	4265	N.D.		
96) n-Dodecane	22.33	57	6865	No Calib	#	
97) Hexachlorobutadiene	22.53	225	275	N.D.		
98) Cyclohexanone	18.32	55	1185	No Calib	#	
99) tert-Butylbenzene	20.24	119	1648	N.D.		
100) n-Butylbenzene	20.97	91	2604	N.D.		
101) 1,1,1,2-Tetrachloroethane	0.00	131	0	N.D.		

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Data File : I:\MS16\DATA\2022\_06\16\06162211.D  
Acq On : 16 Jun 2022 9:28  
Sample : P2202599-003 (1000mL)  
Misc : S35-04032201

Vial: 3  
Operator: WA  
Inst : GCMS-16

Quant Time: Jun 16 10:30:41 2022  
Quant Method : I:\MS16\METHODS\R16051022.M  
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
QLast Update : Tue May 10 19:05:32 2022  
Response via : Initial Calibration  
DataAcq Meth:TO15.M



Data File : I:\MS16\DATA\2022\_06\16\06162211.D  
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DataAcq Meth:TO15.M

107 6/19/22

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.30	130	119532	12.500	ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.43	114	532873	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	17.73	54	134687	12.500	ng	0.00

#### System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...)	12.16	65	222009	13.021	ng	-0.01
Spiked Amount	12.500	Range 70 - 130	Recovery	=	104.16%	
57) Toluene-d8 (SS2)	15.88	98	572930	11.238	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	89.92%	
73) Bromofluorobenzene (SS3)	19.11	174	193215	10.397	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	83.20%	

#### Target Compounds

						Qvalue
2) Propene	4.18	42	203446	8.735	ng	94
3) Dichlorodifluoromethan...	4.36	85	46752	1.742	ng	99
10) Ethanol	6.48	45	144441	10.071	ng	100
13) Acetone	7.15	58	153375	13.653	ng	# 65
14) Trichlorofluoromethane	7.40	101	44628	1.886	ng	100
15) 2-Propanol (Isopropanol)	7.65	45	742714	18.260	ng	97
21) Trichlorotrifluoroethane	9.01	151	33795	3.010	ng	94
26) Vinyl Acetate	10.34	86	3313	1.620	ng	# 6
27) 2-Butanone (MEK)	10.63	72	12410	1.432	ng	# 63
28) cis-1,2-Dichloroethene	11.13	61	71240	3.677	ng	97
30) Ethyl Acetate	11.44	61	15744	2.751	ng	96
31) n-Hexane	11.42	57	146691	5.507	ng	100
34) Tetrahydrofuran (THF)	11.89	72	12667	1.537	ng	# 76
43) Cyclohexane	13.32	84	10250	0.521	ng	94
47) Trichloroethene	14.13	130	62023	4.376	ng	99
50) Methyl Methacrylate	14.34	100	4324	0.817	ng	97
58) Toluene	15.98	91	86549	1.452	ng	99
67) m- & p-Xylenes	18.28	91	42437	0.782	ng	99
75) alpha-Pinene	19.58	93	23259	0.695	ng	99

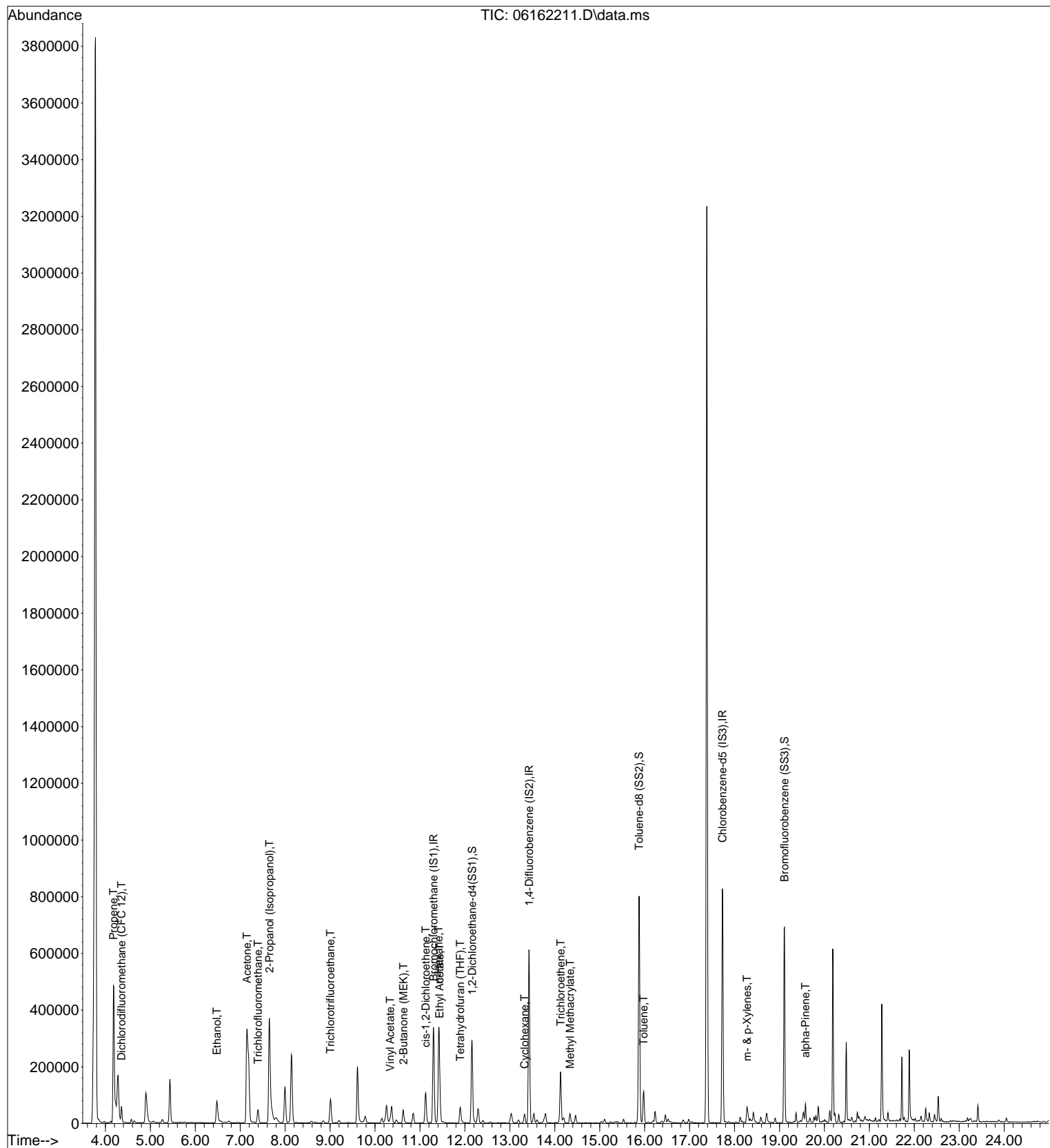
(#) = qualifier out of range (m) = manual integration (+) = signals summed

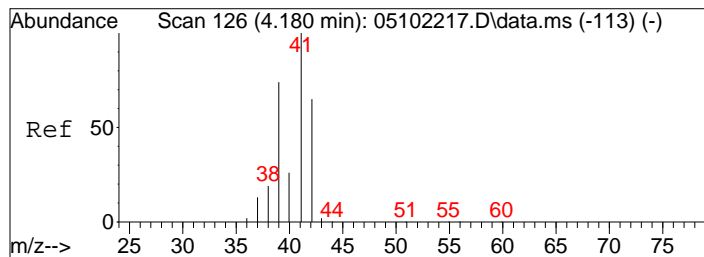


Data File : I:\MS16\DATA\2022\_06\16\06162211.D  
Acq On : 16 Jun 2022 9:28  
Sample : P2202599-003 (1000mL)  
Misc : S35-04032201

Vial: 3  
Operator: WA  
Inst : GCMS-16

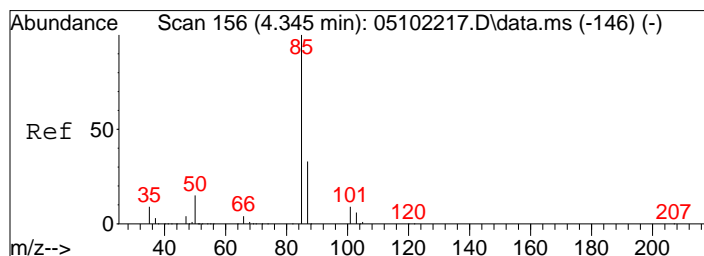
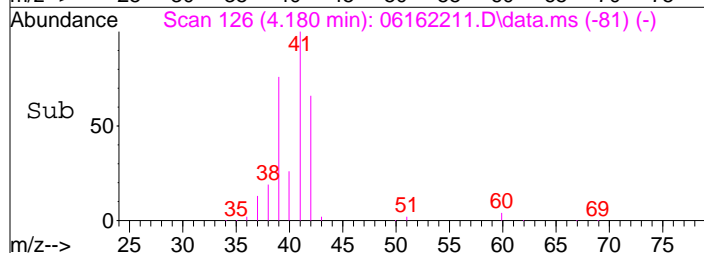
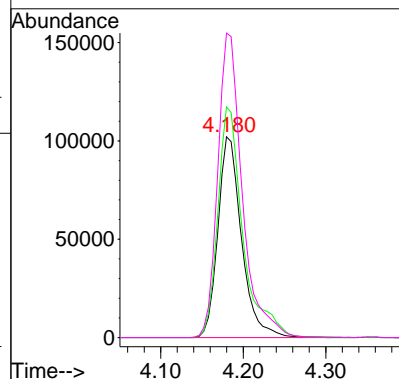
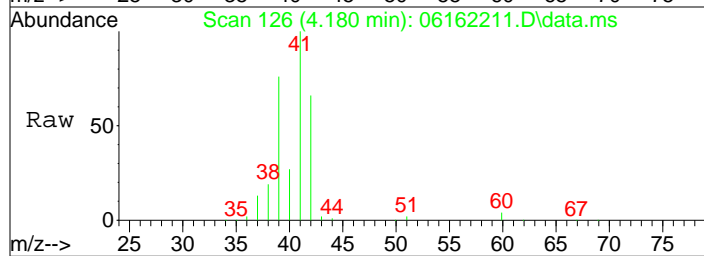
Quant Time: Jun 16 10:30:41 2022  
Quant Method : I:\MS16\METHODS\R16051022.M  
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
QLast Update : Tue May 10 19:05:32 2022  
Response via : Initial Calibration  
DataAcq Meth:TO15.M





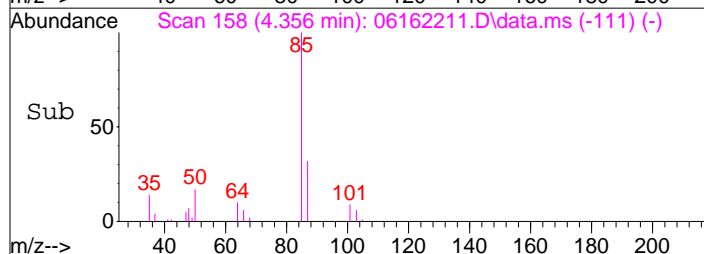
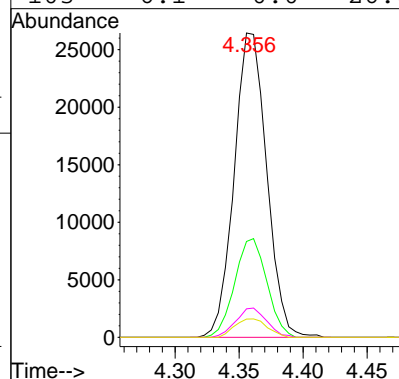
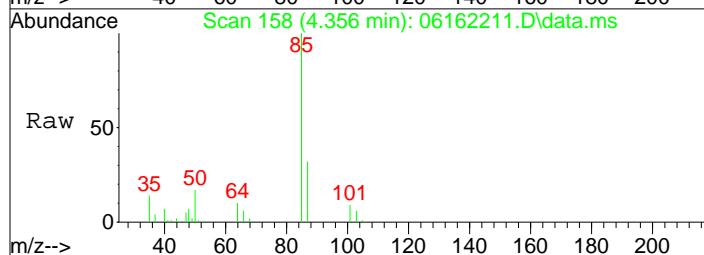
#2  
Propene  
Concen: 8.73 ng  
RT: 4.18 min Scan# 126  
Delta R.T. 0.000 min  
Lab File: 06162211.D  
Acq: 16 Jun 2022 9:28

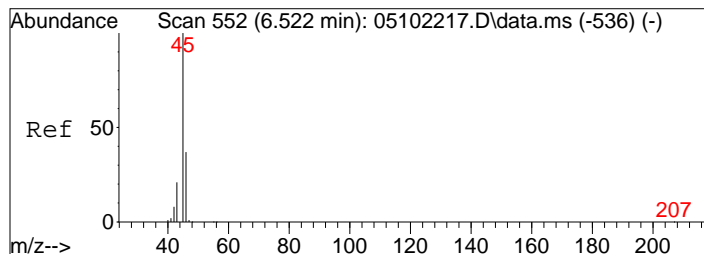
Tgt Ion	42	Resp	203446
Ion Ratio	Lower	Upper	
42	100		
39	122.9	94.3	134.3
41	158.0	132.5	172.5



#3  
Dichlorodifluoromethane (CFC 12)  
Concen: 1.74 ng  
RT: 4.36 min Scan# 158  
Delta R.T. 0.011 min  
Lab File: 06162211.D  
Acq: 16 Jun 2022 9:28

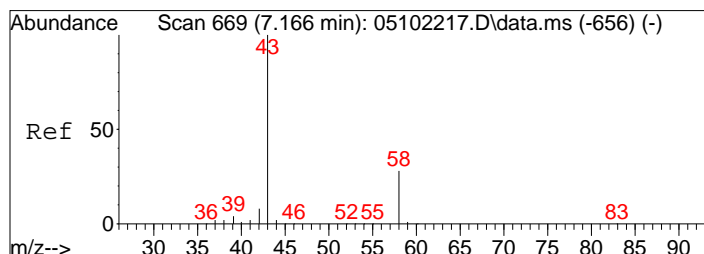
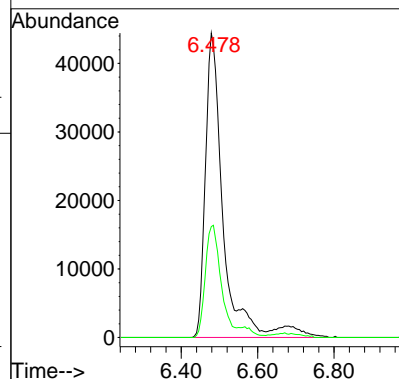
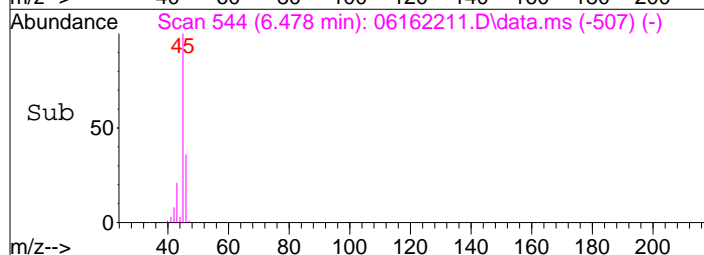
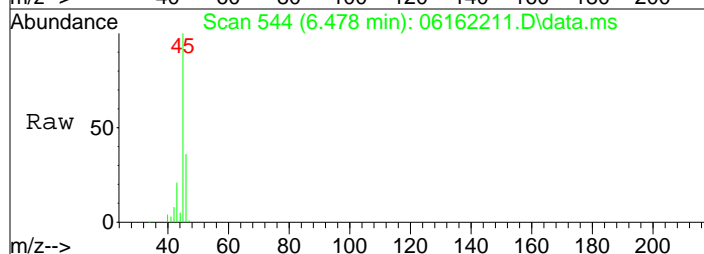
Tgt Ion	85	Resp	46752
Ion Ratio	Lower	Upper	
85	100		
87	32.0	12.9	52.9
101	9.2	0.0	29.3
103	6.1	0.0	26.0





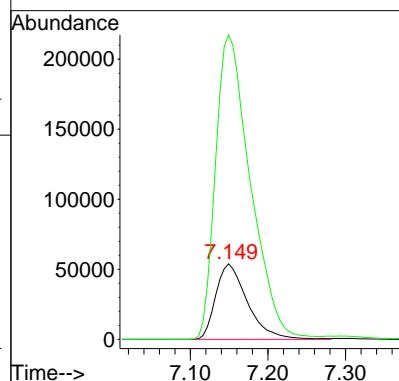
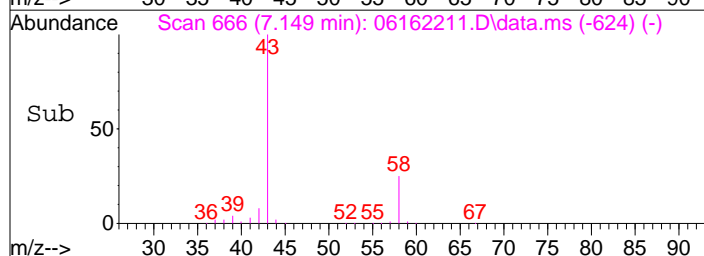
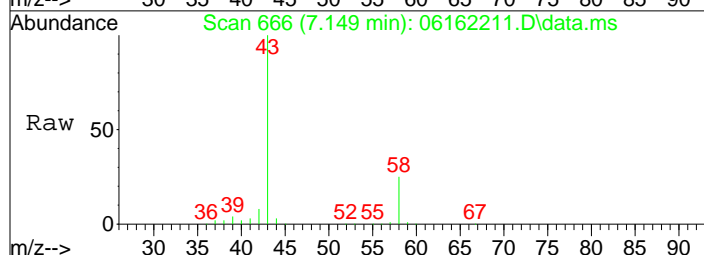
#10  
Ethanol  
Concen: 10.07 ng  
RT: 6.48 min Scan# 544  
Delta R.T. -0.044 min  
Lab File: 06162211.D  
Acq: 16 Jun 2022 9:28

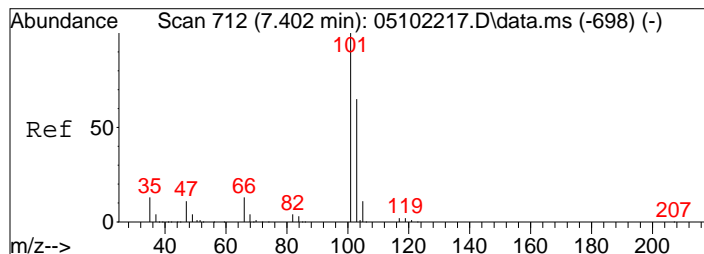
Tgt Ion: 45 Resp: 144441  
Ion Ratio Lower Upper  
45 100  
46 37.3 17.2 57.2



#13  
Acetone  
Concen: 13.65 ng  
RT: 7.15 min Scan# 666  
Delta R.T. -0.016 min  
Lab File: 06162211.D  
Acq: 16 Jun 2022 9:28

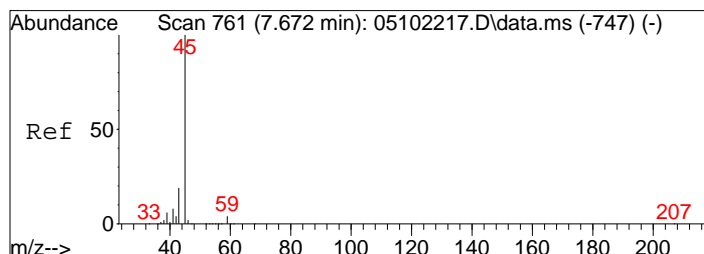
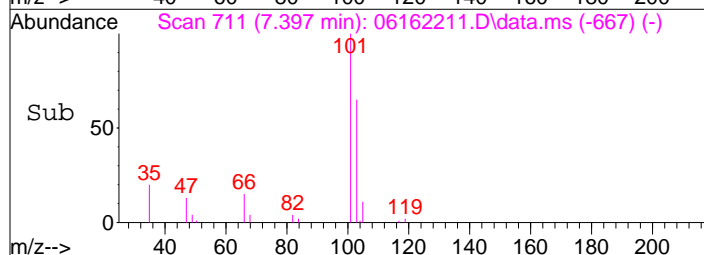
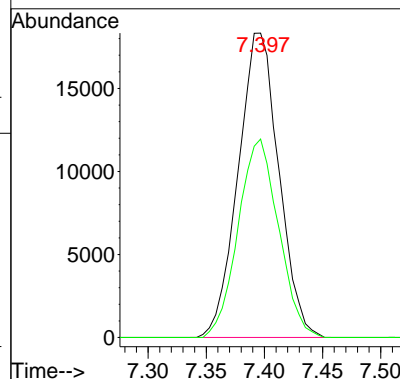
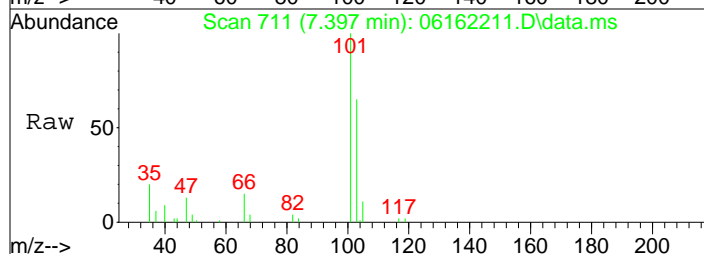
Tgt Ion: 58 Resp: 153375  
Ion Ratio Lower Upper  
58 100  
43 443.5 334.7 394.7#





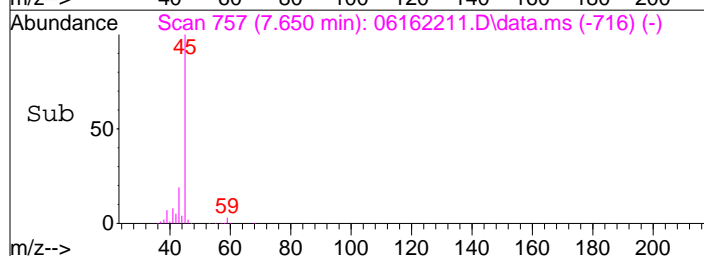
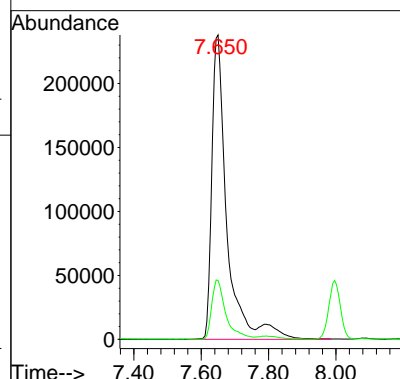
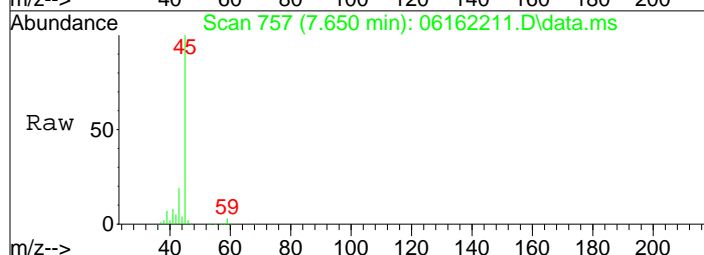
#14  
Trichlorofluoromethane  
Concen: 1.89 ng  
RT: 7.40 min Scan# 711  
Delta R.T. -0.005 min  
Lab File: 06162211.D  
Acq: 16 Jun 2022 9:28

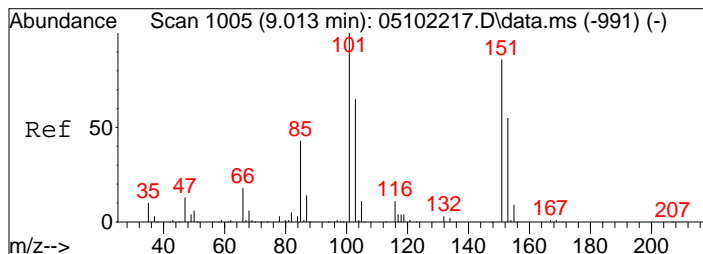
Tgt Ion: 101 Resp: 44628  
Ion Ratio Lower Upper  
101 100  
103 64.7 44.5 84.5



#15  
2-Propanol (Isopropanol)  
Concen: 18.26 ng  
RT: 7.65 min Scan# 757  
Delta R.T. -0.022 min  
Lab File: 06162211.D  
Acq: 16 Jun 2022 9:28

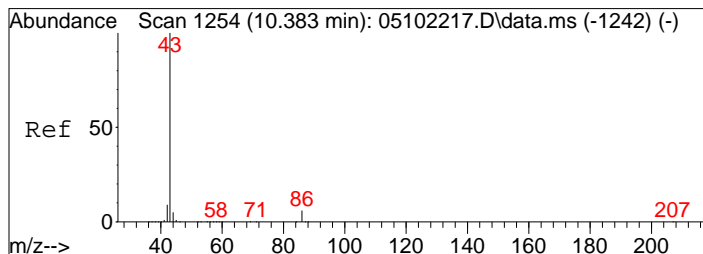
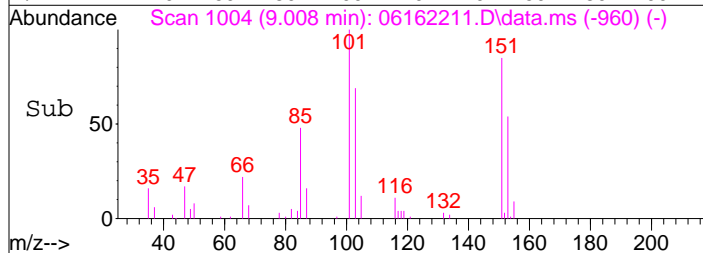
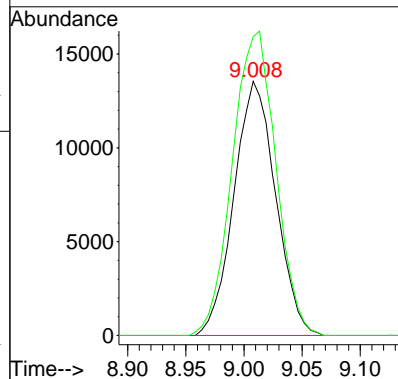
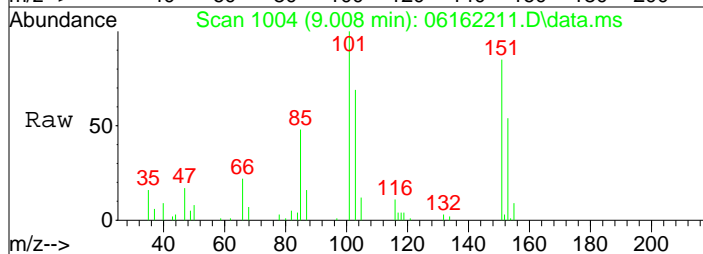
Tgt Ion: 45 Resp: 742714  
Ion Ratio Lower Upper  
45 100  
43 20.1 0.0 38.6





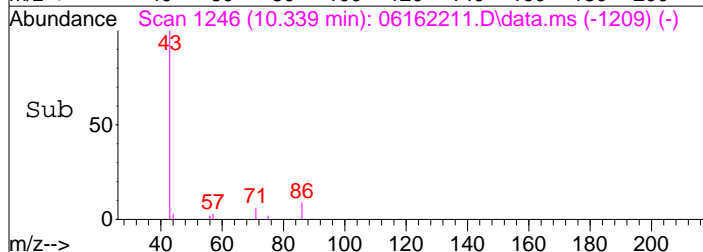
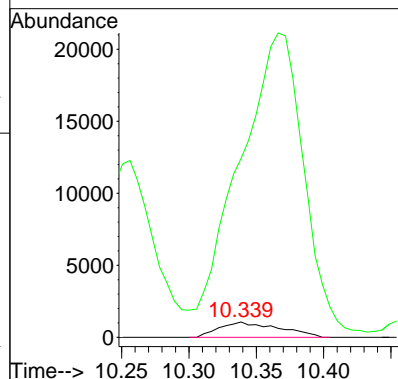
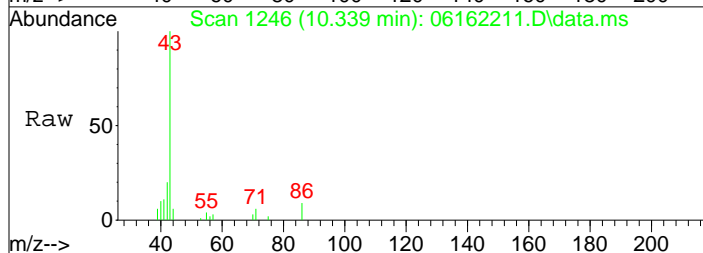
#21  
Trichlorotrifluoroethane  
Concen: 3.01 ng  
RT: 9.01 min Scan# 1004  
Delta R.T. -0.005 min  
Lab File: 06162211.D  
Acq: 16 Jun 2022 9:28

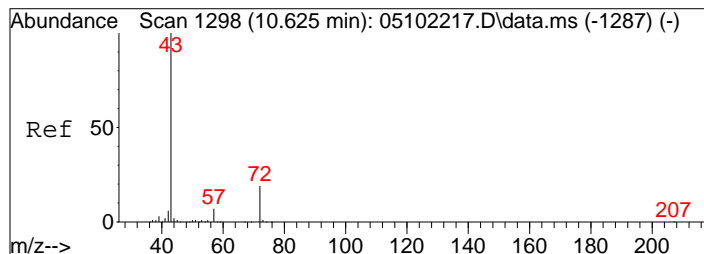
Tgt Ion	151	Resp	33795
Ion Ratio	Lower	Upper	
151	100		
101	124.9	98.2	138.2



#26  
Vinyl Acetate  
Concen: 1.62 ng  
RT: 10.34 min Scan# 1246  
Delta R.T. -0.044 min  
Lab File: 06162211.D  
Acq: 16 Jun 2022 9:28

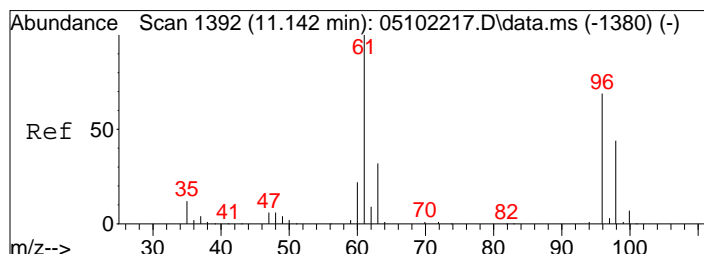
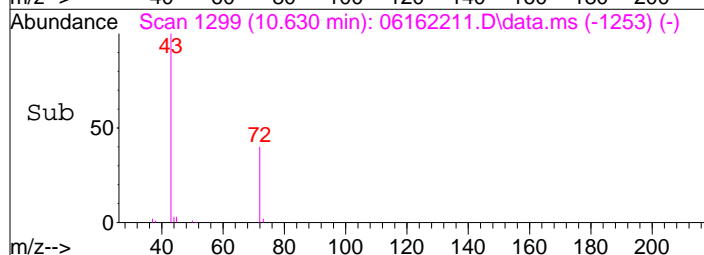
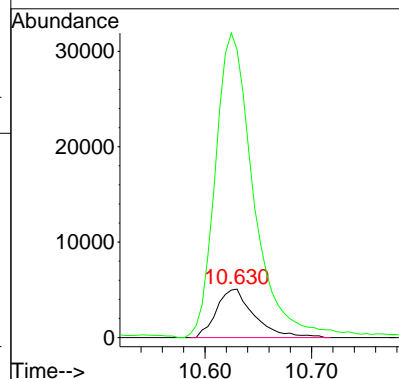
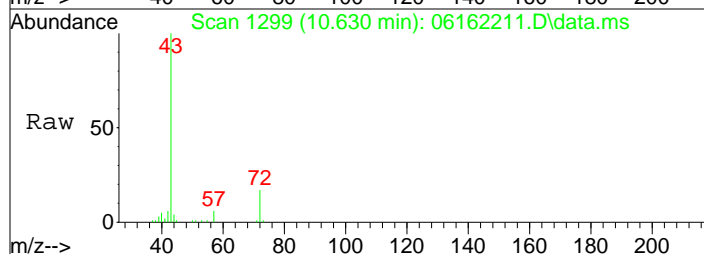
Tgt Ion	86	Resp	3313
Ion Ratio	Lower	Upper	
86	100		
43	2152.0	1551.4	1591.4#





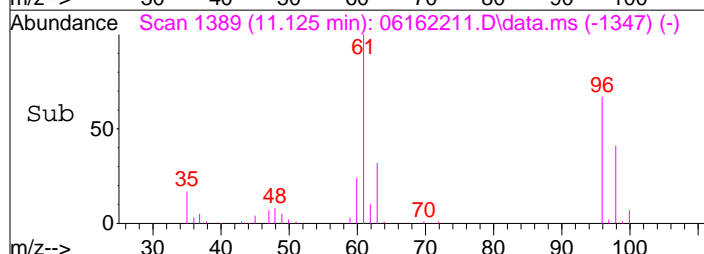
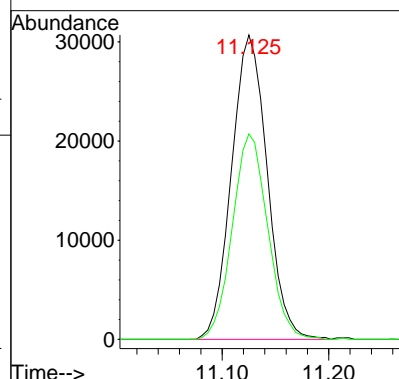
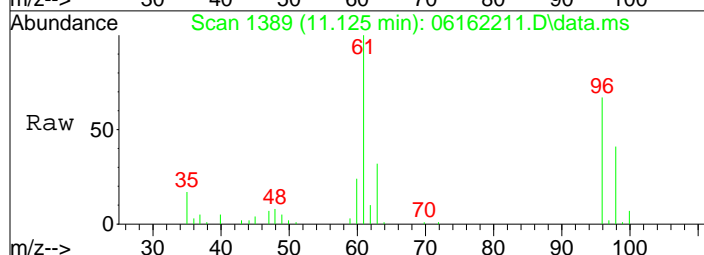
#27  
2-Butanone (MEK)  
Concen: 1.43 ng  
RT: 10.63 min Scan# 1299  
Delta R.T. 0.006 min  
Lab File: 06162211.D  
Acq: 16 Jun 2022 9:28

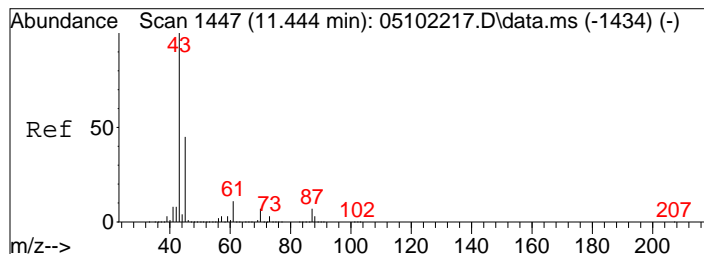
Tgt Ion: 72 Resp: 12410  
Ion Ratio Lower Upper  
72 100  
43 652.1 523.8 563.8#



#28  
cis-1,2-Dichloroethene  
Concen: 3.68 ng  
RT: 11.13 min Scan# 1389  
Delta R.T. -0.016 min  
Lab File: 06162211.D  
Acq: 16 Jun 2022 9:28

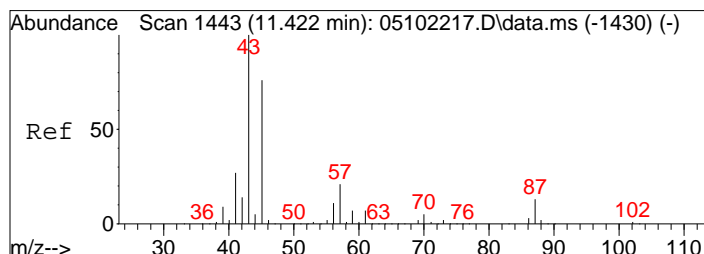
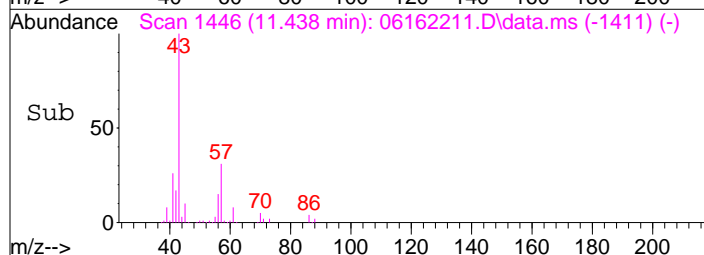
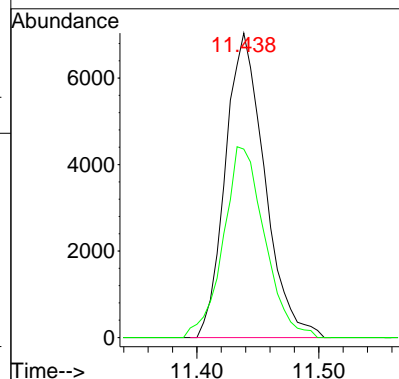
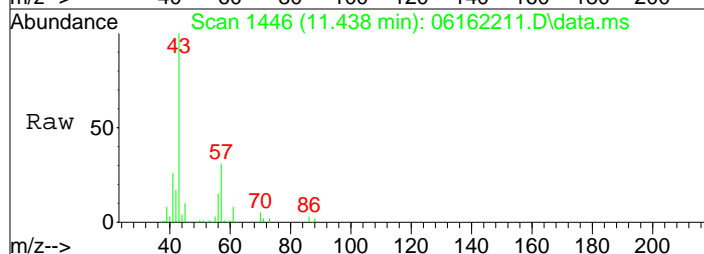
Tgt Ion: 61 Resp: 71240  
Ion Ratio Lower Upper  
61 100  
96 67.0 49.3 89.3





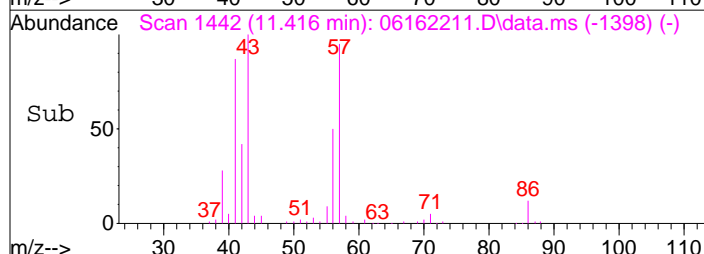
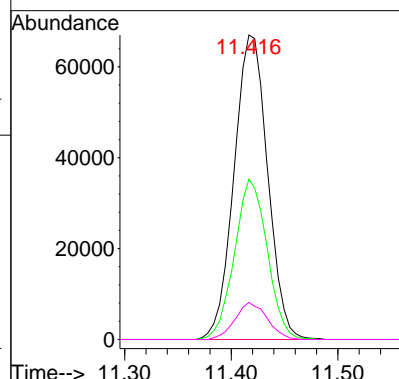
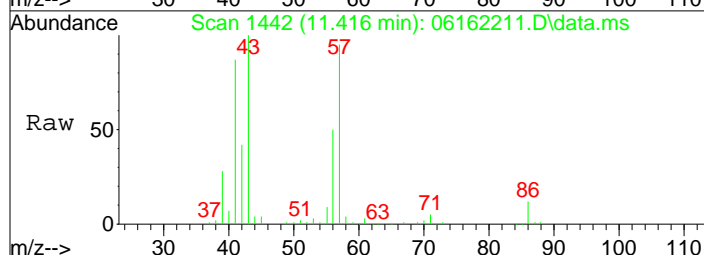
#30  
Ethyl Acetate  
Concen: 2.75 ng  
RT: 11.44 min Scan# 1446  
Delta R.T. -0.006 min  
Lab File: 06162211.D  
Acq: 16 Jun 2022 9:28

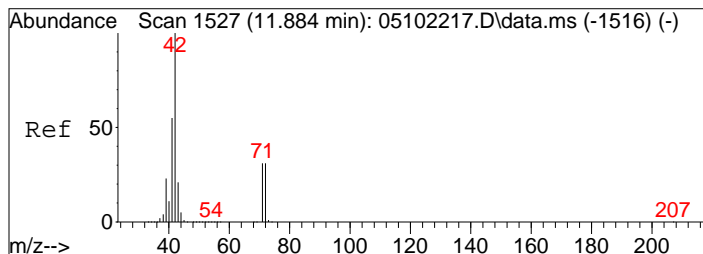
Tgt Ion	61	Resp	15744
Ion Ratio	Lower	Upper	
61	100		
70	66.0	49.4	89.4



#31  
n-Hexane  
Concen: 5.51 ng  
RT: 11.42 min Scan# 1442  
Delta R.T. -0.005 min  
Lab File: 06162211.D  
Acq: 16 Jun 2022 9:28

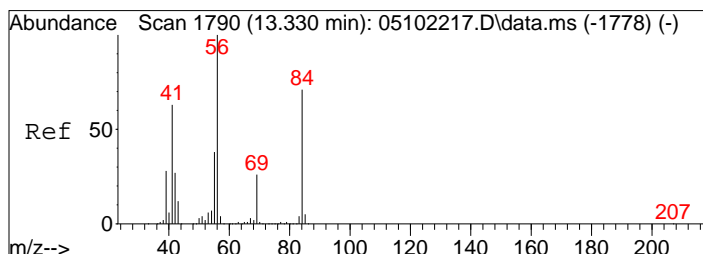
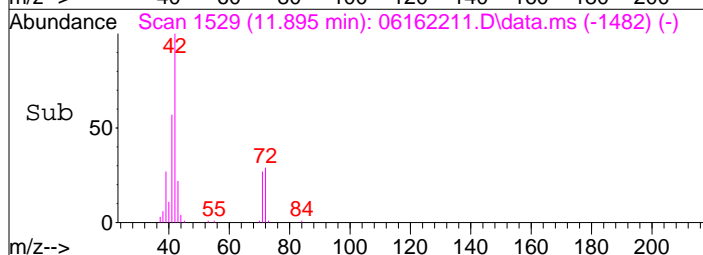
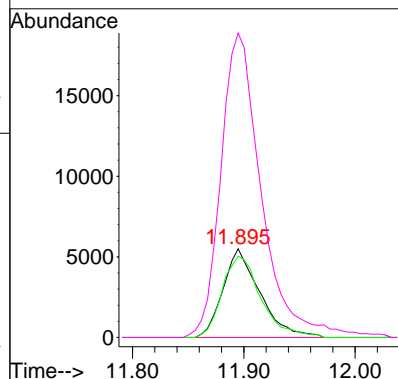
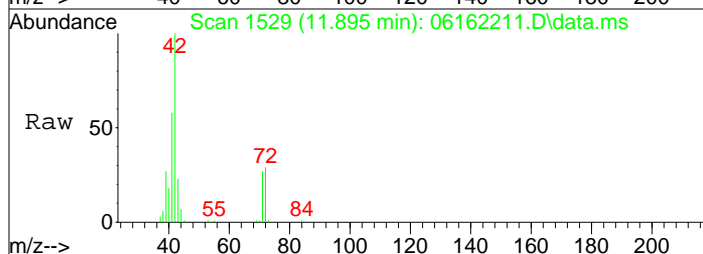
Tgt Ion	57	Resp	146691
Ion Ratio	Lower	Upper	
57	100		
56	51.2	41.0	61.4
86	11.6	9.8	14.8





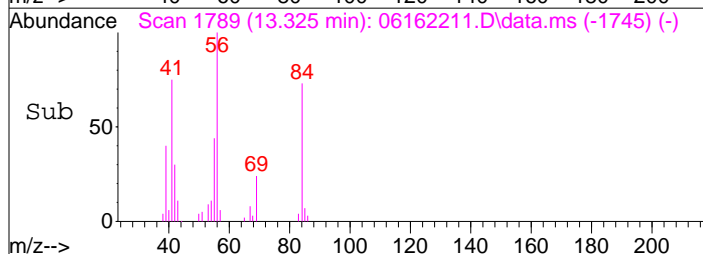
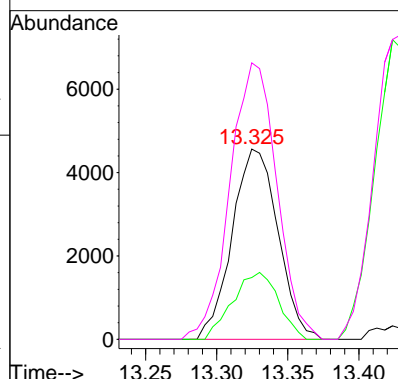
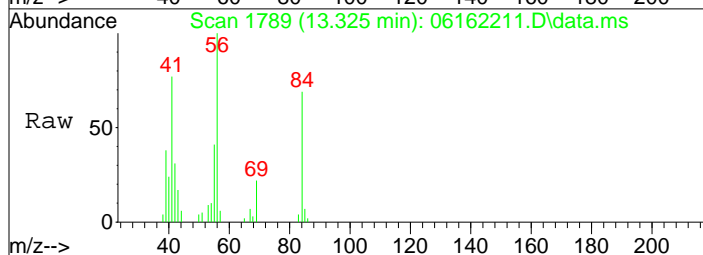
#34  
Tetrahydrofuran (THF)  
Concen: 1.54 ng  
RT: 11.89 min Scan# 1529  
Delta R.T. 0.011 min  
Lab File: 06162211.D  
Acq: 16 Jun 2022 9:28

Tgt Ion: 72 Resp: 12667  
Ion Ratio Lower Upper  
72 100  
71 96.4 77.5 117.5  
42 378.6 295.1 335.1#

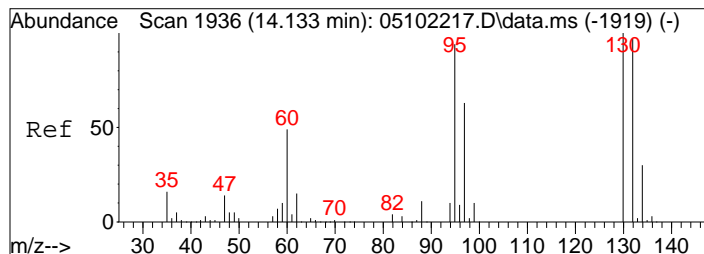


#43  
Cyclohexane  
Concen: 0.52 ng  
RT: 13.32 min Scan# 1789  
Delta R.T. -0.005 min  
Lab File: 06162211.D  
Acq: 16 Jun 2022 9:28

Tgt Ion: 84 Resp: 10250  
Ion Ratio Lower Upper  
84 100  
69 34.9 17.1 57.1  
56 148.3 120.7 160.7

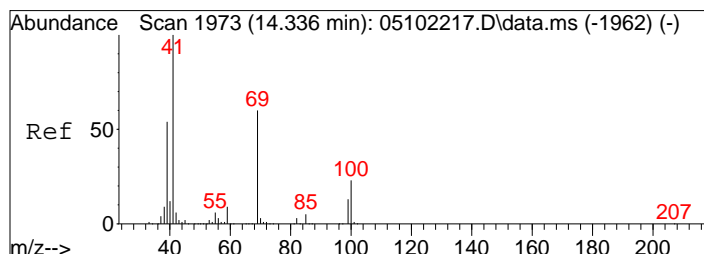
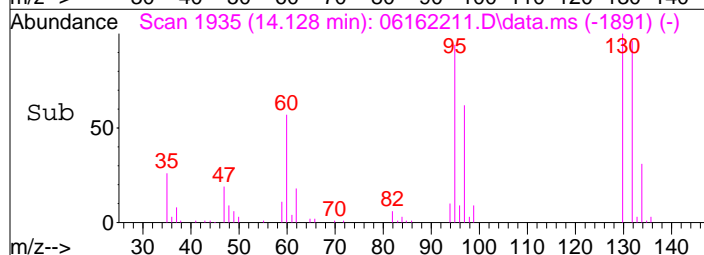
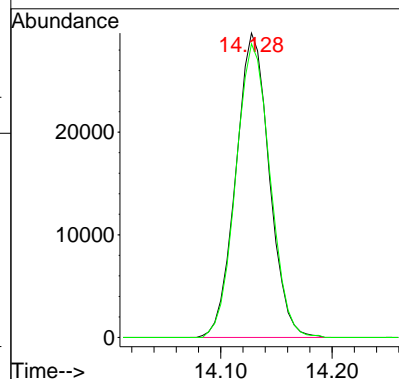
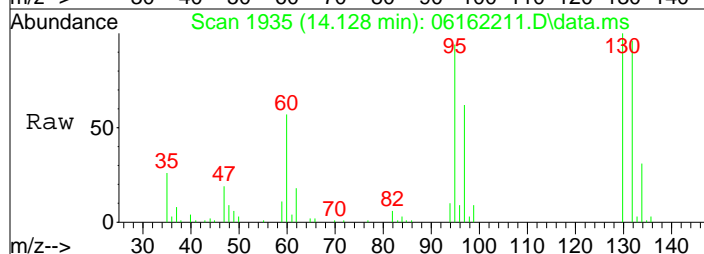






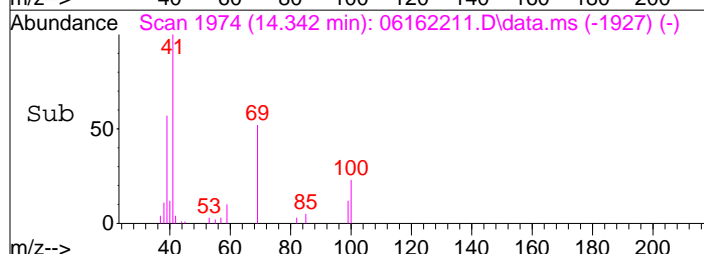
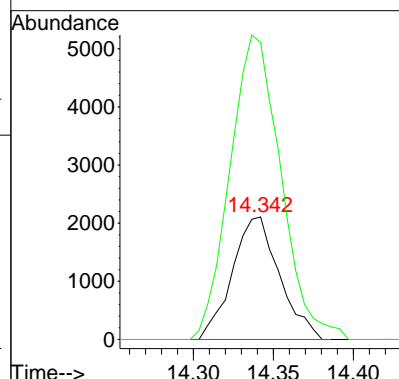
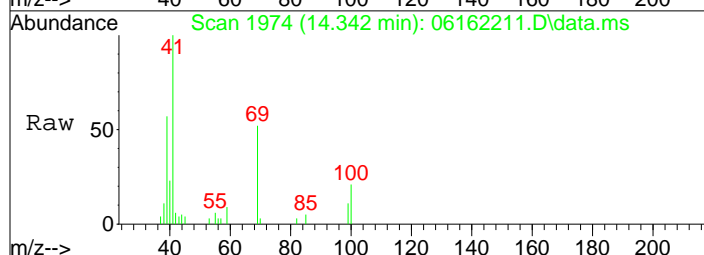
#47  
Trichloroethene  
Concen: 4.38 ng  
RT: 14.13 min Scan# 1935  
Delta R.T. -0.005 min  
Lab File: 06162211.D  
Acq: 16 Jun 2022 9:28

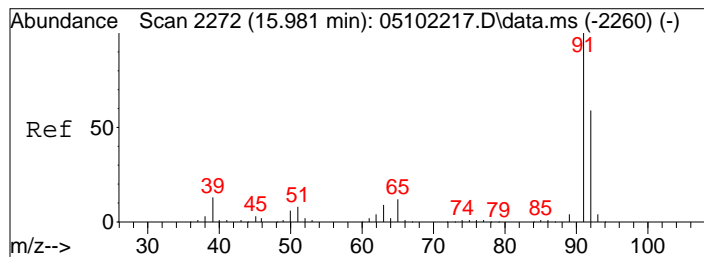
Tgt Ion	130	Resp	62023
Ion Ratio	100	Lower	Upper
130	100		
132	98.7	77.6	117.6



#50  
Methyl Methacrylate  
Concen: 0.82 ng  
RT: 14.34 min Scan# 1974  
Delta R.T. 0.006 min  
Lab File: 06162211.D  
Acq: 16 Jun 2022 9:28

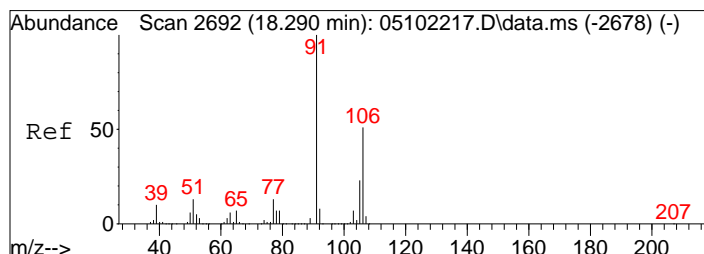
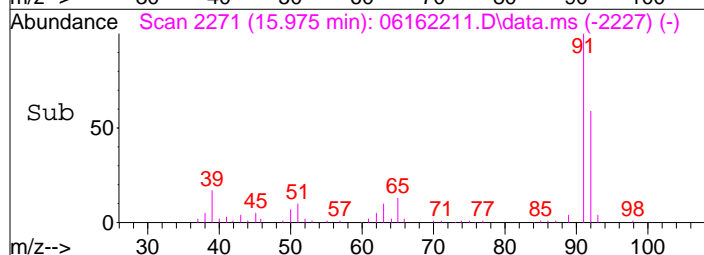
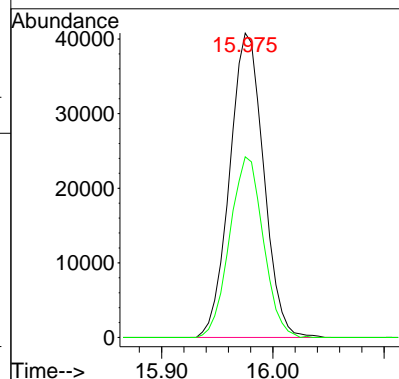
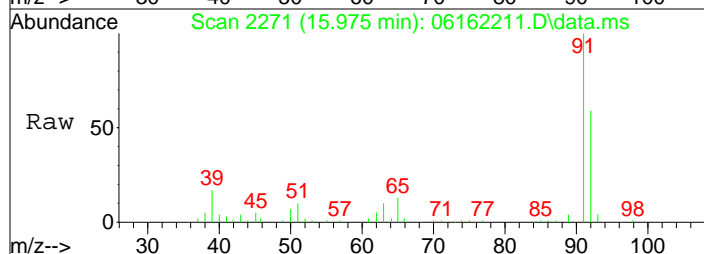
Tgt Ion	100	Resp	4324
Ion Ratio <td>100</td> <td>Lower</td> <td>Upper</td>	100	Lower	Upper
100	100		
69	268.2	241.9	281.9





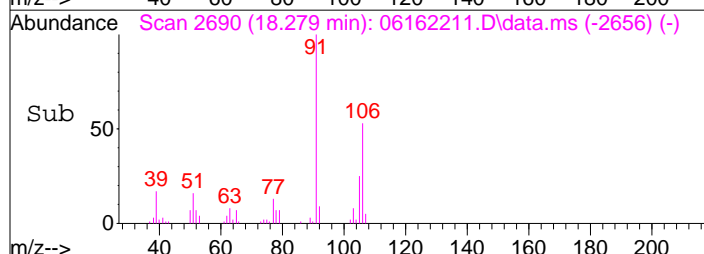
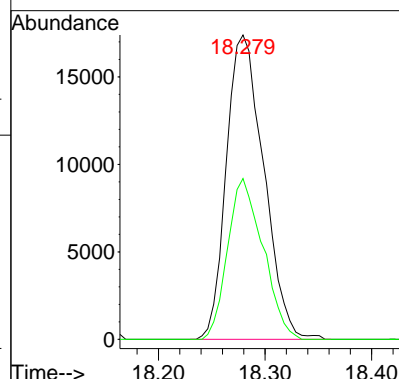
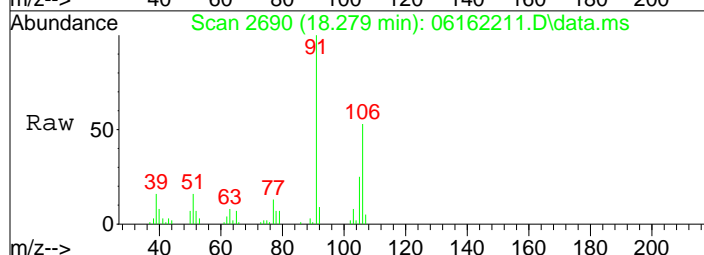
#58  
Toluene  
Concen: 1.45 ng  
RT: 15.98 min Scan# 2271  
Delta R.T. -0.005 min  
Lab File: 06162211.D  
Acq: 16 Jun 2022 9:28

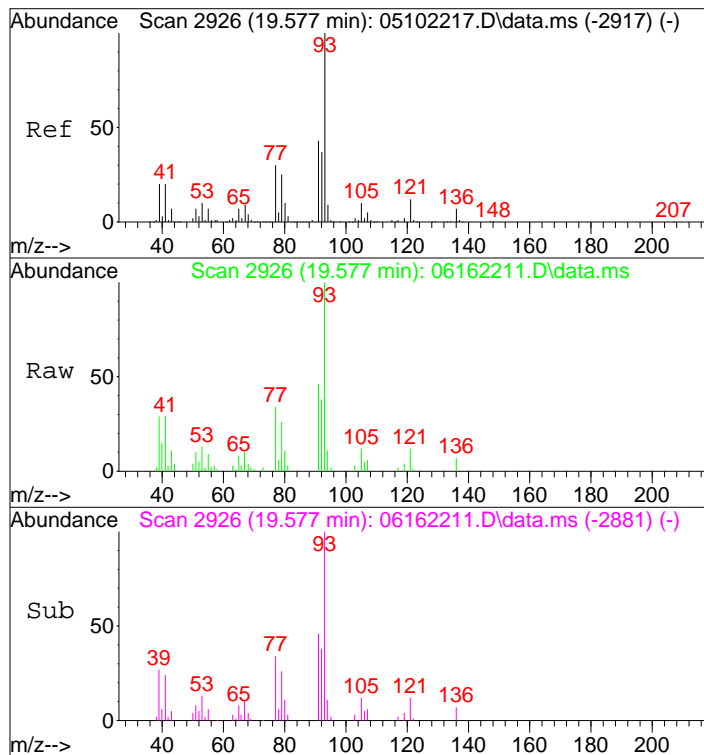
Tgt Ion	91	Resp	86549
Ion Ratio	Lower	Upper	
91	100		
92	58.6	39.1	79.1



#67  
m- & p-Xylenes  
Concen: 0.78 ng  
RT: 18.28 min Scan# 2690  
Delta R.T. -0.011 min  
Lab File: 06162211.D  
Acq: 16 Jun 2022 9:28

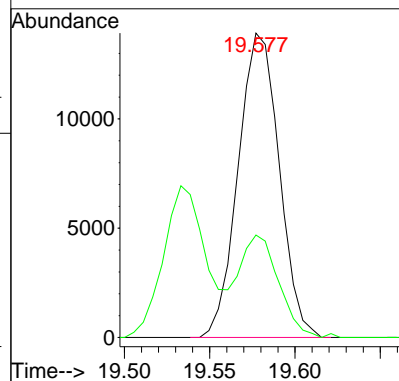
Tgt Ion	91	Resp	42437
Ion Ratio	Lower	Upper	
91	100		
106	49.9	30.8	70.8





#75  
alpha-Pinene  
Concen: 0.70 ng  
RT: 19.58 min Scan# 2926  
Delta R.T. 0.000 min  
Lab File: 06162211.D  
Acq: 16 Jun 2022 9:28

Tgt Ion	93	Resp	23259
Ion Ratio	Lower	Upper	
93	100		
77	31.9	11.2	51.2



Data File : I:\MS16\DATA\2022\_06\16\06162212.D  
 Acq On : 16 Jun 2022 10:02  
 Sample : P2202599-004 (1000mL)  
 Misc : S35-04032201

Vial: 4  
 Operator: WA  
 Inst : GCMS-16

Quant Time: Jun 19 09:44:47 2022

IDA 6/19/22

Quant Method : I:\MS16\METHODS\R16051022.M

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 19:05:32 2022

Response via : Initial Calibration

DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.31	130	123475	12.500	ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.43	114	552050	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	17.73	54	138267	12.500	ng	0.00

#### System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...)	12.16	65	229690	13.042	ng	-0.01
Spiked Amount	12.500	Range 70 - 130	Recovery	=	104.32%	
57) Toluene-d8 (SS2)	15.88	98	590357	11.280	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	90.24%	
73) Bromofluorobenzene (SS3)	19.11	174	199141	10.439	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	83.52%	

#### Target Compounds

						Qvalue
2) Propene	4.18	42	531776	22.102	ng	94
3) Dichlorodifluoromethan...	4.35	85	101501	3.661	ng	99
4) Chloromethane	4.63	50	7409	N.D.		
5) 1,2-Dichloro-1,1,2,2-t...	4.91	135	1467	N.D.		
6) Vinyl Chloride	0.00	62	0	N.D.		
7) 1,3-Butadiene	5.34	54	596	N.D.		
8) Bromomethane	5.79	94	367	N.D.		
9) Chloroethane	6.12	64	178	N.D.		
10) Ethanol	6.51	45	819434	55.311	ng	99
11) Acetonitrile	6.75	41	21879	0.633	ng	98
12) Acrolein	6.94	56	20921	1.960	ng	98
13) Acetone	7.15	58	441052	38.008	ng	# 54
14) Trichlorofluoromethane	7.40	101	203634	8.332	ng	99
15) 2-Propanol (Isopropanol)	7.67	45	2179660	51.877	ng	99
16) Acrylonitrile	7.92	53	772	N.D.		
17) 1,1-Dichloroethene	0.00	96	0	N.D.		
18) 2-Methyl-2-Propanol (t...	8.59	59	5041	N.D.		
19) Methylene Chloride	8.59	84	3262	N.D.		
20) 3-Chloro-1-propene (Al...	8.67	41	5900	N.D.		
21) Trichlorotrifluoroethane	9.01	151	6754	0.582	ng	95
22) Carbon Disulfide	8.85	76	46711	1.027	ng	98
23) trans-1,2-Dichloroethene	0.00	61	0	N.D.		
24) 1,1-Dichloroethane	10.15	63	659	N.D.		
25) Methyl tert-Butyl Ether	10.25	73	540	N.D.		
26) Vinyl Acetate	10.33	86	9314m	4.408	ng	
27) 2-Butanone (MEK)	10.62	72	57485	6.420	ng	# 70
28) cis-1,2-Dichloroethene	11.14	61	2393	N.D.		
29) Diisopropyl Ether	0.00	87	0	N.D.	d	
30) Ethyl Acetate	11.43	61	35245	5.963	ng	87
31) n-Hexane	11.42	57	981534	35.674	ng	99
32) Chloroform	11.47	83	2288	N.D.		
34) Tetrahydrofuran (THF)	11.88	72	85425	10.035	ng	# 80
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.		
36) 1,2-Dichloroethane	12.29	62	4988	N.D.		
38) 1,1,1-Trichloroethane	0.00	97	0	N.D.		
39) Isopropyl Acetate	13.01	61	298	No Calib	#	
40) 1-Butanol	13.01	56	33001	No Calib	#	
41) Benzene	13.03	78	56012	1.061	ng	99
42) Carbon Tetrachloride	13.20	117	5677	N.D.		
43) Cyclohexane	13.33	84	57572	2.826	ng	95
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.		
45) 1,2-Dichloropropane	13.79	63	181	N.D.		
46) Bromodichloromethane	14.09	83	1323	N.D.		
47) Trichloroethene	14.13	130	3672	N.D.		
48) 1,4-Dioxane	14.13	88	127	N.D.		
49) 2,2,4-Trimethylpentane...	14.20	57	100777	1.525	ng	82
50) Methyl Methacrylate	14.34	100	4403	0.803	ng	# 77

Data File : I:\MS16\DATA\2022\_06\16\06162212.D  
 Acq On : 16 Jun 2022 10:02  
 Sample : P2202599-004 (1000mL)  
 Misc : S35-04032201

Vial: 4  
 Operator: WA  
 Inst : GCMS-16

Quant Time: Jun 19 09:44:47 2022

Quant Method : I:\MS16\METHODS\R16051022.M

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 19:05:32 2022

Response via : Initial Calibration

DataAcq Meth:TO15.M

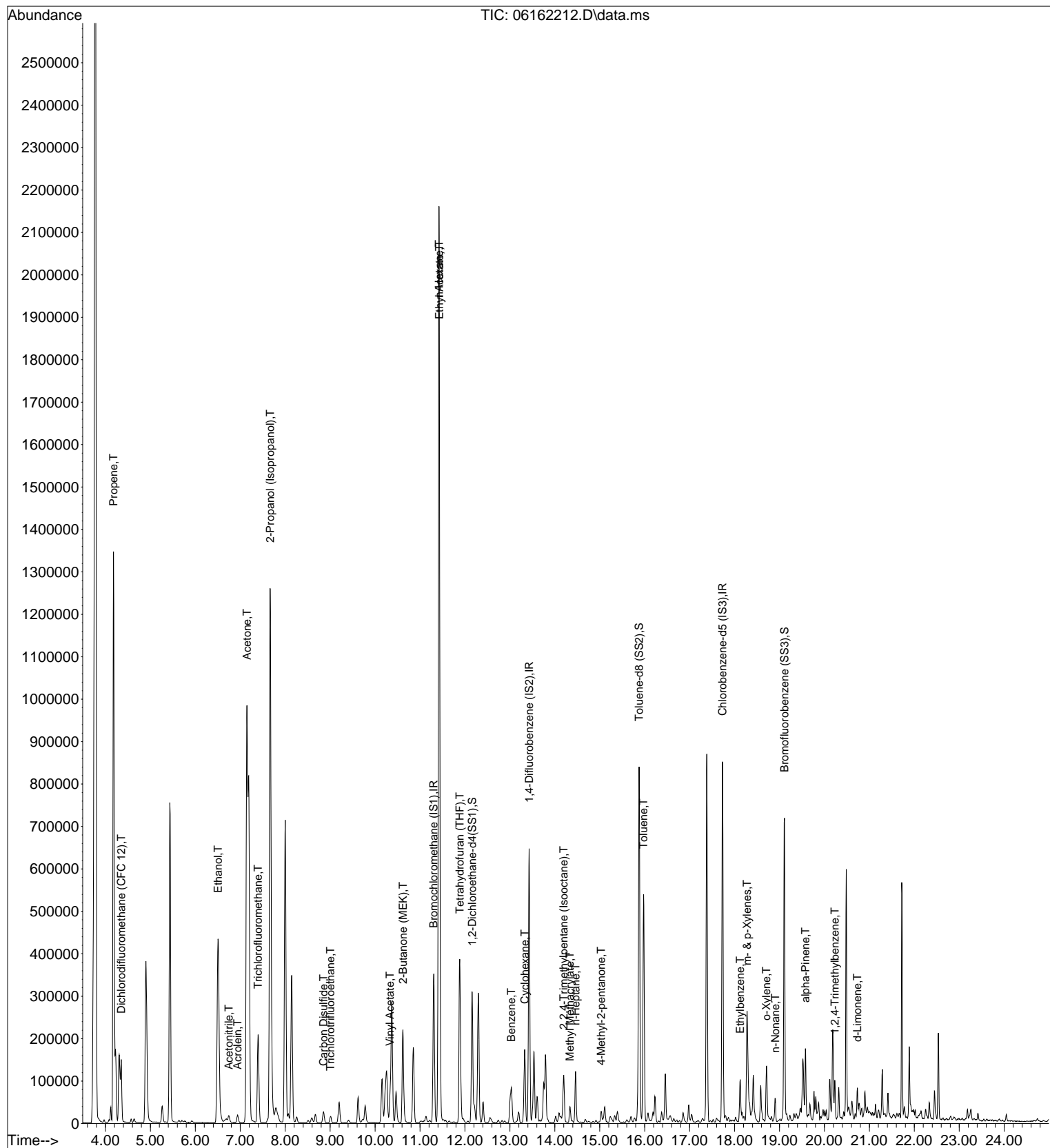
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.46	71	22279	1.609	ng	93
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.		
53) 4-Methyl-2-pentanone	15.03	58	6915	0.465	ng	# 64
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.		
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.		
58) Toluene	15.98	91	400243	6.540	ng	99
59) 2-Hexanone	16.23	43	20031	N.D.		
60) Dibromochloromethane	0.00	129	0	N.D.		
61) 1,2-Dibromoethane	0.00	107	0	N.D.		
62) n-Butyl Acetate	16.85	43	20506	N.D.		
63) n-Octane	16.98	57	6901	N.D.		
64) Tetrachloroethene	17.12	166	177	N.D.		
65) Chlorobenzene	17.81	112	1019	N.D.		
66) Ethylbenzene	18.13	91	72700	1.023	ng	99
67) m- & p-Xylenes	18.28	91	179917	3.231	ng	100
68) Bromoform	0.00	173	0	N.D.		
69) Styrene	18.60	104	7709	N.D.		
70) o-Xylene	18.71	91	60358	1.092	ng	98
71) n-Nonane	18.91	43	22897	0.567	ng	90
72) 1,1,2,2-Tetrachloroethane	18.64	83	253	N.D.		
74) Cumene	19.23	105	4855	N.D.		
75) alpha-Pinene	19.58	93	58802	1.713	ng	96
76) n-Propylbenzene	19.68	91	14506	N.D.		
77) 3-Ethyltoluene	19.80	105	14775	No Calib		
78) 4-Ethyltoluene	19.80	105	14775	N.D.		
79) 1,3,5-Trimethylbenzene	19.87	105	12330	N.D.		
80) alpha-Methylstyrene	20.01	118	5741	No Calib	#	
81) 2-Ethyltoluene	19.87	105	12330	No Calib		
82) 1,2,4-Trimethylbenzene	20.23	105	38186	0.626	ng	88
83) n-Decane	20.23	58	1215	No Calib	#	
84) Benzyl Chloride	20.44	91	1582	N.D.		
85) 1,3-Dichlorobenzene	20.42	146	3250	N.D.		
86) 1,4-Dichlorobenzene	20.42	146	3250	N.D.		
87) sec-Butylbenzene	20.47	105	2256	N.D.		
88) 4-Isopropyltoluene (p-...	20.61	119	6664	N.D.		
89) 1,2,3-Trimethylbenzene	20.61	105	10456	No Calib	#	
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.		
91) d-Limonene	20.73	68	14440m	0.640	ng	
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.		
93) n-Undecane	22.25	57	3618	No Calib	#	
94) 1,2,4-Trichlorobenzene	22.23	180	384	N.D.		
95) Naphthalene	22.34	128	4338	N.D.		
96) n-Dodecane	22.33	57	9634	No Calib	#	
97) Hexachlorobutadiene	0.00	225	0	N.D.		
98) Cyclohexanone	18.31	55	5564	No Calib	#	
99) tert-Butylbenzene	20.19	119	3002	N.D.		
100) n-Butylbenzene	20.97	91	5624	N.D.		
101) 1,1,1,2-Tetrachloroethane	0.00	131	0	N.D.		

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Data File : I:\MS16\DATA\2022\_06\16\06162212.D  
Acq On : 16 Jun 2022 10:02  
Sample : P2202599-004 (1000mL)  
Misc : S35-04032201

Vial: 4  
Operator: WA  
Inst : GCMS-16

Quant Time: Jun 19 09:44:47 2022  
Quant Method : I:\MS16\METHODS\R16051022.M  
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
QLast Update : Tue May 10 19:05:32 2022  
Response via : Initial Calibration  
DataAcq Meth:TO15.M



Data File : I:\MS16\DATA\2022\_06\16\06162212.D  
 Acq On : 16 Jun 2022 10:02  
 Sample : P2202599-004 (1000mL)  
 Misc : S35-04032201

Vial: 4  
 Operator: WA  
 Inst : GCMS-16

Quant Time: Jun 19 09:44:47 2022

Quant Method : I:\MS16\METHODS\R16051022.M

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 19:05:32 2022

Response via : Initial Calibration

DataAcq Meth:TO15.M

6/19/22

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.31	130	123475	12.500	ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.43	114	552050	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	17.73	54	138267	12.500	ng	0.00

#### System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...)	12.16	65	229690	13.042	ng	-0.01
Spiked Amount	12.500	Range 70 - 130	Recovery	=	104.32%	
57) Toluene-d8 (SS2)	15.88	98	590357	11.280	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	90.24%	
73) Bromofluorobenzene (SS3)	19.11	174	199141	10.439	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	83.52%	

#### Target Compounds

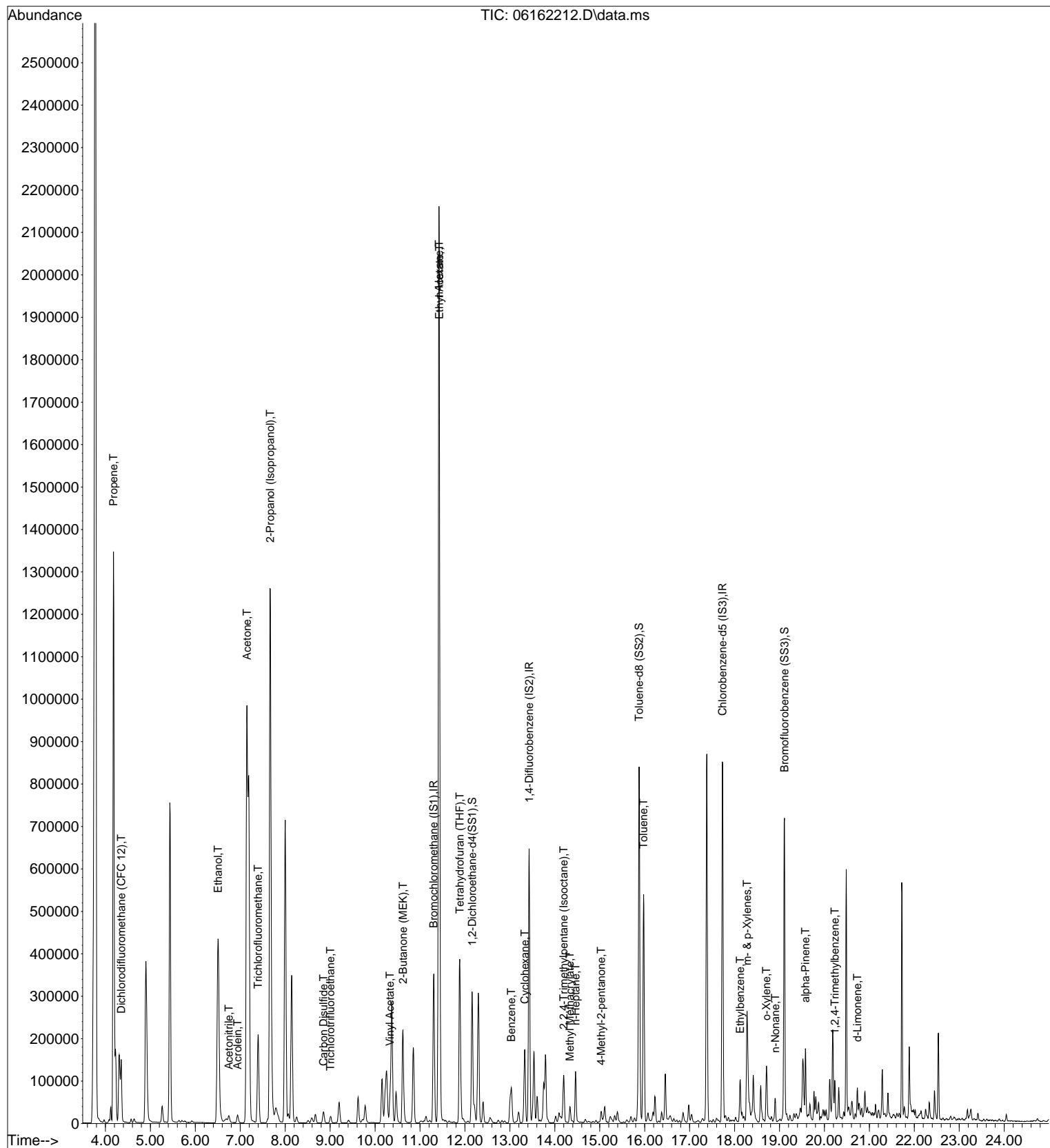
						Qvalue
2) Propene	4.18	42	531776	22.102	ng	94
3) Dichlorodifluoromethan...	4.35	85	101501	3.661	ng	99
10) Ethanol	6.51	45	819434	55.311	ng	99
11) Acetonitrile	6.75	41	21879	0.633	ng	98
12) Acrolein	6.94	56	20921	1.960	ng	98
13) Acetone	7.15	58	441052	38.008	ng	# 54
14) Trichlorofluoromethane	7.40	101	203634	8.332	ng	99
15) 2-Propanol (Isopropanol)	7.67	45	2179660	51.877	ng	99
21) Trichlorotrifluoroethane	9.01	151	6754	0.582	ng	95
22) Carbon Disulfide	8.85	76	46711	1.027	ng	98
26) Vinyl Acetate	10.33	86	9314m	4.408	ng	
27) 2-Butanone (MEK)	10.62	72	57485	6.420	ng	# 70
30) Ethyl Acetate	11.43	61	35245	5.963	ng	87
31) n-Hexane	11.42	57	981534	35.674	ng	99
34) Tetrahydrofuran (THF)	11.88	72	85425	10.035	ng	# 80
41) Benzene	13.03	78	56012	1.061	ng	99
43) Cyclohexane	13.33	84	57572	2.826	ng	95
49) 2,2,4-Trimethylpentane...	14.20	57	100777	1.525	ng	82
50) Methyl Methacrylate	14.34	100	4403	0.803	ng	# 77
51) n-Heptane	14.46	71	22279	1.609	ng	93
53) 4-Methyl-2-pentanone	15.03	58	6915	0.465	ng	# 64
58) Toluene	15.98	91	400243	6.540	ng	99
66) Ethylbenzene	18.13	91	72700	1.023	ng	99
67) m- & p-Xylenes	18.28	91	179917	3.231	ng	100
70) o-Xylene	18.71	91	60358	1.092	ng	98
71) n-Nonane	18.91	43	22897	0.567	ng	90
75) alpha-Pinene	19.58	93	58802	1.713	ng	96
82) 1,2,4-Trimethylbenzene	20.23	105	38186	0.626	ng	88
91) d-Limonene	20.73	68	14440m	0.640	ng	

(#) = qualifier out of range (m) = manual integration (+) = signals summed

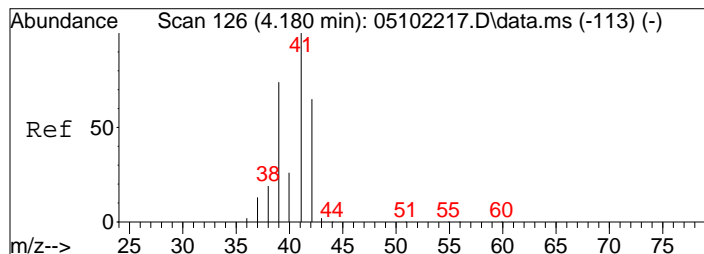
Data File : I:\MS16\DATA\2022\_06\16\06162212.D  
Acq On : 16 Jun 2022 10:02  
Sample : P2202599-004 (1000mL)  
Misc : S35-04032201

Vial: 4  
Operator: WA  
Inst : GCMS-16

Quant Time: Jun 19 09:44:47 2022  
Quant Method : I:\MS16\METHODS\R16051022.M  
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
QLast Update : Tue May 10 19:05:32 2022  
Response via : Initial Calibration  
DataAcq Meth:TO15.M

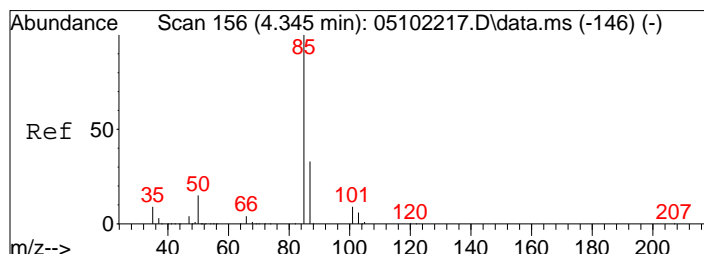
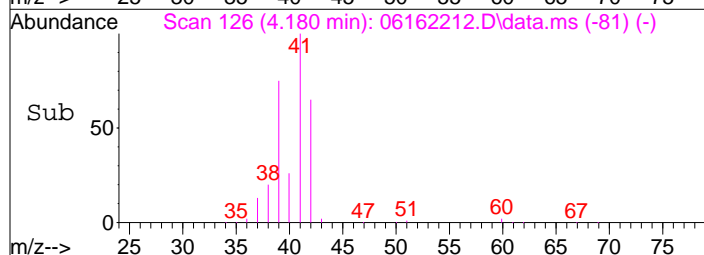
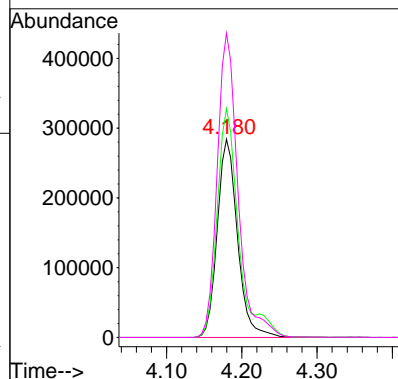
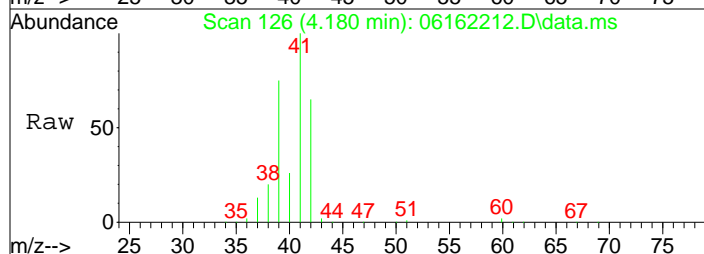






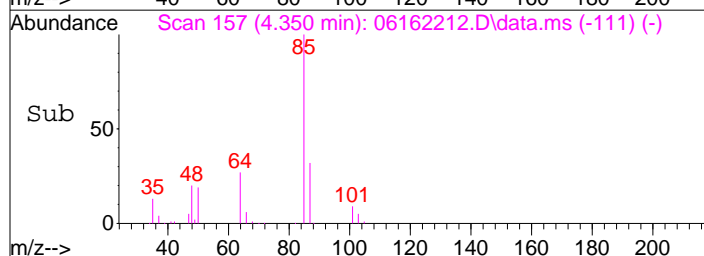
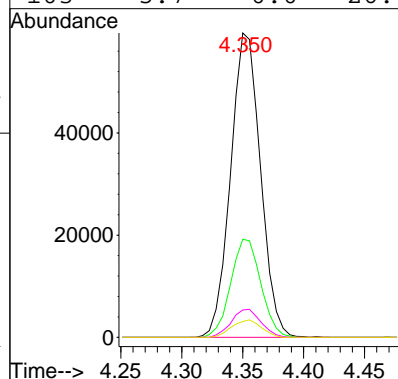
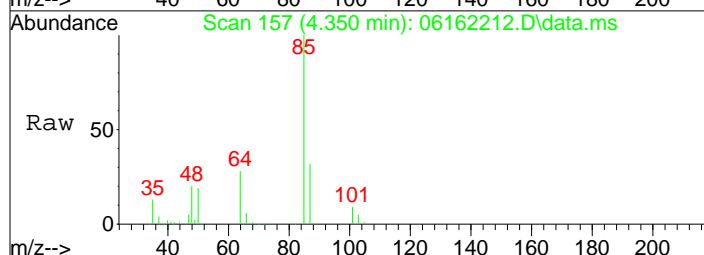
#2  
Propene  
Concen: 22.10 ng  
RT: 4.18 min Scan# 126  
Delta R.T. -0.000 min  
Lab File: 06162212.D  
Acq: 16 Jun 2022 10:02

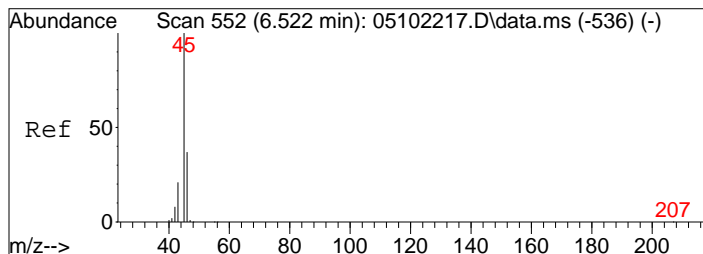
Tgt Ion	42	Resp	531776
Ion Ratio	Lower	Upper	
42	100		
39	122.8	94.3	134.3
41	158.2	132.5	172.5



#3  
Dichlorodifluoromethane (CFC 12)  
Concen: 3.66 ng  
RT: 4.35 min Scan# 157  
Delta R.T. 0.005 min  
Lab File: 06162212.D  
Acq: 16 Jun 2022 10:02

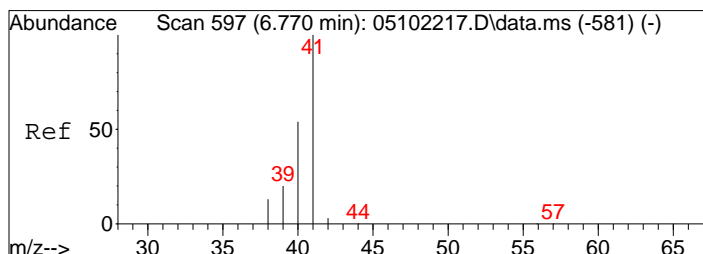
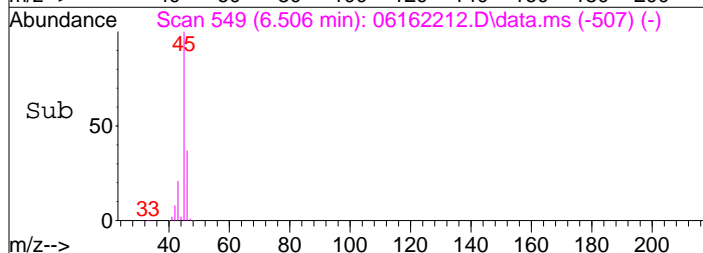
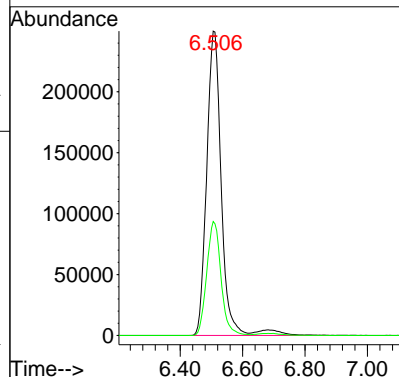
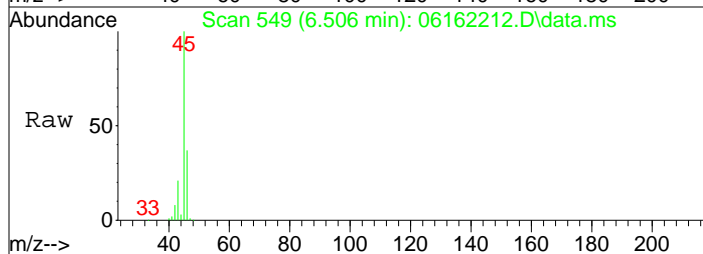
Tgt Ion	85	Resp	101501
Ion Ratio	Lower	Upper	
85	100		
87	32.5	12.9	52.9
101	9.2	0.0	29.3
103	5.7	0.0	26.0





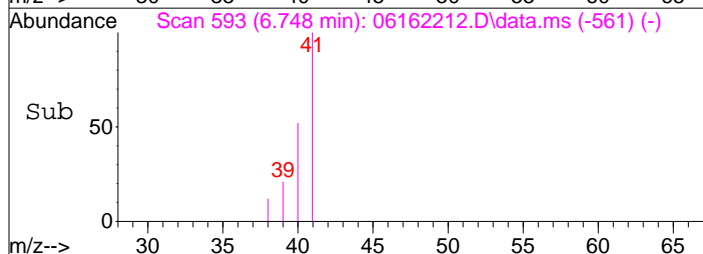
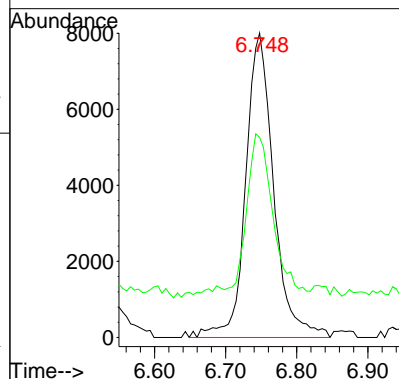
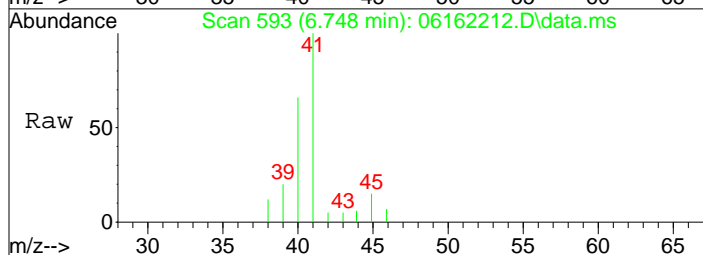
#10  
Ethanol  
Concen: 55.31 ng  
RT: 6.51 min Scan# 549  
Delta R.T. -0.017 min  
Lab File: 06162212.D  
Acq: 16 Jun 2022 10:02

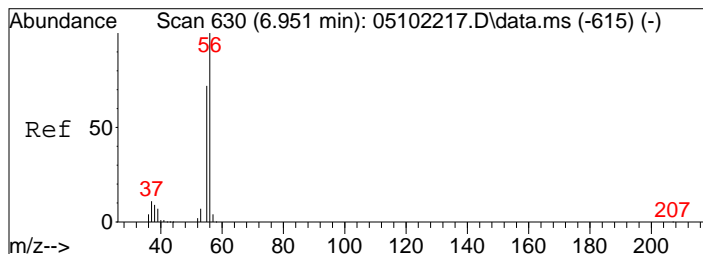
Tgt Ion: 45 Resp: 819434  
Ion Ratio Lower Upper  
45 100  
46 37.6 17.2 57.2



#11  
Acetonitrile  
Concen: 0.63 ng  
RT: 6.75 min Scan# 593  
Delta R.T. -0.022 min  
Lab File: 06162212.D  
Acq: 16 Jun 2022 10:02

Tgt Ion: 41 Resp: 21879  
Ion Ratio Lower Upper  
41 100  
40 52.2 33.7 73.7





#12

Acrolein

Concen: 1.96 ng

RT: 6.94 min Scan# 628

Delta R.T. -0.011 min

Lab File: 06162212.D

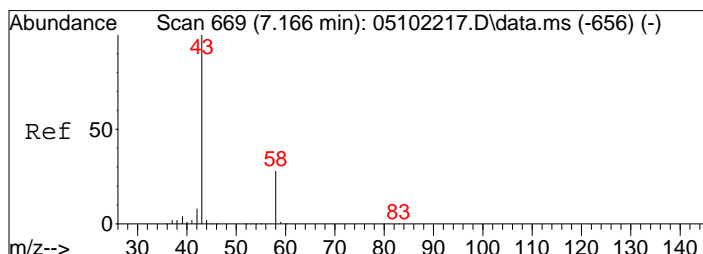
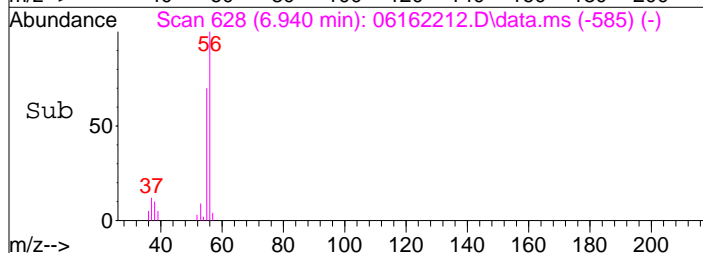
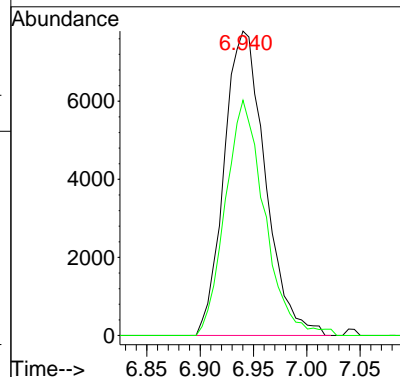
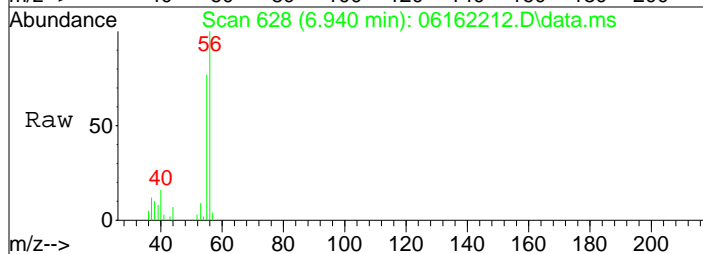
Acq: 16 Jun 2022 10:02

Tgt Ion: 56 Resp: 20921

Ion Ratio Lower Upper

56 100

55 73.6 52.1 92.1



#13

Acetone

Concen: 38.01 ng

RT: 7.15 min Scan# 666

Delta R.T. -0.017 min

Lab File: 06162212.D

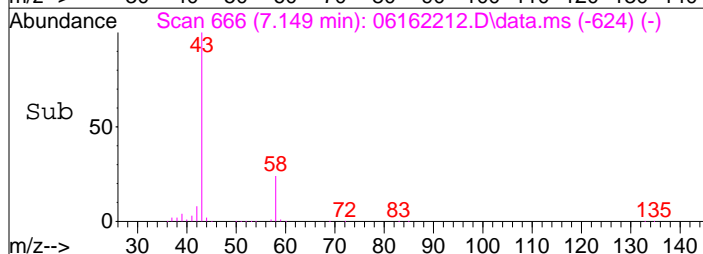
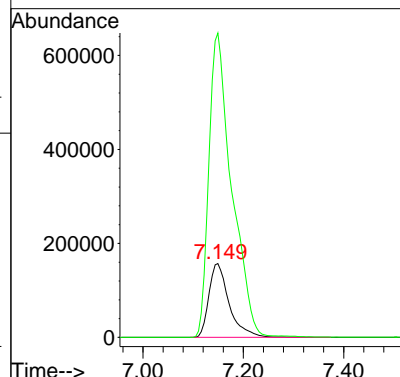
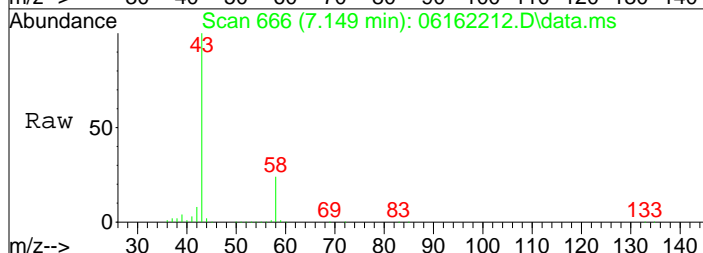
Acq: 16 Jun 2022 10:02

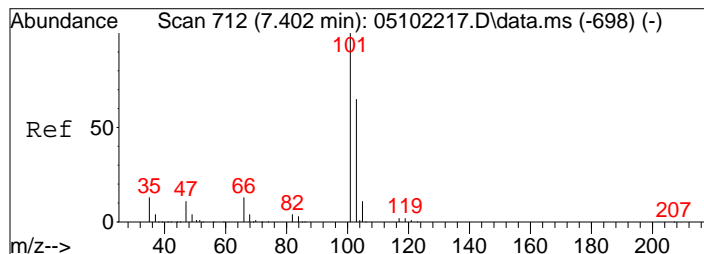
Tgt Ion: 58 Resp: 441052

Ion Ratio Lower Upper

58 100

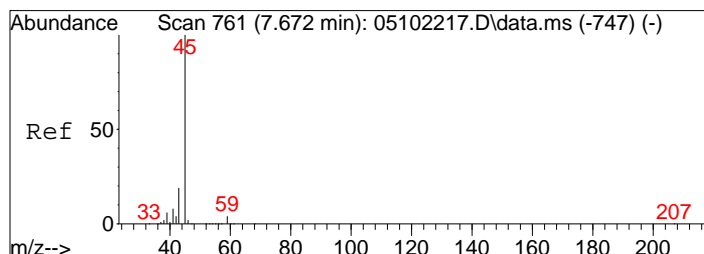
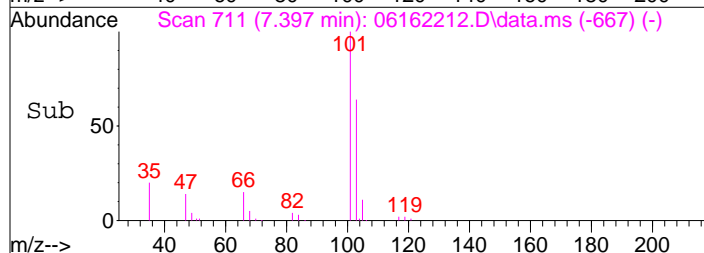
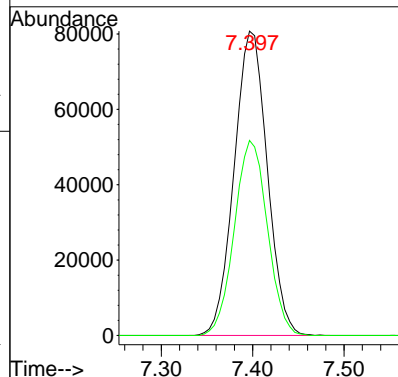
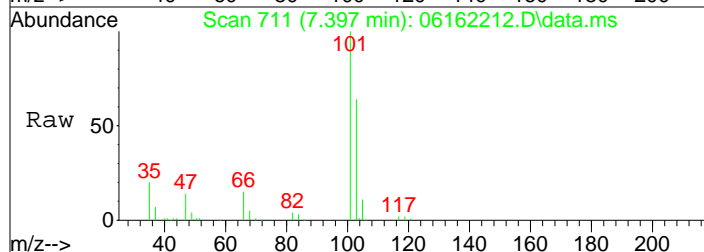
43 466.4 334.7 394.7#





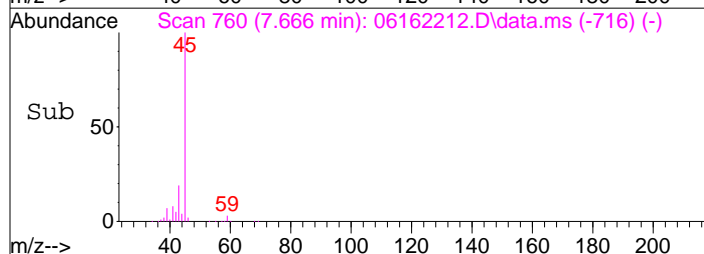
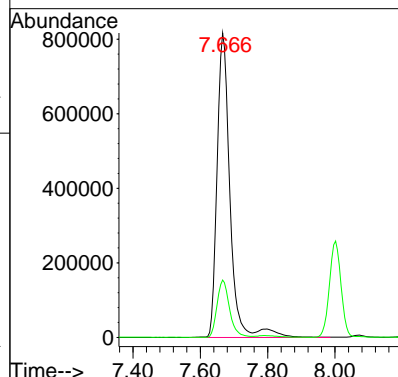
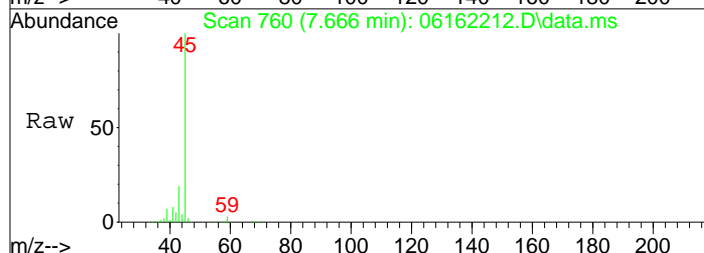
#14  
Trichlorofluoromethane  
Concen: 8.33 ng  
RT: 7.40 min Scan# 711  
Delta R.T. -0.006 min  
Lab File: 06162212.D  
Acq: 16 Jun 2022 10:02

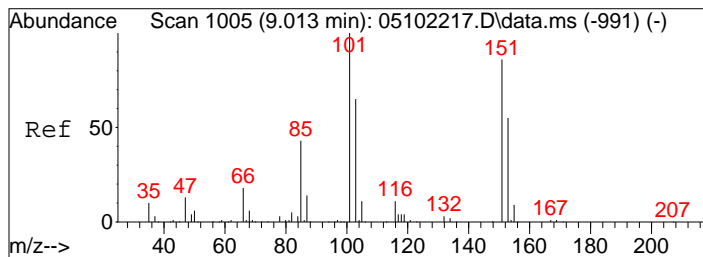
Tgt Ion	101	Resp	203634
Ion	Ratio	Lower	Upper
101	100		
103	63.9	44.5	84.5



#15  
2-Propanol (Isopropanol)  
Concen: 51.88 ng  
RT: 7.67 min Scan# 760  
Delta R.T. -0.006 min  
Lab File: 06162212.D  
Acq: 16 Jun 2022 10:02

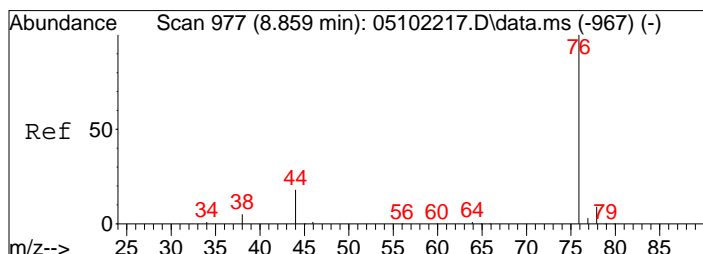
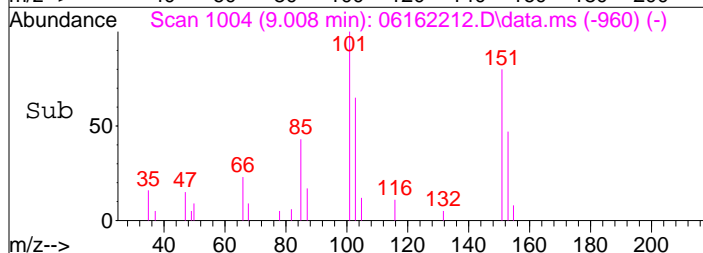
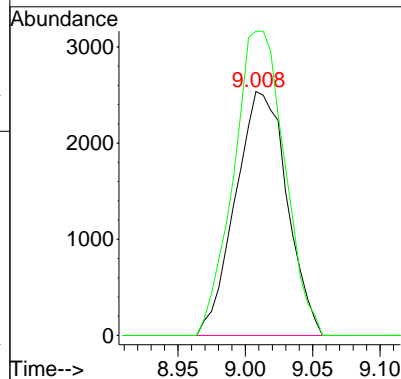
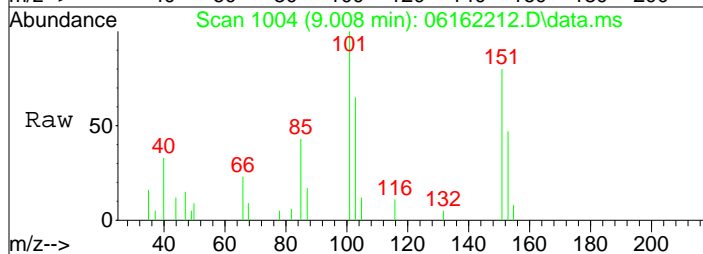
Tgt Ion	45	Resp	2179660
Ion	Ratio	Lower	Upper
45	100		
43	19.1	0.0	38.6





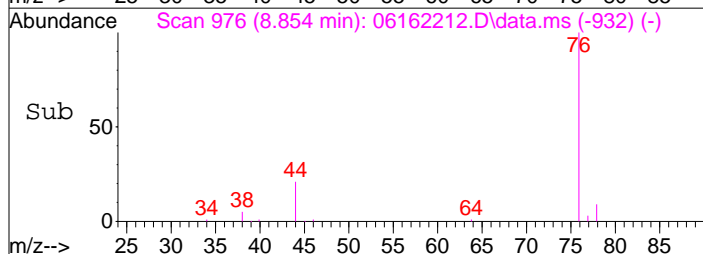
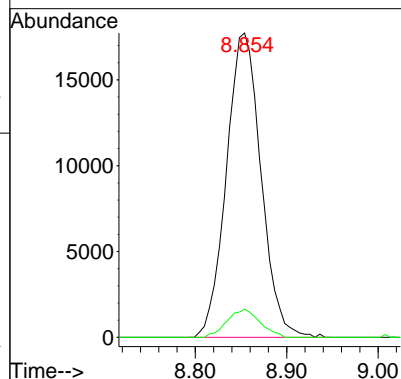
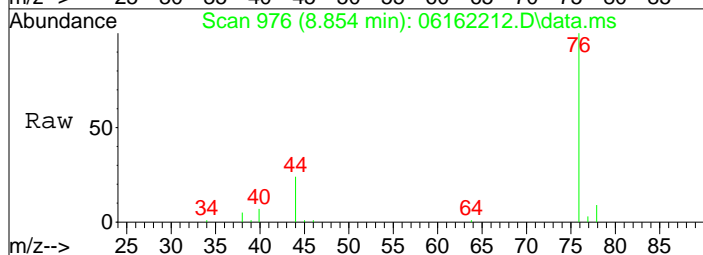
#21  
Trichlorotrifluoroethane  
Concen: 0.58 ng  
RT: 9.01 min Scan# 1004  
Delta R.T. -0.006 min  
Lab File: 06162212.D  
Acq: 16 Jun 2022 10:02

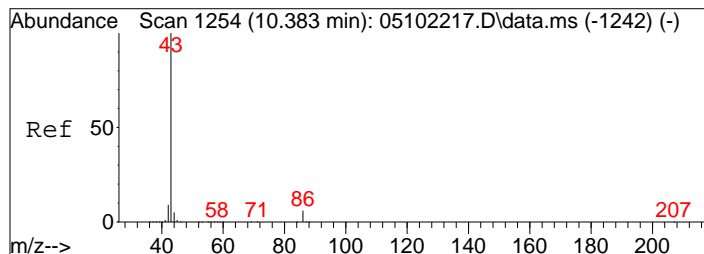
Tgt Ion: 151 Resp: 6754  
Ion Ratio Lower Upper  
151 100  
101 123.7 98.2 138.2



#22  
Carbon Disulfide  
Concen: 1.03 ng  
RT: 8.85 min Scan# 976  
Delta R.T. -0.006 min  
Lab File: 06162212.D  
Acq: 16 Jun 2022 10:02

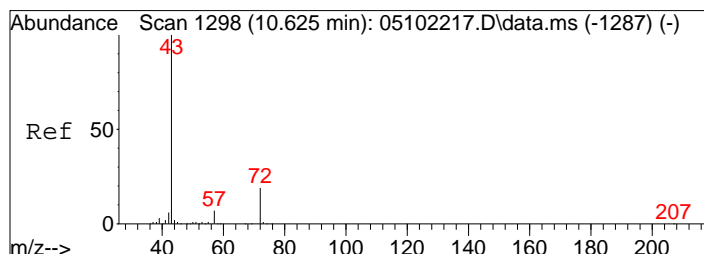
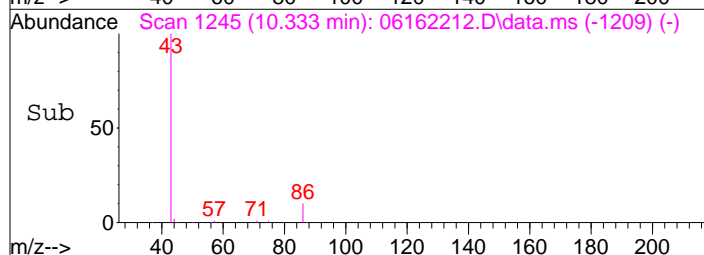
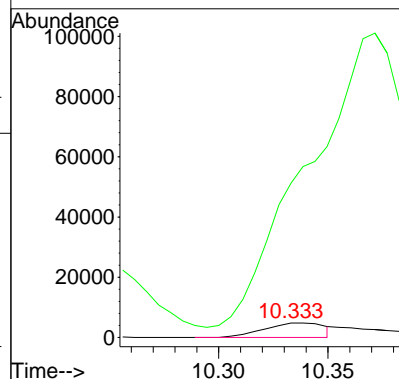
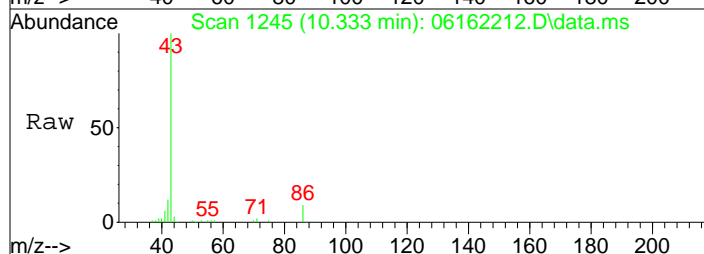
Tgt Ion: 76 Resp: 46711  
Ion Ratio Lower Upper  
76 100  
78 8.8 0.0 29.4





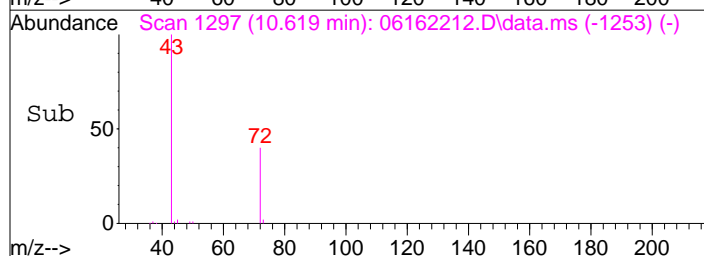
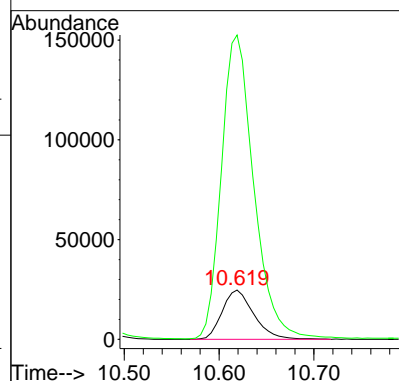
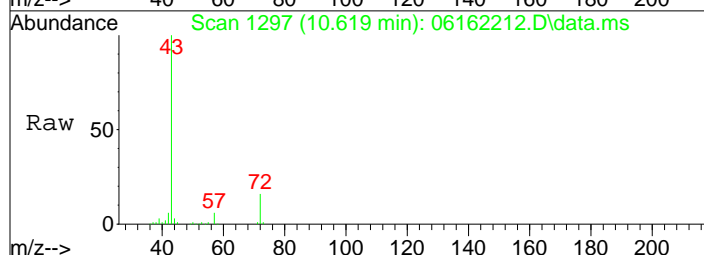
#26  
Vinyl Acetate  
Concen: 4.41 ng m  
RT: 10.33 min Scan# 1245  
Delta R.T. -0.050 min  
Lab File: 06162212.D  
Acq: 16 Jun 2022 10:02

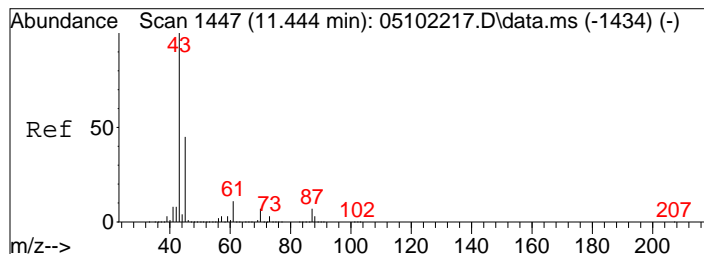
Tgt Ion: 86 Resp: 9314  
Ion Ratio Lower Upper  
86 100  
43 3603.2 1551.4 1591.4#



#27  
2-Butanone (MEK)  
Concen: 6.42 ng  
RT: 10.62 min Scan# 1297  
Delta R.T. -0.006 min  
Lab File: 06162212.D  
Acq: 16 Jun 2022 10:02

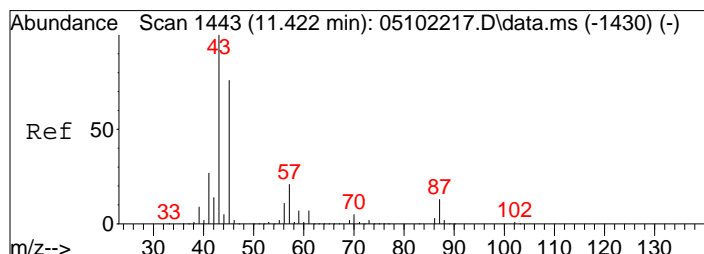
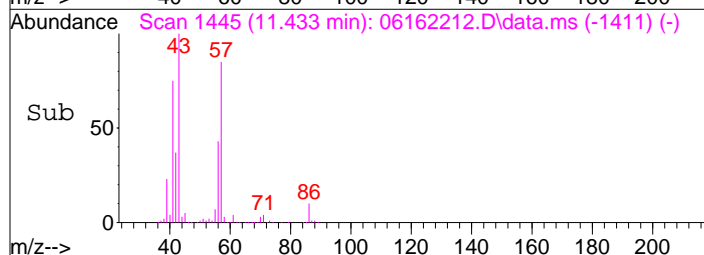
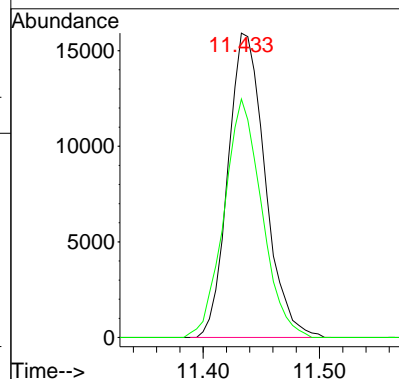
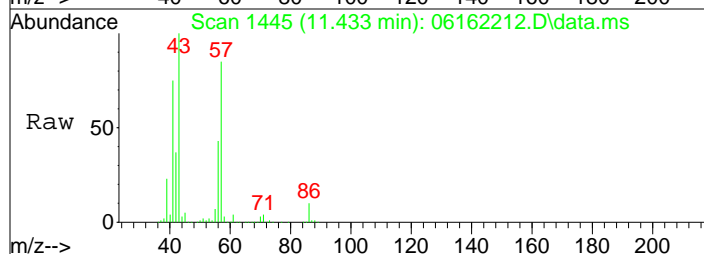
Tgt Ion: 72 Resp: 57485  
Ion Ratio Lower Upper  
72 100  
43 630.0 523.8 563.8#





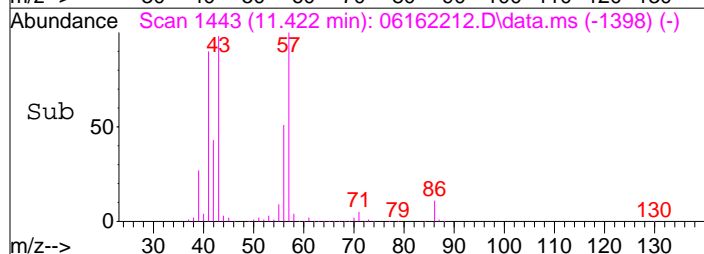
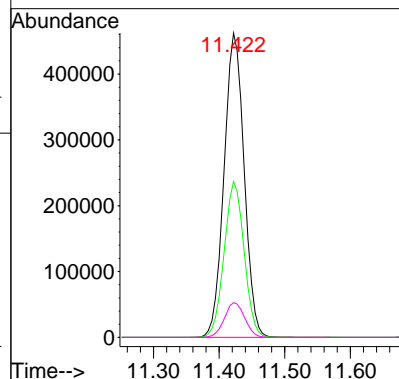
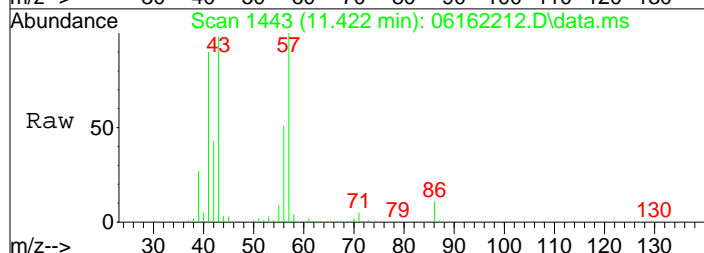
#30  
Ethyl Acetate  
Concen: 5.96 ng  
RT: 11.43 min Scan# 1445  
Delta R.T. -0.011 min  
Lab File: 06162212.D  
Acq: 16 Jun 2022 10:02

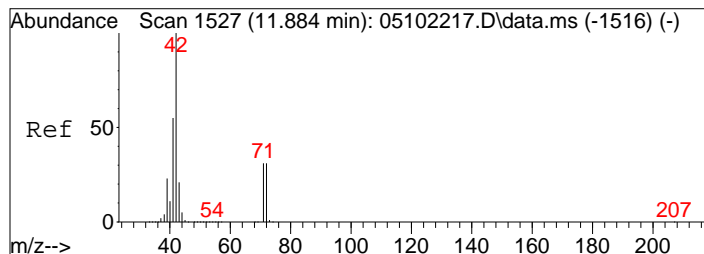
Tgt Ion: 61 Resp: 35245  
Ion Ratio Lower Upper  
61 100  
70 79.8 49.4 89.4



#31  
n-Hexane  
Concen: 35.67 ng  
RT: 11.42 min Scan# 1443  
Delta R.T. -0.000 min  
Lab File: 06162212.D  
Acq: 16 Jun 2022 10:02

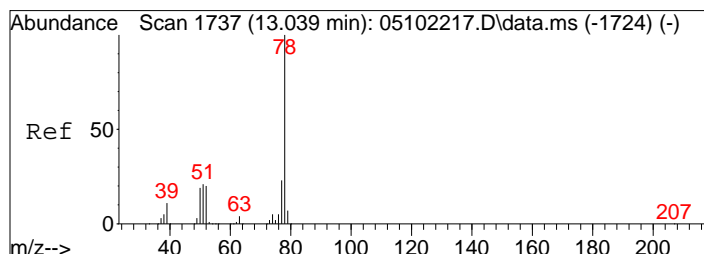
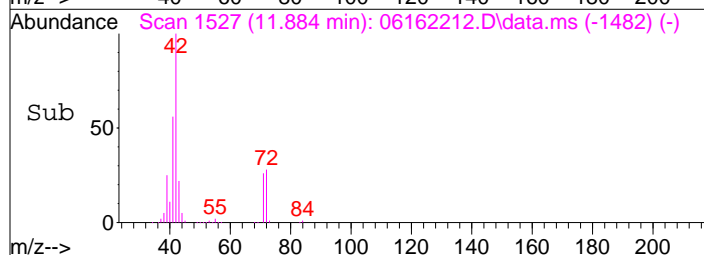
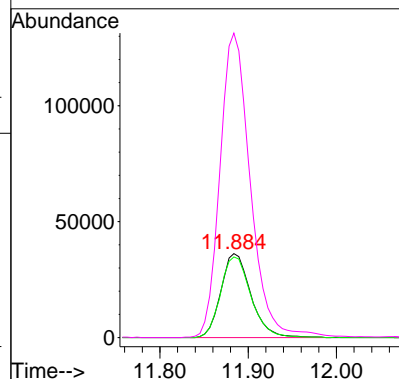
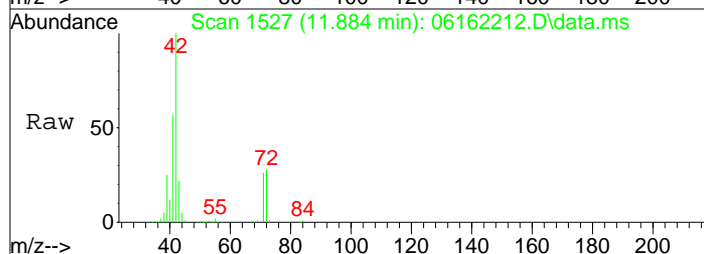
Tgt Ion: 57 Resp: 981534  
Ion Ratio Lower Upper  
57 100  
56 51.0 41.0 61.4  
86 11.6 9.8 14.8





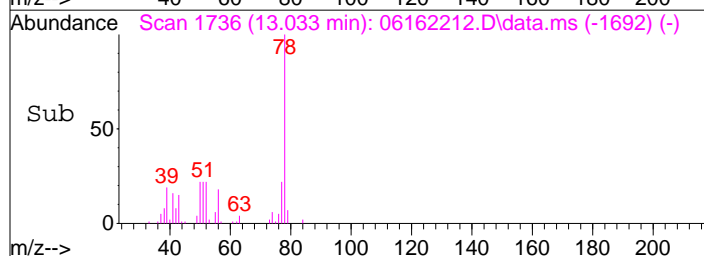
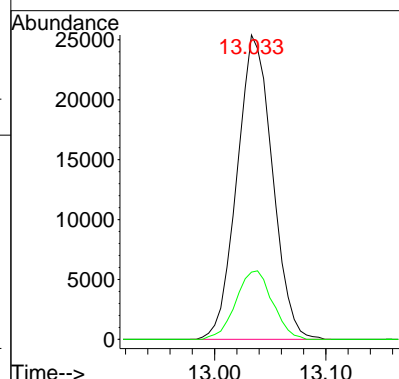
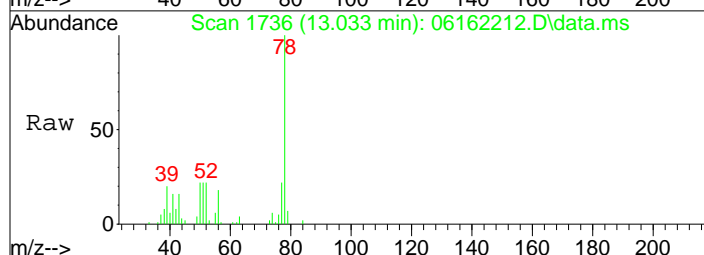
#34  
Tetrahydrofuran (THF)  
Concen: 10.04 ng  
RT: 11.88 min Scan# 1527  
Delta R.T. -0.000 min  
Lab File: 06162212.D  
Acq: 16 Jun 2022 10:02

Tgt Ion	72	Resp	85425
Ion Ratio	Lower	Upper	
72	100		
71	97.6	77.5	117.5
42	369.2	295.1	335.1#

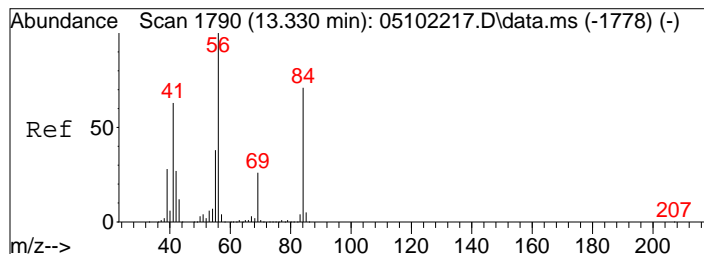


#41  
Benzene  
Concen: 1.06 ng  
RT: 13.03 min Scan# 1736  
Delta R.T. -0.006 min  
Lab File: 06162212.D  
Acq: 16 Jun 2022 10:02

Tgt Ion	78	Resp	56012
Ion Ratio	Lower	Upper	
78	100		
77	23.4	2.8	42.8

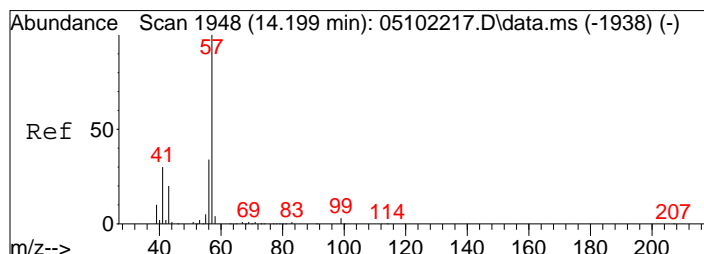
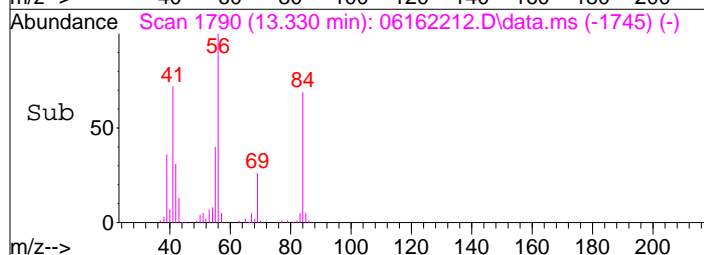
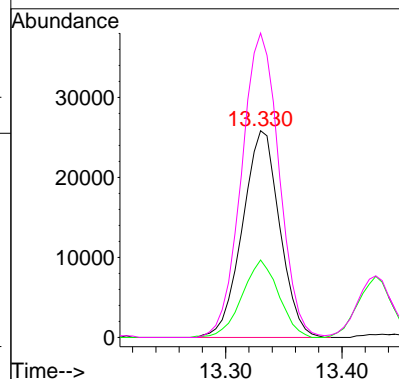
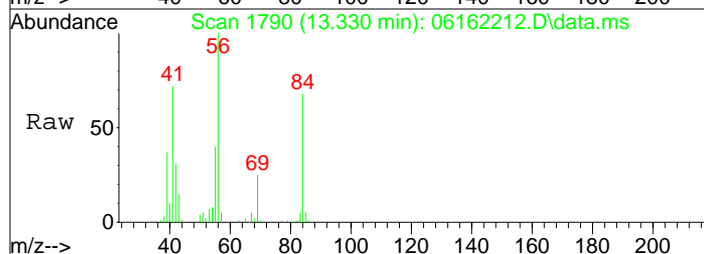






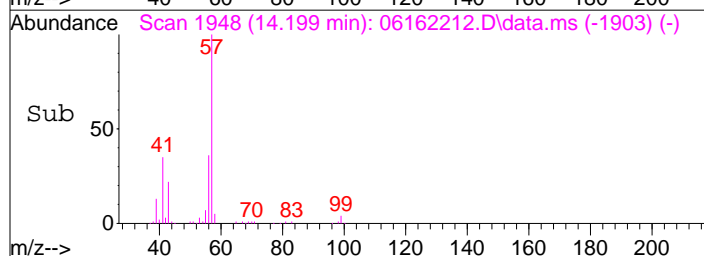
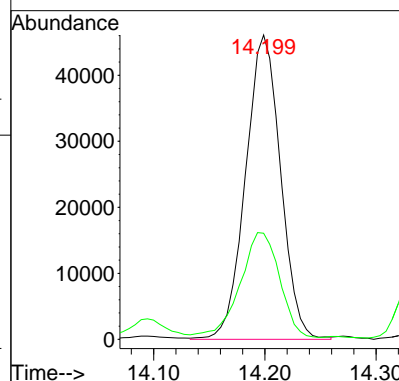
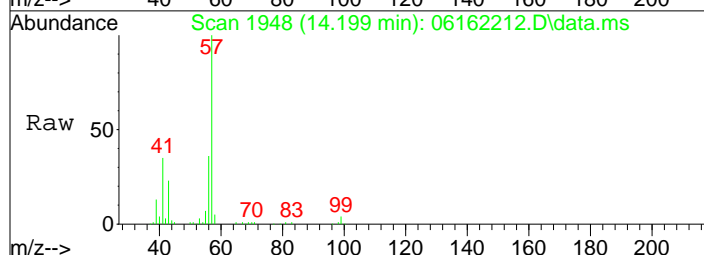
#43  
Cyclohexane  
Concen: 2.83 ng  
RT: 13.33 min Scan# 1790  
Delta R.T. -0.000 min  
Lab File: 06162212.D  
Acq: 16 Jun 2022 10:02

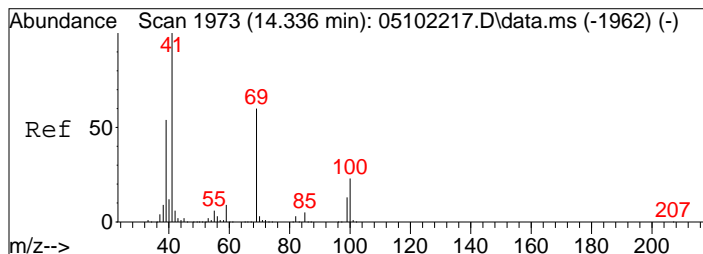
Tgt Ion:	84	Resp:	57572
Ion Ratio	Lower	Upper	
84	100		
69	36.8	17.1	57.1
56	148.3	120.7	160.7



#49  
2,2,4-Trimethylpentane (Isooctane)  
Concen: 1.53 ng  
RT: 14.20 min Scan# 1948  
Delta R.T. -0.000 min  
Lab File: 06162212.D  
Acq: 16 Jun 2022 10:02

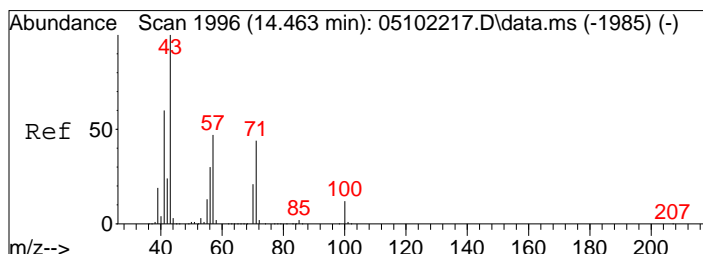
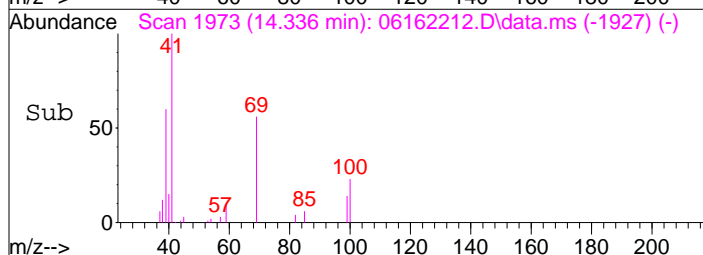
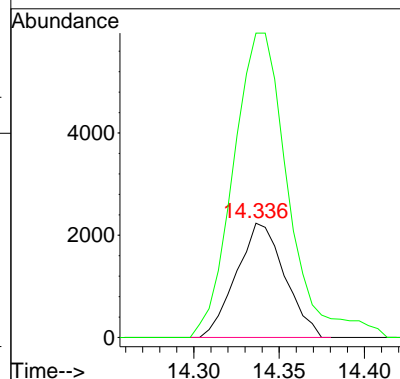
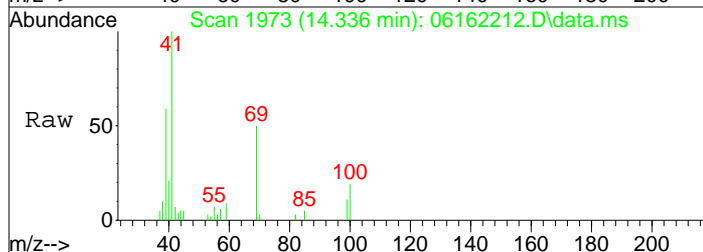
Tgt Ion:	57	Resp:	100777
Ion Ratio	Lower	Upper	
57	100		
41	39.5	10.0	50.0





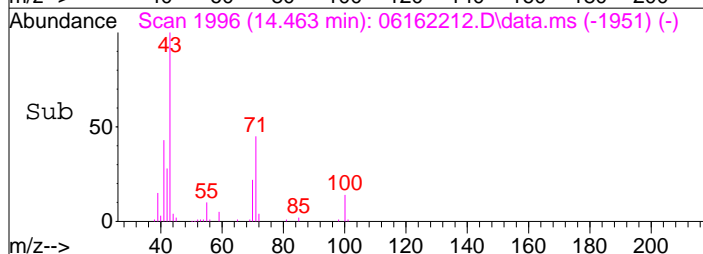
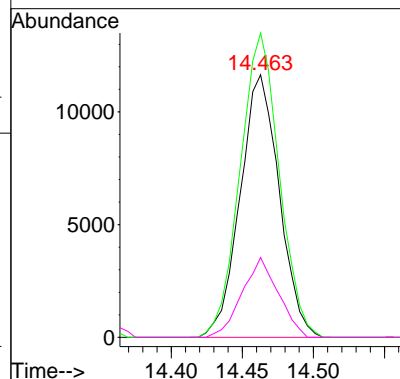
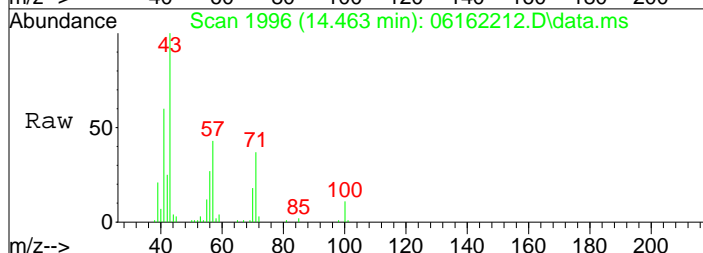
#50  
Methyl Methacrylate  
Concen: 0.80 ng  
RT: 14.34 min Scan# 1973  
Delta R.T. 0.000 min  
Lab File: 06162212.D  
Acq: 16 Jun 2022 10:02

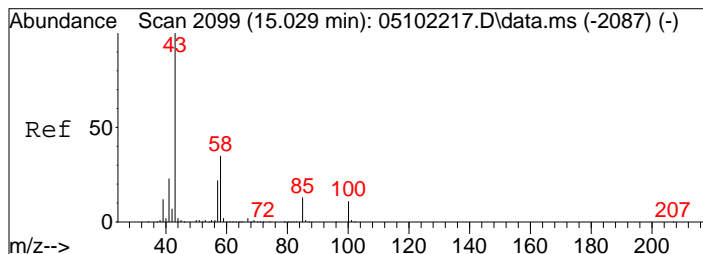
Tgt Ion	100	Resp	4403
Ion Ratio	100	Lower	Upper
69	302.7	241.9	281.9#



#51  
n-Heptane  
Concen: 1.61 ng  
RT: 14.46 min Scan# 1996  
Delta R.T. -0.000 min  
Lab File: 06162212.D  
Acq: 16 Jun 2022 10:02

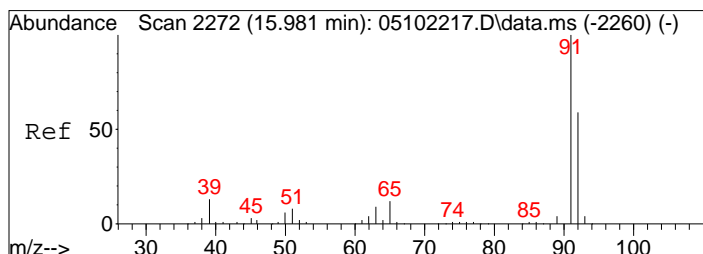
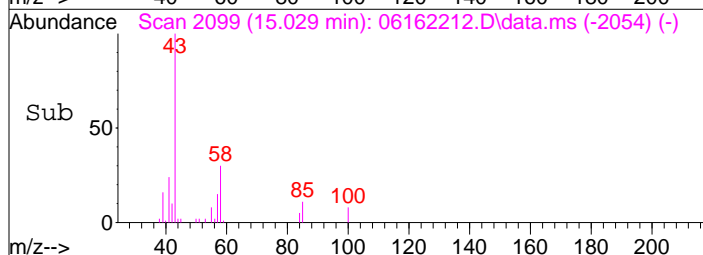
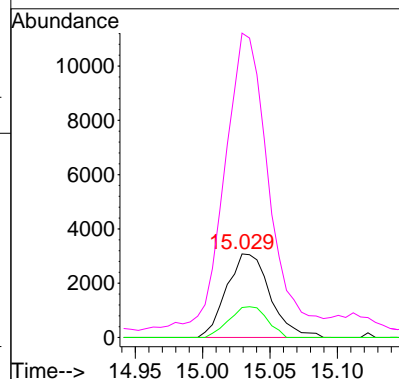
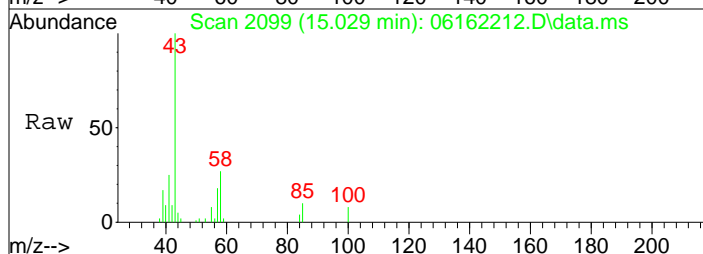
Tgt Ion	71	Resp	22279
Ion Ratio <th>71</th> <th>100</th> <th></th>	71	100	
57	116.0	87.4	127.4
100	28.1	8.4	48.4





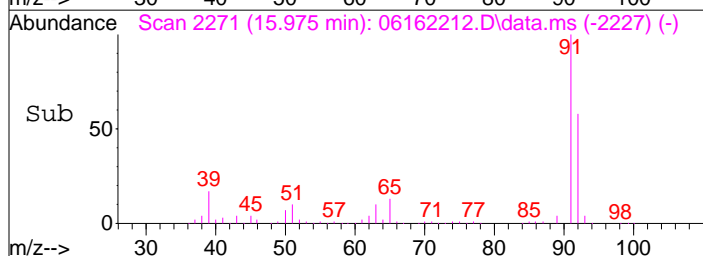
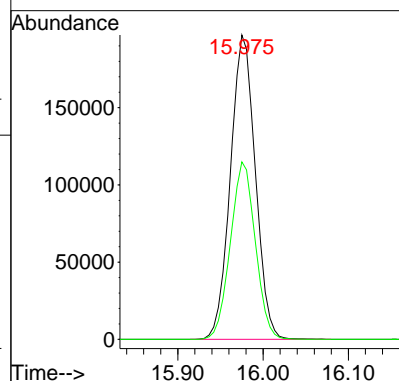
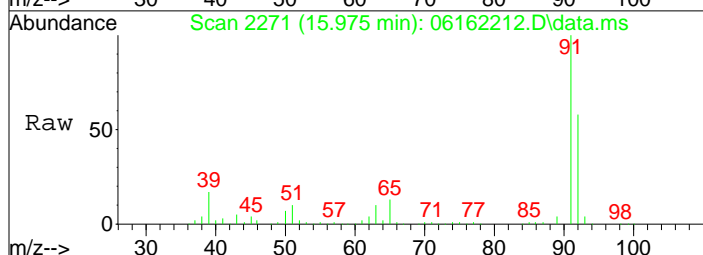
#53  
4-Methyl-2-pentanone  
Concen: 0.47 ng  
RT: 15.03 min Scan# 2099  
Delta R.T. -0.000 min  
Lab File: 06162212.D  
Acq: 16 Jun 2022 10:02

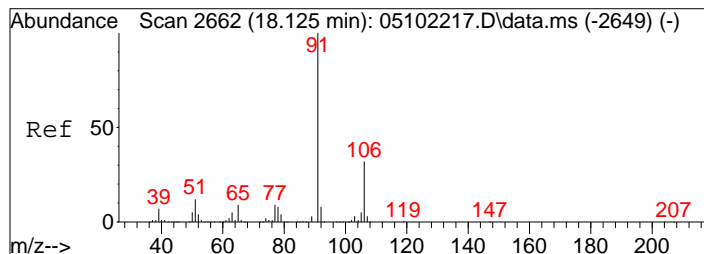
Tgt Ion	58	Resp	6915
Ion Ratio	58	100	
	85	32.2	29.7 44.5
	43	361.1	227.9 341.9#



#58  
Toluene  
Concen: 6.54 ng  
RT: 15.98 min Scan# 2271  
Delta R.T. -0.006 min  
Lab File: 06162212.D  
Acq: 16 Jun 2022 10:02

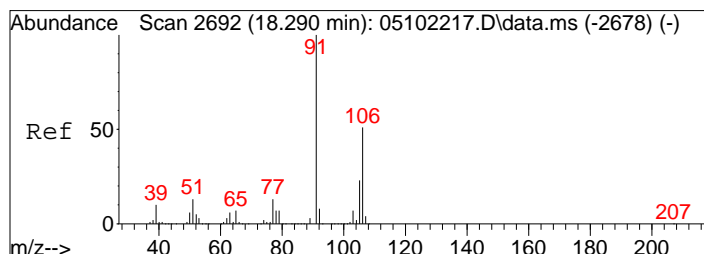
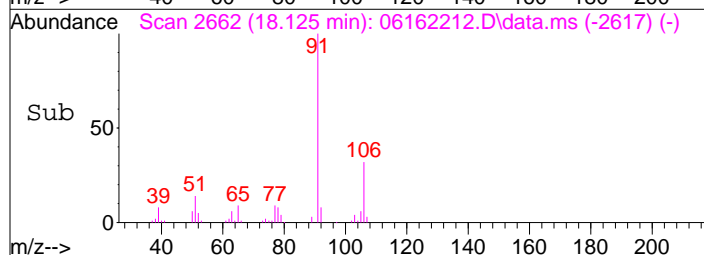
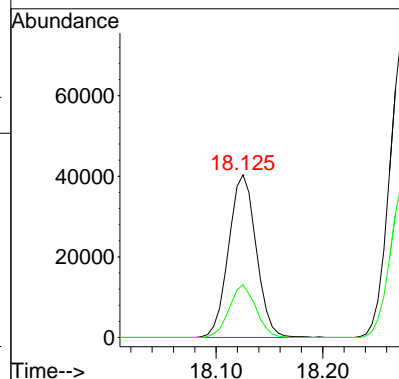
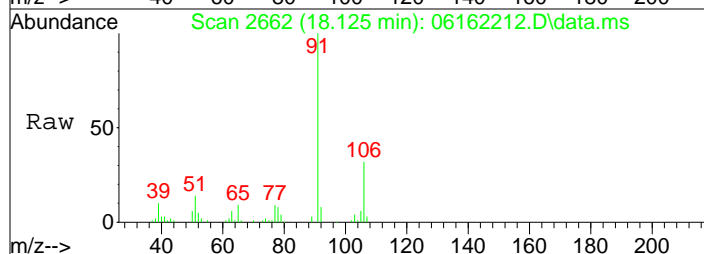
Tgt Ion	91	Resp	400243
Ion Ratio	91	100	
	92	58.3	39.1 79.1





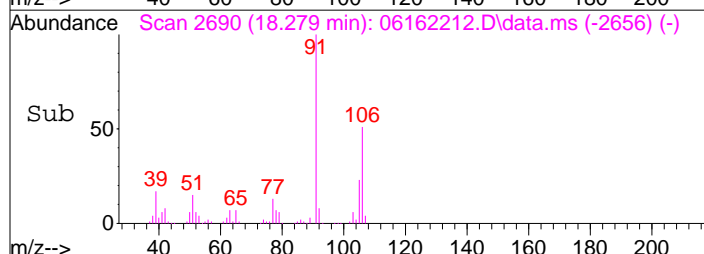
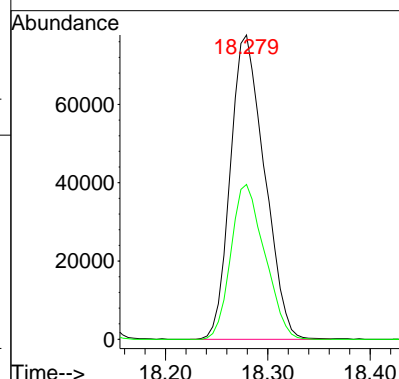
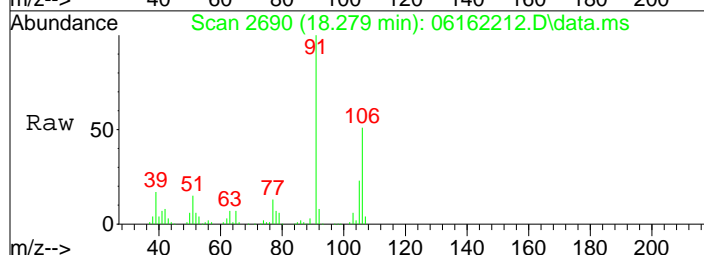
#66  
Ethylbenzene  
Concen: 1.02 ng  
RT: 18.13 min Scan# 2662  
Delta R.T. -0.000 min  
Lab File: 06162212.D  
Acq: 16 Jun 2022 10:02

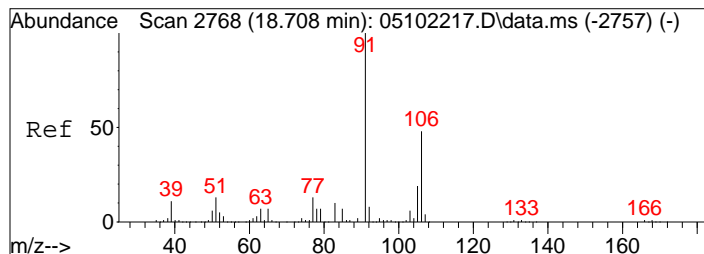
Tgt Ion:	91	Resp:	72700
Ion Ratio	Lower	Upper	
91	100		
106	31.3	12.0	52.0



#67  
m- & p-Xylenes  
Concen: 3.23 ng  
RT: 18.28 min Scan# 2690  
Delta R.T. -0.011 min  
Lab File: 06162212.D  
Acq: 16 Jun 2022 10:02

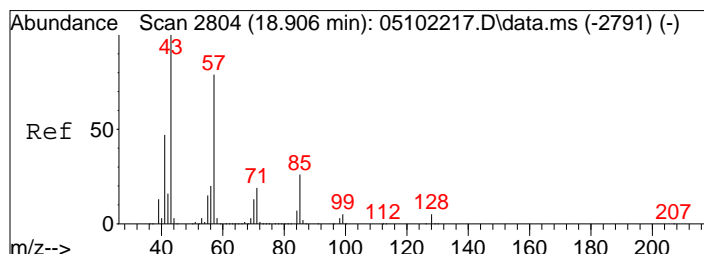
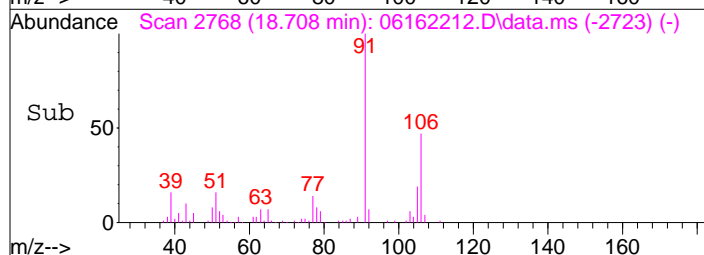
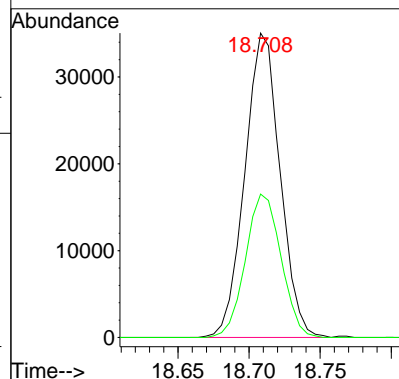
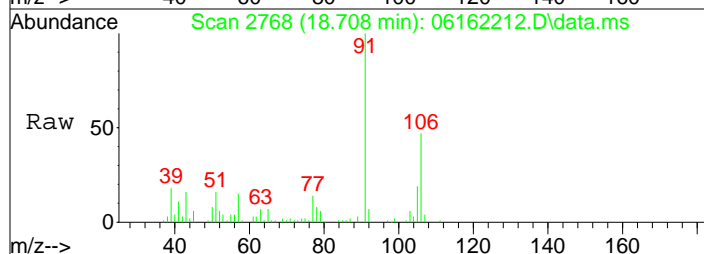
Tgt Ion:	91	Resp:	179917
Ion Ratio	Lower	Upper	
91	100		
106	50.5	30.8	70.8





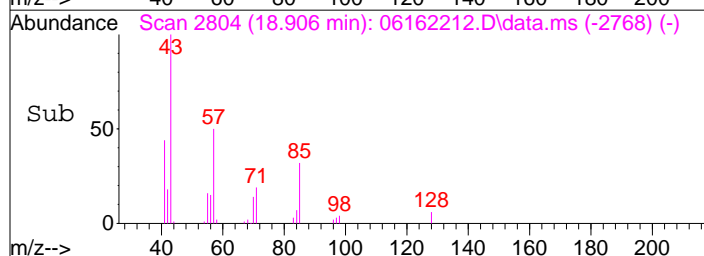
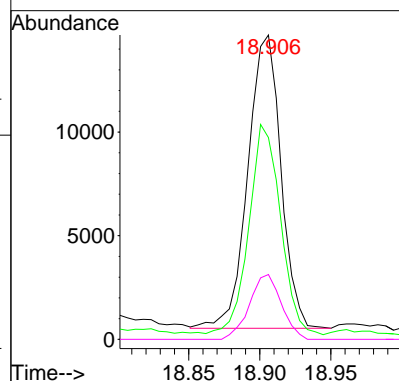
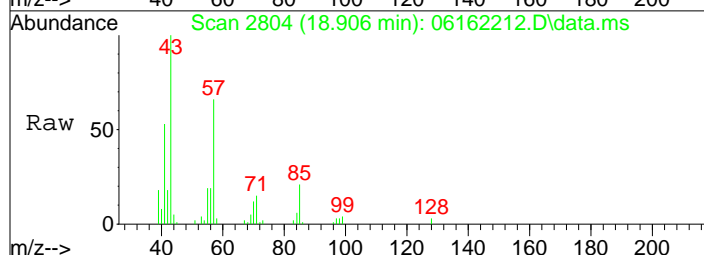
#70  
o-Xylene  
Concen: 1.09 ng  
RT: 18.71 min Scan# 2768  
Delta R.T. -0.000 min  
Lab File: 06162212.D  
Acq: 16 Jun 2022 10:02

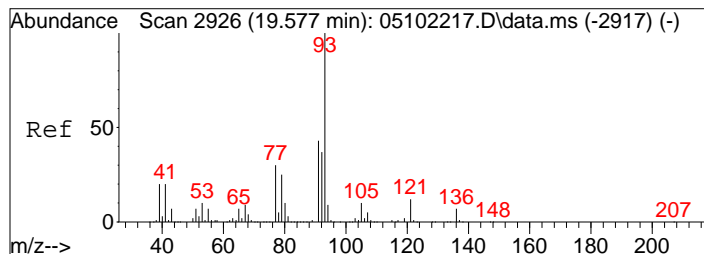
Tgt Ion: 91 Resp: 60358  
Ion Ratio Lower Upper  
91 100  
106 47.6 28.6 68.6



#71  
n-Nonane  
Concen: 0.57 ng  
RT: 18.91 min Scan# 2804  
Delta R.T. -0.000 min  
Lab File: 06162212.D  
Acq: 16 Jun 2022 10:02

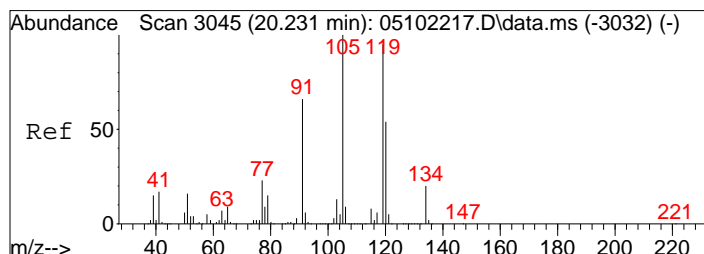
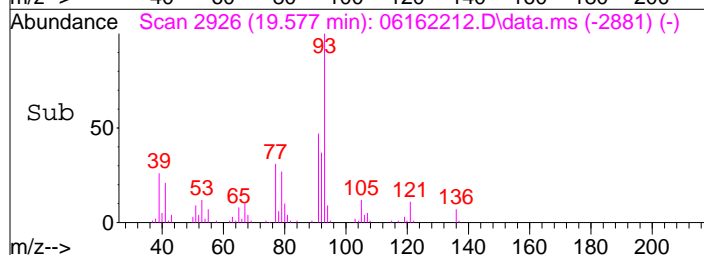
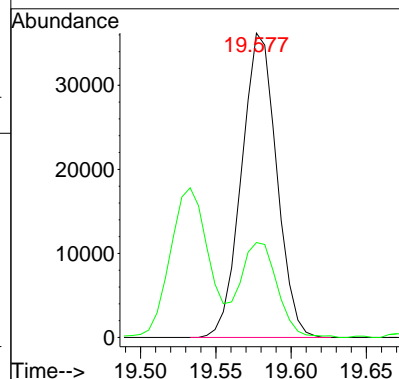
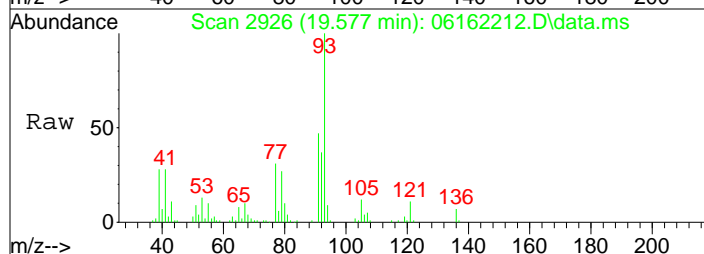
Tgt Ion: 43 Resp: 22897  
Ion Ratio Lower Upper  
43 100  
57 68.7 58.4 98.4  
85 21.3 5.3 45.3





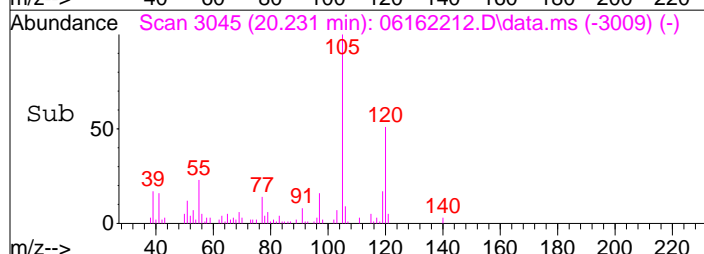
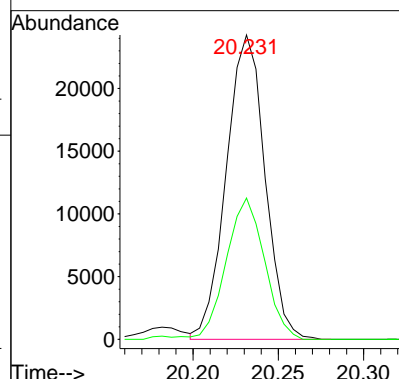
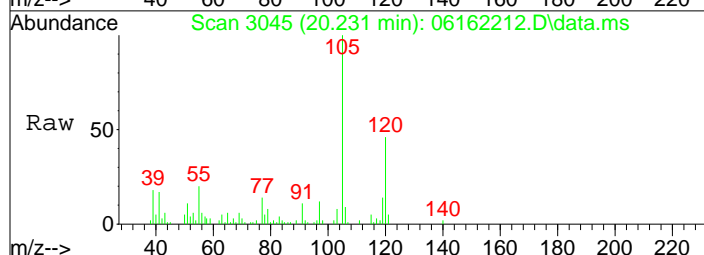
#75  
alpha-Pinene  
Concen: 1.71 ng  
RT: 19.58 min Scan# 2926  
Delta R.T. -0.000 min  
Lab File: 06162212.D  
Acq: 16 Jun 2022 10:02

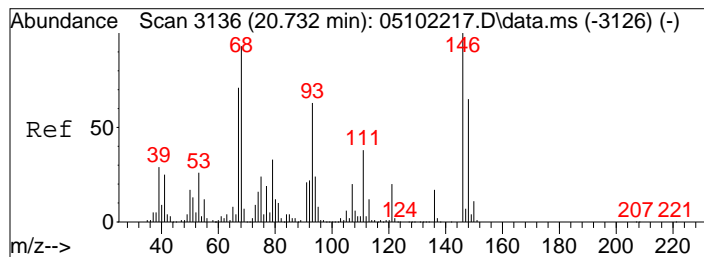
Tgt Ion:	93	Resp:	58802
Ion Ratio	Lower	Upper	
93	100		
77	33.4	11.2	51.2



#82  
1,2,4-Trimethylbenzene  
Concen: 0.63 ng  
RT: 20.23 min Scan# 3045  
Delta R.T. -0.000 min  
Lab File: 06162212.D  
Acq: 16 Jun 2022 10:02

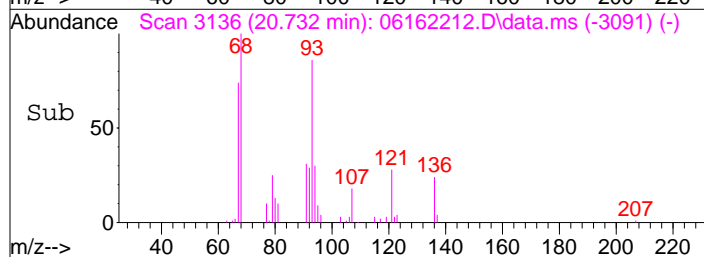
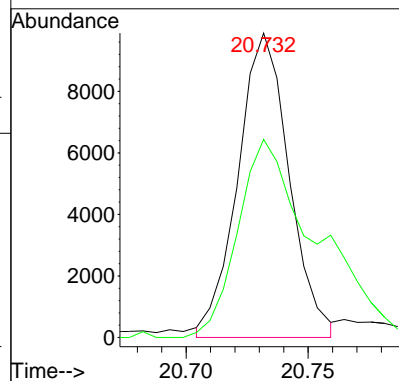
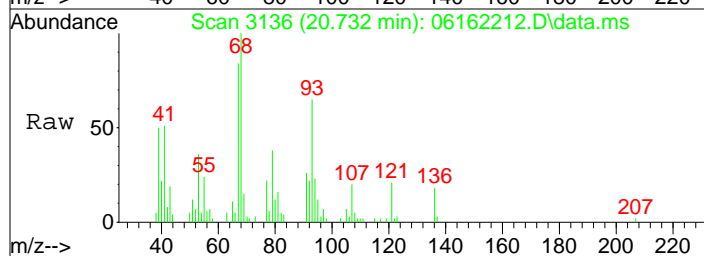
Tgt Ion:	105	Resp:	38186
Ion Ratio	Lower	Upper	
105	100		
120	45.8	34.4	74.4





#91  
d-Limonene  
Concen: 0.64 ng m  
RT: 20.73 min Scan# 3136  
Delta R.T. -0.000 min  
Lab File: 06162212.D  
Acq: 16 Jun 2022 10:02

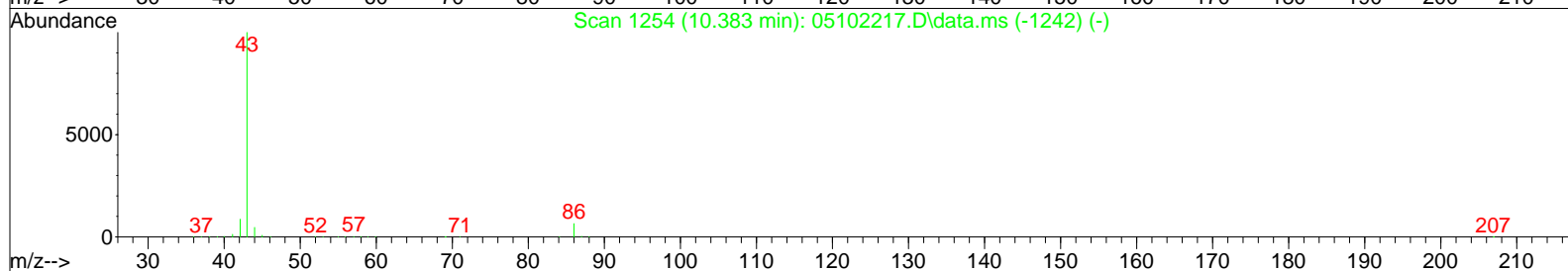
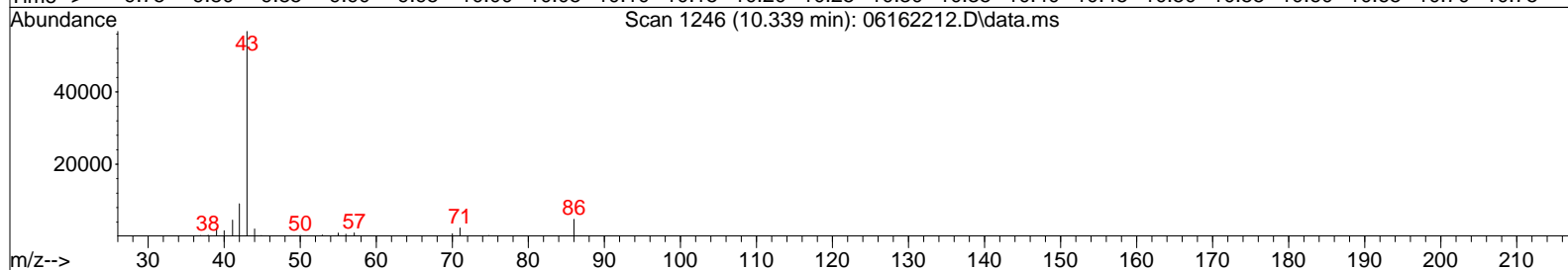
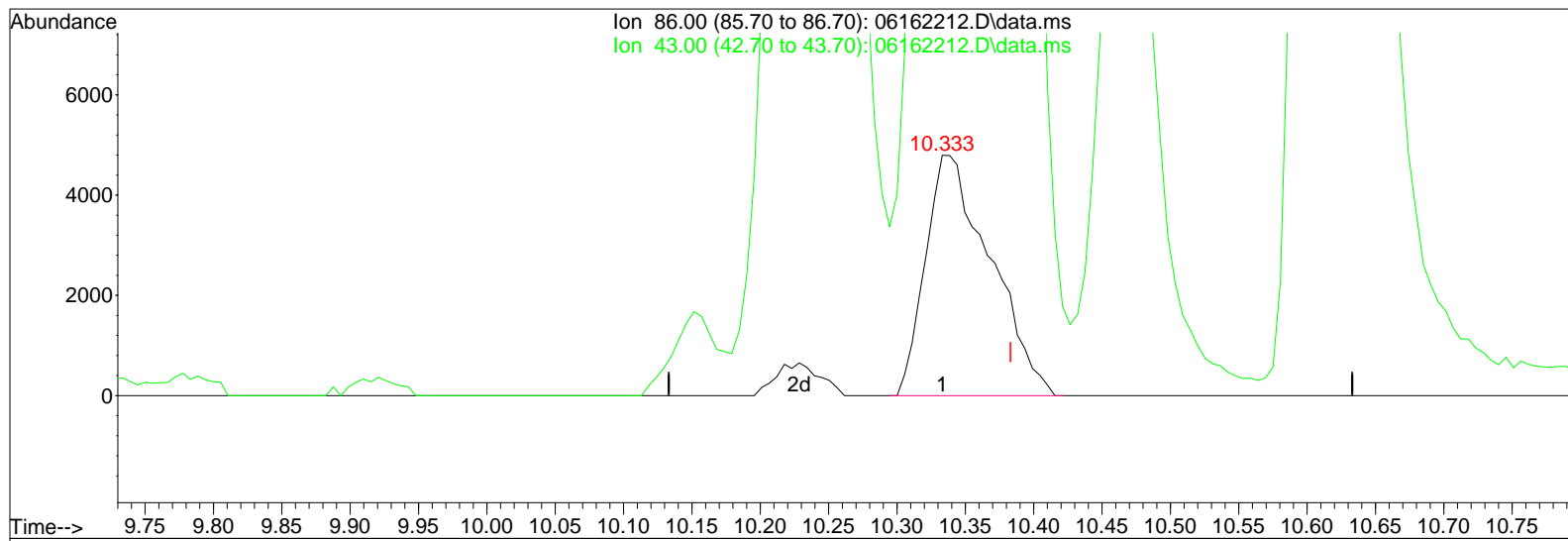
Tgt Ion: 68 Resp: 14440  
Ion Ratio Lower Upper  
68 100  
93 100.5 49.1 89.1#



Data File : I:\MS16\DATA\2022\_06\16\06162212.D  
Acq On : 16 Jun 2022 10:02  
Sample : P2202599-004 (1000mL)  
Misc : S35-04032201

Vial: 4  
Operator: WA  
Inst : GCMS-16

Quant Time: Jun 17 11:34:05 2022  
Quant Method : I:\MS16\METHODS\R16051022.M  
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
QLast Update : Tue May 10 19:05:32 2022  
Response via : Initial Calibration  
DataAcq Meth:TO15.M



TIC: 06162212.D\data.ms

(26) Vinyl Acetate (T)

10.333min (-0.050) 7.48ng

response 15807

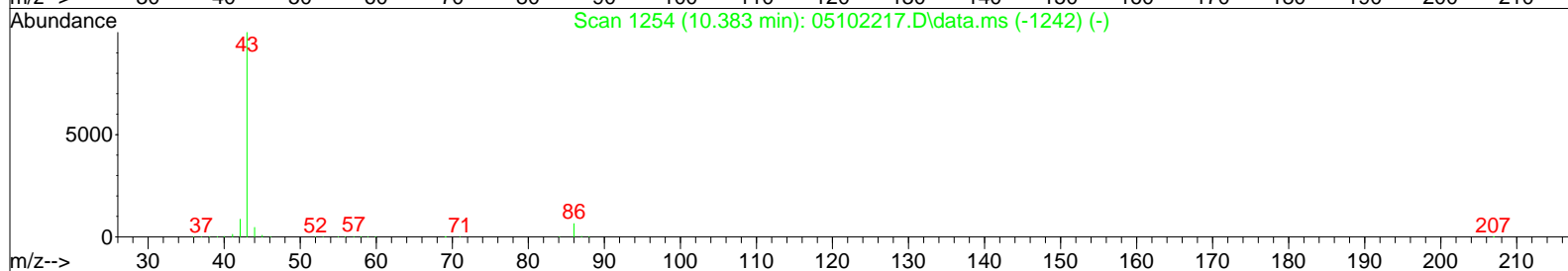
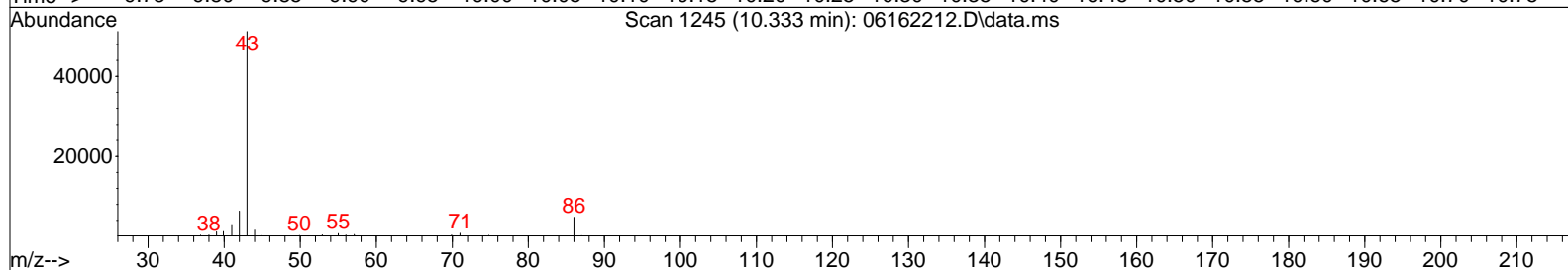
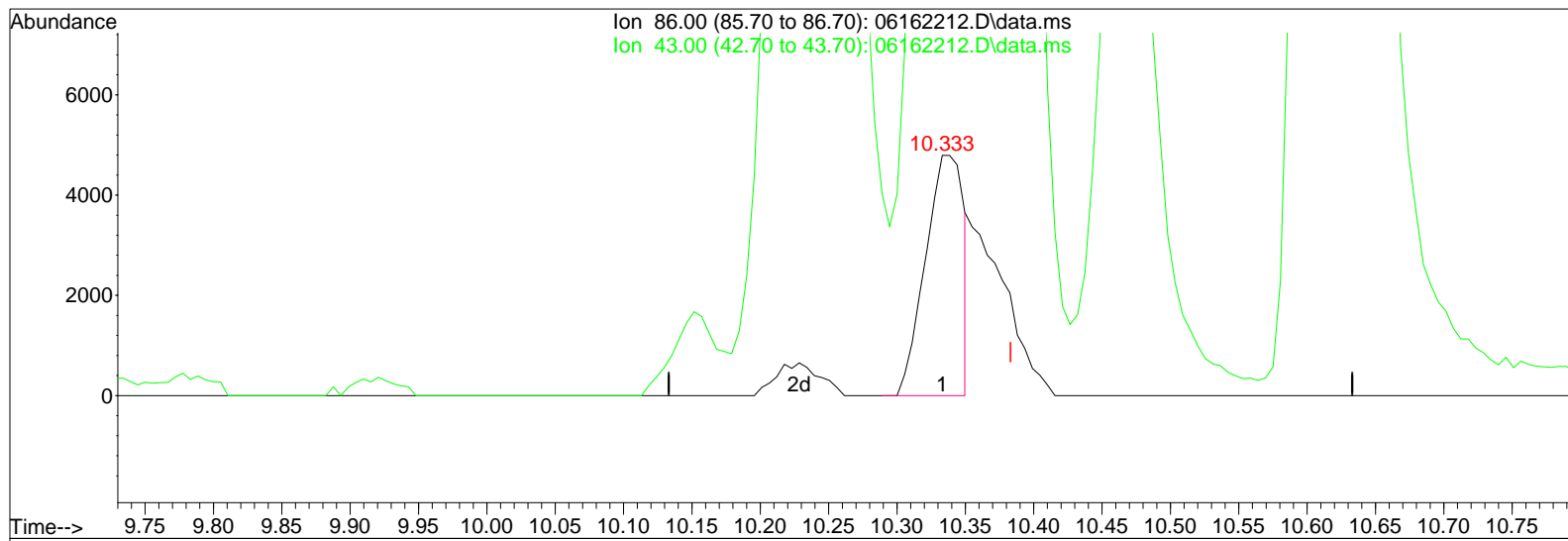
Ion	Exp%	Act%
86.00	100	100
43.00	1571.40	2123.14#
0.00	0.00	0.00
0.00	0.00	0.00



Data File : I:\MS16\DATA\2022\_06\16\06162212.D  
Acq On : 16 Jun 2022 10:02  
Sample : P2202599-004 (1000mL)  
Misc : S35-04032201

Vial: 4  
Operator: WA  
Inst : GCMS-16

Quant Time: Jun 17 11:34:05 2022  
Quant Method : I:\MS16\METHODS\R16051022.M  
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
QLast Update : Tue May 10 19:05:32 2022  
Response via : Initial Calibration  
DataAcq Meth:TO15.M



TIC: 06162212.D\data.ms

(26) Vinyl Acetate (T)

IPC

10.333min (-0.050) 4.41ng m

WA 6/19/22

response 9314

LH 6/20/22

Ion	Exp%	Act%
86.00	100	100
43.00	1571.40	3603.23#
0.00	0.00	0.00
0.00	0.00	0.00

Data File: I:\MS16\DATA\2022\_06\16\06162212.D

Sample : P2202599-004 (1000mL)

Acq On : 16 Jun 2022 10:02

Misc : S35-04032201

ALS Vial : 4 Sample Multiplier: 1

Inst : GCMS-16

Operator: WA

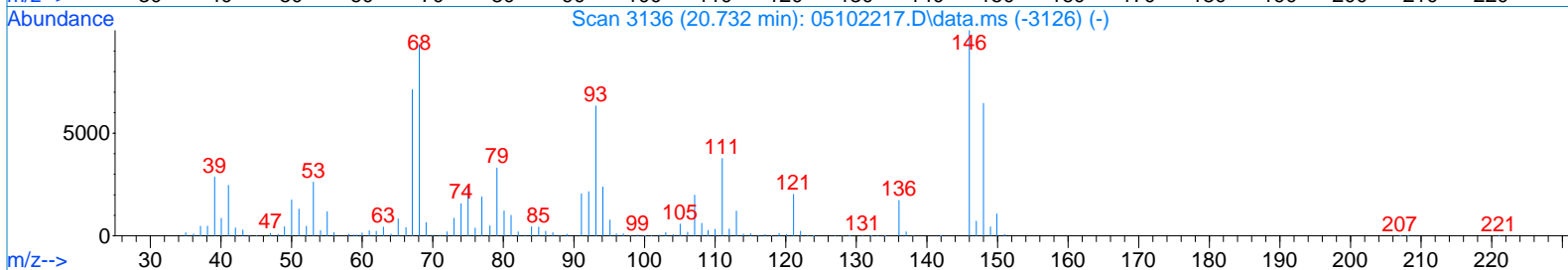
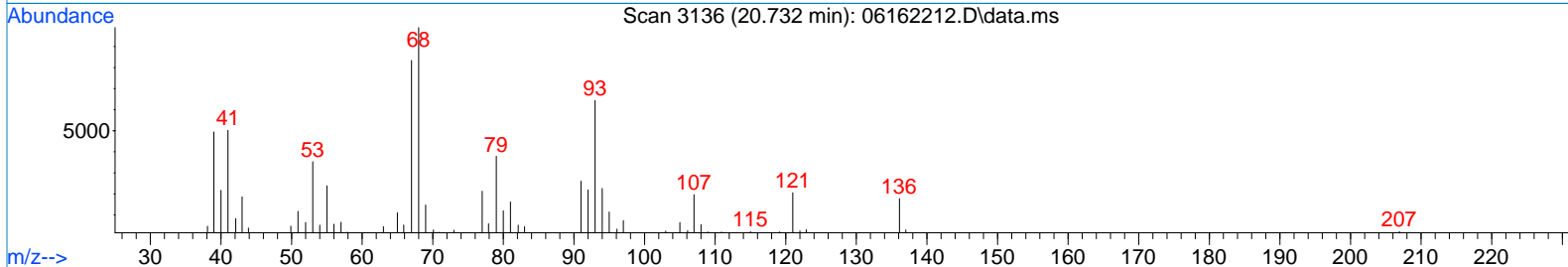
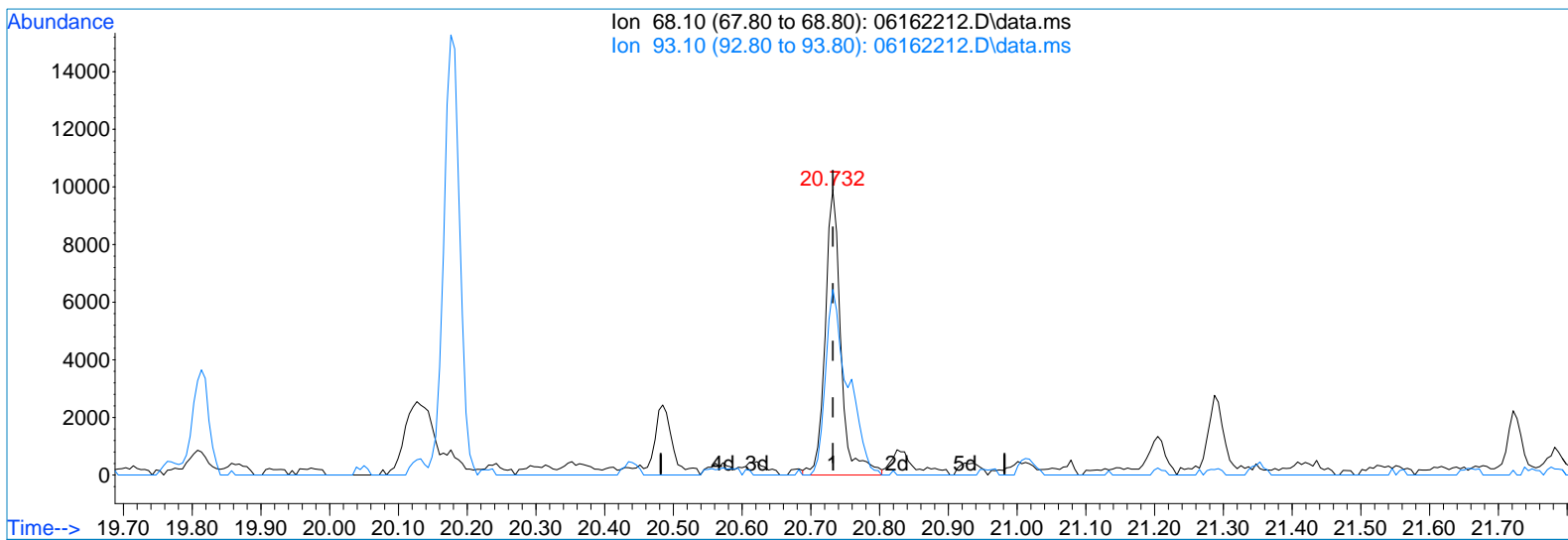
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

Quant Time: Jun 17 11:30:26 2022

Quant Method : I:\MS16\METHODS\R16051022.M

QLast Update : Tue May 10 19:05:32 2022

Response via : Initial Calibration



TIC: 06162212.D\data.ms

(91) d-Limonene (T)

20.732min (-0.000) 0.70ng

response 15719

Ion	Exp%	Act%
68.10	100	100
93.10	69.10	92.29#
0.00	0.00	0.00
0.00	0.00	0.00

Data File: I:\MS16\DATA\2022\_06\16\06162212.D

Sample : P2202599-004 (1000mL)

Acq On : 16 Jun 2022 10:02

Misc : S35-04032201

ALS Vial : 4 Sample Multiplier: 1

Inst : GCMS-16

Operator: WA

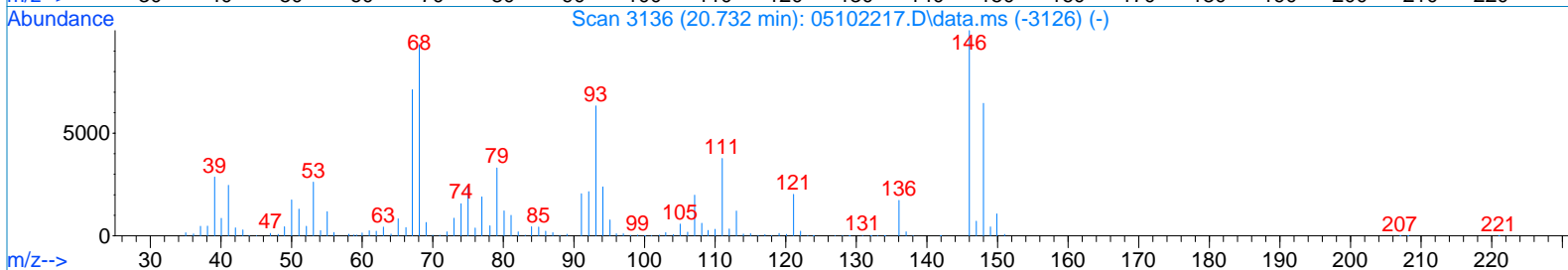
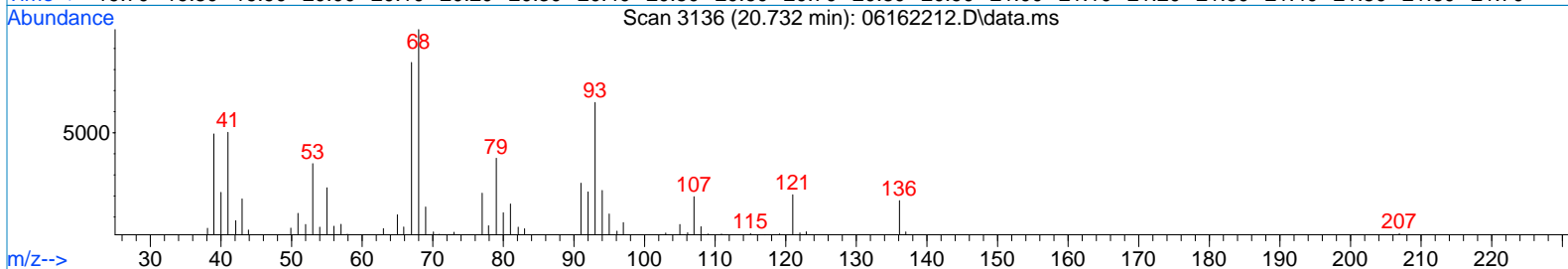
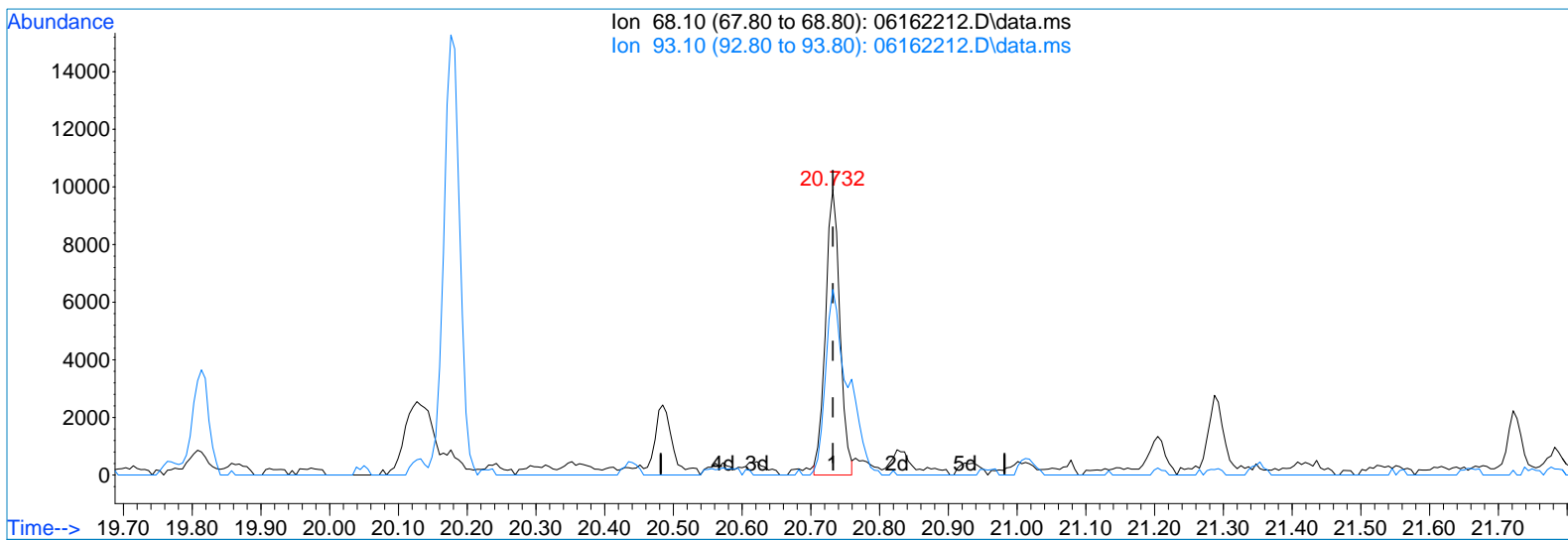
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

Quant Time: Jun 17 11:30:26 2022

Quant Method : I:\MS16\METHODS\R16051022.M

QLast Update : Tue May 10 19:05:32 2022

Response via : Initial Calibration



TIC: 06162212.D\data.ms

(91) d-Limonene (T)

20.732min (-0.000) 0.64ng m

response 14440

Ion	Exp%	Act%
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68.10	100	100
-------	-----	-----

93.10	69.10	100.46#
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0.00	0.00	0.00
------	------	------

0.00	0.00	0.00
------	------	------

IPC

KM 6/17/22

LWA 6/19/22

LM 6/20/22

Data File : I:\MS16\DATA\2022\_06\16\06162206.D  
 Acq On : 16 Jun 2022 6:21  
 Sample : MB R16061622\_1000mL  
 Misc : S35-04032201

Vial: 2  
 Operator: WA  
 Inst : GCMS-16

Quant Time: Jun 16 10:13:46 2022

Quant Method : I:\MS16\METHODS\R16051022.M

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 19:05:32 2022

Response via : Initial Calibration

DataAcq Meth:TO15.M

107 6/16/22

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.29	130	126192	12.500	ng	-0.03
37) 1,4-Difluorobenzene (IS2)	13.42	114	553767	12.500	ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.73	54	136726	12.500	ng	0.00

#### System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...)	12.15	65	232056	12.892	ng	-0.02
Spiked Amount	12.500	Range 70 - 130	Recovery	=	103.12%	
57) Toluene-d8 (SS2)	15.88	98	587229	11.346	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	90.80%	
73) Bromofluorobenzene (SS3)	19.11	174	202946	10.758	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	86.08%	

#### Target Compounds

						Qvalue
2) Propene	4.22	42	296	N.D.		
3) Dichlorodifluoromethan...	0.00	85	0	N.D.		
4) Chloromethane	0.00	50	0	N.D.		
5) 1,2-Dichloro-1,1,2,2-t...	0.00	135	0	N.D.		
6) Vinyl Chloride	0.00	62	0	N.D.		
7) 1,3-Butadiene	0.00	54	0	N.D.		
8) Bromomethane	0.00	94	0	N.D.		
9) Chloroethane	0.00	64	0	N.D.		
10) Ethanol	6.49	45	2912	0.192	ng	85
11) Acetonitrile	0.00	41	0	N.D.	d	
12) Acrolein	6.97	56	57	N.D.		
13) Acetone	7.20	58	1802	0.152	ng	# 74
14) Trichlorofluoromethane	0.00	101	0	N.D.		
15) 2-Propanol (Isopropanol)	7.71	45	321	N.D.		
16) Acrylonitrile	7.92	53	738	N.D.		
17) 1,1-Dichloroethene	0.00	96	0	N.D.		
18) 2-Methyl-2-Propanol (t...	0.00	59	0	N.D.		
19) Methylene Chloride	0.00	84	0	N.D.		
20) 3-Chloro-1-propene (Al...	0.00	41	0	N.D.		
21) Trichlorotrifluoroethane	0.00	151	0	N.D.		
22) Carbon Disulfide	0.00	76	0	N.D.	d	
23) trans-1,2-Dichloroethene	0.00	61	0	N.D.		
24) 1,1-Dichloroethane	0.00	63	0	N.D.		
25) Methyl tert-Butyl Ether	0.00	73	0	N.D.		
26) Vinyl Acetate	0.00	86	0	N.D.		
27) 2-Butanone (MEK)	0.00	72	0	N.D.		
28) cis-1,2-Dichloroethene	0.00	61	0	N.D.		
29) Diisopropyl Ether	0.00	87	0	N.D.		
30) Ethyl Acetate	0.00	61	0	N.D.		
31) n-Hexane	0.00	57	0	N.D.		
32) Chloroform	0.00	83	0	N.D.		
34) Tetrahydrofuran (THF)	0.00	72	0	N.D.		
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.		
36) 1,2-Dichloroethane	0.00	62	0	N.D.		
38) 1,1,1-Trichloroethane	0.00	97	0	N.D.		
39) Isopropyl Acetate	0.00	61	0	N.D.		
40) 1-Butanol	0.00	56	0	N.D.		
41) Benzene	13.03	78	780	N.D.		
42) Carbon Tetrachloride	0.00	117	0	N.D.		
43) Cyclohexane	13.41	84	620	N.D.		
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.		
45) 1,2-Dichloropropane	0.00	63	0	N.D.		
46) Bromodichloromethane	0.00	83	0	N.D.		
47) Trichloroethene	0.00	130	0	N.D.		
48) 1,4-Dioxane	0.00	88	0	N.D.		
49) 2,2,4-Trimethylpentane...	0.00	57	0	N.D.		
50) Methyl Methacrylate	0.00	100	0	N.D.		

Data File : I:\MS16\DATA\2022\_06\16\06162206.D  
 Acq On : 16 Jun 2022 6:21  
 Sample : MB R16061622\_1000mL  
 Misc : S35-04032201

Vial: 2  
 Operator: WA  
 Inst : GCMS-16

Quant Time: Jun 16 10:13:46 2022

Quant Method : I:\MS16\METHODS\R16051022.M

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 19:05:32 2022

Response via : Initial Calibration

DataAcq Meth:TO15.M

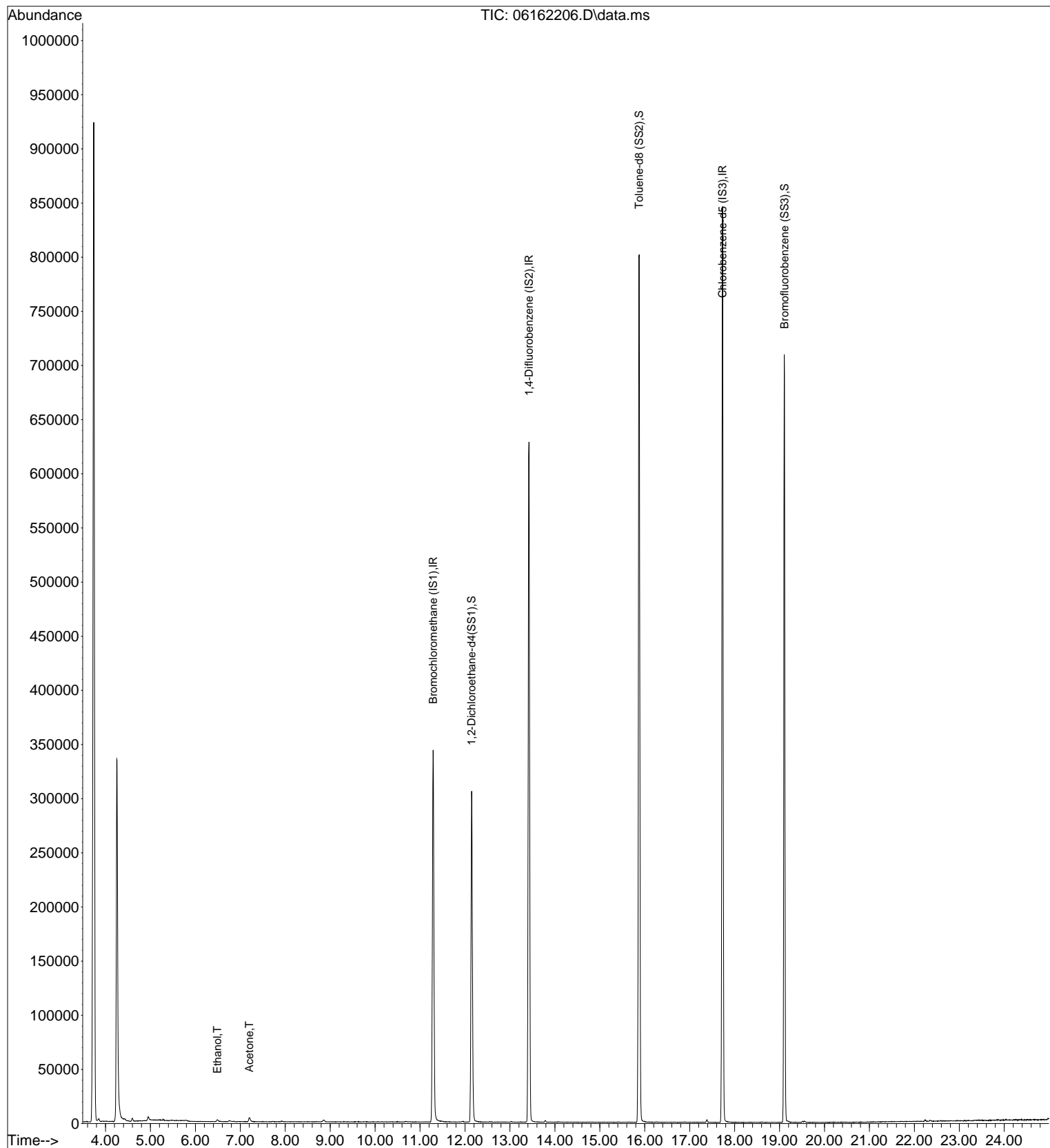
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	0.00	71	0	N.D.		
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.		
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.		
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.		
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.		
58) Toluene	15.98	91	264	N.D.		
59) 2-Hexanone	16.26	43	427	N.D.		
60) Dibromochloromethane	0.00	129	0	N.D.		
61) 1,2-Dibromoethane	0.00	107	0	N.D.		
62) n-Butyl Acetate	16.88	43	380	N.D.		
63) n-Octane	0.00	57	0	N.D.		
64) Tetrachloroethene	0.00	166	0	N.D.		
65) Chlorobenzene	0.00	112	0	N.D.		
66) Ethylbenzene	0.00	91	0	N.D.		
67) m- & p-Xylenes	0.00	91	0	N.D.		
68) Bromoform	0.00	173	0	N.D.		
69) Styrene	0.00	104	0	N.D.		
70) o-Xylene	0.00	91	0	N.D.		
71) n-Nonane	0.00	43	0	N.D.		
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.		
74) Cumene	19.10	105	400	N.D.		
75) alpha-Pinene	0.00	93	0	N.D.		
76) n-Propylbenzene	0.00	91	0	N.D.		
77) 3-Ethyltoluene	19.60	105	161	No Calib	#	
78) 4-Ethyltoluene	0.00	105	0	N.D.		
79) 1,3,5-Trimethylbenzene	0.00	105	0	N.D.		
80) alpha-Methylstyrene	0.00	118	0	N.D.		
81) 2-Ethyltoluene	0.00	105	0	N.D.		
82) 1,2,4-Trimethylbenzene	0.00	105	0	N.D.		
83) n-Decane	0.00	58	0	N.D.		
84) Benzyl Chloride	20.35	91	111	N.D.		
85) 1,3-Dichlorobenzene	20.37	146	124	N.D.		
86) 1,4-Dichlorobenzene	20.43	146	201	N.D.		
87) sec-Butylbenzene	0.00	105	0	N.D.		
88) 4-Isopropyltoluene (p-...	0.00	119	0	N.D.		
89) 1,2,3-Trimethylbenzene	0.00	105	0	N.D.		
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.		
91) d-Limonene	0.00	68	0	N.D.		
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.		
93) n-Undecane	0.00	57	0	N.D.		
94) 1,2,4-Trichlorobenzene	22.24	180	809	N.D.		
95) Naphthalene	22.35	128	1645	N.D.		
96) n-Dodecane	0.00	57	0	N.D.		
97) Hexachlorobutadiene	0.00	225	0	N.D.		
98) Cyclohexanone	0.00	55	0	N.D.		
99) tert-Butylbenzene	0.00	119	0	N.D.		
100) n-Butylbenzene	20.97	91	107	N.D.		
101) 1,1,1,2-Tetrachloroethane	0.00	131	0	N.D.		

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Data File : I:\MS16\DATA\2022\_06\16\06162206.D  
Acq On : 16 Jun 2022 6:21  
Sample : MB R16061622\_1000mL  
Misc : S35-04032201

Vial: 2  
Operator: WA  
Inst : GCMS-16

Quant Time: Jun 16 10:13:46 2022  
Quant Method : I:\MS16\METHODS\R16051022.M  
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
QLast Update : Tue May 10 19:05:32 2022  
Response via : Initial Calibration  
DataAcq Meth:TO15.M



Data File : I:\MS16\DATA\2022\_06\16\06162207.D

Vial: 2

Acq On : 16 Jun 2022 6:56

Operator: WA

Sample : LCS R16061622\_25ng

Inst : GCMS-16

Misc : S35-04032201/S35-05312201 (6/30)

Quant Time: Jun 16 07:26:24 2022

Quant Method : I:\MS16\METHODS\R16051022.M

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 19:05:32 2022

Response via : Initial Calibration

6/16/22

DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.32	130	134233	12.500	ng	0.00
37) 1,4-Difluorobenzene (IS2)	13.43	114	594478	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	17.73	54	154021	12.500	ng	0.00

## System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...)	12.17	65	250838	13.101	ng	0.00
Spiked Amount	12.500	Range	70 - 130	Recovery	=	104.80%
57) Toluene-d8 (SS2)	15.88	98	630126	10.808	ng	0.00
Spiked Amount	12.500	Range	70 - 130	Recovery	=	86.48%
73) Bromofluorobenzene (SS3)	19.11	174	229350	10.793	ng	0.00
Spiked Amount	12.500	Range	70 - 130	Recovery	=	86.32%

## Target Compounds

						Qvalue
2) Propene	4.17	42	711486	27.201	ng	99
3) Dichlorodifluoromethan...	4.34	85	744621	24.707	ng	100
4) Chloromethane	4.63	50	703228	26.620	ng	99
5) 1,2-Dichloro-1,1,2,2-t...	4.90	135	398475	25.811	ng	100
6) Vinyl Chloride	5.06	62	653887	27.919	ng	100
7) 1,3-Butadiene	5.33	54	578717	27.524	ng	95
8) Bromomethane	5.77	94	283391	24.327	ng	100
9) Chloroethane	6.12	64	254006	25.427	ng	100
10) Ethanol	6.52	45	1737483	107.880	ng	99
11) Acetonitrile	6.76	41	922945	24.554	ng	100
12) Acrolein	6.95	56	552017	47.578	ng	99
13) Acetone	7.16	58	1701719	134.893	ng	87
14) Trichlorofluoromethane	7.40	101	654679	24.640	ng	100
15) 2-Propanol (Isopropanol)	7.67	45	2412626	52.820	ng	99
16) Acrylonitrile	7.93	53	1218833	51.899	ng	99
17) 1,1-Dichloroethene	8.37	96	340519	24.559	ng	94
18) 2-Methyl-2-Propanol (t...	8.54	59	2203111	53.481	ng	97
19) Methylene Chloride	8.60	84	345846	23.986	ng	86
20) 3-Chloro-1-propene (Al...	8.76	41	672196	26.640	ng	95
21) Trichlorotrifluoroethane	9.01	151	310811	24.649	ng	95
22) Carbon Disulfide	8.85	76	2508251	50.713	ng	100
23) trans-1,2-Dichloroethene	9.87	61	565700	25.826	ng	99
24) 1,1-Dichloroethane	10.12	63	690640	25.717	ng	100
25) Methyl tert-Butyl Ether	10.22	73	1080972	24.091	ng	98
26) Vinyl Acetate	10.38	86	354616	154.384	ng	# 58
27) 2-Butanone (MEK)	10.62	72	492396	50.584	ng	# 75
28) cis-1,2-Dichloroethene	11.14	61	553695	25.449	ng	97
29) Diisopropyl Ether	11.43	87	768674	61.727	ng	# 79
30) Ethyl Acetate	11.44	61	587560	91.436	ng	94
31) n-Hexane	11.42	57	888281	29.698	ng	99
32) Chloroform	11.49	83	651880	26.504	ng	100
34) Tetrahydrofuran (THF)	11.88	72	462698	49.998	ng	# 85
35) Ethyl tert-Butyl Ether	12.02	87	917560	52.548	ng	91
36) 1,2-Dichloroethane	12.29	62	563212	26.262	ng	99
38) 1,1,1-Trichloroethane	12.56	97	595394	24.778	ng	98
39) Isopropyl Acetate	12.99	61	10813	No Calib	#	
40) 1-Butanol	13.01	56	13106	No Calib	#	
41) Benzene	13.04	78	1439352	25.311	ng	100
42) Carbon Tetrachloride	13.20	117	489347	23.909	ng	100
43) Cyclohexane	13.33	84	1125284	51.288	ng	93
44) tert-Amyl Methyl Ether	13.67	73	2215520	52.399	ng	95
45) 1,2-Dichloropropane	13.89	63	399996	25.662	ng	100
46) Bromodichloromethane	14.08	83	535818	25.943	ng	100
47) Trichloroethene	14.13	130	396883	25.098	ng	100
48) 1,4-Dioxane	14.11	88	299644	25.244	ng	98
49) 2,2,4-Trimethylpentane...	14.20	57	1872366	26.313	ng	95
50) Methyl Methacrylate	14.34	100	306251	51.869	ng	92

Data File : I:\MS16\DATA\2022\_06\16\06162207.D

Vial: 2

Acq On : 16 Jun 2022 6:56

Operator: WA

Sample : LCS R16061622\_25ng

Inst : GCMS-16

Misc : S35-04032201/S35-05312201 (6/30)

Quant Time: Jun 16 07:26:24 2022

Quant Method : I:\MS16\METHODS\R16051022.M

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 19:05:32 2022

Response via : Initial Calibration

DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.46	71	369300	24.771	ng	95
52) cis-1,3-Dichloropropene	15.00	75	593590	26.389	ng	99
53) 4-Methyl-2-pentanone	15.02	58	903427	56.452	ng	87
54) trans-1,3-Dichloropropene	15.51	75	529582	25.554	ng	100
55) 1,1,2-Trichloroethane	15.68	97	351074	24.772	ng	99
58) Toluene	15.98	91	1495136	21.931	ng	99
59) 2-Hexanone	16.22	43	2692110	51.970	ng	94
60) Dibromochloromethane	16.39	129	451372	21.850	ng	100
61) 1,2-Dibromoethane	16.64	107	409383	21.685	ng	99
62) n-Butyl Acetate	16.85	43	2994292	52.988	ng	95
63) n-Octane	16.98	57	401422	21.879	ng	93
64) Tetrachloroethene	17.12	166	414297	21.472	ng	100
65) Chlorobenzene	17.77	112	1007970	22.205	ng	100
66) Ethylbenzene	18.13	91	1781526	22.507	ng	98
67) m- & p-Xylenes	18.29	91	2901137	46.776	ng	99
68) Bromoform	18.35	173	388713	21.940	ng	100
69) Styrene	18.61	104	1040441	21.924	ng	100
70) o-Xylene	18.71	91	1439421	23.380	ng	99
71) n-Nonane	18.91	43	1173821	26.085	ng	93
72) 1,1,2,2-Tetrachloroethane	18.69	83	676768	23.564	ng	99
74) Cumene	19.23	105	1850101	23.074	ng	99
75) alpha-Pinene	19.58	93	895954	23.427	ng	97
76) n-Propylbenzene	19.68	91	2248125	23.630	ng	98
77) 3-Ethyltoluene	19.81	105	1864344	No Calib		
78) 4-Ethyltoluene	19.81	105	1864344	23.585	ng	98
79) 1,3,5-Trimethylbenzene	19.87	105	1562454	23.761	ng	98
80) alpha-Methylstyrene	19.87	118	12466	No Calib	#	
81) 2-Ethyltoluene	19.87	105	1562454	No Calib		
82) 1,2,4-Trimethylbenzene	20.23	105	1785272	26.258	ng	99
83) n-Decane	20.23	58	112914	No Calib	#	
84) Benzyl Chloride	20.35	91	2519259	51.269	ng	97
85) 1,3-Dichlorobenzene	20.37	146	932744	24.070	ng	100
86) 1,4-Dichlorobenzene	20.42	146	881447	22.389	ng	99
87) sec-Butylbenzene	20.47	105	2109630	24.128	ng	99
88) 4-Isopropyltoluene (p-...	20.61	119	1822839	23.437	ng	99
89) 1,2,3-Trimethylbenzene	20.61	105	70276	No Calib		
90) 1,2-Dichlorobenzene	20.73	146	907908	24.287	ng	100
91) d-Limonene	20.73	68	658417	26.189	ng	97
92) 1,2-Dibromo-3-Chloropr...	21.11	157	670257	44.318	ng	86
93) n-Undecane	22.33	57	2115	No Calib	#	
94) 1,2,4-Trichlorobenzene	22.24	180	1409633	44.831	ng	100
95) Naphthalene	22.34	128	2008227	22.124	ng	100
96) n-Dodecane	22.33	57	2014	No Calib	#	
97) Hexachlorobutadiene	22.66	225	402407	20.043	ng	99
98) Cyclohexanone	18.28	55	2884	No Calib		
99) tert-Butylbenzene	20.23	119	1696686	25.988	ng	100
100) n-Butylbenzene	20.97	91	1728224	23.987	ng	98
101) 1,1,1,2-Tetrachloroethane	17.76	131	389144	21.628	ng	99

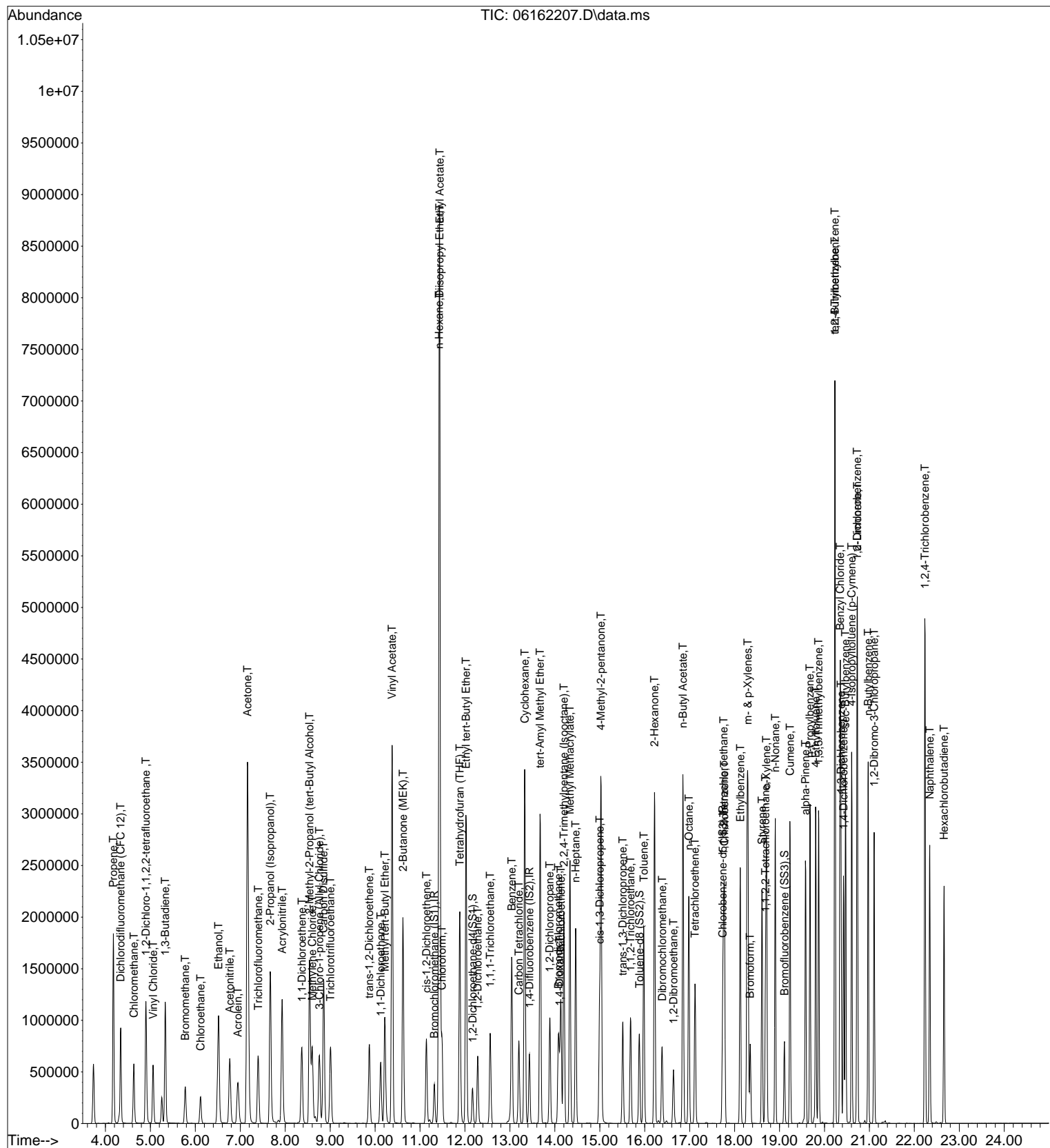
(#) = qualifier out of range (m) = manual integration (+) = signals summed



Data File : I:\MS16\DATA\2022\_06\16\06162207.D  
Acq On : 16 Jun 2022 6:56  
Sample : LCS R16061622\_25ng  
Misc : S35-04032201/S35-05312201 (6/30)

Vial: 2  
Operator: WA  
Inst : GCMS-16

Quant Time: Jun 16 07:26:24 2022  
Quant Method : I:\MS16\METHODS\R16051022.M  
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
QLast Update : Tue May 10 19:05:32 2022  
Response via : Initial Calibration  
DataAcq Meth:TO15.M



Data File : I:\MS16\DATA\2022\_06\16\06162214.D

Vial: 2

Acq On : 16 Jun 2022 11:29

Operator: WA

Sample : LCSD R16061622\_25ng

Inst : GCMS-16

Misc : S35-04032201/S35-05312201 (6/30)

Quant Time: Jun 16 13:34:31 2022

Quant Method : I:\MS16\METHODS\R16051022.M

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 19:05:32 2022

Response via : Initial Calibration

DataAcq Meth:TO15.M

107 6/16/22

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.32	130	130126	12.500	ng	0.00
37) 1,4-Difluorobenzene (IS2)	13.43	114	567984	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	17.73	54	150519	12.500	ng	0.00

## System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...)	12.17	65	242545	13.068	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	104.56%	
57) Toluene-d8 (SS2)	15.88	98	609300	10.694	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	85.52%	
73) Bromofluorobenzene (SS3)	19.11	174	219608	10.575	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	84.56%	

## Target Compounds

						Qvalue
2) Propene	4.17	42	721221	28.443	ng	99
3) Dichlorodifluoromethan...	4.34	85	721040	24.680	ng	100
4) Chloromethane	4.63	50	671195	26.209	ng	99
5) 1,2-Dichloro-1,1,2,2-t...	4.91	135	374335	25.012	ng	100
6) Vinyl Chloride	5.06	62	631202	27.801	ng	100
7) 1,3-Butadiene	5.33	54	567495	27.842	ng	95
8) Bromomethane	5.78	94	272516	24.132	ng	100
9) Chloroethane	6.12	64	247388	25.547	ng	100
10) Ethanol	6.53	45	1722185	110.305	ng	99
11) Acetonitrile	6.78	41	912149	25.032	ng	100
12) Acrolein	6.95	56	539050	47.927	ng	99
13) Acetone	7.17	58	1642321	134.293	ng	# 85
14) Trichlorofluoromethane	7.40	101	622778	24.179	ng	100
15) 2-Propanol (Isopropanol)	7.68	45	2336757	52.774	ng	99
16) Acrylonitrile	7.94	53	1188791	52.217	ng	99
17) 1,1-Dichloroethene	8.38	96	328254	24.422	ng	93
18) 2-Methyl-2-Propanol (t...	8.55	59	2051458	51.371	ng	96
19) Methylene Chloride	8.61	84	332856	23.814	ng	84
20) 3-Chloro-1-propene (Al...	8.77	41	660455	27.000	ng	94
21) Trichlorotrifluoroethane	9.01	151	293280	23.993	ng	94
22) Carbon Disulfide	8.86	76	2456125	51.227	ng	100
23) trans-1,2-Dichloroethene	9.88	61	546349	25.730	ng	98
24) 1,1-Dichloroethane	10.13	63	669838	25.730	ng	100
25) Methyl tert-Butyl Ether	10.22	73	1042318	23.963	ng	97
26) Vinyl Acetate	10.39	86	338729	152.122	ng	# 48
27) 2-Butanone (MEK)	10.62	72	483165	51.202	ng	# 72
28) cis-1,2-Dichloroethene	11.15	61	533901	25.313	ng	97
29) Diisopropyl Ether	11.44	87	731391	60.587	ng	# 82
30) Ethyl Acetate	11.44	61	572101	91.840	ng	93
31) n-Hexane	11.42	57	857277	29.566	ng	99
32) Chloroform	11.49	83	632445	26.525	ng	99
34) Tetrahydrofuran (THF)	11.89	72	449825	50.141	ng	# 82
35) Ethyl tert-Butyl Ether	12.03	87	877357	51.832	ng	# 90
36) 1,2-Dichloroethane	12.29	62	541198	26.032	ng	100
38) 1,1,1-Trichloroethane	12.57	97	568602	24.767	ng	98
39) Isopropyl Acetate	13.00	61	10939	No Calib	#	
40) 1-Butanol	13.02	56	12426	No Calib	#	
41) Benzene	13.04	78	1395938	25.693	ng	100
42) Carbon Tetrachloride	13.20	117	464732	23.765	ng	100
43) Cyclohexane	13.34	84	1083135	51.670	ng	92
44) tert-Amyl Methyl Ether	13.68	73	2147591	53.162	ng	95
45) 1,2-Dichloropropane	13.89	63	391959	26.320	ng	100
46) Bromodichloromethane	14.08	83	515190	26.108	ng	100
47) Trichloroethene	14.13	130	379904	25.145	ng	100
48) 1,4-Dioxane	14.11	88	288370	25.427	ng	96
49) 2,2,4-Trimethylpentane...	14.20	57	1834382	26.982	ng	95
50) Methyl Methacrylate	14.34	100	293735	52.069	ng	90

Data File : I:\MS16\DATA\2022\_06\16\06162214.D

Vial: 2

Acq On : 16 Jun 2022 11:29

Operator: WA

Sample : LCSD R16061622\_25ng

Inst : GCMS-16

Misc : S35-04032201/S35-05312201 (6/30)

Quant Time: Jun 16 13:34:31 2022

Quant Method : I:\MS16\METHODS\R16051022.M

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 19:05:32 2022

Response via : Initial Calibration

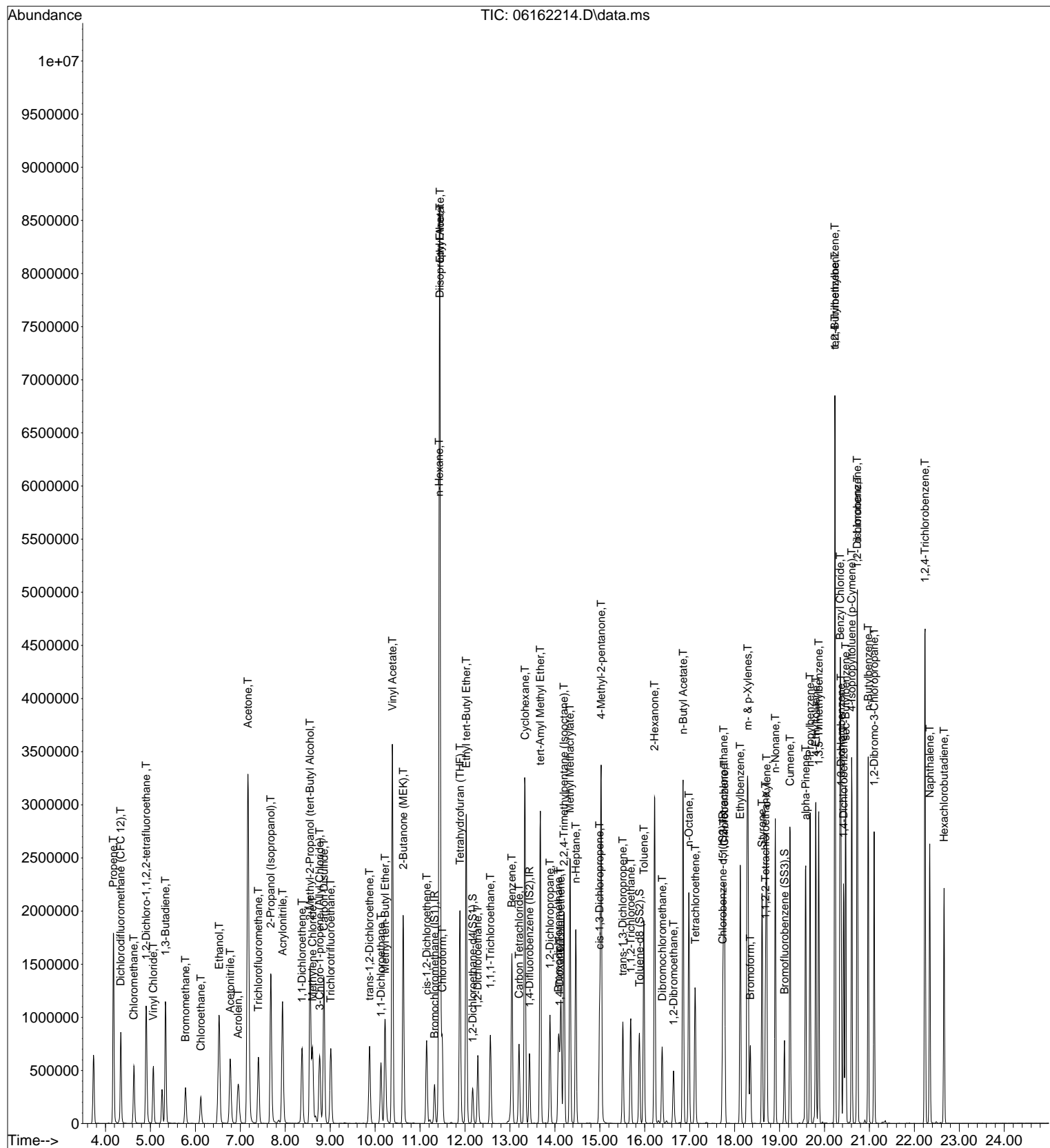
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.47	71	359011	25.204	ng	94
52) cis-1,3-Dichloropropene	15.00	75	575239	26.766	ng	100
53) 4-Methyl-2-pentanone	15.03	58	876983	57.356	ng	84
54) trans-1,3-Dichloropropene	15.51	75	510206	25.768	ng	100
55) 1,1,2-Trichloroethane	15.69	97	340001	25.110	ng	99
58) Toluene	15.98	91	1451247	21.782	ng	99
59) 2-Hexanone	16.22	43	2646345	52.275	ng	93
60) Dibromochloromethane	16.39	129	428572	21.229	ng	100
61) 1,2-Dibromoethane	16.64	107	390451	21.164	ng	99
62) n-Butyl Acetate	16.85	43	2948097	53.385	ng	94
63) n-Octane	16.98	57	394686	22.012	ng	93
64) Tetrachloroethene	17.12	166	393241	20.855	ng	100
65) Chlorobenzene	17.77	112	963672	21.723	ng	100
66) Ethylbenzene	18.13	91	1714173	22.160	ng	99
67) m- & p-Xylenes	18.29	91	2781578	45.891	ng	99
68) Bromoform	18.35	173	367824	21.244	ng	100
69) Styrene	18.61	104	1001745	21.600	ng	99
70) o-Xylene	18.71	91	1388241	23.073	ng	99
71) n-Nonane	18.91	43	1159994	26.377	ng	91
72) 1,1,2,2-Tetrachloroethane	18.69	83	660950	23.549	ng	99
74) Cumene	19.24	105	1784445	22.773	ng	99
75) alpha-Pinene	19.58	93	860810	23.032	ng	97
76) n-Propylbenzene	19.68	91	2174675	23.390	ng	98
77) 3-Ethyltoluene	19.81	105	1803612	No Calib		
78) 4-Ethyltoluene	19.81	105	1803612	23.347	ng	98
79) 1,3,5-Trimethylbenzene	19.87	105	1501970	23.372	ng	98
80) alpha-Methylstyrene	19.87	118	12189	No Calib	#	
81) 2-Ethyltoluene	19.87	105	1501970	No Calib		
82) 1,2,4-Trimethylbenzene	20.23	105	1716111	25.828	ng	99
83) n-Decane	20.23	58	110964	No Calib	#	
84) Benzyl Chloride	20.35	91	2445715	50.931	ng	97
85) 1,3-Dichlorobenzene	20.37	146	894184	23.612	ng	99
86) 1,4-Dichlorobenzene	20.42	146	844162	21.941	ng	100
87) sec-Butylbenzene	20.47	105	2034303	23.808	ng	99
88) 4-Isopropyltoluene (p-...	20.61	119	1745039	22.959	ng	99
89) 1,2,3-Trimethylbenzene	20.61	105	67792	No Calib		
90) 1,2-Dichlorobenzene	20.73	146	864838	23.673	ng	100
91) d-Limonene	20.73	68	638925	26.005	ng	96
92) 1,2-Dibromo-3-Chloropr...	21.11	157	641711	43.418	ng	# 85
93) n-Undecane	22.34	57	2014	No Calib	#	
94) 1,2,4-Trichlorobenzene	22.24	180	1343233	43.714	ng	100
95) Naphthalene	22.34	128	1926537	21.718	ng	100
96) n-Dodecane	22.34	57	1931	No Calib	#	
97) Hexachlorobutadiene	22.66	225	382341	19.486	ng	100
98) Cyclohexanone	18.29	55	2963	No Calib		
99) tert-Butylbenzene	20.23	119	1628203	25.520	ng	99
100) n-Butylbenzene	20.97	91	1669213	23.707	ng	98
101) 1,1,1,2-Tetrachloroethane	17.76	131	370872	21.092	ng	100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Vial: 2  
Operator: WA  
Inst : GCMS-16

Quant Time: Jun 16 13:34:31 2022  
Quant Method : I:\MS16\METHODS\R16051022.M  
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
QLast Update : Tue May 10 19:05:32 2022  
Response via : Initial Calibration  
DataAcq Meth:TO15.M



Method Path : I:\MS16\METHODS\  
 Method File : R16051022.M  
 Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
 Last Update : Tue May 10 19:05:32 2022  
 Response Via : Initial Calibration

*WFA* 5/10/22

## Calibration Files

0.1 =05102212.D 0.2 =05102213.D 0.5 =05102214.D 1.0 =05102215.D 5.0 =05102216.D 25 =05102217.D 50 =05102218.D  
 100 =05102219.D

Compound		0.1	0.2	0.5	1.0	5.0	25	50	100	Avg	%RSD
-----											
1) IR	Bromochloromethane...	-----ISTD-----									
2) T	Propene	2.375	2.174	2.504	2.145	2.482	2.403	2.496	2.906	2.436	9.69
3) T	Dichlorodifluo...	3.485	2.952	2.680	2.924	2.672	2.710	2.564	2.465	2.806	11.38
4) T	Chloromethane	3.065	2.786	2.442	2.769	2.281	2.483	2.267	1.587	2.460	18.18
5) T	1,2-Dichloro-1...	1.674	1.501	1.406	1.488	1.368	1.394	1.379	1.291	1.438	8.11
6) T	Vinyl Chloride	2.440	2.239	2.108	2.297	2.134	2.146	2.101	1.982	2.181	6.45
7) T	1,3-Butadiene	2.389	2.031	1.838	1.958	1.790	1.945	1.916	1.797	1.958	9.87
8) T	Bromomethane	1.238	1.139	1.026	1.090	1.058	1.056	1.039	1.033	1.085	6.64
9) T	Chloroethane	1.006	0.922	0.888	0.987	0.902	0.925	0.917	0.895	0.930	4.65
10) T	Ethanol	2.087	1.714	1.482	1.399	1.278	1.362	1.358	1.319	1.500	18.20
11) T	Acetonitrile	4.307	3.614	3.293	3.463	3.268	3.418	3.367	3.273	3.500	9.89
12) T	Acrolein	1.415	1.137	0.996	1.144	0.971	1.019	0.995	0.966	1.080	14.10
13) T	Acetone	1.448	1.259	1.110	1.186	1.090	1.160	1.115	1.031	1.175	11.02
14) T	Trichlorofluor...	2.765	2.553	2.409	2.566	2.376	2.454	2.384	2.285	2.474	6.06
15) T	2-Propanol (Is...	6.083	5.170	3.825	4.945	3.592	4.106	3.673	2.634	4.253	25.56
16) T	Acrylonitrile	2.473	2.170	2.064	2.193	2.081	2.226	2.197	2.092	2.187	5.97
17) T	1,1-Dichloroet...	1.612	1.325	1.215	1.312	1.188	1.255	1.225	1.197	1.291	10.78
18) T	2-Methyl-2-Pro...	4.453	4.091	3.703	4.214	3.785	4.182	3.934	2.325	3.836	17.13
19) T	Methylene Chlo...	1.668	1.457	1.274	1.353	1.236	1.284	1.254	1.214	1.343	11.37
20) T	3-Chloro-1-pro...	2.385	2.161	2.137	2.386	2.293	2.547	2.483	2.405	2.350	6.15
21) T	Trichlorotrifl...	1.275	1.208	1.100	1.235	1.135	1.192	1.153	1.095	1.174	5.49
22) T	Carbon Disulfide	5.381	4.666	4.329	4.692	4.372	4.640	4.503	4.262	4.606	7.67
23) T	trans-1,2-Dich...	2.195	1.987	1.914	2.117	1.983	2.086	2.039	1.996	2.040	4.38
24) T	1,1-Dichloroet...	2.800	2.548	2.361	2.633	2.396	2.507	2.424	2.337	2.501	6.28
25) T	Methyl tert-Bu...	4.829	4.310	3.960	4.319	3.989	4.131	4.007	3.883	4.178	7.36
26) T	Vinyl Acetate	0.157	0.182	0.181	0.211	0.217	0.260	0.257	0.246	0.214	18.08
27) T	2-Butanone (MEK)	0.972	0.895	0.869	0.923	0.871	0.931	0.919	0.872	0.906	4.04
28) T	cis-1,2-Dichlo...	2.191	2.040	1.953	2.083	1.958	2.055	1.998	1.930	2.026	4.24
29) T	Diisopropyl Ether	1.312	1.207	1.127	1.258	1.185	1.194	1.092	0.903	1.160	10.72
30) T	Ethyl Acetate	0.631	0.560	0.571	0.621	0.611	0.688	0.618	0.488	0.598	9.87
31) T	n-Hexane	3.461	2.969	2.588	2.800	2.601	2.871	2.682	2.310	2.785	12.20
32) T	Chloroform	2.724	2.396	2.197	2.386	2.224	2.263	2.155	1.978	2.290	9.60
33) S	1,2-Dichloroet...	1.821	1.814	1.823	1.818	1.815	1.768	1.731	1.675	1.783	3.05
34) T	Tetrahydrofura...	0.987	0.889	0.796	0.871	0.819	0.868	0.853	0.811	0.862	6.97
35) T	Ethyl tert-But...	1.764	1.603	1.522	1.652	1.573	1.690	1.663	1.541	1.626	5.02
36) T	1,2-Dichloroet...	2.176	2.072	1.928	2.105	1.953	2.000	1.929	1.813	1.997	5.81
37) IR	1,4-Difluorobenzen...	-----ISTD-----									
38) T	1,1,1-Trichlor...	0.574	0.524	0.474	0.509	0.475	0.505	0.496	0.485	0.505	6.46
39) T	Isopropyl Acetate									0.000	-1.00
40) T	1-Butanol									0.000	-1.00
41) T	Benzene	1.405	1.221	1.120	1.189	1.110	1.193	1.179	1.149	1.196	7.75
42) T	Carbon Tetrach...	0.467	0.428	0.399	0.434	0.404	0.442	0.438	0.431	0.430	5.01

Method Path : I:\MS16\METHODS\  
Method File : R16051022.M

Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)												
43)	T	Cyclohexane	0.536	0.457	0.430	0.466	0.430	0.469	0.466	0.437	0.461	7.44
44)	T	tert-Amyl Meth...	0.948	0.927	0.842	0.872	0.840	0.919	0.912	0.853	0.889	4.77
45)	T	1,2-Dichloropr...	0.364	0.330	0.308	0.330	0.310	0.331	0.326	0.321	0.328	5.27
46)	T	Bromodichlorom...	0.492	0.435	0.405	0.440	0.408	0.441	0.433	0.422	0.434	6.23
47)	T	Trichloroethene	0.364	0.333	0.312	0.333	0.316	0.339	0.338	0.325	0.333	4.79
48)	T	1,4-Dioxane	0.260	0.260	0.227	0.252	0.236	0.256	0.254	0.251	0.250	4.71
49)	T	2,2,4-Trimethy...	1.750	1.572	1.399	1.521	1.411	1.495	1.454	1.367	1.496	8.24
50)	T	Methyl Methacr...	0.124	0.116	0.115	0.124	0.121	0.135	0.133	0.125	0.124	5.79
51)	T	n-Heptane	0.380	0.321	0.287	0.310	0.291	0.313	0.308	0.298	0.313	9.33
52)	T	cis-1,3-Dichlo...	0.466	0.442	0.427	0.472	0.460	0.508	0.507	0.502	0.473	6.46
53)	T	4-Methyl-2-pen...	0.354	0.332	0.309	0.336	0.321	0.358	0.351	0.331	0.337	5.07
54)	T	trans-1,3-Dich...	0.388	0.387	0.394	0.428	0.431	0.488	0.486	0.483	0.436	10.28
55)	T	1,1,2-Trichlor...	0.332	0.303	0.282	0.298	0.280	0.300	0.296	0.293	0.298	5.38
56)	IR	Chlorobenzene-d5 (...)	-----ISTD-----									
57)	S	Toluene-d8 (SS2)	4.833	4.799	4.753	4.750	4.702	4.701	4.706	4.610	4.732	1.45
58)	T	Toluene	6.754	5.654	5.207	5.561	5.147	5.458	5.399	5.084	5.533	9.63
59)	T	2-Hexanone	4.785	4.232	3.951	4.245	4.122	4.376	4.226	3.697	4.204	7.51
60)	T	Dibromochlorom...	1.931	1.637	1.537	1.673	1.581	1.711	1.719	1.623	1.677	7.15
61)	T	1,2-Dibromoethane	1.642	1.555	1.445	1.554	1.463	1.570	1.563	1.465	1.532	4.43
62)	T	n-Butyl Acetate	4.913	4.671	4.230	4.672	4.513	4.852	4.721	4.117	4.586	6.18
63)	T	n-Octane	2.074	1.623	1.351	1.423	1.316	1.405	1.404	1.316	1.489	17.18
64)	T	Tetrachloroethene	1.736	1.605	1.488	1.601	1.473	1.576	1.569	1.478	1.566	5.60
65)	T	Chlorobenzene	4.192	3.788	3.457	3.673	3.459	3.735	3.745	3.424	3.684	6.84
66)	T	Ethylbenzene	7.654	6.609	5.993	6.387	6.008	6.449	6.400	5.891	6.424	8.71
67)	T	m- & p-Xylenes	5.889	5.391	4.777	4.973	4.714	5.075	5.009	4.440	5.034	8.84
68)	T	Bromoform	1.558	1.412	1.351	1.446	1.397	1.513	1.489	1.337	1.438	5.43
69)	T	Styrene	4.070	3.919	3.571	3.816	3.701	4.050	4.013	3.673	3.851	4.93
70)	T	o-Xylene	5.896	5.242	4.771	5.037	4.756	4.999	4.901	4.371	4.997	8.89
71)	T	n-Nonane	4.124	3.822	3.454	3.710	3.542	3.772	3.630	3.163	3.652	7.75
72)	T	1,1,2,2-Tetrac...	2.701	2.395	2.161	2.315	2.219	2.376	2.341	2.139	2.331	7.64
73)	S	Bromofluoroben...	1.738	1.734	1.726	1.712	1.717	1.726	1.728	1.715	1.725	0.52
74)	T	Cumene	7.410	6.717	6.028	6.598	6.189	6.667	6.575	5.874	6.507	7.41
75)	T	alpha-Pinene	3.084	3.138	2.914	3.097	3.024	3.283	3.278	3.014	3.104	4.12
76)	T	n-Propylbenzene	8.967	8.093	7.186	7.793	7.405	7.906	7.693	6.725	7.721	8.63
77)	T	3-Ethyltoluene								0.000		-1.00
78)	T	4-Ethyltoluene	7.330	6.660	5.963	6.429	6.133	6.648	6.476	5.685	6.415	7.84
79)	T	1,3,5-Trimethy...	6.153	5.571	5.033	5.327	5.119	5.485	5.344	4.661	5.337	8.20
80)	T	alpha-Methylst...								0.000		-1.00
81)	T	2-Ethyltoluene								0.000		-1.00
82)	T	1,2,4-Trimethy...	6.211	5.633	5.130	5.568	5.325	5.972	5.696	4.607	5.518	9.07
83)	T	n-Decane								0.000		-1.00
84)	T	Benzyl Chloride	3.471	3.314	3.373	3.771	4.152	5.014	4.896	3.913	3.988	16.57
85)	T	1,3-Dichlorobe...	3.741	3.334	2.995	3.152	3.034	3.311	3.123	2.469	3.145	11.46
86)	T	1,4-Dichlorobe...	3.946	3.391	2.995	3.141	2.999	3.278	3.127	2.685	3.195	11.57
87)	T	sec-Butylbenzene	8.293	7.434	6.810	7.338	6.978	7.364	6.898	5.653	7.096	10.51
88)	T	4-Isopropyltol...	7.505	6.590	5.923	6.367	6.045	6.603	6.271	5.192	6.312	10.48
89)	T	1,2,3-Trimethy...								0.000		-1.00
90)	T	1,2-Dichlorobe...	3.569	3.247	2.907	3.015	2.936	3.199	3.012	2.386	3.034	11.18
91)	T	d-Limonene	2.111	2.009	1.916	2.043	2.019	2.259	2.183	1.783	2.040	7.32
92)	T	1,2-Dibromo-3-...	1.339	1.226	1.130	1.210	1.193	1.338	1.297	1.086	1.227	7.57
93)	T	n-Undecane								0.000		-1.00
94)	T	1,2,4-Trichlor...	3.171	2.611	2.375	2.322	2.304	2.778	2.679	2.175	2.552	12.76

Method Path : I:\MS16\METHODS\  
Method File : R16051022.M  
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

95) T	Naphthalene	8.191	7.104	6.596	6.573	8.189	8.037	6.877	7.367	10.12
96) T	n-Dodecane								0.000	-1.00
97) T	Hexachlorobuta...	1.859	1.710	1.554	1.565	1.507	1.663	1.666	1.512	7.34
98) T	Cyclohexanone								0.000	-1.00
99) T	tert-Butylbenzene	6.166	5.470	4.994	5.340	5.129	5.715	5.337	4.237	10.60
100) T	n-Butylbenzene	6.800	6.090	5.450	5.795	5.625	6.033	5.864	5.122	8.52
101) T	1,1,1,2-Tetrac...	1.679	1.480	1.386	1.450	1.362	1.479	1.480	1.365	7.00

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(#) = Out of Range

## Primary Source Standards Concentrations (Working &amp; Initial Calibration)

MSA 5/11/22

1ng/L Std. ID:

40ng/L Std. ID:

4ng/L Std. ID: S35-05102204

200ng/L Std. ID: S35-05102202

20ng/L Std. ID: S35-05102203

1000ng/L Std. ID:

Dilution Factors:								Working STD Conc.(ng/L):								
									4	4	4	20	20	200	200	200
								Injection (L):	0.025	0.050	0.1250	0.050	0.25	0.125	0.25	0.50
								ICAL Points:	0.1ng	0.2ng	0.5ng	1ng	5ng	25ng	50ng	100ng
Compounds	Source Std. mg/m <sup>3</sup>	1000ng/L	200ng/L	40ng/L	20ng/L	4ng/L	1ng/L		0.104	0.208	0.520	1.04	5.20	26.00	52.0	104
Propene	1.04	1040	208	41.6	20.8	4.16	1.04		0.105	0.210	0.525	1.05	5.25	26.25	52.5	105
Dichlorodifluoromethane	1.05	1050	210	42.0	21.0	4.20	1.05		0.102	0.204	0.510	1.02	5.10	25.50	51.0	102
Chloromethane	1.02	1020	204	40.8	20.4	4.08	1.02		0.108	0.216	0.540	1.08	5.40	27.00	54.0	108
Freon-114	1.08	1080	216	43.2	21.6	4.32	1.08		0.104	0.208	0.520	1.04	5.20	26.00	52.0	104
Vinyl Chloride	1.04	1040	208	41.6	20.8	4.16	1.04		0.104	0.208	0.520	1.04	5.20	26.00	52.0	104
1,3-Butadiene	1.04	1040	208	41.6	20.8	4.16	1.04		0.104	0.208	0.520	1.04	5.20	26.00	52.0	104
Bromomethane	1.02	1020	204	40.8	20.4	4.08	1.02		0.102	0.204	0.510	1.02	5.10	25.50	51.0	102
Chloroethane	1.02	1020	204	40.8	20.4	4.08	1.02		0.102	0.204	0.510	1.02	5.10	25.50	51.0	102
Ethanol	3.62	3620	724	144.8	72.4	14.48	3.62		0.362	0.724	1.810	3.62	18.10	90.50	181.0	362
Acetonitrile	0.93	930	186	37.2	18.6	3.72	0.93		0.093	0.186	0.465	0.93	4.65	23.25	46.5	93
Acrolein	2.00	2000	400	80.0	40.0	8.00	2.00		0.200	0.400	1.000	2.00	10.00	50.00	100.0	200
Acetone	5.19	5190	1038	207.6	103.8	20.76	5.19		0.519	1.038	2.595	5.19	25.95	129.75	259.5	519
Trichlorofluoromethane	1.03	1030	206	41.2	20.6	4.12	1.03		0.103	0.206	0.515	1.03	5.15	25.75	51.5	103
Isopropanol	2.02	2020	404	80.8	40.4	8.08	2.02		0.202	0.404	1.010	2.02	10.10	50.50	101.0	202
Acrylonitrile	2.03	2030	406	81.2	40.6	8.12	2.03		0.203	0.406	1.015	2.03	10.15	50.75	101.5	203
1,1-Dichloroethene	1.07	1070	214	42.8	21.4	4.28	1.07		0.107	0.214	0.535	1.07	5.35	26.75	53.5	107
tert-Butanol	2.10	2100	420	84.0	42.0	8.40	2.10		0.210	0.420	1.050	2.10	10.50	52.50	105.0	210
Methylene Chloride	1.04	1040	208	41.6	20.8	4.16	1.04		0.104	0.208	0.520	1.04	5.20	26.00	52.0	104
Allyl Chloride	1.05	1050	210	42.0	21.0	4.20	1.05		0.105	0.210	0.525	1.05	5.25	26.25	52.5	105
Trichlorotrifluoroethane	1.08	1080	216	43.2	21.6	4.32	1.08		0.108	0.216	0.540	1.08	5.40	27.00	54.0	108
Carbon Disulfide	2.10	2100	420	84.0	42.0	8.40	2.10		0.210	0.420	1.050	2.10	10.50	52.50	105.0	210
trans-1,2-Dichloroethene	1.06	1060	212	42.4	21.2	4.24	1.06		0.106	0.212	0.530	1.06	5.30	26.50	53.0	106
1,1-Dichloroethane	1.05	1050	210	42.0	21.0	4.20	1.05		0.105	0.210	0.525	1.05	5.25	26.25	52.5	105
Methyl tert-Butyl Ether	1.05	1050	210	42.0	21.0	4.20	1.05		0.105	0.210	0.525	1.05	5.25	26.25	52.5	105
Vinyl Acetate	3.40	3400	680	136.0	68.0	13.60	3.40		0.340	0.680	1.700	3.40	17.00	85.00	170.0	340
2-Butanone	2.06	2060	412	82.4	41.2	8.24	2.06		0.206	0.412	1.030	2.06	10.30	51.50	103.0	206
cis-1,2-Dichloroethene	1.04	1040	208	41.6	20.8	4.16	1.04		0.104	0.208	0.520	1.04	5.20	26.00	52.0	104
Diisopropyl Ether	2.12	2120	424	84.8	42.4	8.48	2.12		0.212	0.424	1.060	2.12	10.60	53.00	106.0	212
Ethyl Acetate	4.08	4080	816	163.2	81.6	16.32	4.08		0.408	0.816	2.040	4.08	20.40	102.00	204.0	408
n-Hexane	1.05	1050	210	42.0	21.0	4.20	1.05		0.105	0.210	0.525	1.05	5.25	26.25	52.5	105
Chloroform	1.07	1070	214	42.8	21.4	4.28	1.07		0.107	0.214	0.535	1.07	5.35	26.75	53.5	107
Tetrahydrofuran	1.97	1970	394	78.8	39.4	7.88	1.97		0.197	0.394	0.985	1.97	9.85	49.25	98.5	197
Ethyl tert-Butyl Ether	2.10	2100	420	84.0	42.0	8.40	2.10		0.210	0.420	1.050	2.10	10.50	52.50	105.0	210
1,2-Dichloroethane	1.06	1060	212	42.4	21.2	4.24	1.06		0.106	0.212	0.530	1.06	5.30	26.50	53.0	106
1,1,1-Trichloroethane	1.04	1040	208	41.6	20.8	4.16	1.04		0.104	0.208	0.520	1.04	5.20	26.00	52.0	104
Benzene	1.04	1040	208	41.6	20.8	4.16	1.04		0.104	0.208	0.520	1.04	5.20	26.00	52.0	104
Carbon Tetrachloride	1.05	1050	210	42.0	21.0	4.20	1.05		0.105	0.210	0.525	1.05	5.25	26.25	52.5	105
Cyclohexane	2.07	2070	414	82.8	41.4	8.28	2.07		0.207	0.414	1.035	2.07	10.35	51.75	103.5	207
tert-Amyl Methyl Ether	2.09	2090	418	83.6	41.8	8.36	2.09		0.209	0.418	1.045	2.09	10.45	52.25	104.5	209
1,2-Dichloropropane	1.03	1030	206	41.2	20.6	4.12	1.03		0.103	0.206	0.515	1.03	5.15	25.75	51.5	103
Bromodichloromethane	1.05	1050	210	42.0	21.0	4.20	1.05		0.105	0.210	0.525	1.05	5.25	26.25	52.5	105
Trichloroethene	1.03	1030	206	41.2	20.6	4.12	1.03		0.103	0.206	0.515	1.03	5.15	25.75	51.5	103
1,4-Dioxane	1.04	1040	208	41.6	20.8	4.16	1.04		0.104	0.208	0.520	1.04	5.20	26.00	52.0	104
Isooctane	1.06	1060	212	42.4	21.2	4.24	1.06		0.106	0.212	0.530	1.06	5.30	26.50	53.0	106
Methyl Methacrylate	2.08	2080	416	83.2	41.6	8.32	2.08		0.208	0.416	1.040	2.08	10.40	52.00	104.0	208
n-Heptane	1.05	1050	210	42.0	21.0	4.20	1.05		0.105	0.210	0.525	1.05	5.25	26.25	52.5	105



## Primary Source Standards Concentrations (Working &amp; Initial Calibration)

1ng/L Std. ID:

40ng/L Std. ID:

4ng/L Std. ID: S35-05102204

200ng/L Std. ID: S35-05102202

20ng/L Std. ID: S35-05102203

1000ng/L Std. ID:

Dilution Factors:								Working STD Conc.(ng/L):								
	1	5	25	50	250	1000			4	4	4	20	20	200	200	200
	Source Std.		Primary Working Standards					Injection (L):	0.025	0.050	0.1250	0.050	0.25	0.125	0.25	0.50
Compounds	mg/m³	1000ng/L	200ng/L	40ng/L	20ng/L	4ng/L	1ng/L	ICAL Points:	0.1ng	0.2ng	0.5ng	1ng	5ng	25ng	50ng	100ng
cis-1,3-Dichloropropene	1.05	1050	210	42.0	21.0	4.20	1.05		0.105	0.210	0.525	1.05	5.25	26.25	52.5	105
4-Methyl-2-pentanone	2.08	2080	416	83.2	41.6	8.32	2.08		0.208	0.416	1.040	2.08	10.40	52.00	104.0	208
trans-1,3-Dichloropropene	1.01	1010	202	40.4	20.2	4.04	1.01		0.101	0.202	0.505	1.01	5.05	25.25	50.5	101
1,1,2-Trichloroethane	1.04	1040	208	41.6	20.8	4.16	1.04		0.104	0.208	0.520	1.04	5.20	26.00	52.0	104
Toluene	1.03	1030	206	41.2	20.6	4.12	1.03		0.103	0.206	0.515	1.03	5.15	25.75	51.5	103
2-Hexanone	2.05	2050	410	82.0	41.0	8.20	2.05		0.205	0.410	1.025	2.05	10.25	51.25	102.5	205
Dibromochloromethane	1.05	1050	210	42.0	21.0	4.20	1.05		0.105	0.210	0.525	1.05	5.25	26.25	52.5	105
1,2-Dibromoethane	1.04	1040	208	41.6	20.8	4.16	1.04		0.104	0.208	0.520	1.04	5.20	26.00	52.0	104
n-Butyl Acetate	2.04	2040	408	81.6	40.8	8.16	2.04		0.204	0.408	1.020	2.04	10.20	51.00	102.0	204
n-Octane	1.05	1050	210	42.0	21.0	4.20	1.05		0.105	0.210	0.525	1.05	5.25	26.25	52.5	105
Tetrachloroethene	1.04	1040	208	41.6	20.8	4.16	1.04		0.104	0.208	0.520	1.04	5.20	26.00	52.0	104
Chlorobenzene	1.04	1040	208	41.6	20.8	4.16	1.04		0.104	0.208	0.520	1.04	5.20	26.00	52.0	104
Ethylbenzene	1.03	1030	206	41.2	20.6	4.12	1.03		0.103	0.206	0.515	1.03	5.15	25.75	51.5	103
m-&p-Xylene	2.06	2060	412	82.4	41.2	8.24	2.06		0.206	0.412	1.030	2.06	10.30	51.50	103.0	206
Bromoform	1.04	1040	208	41.6	20.8	4.16	1.04		0.104	0.208	0.520	1.04	5.20	26.00	52.0	104
Styrene	1.03	1030	206	41.2	20.6	4.12	1.03		0.103	0.206	0.515	1.03	5.15	25.75	51.5	103
o-Xylene	1.04	1040	208	41.6	20.8	4.16	1.04		0.104	0.208	0.520	1.04	5.20	26.00	52.0	104
n-Nonane	1.04	1040	208	41.6	20.8	4.16	1.04		0.104	0.208	0.520	1.04	5.20	26.00	52.0	104
1,1,2,2-Tetrachloroethane	1.04	1040	208	41.6	20.8	4.16	1.04		0.104	0.208	0.520	1.04	5.20	26.00	52.0	104
Cumene	1.04	1040	208	41.6	20.8	4.16	1.04		0.104	0.208	0.520	1.04	5.20	26.00	52.0	104
alpha-Pinene	1.08	1080	216	43.2	21.6	4.32	1.08		0.108	0.216	0.540	1.08	5.40	27.00	54.0	108
n-Propylbenzene	1.05	1050	210	42.0	21.0	4.20	1.05		0.105	0.210	0.525	1.05	5.25	26.25	52.5	105
4-Ethyltoluene	1.06	1060	212	42.4	21.2	4.24	1.06		0.106	0.212	0.530	1.06	5.30	26.50	53.0	106
1,3,5-Trimethylbenzene	1.04	1040	208	41.6	20.8	4.16	1.04		0.104	0.208	0.520	1.04	5.20	26.00	52.0	104
1,2,4-Trimethylbenzene	1.03	1030	206	41.2	20.6	4.12	1.03		0.103	0.206	0.515	1.03	5.15	25.75	51.5	103
Benzyl Chloride	2.06	2060	412	82.4	41.2	8.24	2.06		0.206	0.412	1.030	2.06	10.30	51.50	103.0	206
1,3-Dichlorobenzene	1.04	1040	208	41.6	20.8	4.16	1.04		0.104	0.208	0.520	1.04	5.20	26.00	52.0	104
1,4-Dichlorobenzene	1.04	1040	208	41.6	20.8	4.16	1.04		0.104	0.208	0.520	1.04	5.20	26.00	52.0	104
sec-Butylbenzene	1.04	1040	208	41.6	20.8	4.16	1.04		0.104	0.208	0.520	1.04	5.20	26.00	52.0	104
p-Isopropyltoluene	1.04	1040	208	41.6	20.8	4.16	1.04		0.104	0.208	0.520	1.04	5.20	26.00	52.0	104
1,2-Dichlorobenzene	1.05	1050	210	42.0	21.0	4.20	1.05		0.105	0.210	0.525	1.05	5.25	26.25	52.5	105
d-Limonene	1.05	1050	210	42.0	21.0	4.20	1.05		0.105	0.210	0.525	1.05	5.25	26.25	52.5	105
1,2-Dibromo-3-chloropropane	2.00	2000	400	80.0	40.0	8.00	2.00		0.200	0.400	1.000	2.00	10.00	50.00	100.0	200
1,2,4-Trichlorobenzene	2.04	2040	408	81.6	40.8	8.16	2.04		0.204	0.408	1.020	2.04	10.20	51.00	102.0	204
Naphthalene	1.04	1040	208	41.6	20.8	4.16	1.04		0.104	0.208	0.520	1.04	5.20	26.00	52.0	104
Hexachloro-1,3-butadiene	1.03	1030	206	41.2	20.6	4.12	1.03		0.103	0.206	0.515	1.03	5.15	25.75	51.5	103
tert-Butylbenzene	1.04	1040	208	41.6	20.8	4.16	1.04		0.104	0.208	0.520	1.04	5.20	26.00	52.0	104
n-Butylbenzene	1.04	1040	208	41.6	20.8	4.16	1.04		0.104	0.208	0.520	1.04	5.20	26.00	52.0	104
1,1,1,2-Tetrachloroethane	1.04	1040	208	41.6	20.8	4.16	1.04		0.104	0.208	0.520	1.04	5.20	26.00	52.0	104

Method : I:\MS16\METHODS\R16051022.M (RTE Integrator)  
 Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
 Last Update : Tue May 10 19:05:32 2022  
 Response via : Initial Calibration

#	ID	Conc	ISTD Conc	Path\File	5/10/22
1	0.1	0	13	I:\MS16\DATA\2022_05\10\05102212.D	
2	0.2	0	13	I:\MS16\DATA\2022_05\10\05102213.D	
3	0.5	1	13	I:\MS16\DATA\2022_05\10\05102214.D	
4	1.0	1	13	I:\MS16\DATA\2022_05\10\05102215.D	
5	5.0	5	13	I:\MS16\DATA\2022_05\10\05102216.D	
6	25	26	13	I:\MS16\DATA\2022_05\10\05102217.D	
7	50	52	13	I:\MS16\DATA\2022_05\10\05102218.D	
8	100	104	13	I:\MS16\DATA\2022_05\10\05102219.D	

#	ID	Update Time				Quant Time				Acquisition Time			
1	0.1	May	10	18:16	2022	May	10	17:40	2022	10 May	2022	13:46	
2	0.2	May	10	18:16	2022	May	10	17:45	2022	10 May	2022	14:20	
3	0.5	May	10	18:16	2022	May	10	17:59	2022	10 May	2022	14:54	
4	1.0	May	10	18:17	2022	May	10	18:03	2022	10 May	2022	15:28	
5	5.0	May	10	18:17	2022	May	10	18:08	2022	10 May	2022	16:02	
6	25	May	10	18:17	2022	May	10	18:10	2022	10 May	2022	16:36	
7	50	May	10	18:17	2022	May	10	18:12	2022	10 May	2022	17:10	
8	100	May	10	19:05	2022	May	10	18:15	2022	10 May	2022	17:44	

R16051022.M

Tue May 10 20:28:03 2022

Data File : I:\MS16\DATA\2022\_05\10\05102212.D  
 Acq On : 10 May 2022 13:46  
 Sample : 0.1ng R16051022 ICAL Std  
 Misc : S35-04032201/S35-05102204 (6/09)

Vial: 13  
 Operator: TZ/CG  
 Inst : GCMS-16

Quant Time: May 10 17:40:59 2022

Quant Method : I:\MS16\METHODS\R16051022.M

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 17:29:58 2022

Response via : Initial Calibration

DataAcq Meth:TO15.M

5/11/22

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.30	130	164400	12.500	ng	-0.03
37) 1,4-Difluorobenzene (IS2)	13.42	114	744343	12.500	ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.73	54	166054	12.500	ng	0.00

#### System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...)	12.15	65	299319	13.254	ng	-0.02
Spiked Amount	12.500	Range 70 - 130	Recovery	=	106.00%	
57) Toluene-d8 (SS2)	15.88	98	802500	10.001	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	80.00%	
73) Bromofluorobenzene (SS3)	19.11	174	288607	11.285	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	90.24%	

#### Target Compounds

						Qvalue
2) Propene	4.22	42	3248m	0.130	ng	
3) Dichlorodifluoromethan...	4.37	85	4813	0.116	ng	96
4) Chloromethane	4.66	50	4112	0.137	ng	97
5) 1,2-Dichloro-1,1,2,2-t...	4.93	135	2378	0.107	ng	95
6) Vinyl Chloride	5.08	62	3337	0.108	ng	99
7) 1,3-Butadiene	5.35	54	3268	0.153	ng	90
8) Bromomethane	5.79	94	1661	0.099	ng	80
9) Chloroethane	6.13	64	1350	0.099	ng	89
10) Ethanol	6.47	45	9935	0.642	ng	86
11) Acetonitrile	6.75	41	5268	0.127	ng	77
12) Acrolein	6.95	56	3723m	0.326	ng	
13) Acetone	7.17	58	9881	0.638	ng	90
14) Trichlorofluoromethane	7.41	101	3746	0.106	ng	96
15) 2-Propanol (Isopropanol)	7.67	45	16162	0.306	ng	90
16) Acrylonitrile	7.91	53	6603	0.243	ng	95
17) 1,1-Dichloroethene	8.37	96	2269	0.123	ng	86
18) 2-Methyl-2-Propanol (t...	8.58	59	12300	0.253	ng	90
19) Methylene Chloride	8.57	84	2282	0.113	ng	95
20) 3-Chloro-1-propene (Al...	8.74	41	3294	0.117	ng	94
21) Trichlorotrifluoroethane	9.01	151	1811	0.113	ng	98
22) Carbon Disulfide	8.85	76	14862	0.216	ng	99
23) trans-1,2-Dichloroethene	9.85	61	3060	0.112	ng	84
24) 1,1-Dichloroethane	10.10	63	3867	0.115	ng	97
25) Methyl tert-Butyl Ether	10.25	73	6668	0.119	ng	84
26) Vinyl Acetate	10.38	86	701	0.179	ng	# 45
27) 2-Butanone (MEK)	10.64	72	2634	0.185	ng	# 82
28) cis-1,2-Dichloroethene	11.12	61	2997	0.113	ng	88
29) Diisopropyl Ether	11.44	87	3657	0.220	ng	# 89
30) Ethyl Acetate	11.44	61	3384	0.463	ng	95
31) n-Hexane	11.41	57	4780	0.172	ng	# 85
32) Chloroform	11.46	83	3834	0.115	ng	95
34) Tetrahydrofuran (THF)	11.91	72	2556	0.196	ng	# 71
35) Ethyl tert-Butyl Ether	12.03	87	4872	0.229	ng	# 93
36) 1,2-Dichloroethane	12.27	62	3033	0.117	ng	97
38) 1,1,1-Trichloroethane	12.55	97	3552	0.118	ng	96
39) Isopropyl Acetate	0.00	61	0	N.D.		
40) 1-Butanol	0.00	56	0	N.D.	d	
41) Benzene	13.03	78	8701	0.112	ng	99
42) Carbon Tetrachloride	13.19	117	2920	0.119	ng	97
43) Cyclohexane	13.32	84	6606	0.232	ng	95
44) tert-Amyl Methyl Ether	13.68	73	11801	0.234	ng	96
45) 1,2-Dichloropropane	13.89	63	2235	0.118	ng	98
46) Bromodichloromethane	14.07	83	3075	0.121	ng	96
47) Trichloroethene	14.13	130	2230	0.108	ng	100
48) 1,4-Dioxane	14.12	88	1608	0.094	ng	92
49) 2,2,4-Trimethylpentane...	14.20	57	11049	0.147	ng	93
50) Methyl Methacrylate	14.34	100	1542	0.192	ng	# 80

Data File : I:\MS16\DATA\2022\_05\10\05102212.D  
 Acq On : 10 May 2022 13:46  
 Sample : 0.1ng R16051022 ICAL Std  
 Misc : S35-04032201/S35-05102204 (6/09)

Vial: 13  
 Operator: TZ/CG  
 Inst : GCMS-16

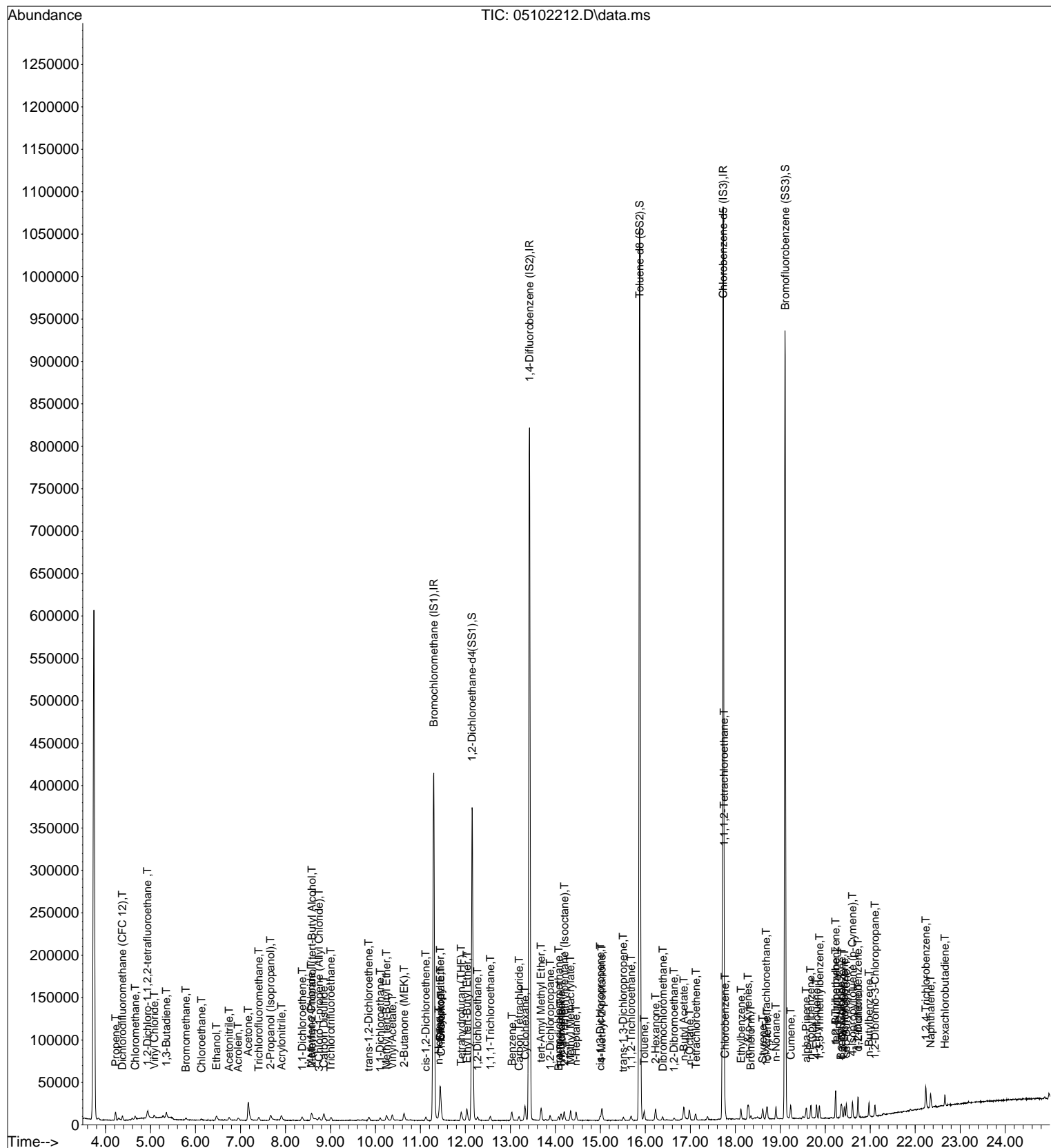
Quant Time: May 10 17:40:59 2022  
 Quant Method : I:\MS16\METHODS\R16051022.M  
 Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
 QLast Update : Tue May 10 17:29:58 2022  
 Response via : Initial Calibration  
 DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.46	71	2377	0.124	ng	# 80
52) cis-1,3-Dichloropropene	15.00	75	2911	0.098	ng	96
53) 4-Methyl-2-pentanone	15.03	58	4386	0.254	ng	93
54) trans-1,3-Dichloropropene	15.51	75	2336	0.086	ng	93
55) 1,1,2-Trichloroethane	15.68	97	2056	0.111	ng	90
58) Toluene	15.98	91	9242	0.095	ng	94
59) 2-Hexanone	16.23	43	13031	0.238	ng	93
60) Dibromochloromethane	16.39	129	2693	0.105	ng	95
61) 1,2-Dibromoethane	16.64	107	2269	0.086	ng	99
62) n-Butyl Acetate	16.86	43	13314	0.222	ng	84
63) n-Octane	16.98	57	2893	0.149	ng	85
64) Tetrachloroethene	17.12	166	2398	0.092	ng	100
65) Chlorobenzene	17.77	112	5791	0.090	ng	98
66) Ethylbenzene	18.13	91	10473	0.097	ng	94
67) m- & p-Xylenes	18.28	91	16117	0.196	ng	95
68) Bromoform	18.35	173	2152	0.098	ng	96
69) Styrene	18.61	104	5569	0.083	ng	96
70) o-Xylene	18.71	91	8146	0.099	ng	95
71) n-Nonane	18.90	43	5697	0.132	ng	91
72) 1,1,2,2-Tetrachloroethane	18.69	83	3732	0.097	ng	97
74) Cumene	19.23	105	10238	0.095	ng	99
75) alpha-Pinene	19.58	93	4424	0.087	ng	# 48
76) n-Propylbenzene	19.68	91	12508	0.098	ng	96
77) 3-Ethyltoluene	0.00	105	0	N.D.	d	
78) 4-Ethyltoluene	19.81	105	10321	0.099	ng	96
79) 1,3,5-Trimethylbenzene	19.87	105	8501	0.099	ng	97
80) alpha-Methylstyrene	0.00	118	0	N.D.		
81) 2-Ethyltoluene	0.00	105	0	N.D.	d	
82) 1,2,4-Trimethylbenzene	20.23	105	8499	0.104	ng	98
83) n-Decane	0.00	58	0	N.D.	d	
84) Benzyl Chloride	20.35	91	9498	0.145	ng	96
85) 1,3-Dichlorobenzene	20.37	146	5168	0.105	ng	95
86) 1,4-Dichlorobenzene	20.42	146	5452	0.106	ng	93
87) sec-Butylbenzene	20.47	105	11457	0.100	ng	95
88) 4-Isopropyltoluene (p-...	20.61	119	10368	0.104	ng	98
89) 1,2,3-Trimethylbenzene	0.00	105	0	N.D.	d	
90) 1,2-Dichlorobenzene	20.73	146	4978	0.107	ng	91
91) d-Limonene	20.73	68	2945	0.101	ng	98
92) 1,2-Dibromo-3-Chloropr...	21.11	157	3557	0.202	ng	# 37
93) n-Undecane	0.00	57	0	N.D.	d	
94) 1,2,4-Trichlorobenzene	22.23	180	8593	0.233	ng	97
95) Naphthalene	22.34	128	13681	0.112	ng	100
96) n-Dodecane	0.00	57	0	N.D.	d	
97) Hexachlorobutadiene	22.66	225	2543	0.113	ng	93
98) Cyclohexanone	0.00	55	0	N.D.	d	
99) tert-Butylbenzene	20.23	119	8519	0.106	ng	98
100) n-Butylbenzene	20.97	91	9394	0.102	ng	95
101) 1,1,1,2-Tetrachloroethane	17.75	131	2319	0.103	ng	# 95

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Vial: 13  
Operator: TZ/CG  
Inst : GCMS-16

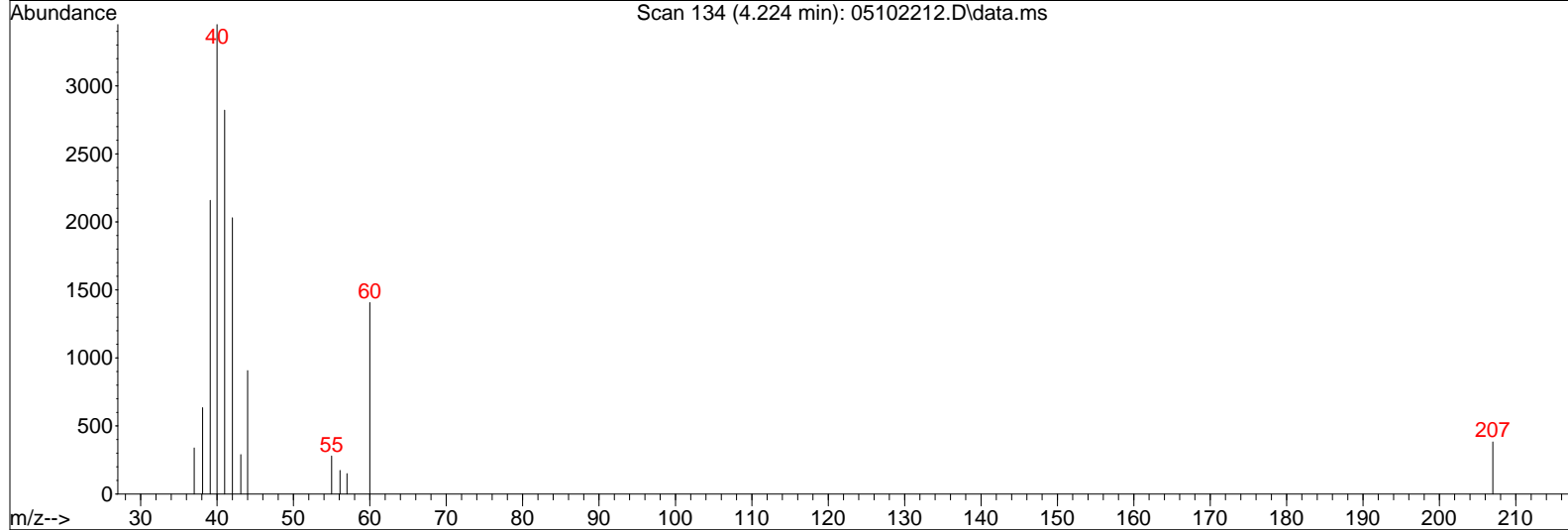
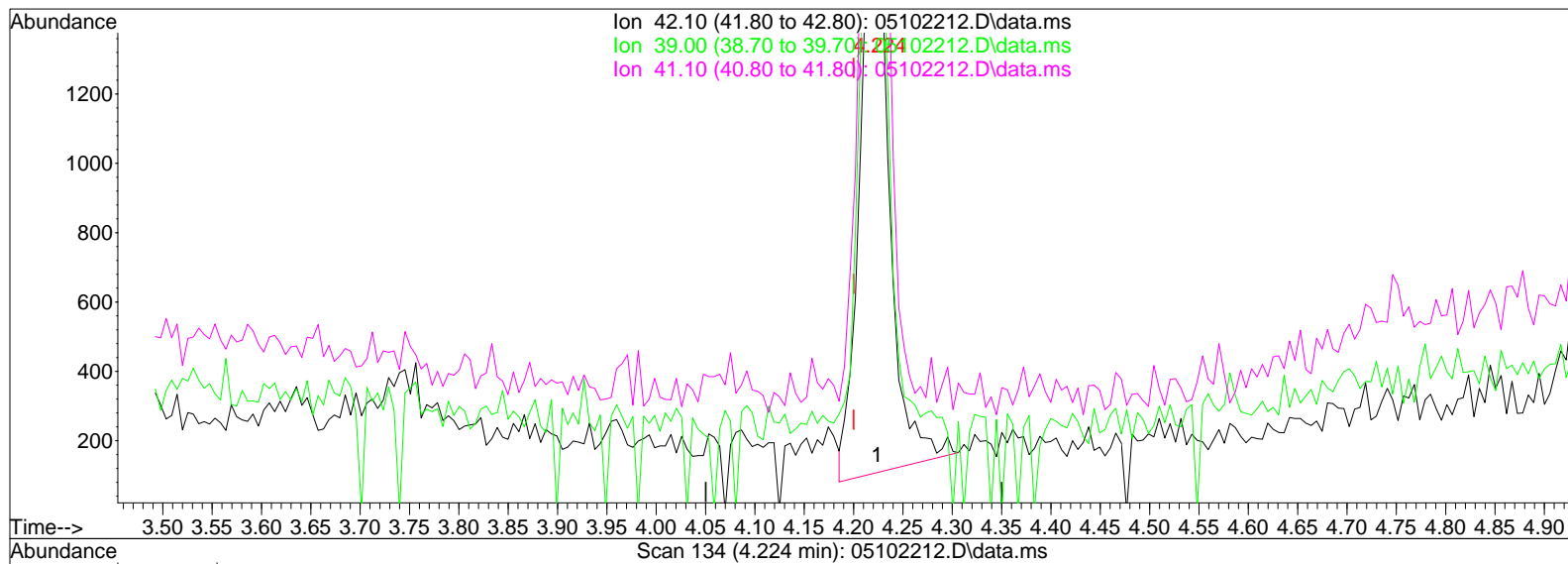
Quant Time: May 10 17:40:59 2022  
Quant Method : I:\MS16\METHODS\R16051022.M  
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
QLast Update : Tue May 10 17:29:58 2022  
Response via : Initial Calibration  
DataAcq Meth:TO15.M



Data File : I:\MS16\DATA\2022\_05\10\05102212.D  
Acq On : 10 May 2022 13:46  
Sample : 0.1ng R16051022 ICAL Std  
Misc : S35-04032201/S35-05052204 (6/09)

Vial: 13  
Operator: TZ/CG  
Inst : GCMS-16

Quant Time: May 10 17:36:12 2022  
Quant Method : I:\MS16\METHODS\R16051022.M  
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
QLast Update : Tue May 10 17:29:58 2022  
Response via : Initial Calibration  
DataAcq Meth:TO15.M



TIC: 05102212.D\data.ms

(2) Propene (T)

4.224min (+0.024) 0.15ng

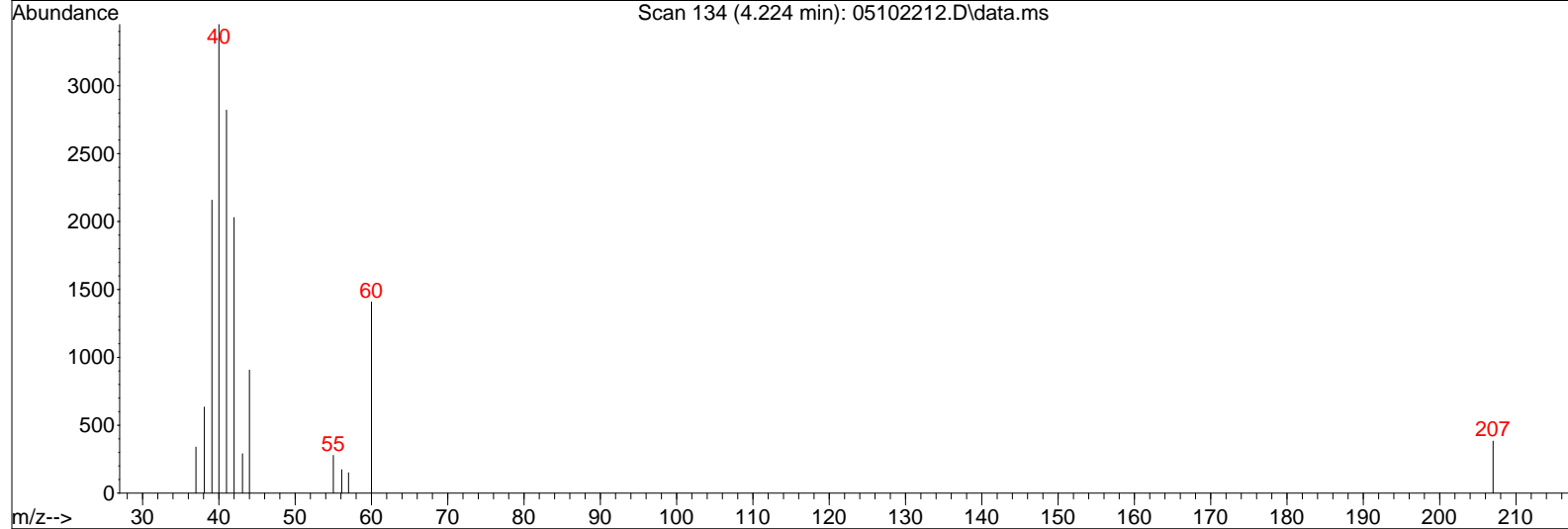
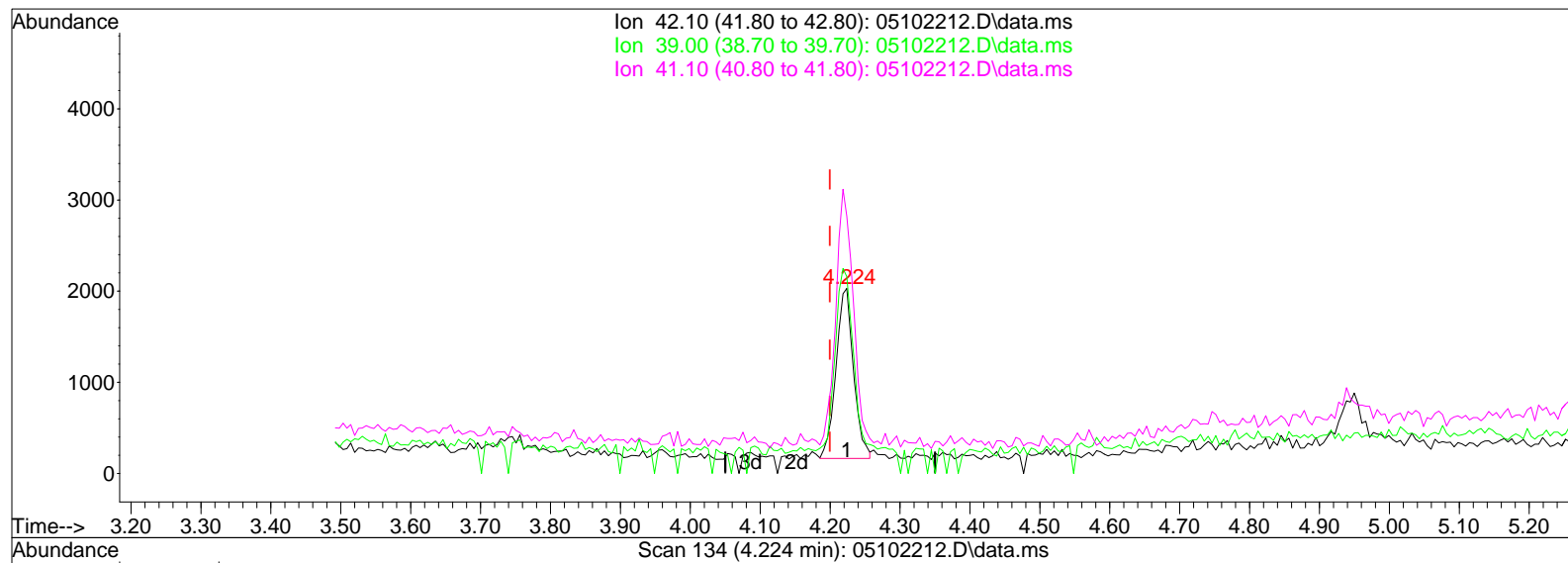
response 3642

Ion	Exp%	Act%
42.10	100	100
39.00	114.30	145.47#
41.10	152.50	134.24
0.00	0.00	0.00

Data File : I:\MS16\DATA\2022\_05\10\05102212.D  
Acq On : 10 May 2022 13:46  
Sample : 0.1ng R16051022 ICAL Std  
Misc : S35-04032201/S35-05102204 (6/09)

Vial: 13  
Operator: TZ/CG  
Inst : GCMS-16

Quant Time: May 10 17:40:59 2022  
Quant Method : I:\MS16\METHODS\R16051022.M  
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
QLast Update : Tue May 10 17:29:58 2022  
Response via : Initial Calibration  
DataAcq Meth:TO15.M



TIC: 05102212.D\data.ms

(2) Propene (T)

4.224min (+0.024) 0.13ng m

BLC

response 3248

4.224 5/11/22

Ion	Exp%	Act%
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42.10	100	100
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39.00	114.30	163.12#
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41.10	152.50	150.52
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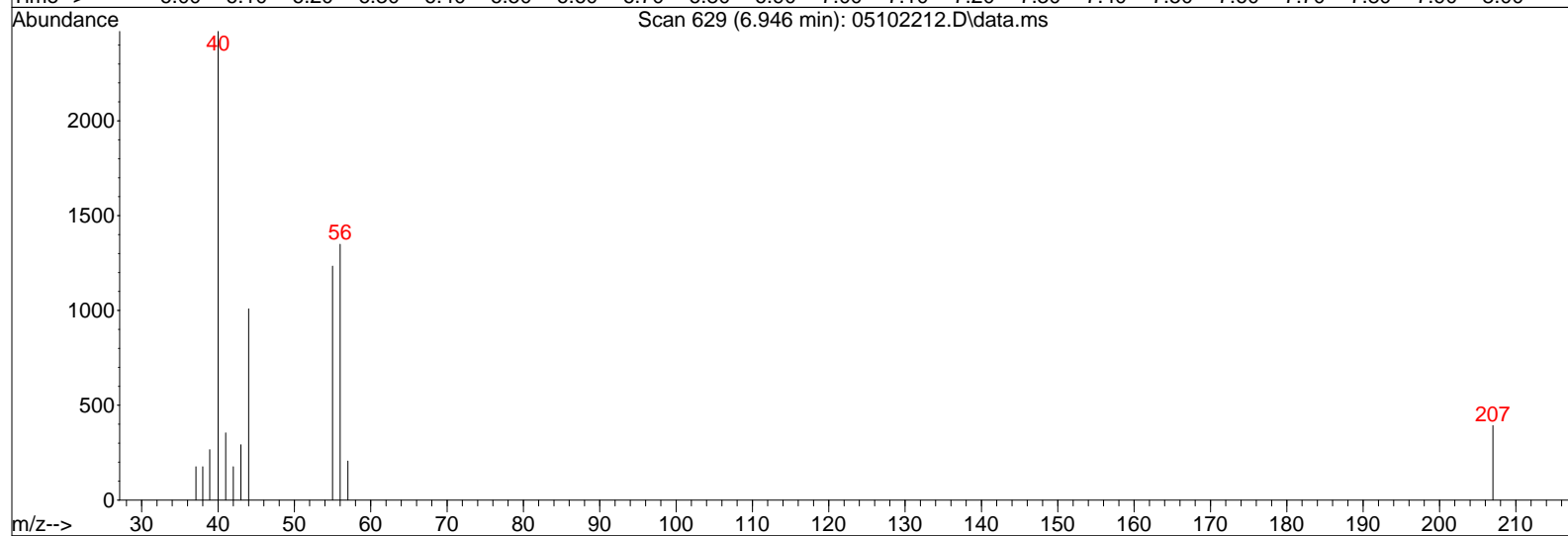
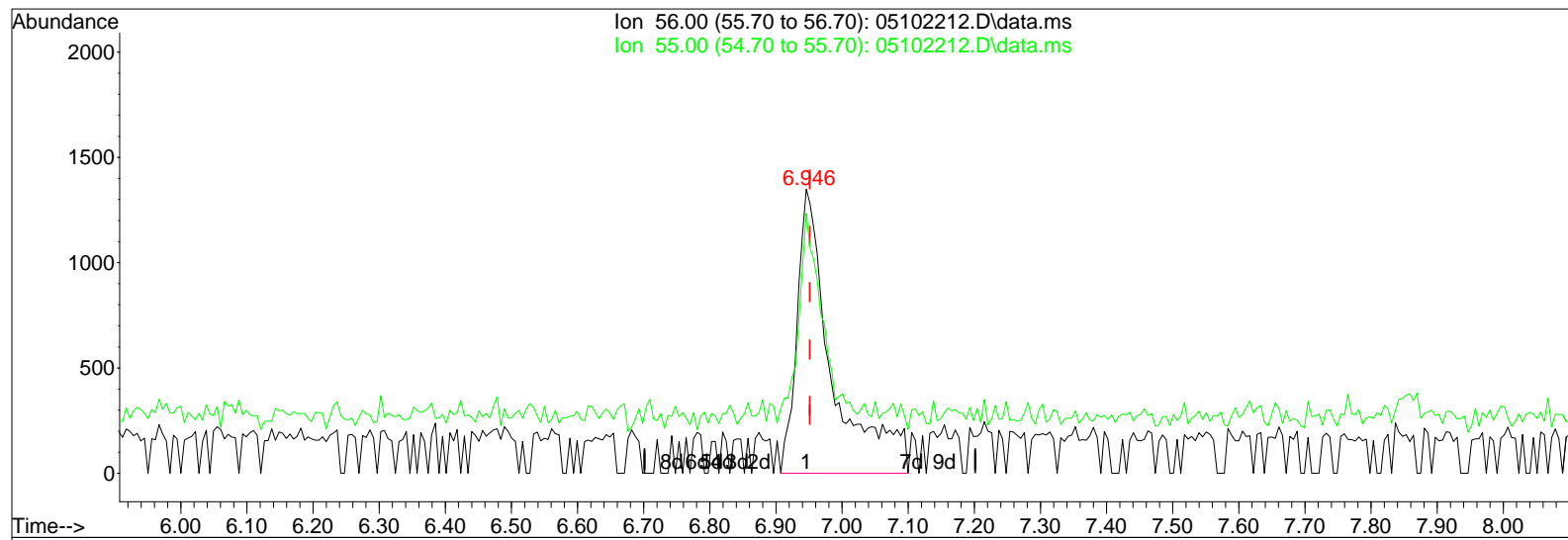
0.00	0.00	0.00
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TZ 5/16/22

Data File : I:\MS16\DATA\2022\_05\10\05102212.D  
Acq On : 10 May 2022 13:46  
Sample : 0.1ng R16051022 ICAL Std  
Misc : S35-04032201/S35-05052204 (6/09)

Vial: 13  
Operator: TZ/CG  
Inst : GCMS-16

Quant Time: May 10 17:36:12 2022  
Quant Method : I:\MS16\METHODS\R16051022.M  
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
QLast Update : Tue May 10 17:29:58 2022  
Response via : Initial Calibration  
DataAcq Meth:TO15.M



TIC: 05102212.D\data.ms

(12) Acrolein (T)

6.946min (-0.005) 0.43ng

response 4964

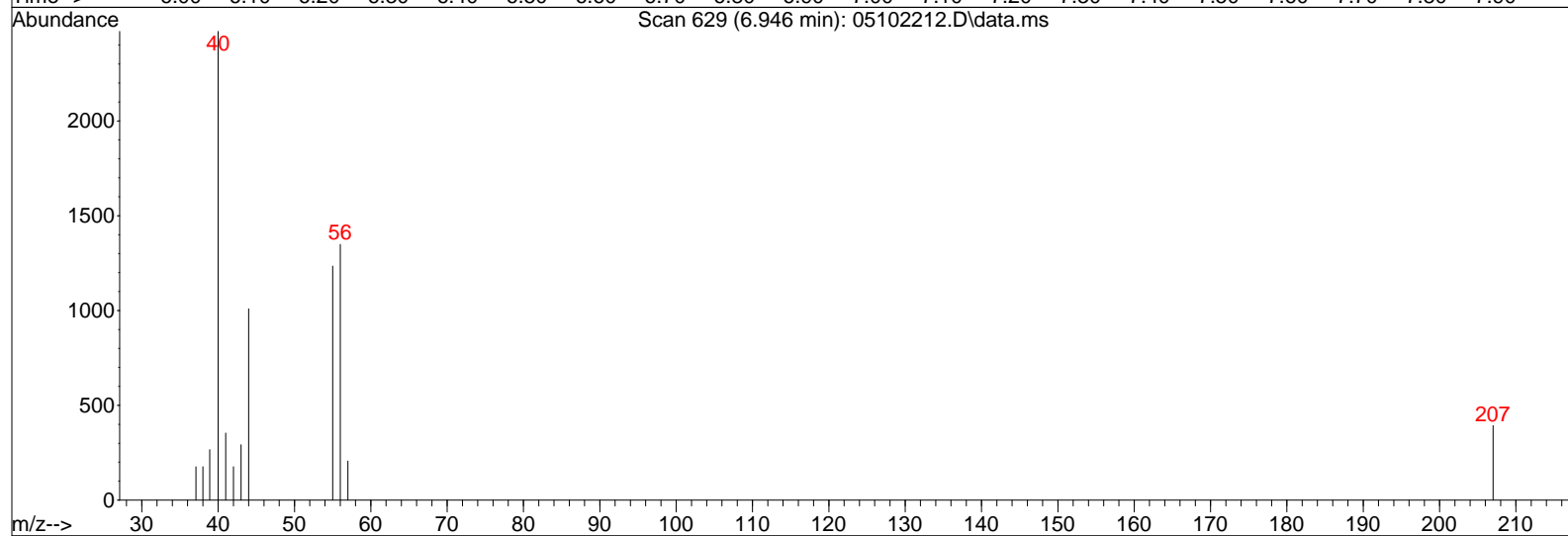
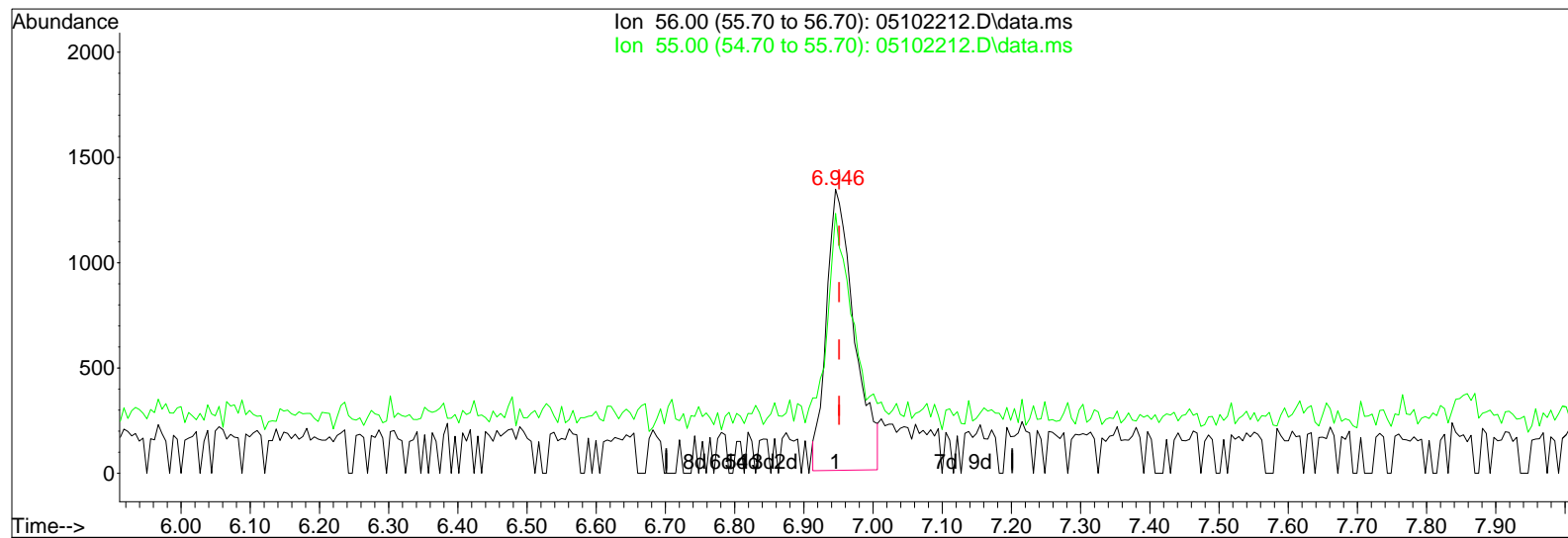
Ion	Exp%	Act%
56.00	100	100
55.00	72.10	62.37
0.00	0.00	0.00
0.00	0.00	0.00



Data File : I:\MS16\DATA\2022\_05\10\05102212.D  
Acq On : 10 May 2022 13:46  
Sample : 0.1ng R16051022 ICAL Std  
Misc : S35-04032201/S35-05102204 (6/09)

Vial: 13  
Operator: TZ/CG  
Inst : GCMS-16

Quant Time: May 10 17:40:59 2022  
Quant Method : I:\MS16\METHODS\R16051022.M  
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
QLast Update : Tue May 10 17:29:58 2022  
Response via : Initial Calibration  
DataAcq Meth:TO15.M



TIC: 05102212.D\data.ms

(12) Acrolein (T)

6.946min (-0.005) 0.33ng m

response 3723

BLC

Ion	Exp%	Act%
-----	------	------

56.00	100	100
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55.00	72.10	83.16
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0.00	0.00	0.00
------	------	------

0.00	0.00	0.00
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IDA 5/11/22

TZ 5/16/22

Data File : I:\MS16\DATA\2022\_05\10\05102213.D  
 Acq On : 10 May 2022 14:20  
 Sample : 0.2ng R16051022 ICAL Std  
 Misc : S35-04032201/S35-05102204 (6/09)

Vial: 13  
 Operator: TZ/CG  
 Inst : GCMS-16

Quant Time: May 10 17:45:45 2022

Quant Method : I:\MS16\METHODS\R16051022.M

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 17:29:58 2022

Response via : Initial Calibration

DataAcq Meth:TO15.M

5/11/22

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.29	130	161132	12.500	ng	-0.03
37) 1,4-Difluorobenzene (IS2)	13.42	114	727640	12.500	ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.73	54	160388	12.500	ng	0.00

#### System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...)	12.15	65	292238	13.203	ng	-0.02
Spiked Amount	12.500	Range 70 - 130	Recovery	=	105.60%	
57) Toluene-d8 (SS2)	15.88	98	769761	9.932	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	79.44%	
73) Bromofluorobenzene (SS3)	19.11	174	278036	11.255	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	90.08%	

#### Target Compounds

						Qvalue
2) Propene	4.21	42	5830m	0.238	ng	
3) Dichlorodifluoromethan...	4.37	85	7990	0.197	ng	97
4) Chloromethane	4.65	50	7326	0.248	ng	99
5) 1,2-Dichloro-1,1,2,2-t...	4.92	135	4179	0.193	ng	98
6) Vinyl Chloride	5.08	62	6003	0.198	ng	100
7) 1,3-Butadiene	5.34	54	5445	0.261	ng	90
8) Bromomethane	5.77	94	2994	0.182	ng	95
9) Chloroethane	6.12	64	2425	0.182	ng	92
10) Ethanol	6.46	45	15995	1.054	ng	86
11) Acetonitrile	6.73	41	8666	0.214	ng	85
12) Acrolein	6.94	56	5863m	0.523	ng	
13) Acetone	7.16	58	16842	1.109	ng	95
14) Trichlorofluoromethane	7.40	101	6780	0.197	ng	99
15) 2-Propanol (Isopropanol)	7.65	45	26923	0.520	ng	96
16) Acrylonitrile	7.90	53	11359	0.426	ng	99
17) 1,1-Dichloroethene	8.36	96	3656	0.202	ng	92
18) 2-Methyl-2-Propanol (t...	8.57	59	22151	0.464	ng	90
19) Methylene Chloride	8.57	84	3907	0.197	ng	90
20) 3-Chloro-1-propene (Al...	8.74	41	5851	0.212	ng	95
21) Trichlorotrifluoroethane	9.01	151	3364	0.215	ng	99
22) Carbon Disulfide	8.85	76	25264	0.375	ng	100
23) trans-1,2-Dichloroethene	9.85	61	5431	0.203	ng	93
24) 1,1-Dichloroethane	10.10	63	6898	0.210	ng	100
25) Methyl tert-Butyl Ether	10.23	73	11666	0.213	ng	90
26) Vinyl Acetate	10.37	86	1591	0.415	ng	99
27) 2-Butanone (MEK)	10.62	72	4752	0.340	ng	# 84
28) cis-1,2-Dichloroethene	11.12	61	5471	0.211	ng	93
29) Diisopropyl Ether	11.43	87	6595	0.405	ng	# 88
30) Ethyl Acetate	11.44	61	5889	0.822	ng	88
31) n-Hexane	11.42	57	8038	0.295	ng	91
32) Chloroform	11.45	83	6609	0.203	ng	97
34) Tetrahydrofuran (THF)	11.90	72	4516	0.354	ng	97
35) Ethyl tert-Butyl Ether	12.03	87	8679	0.417	ng	97
36) 1,2-Dichloroethane	12.27	62	5663	0.224	ng	100
38) 1,1,1-Trichloroethane	12.55	97	6350	0.215	ng	97
39) Isopropyl Acetate	0.00	61	0	N.D.	d	
40) 1-Butanol	0.00	56	0	N.D.	d	
41) Benzene	13.03	78	14786	0.196	ng	99
42) Carbon Tetrachloride	13.19	117	5232	0.218	ng	99
43) Cyclohexane	13.32	84	11018	0.396	ng	92
44) tert-Amyl Methyl Ether	13.68	73	22553	0.457	ng	98
45) 1,2-Dichloropropane	13.87	63	3962	0.215	ng	95
46) Bromodichloromethane	14.07	83	5316	0.215	ng	95
47) Trichloroethene	14.12	130	3994	0.198	ng	99
48) 1,4-Dioxane	14.12	88	3149	0.188	ng	99
49) 2,2,4-Trimethylpentane...	14.19	57	19403	0.265	ng	100
50) Methyl Methacrylate	14.34	100	2807	0.357	ng	# 84

Data File : I:\MS16\DATA\2022\_05\10\05102213.D  
 Acq On : 10 May 2022 14:20  
 Sample : 0.2ng R16051022 ICAL Std  
 Misc : S35-04032201/S35-05102204 (6/09)

Vial: 13  
 Operator: TZ/CG  
 Inst : GCMS-16

Quant Time: May 10 17:45:45 2022

Quant Method : I:\MS16\METHODS\R16051022.M

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 17:29:58 2022

Response via : Initial Calibration

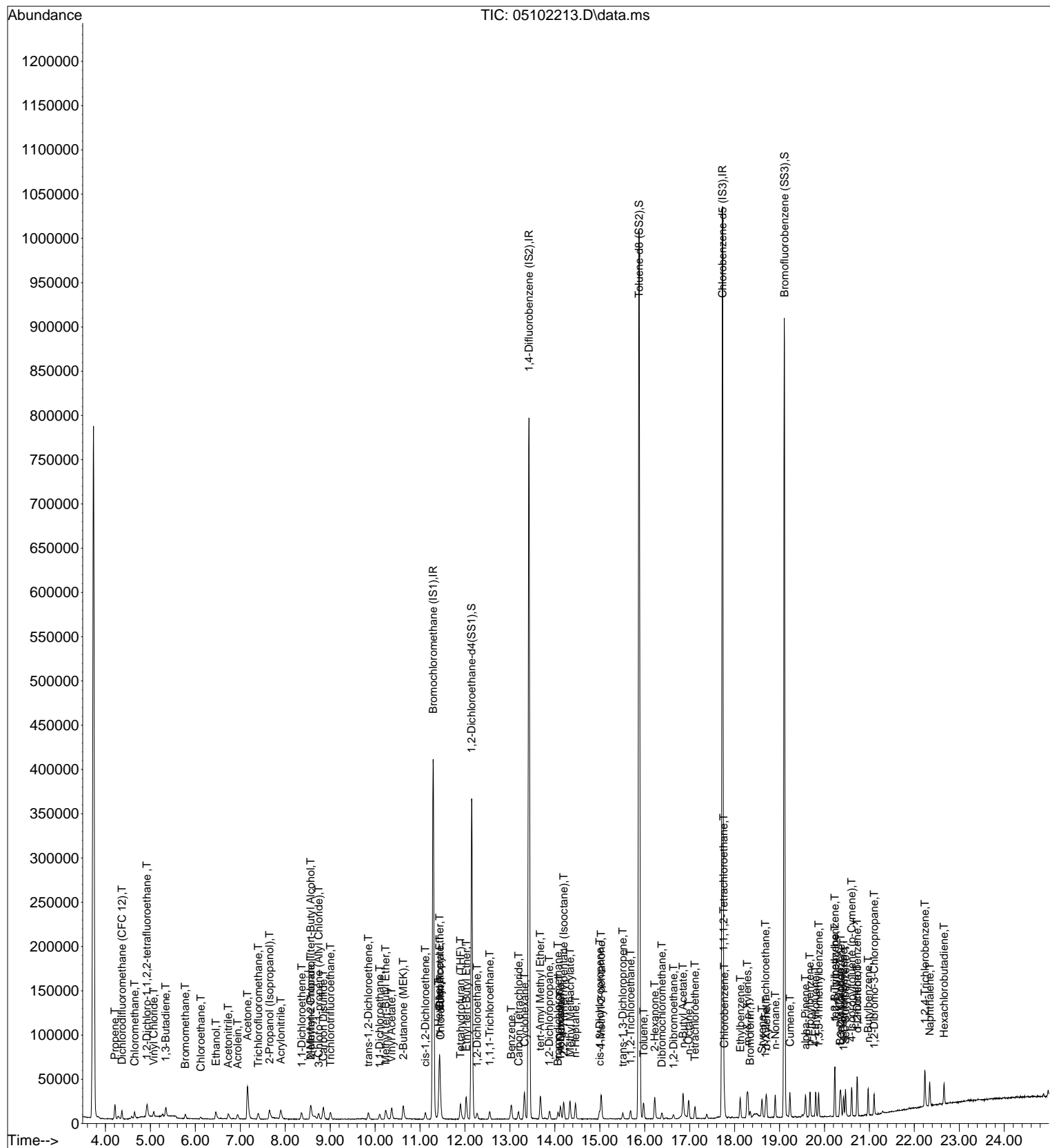
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.46	71	3929	0.209	ng	91
52) cis-1,3-Dichloropropene	15.00	75	5404	0.186	ng	97
53) 4-Methyl-2-pentanone	15.03	58	8034	0.476	ng	94
54) trans-1,3-Dichloropropene	15.51	75	4546	0.170	ng	100
55) 1,1,2-Trichloroethane	15.68	97	3667	0.203	ng	100
58) Toluene	15.98	91	14945	0.159	ng	100
59) 2-Hexanone	16.22	43	22261	0.421	ng	97
60) Dibromochloromethane	16.38	129	4412	0.178	ng	99
61) 1,2-Dibromoethane	16.64	107	4149	0.163	ng	96
62) n-Butyl Acetate	16.85	43	24452	0.422	ng	95
63) n-Octane	16.98	57	4373	0.234	ng	93
64) Tetrachloroethene	17.12	166	4283	0.170	ng	100
65) Chlorobenzene	17.77	112	10109	0.163	ng	96
66) Ethylbenzene	18.13	91	17470	0.167	ng	99
67) m- & p-Xylenes	18.28	91	28500	0.359	ng	95
68) Bromoform	18.35	173	3769	0.177	ng	99
69) Styrene	18.61	104	10358	0.160	ng	99
70) o-Xylene	18.71	91	13990	0.175	ng	97
71) n-Nonane	18.91	43	10200	0.244	ng	94
72) 1,1,2,2-Tetrachloroethane	18.69	83	6393	0.173	ng	97
74) Cumene	19.23	105	17926	0.173	ng	99
75) alpha-Pinene	19.58	93	8697	0.178	ng	66
76) n-Propylbenzene	19.68	91	21808	0.177	ng	96
77) 3-Ethyltoluene	0.00	105	0	N.D.	d	
78) 4-Ethyltoluene	19.80	105	18116	0.180	ng	98
79) 1,3,5-Trimethylbenzene	19.87	105	14869	0.179	ng	98
80) alpha-Methylstyrene	0.00	118	0	N.D.		
81) 2-Ethyltoluene	0.00	105	0	N.D.	d	
82) 1,2,4-Trimethylbenzene	20.23	105	14890	0.188	ng	99
83) n-Decane	0.00	58	0	N.D.	d	
84) Benzyl Chloride	20.35	91	17518	0.277	ng	97
85) 1,3-Dichlorobenzene	20.36	146	8899	0.186	ng	96
86) 1,4-Dichlorobenzene	20.42	146	9049	0.182	ng	95
87) sec-Butylbenzene	20.47	105	19839	0.180	ng	96
88) 4-Isopropyltoluene (p-...	20.61	119	17587	0.182	ng	97
89) 1,2,3-Trimethylbenzene	0.00	105	0	N.D.	d	
90) 1,2-Dichlorobenzene	20.73	146	8750	0.194	ng	94
91) d-Limonene	20.73	68	5413	0.191	ng	99
92) 1,2-Dibromo-3-Chloropr...	21.11	157	6291	0.369	ng	82
93) n-Undecane	0.00	57	0	N.D.	d	
94) 1,2,4-Trichlorobenzene	22.23	180	13670	0.383	ng	100
95) Naphthalene	22.34	128	21860	0.186	ng	99
96) n-Dodecane	0.00	57	0	N.D.	d	
97) Hexachlorobutadiene	22.66	225	4520	0.208	ng	98
98) Cyclohexanone	0.00	55	0	N.D.	d	
99) tert-Butylbenzene	20.23	119	14599	0.187	ng	100
100) n-Butylbenzene	20.97	91	16254	0.183	ng	96
101) 1,1,1,2-Tetrachloroethane	17.76	131	3950	0.182	ng	95

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Vial: 13  
Operator: TZ/CG  
Inst : GCMS-16

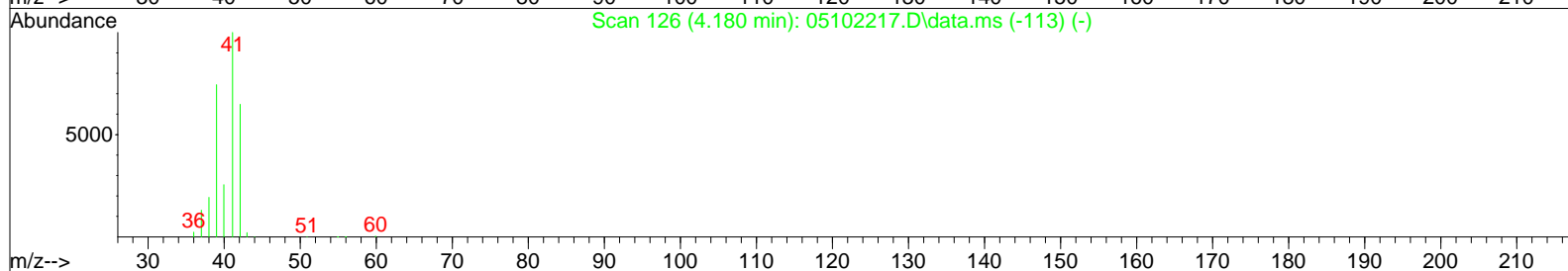
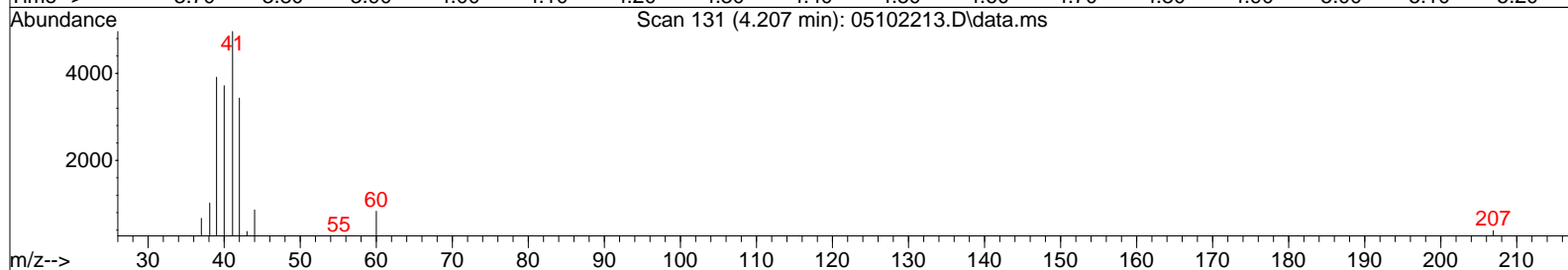
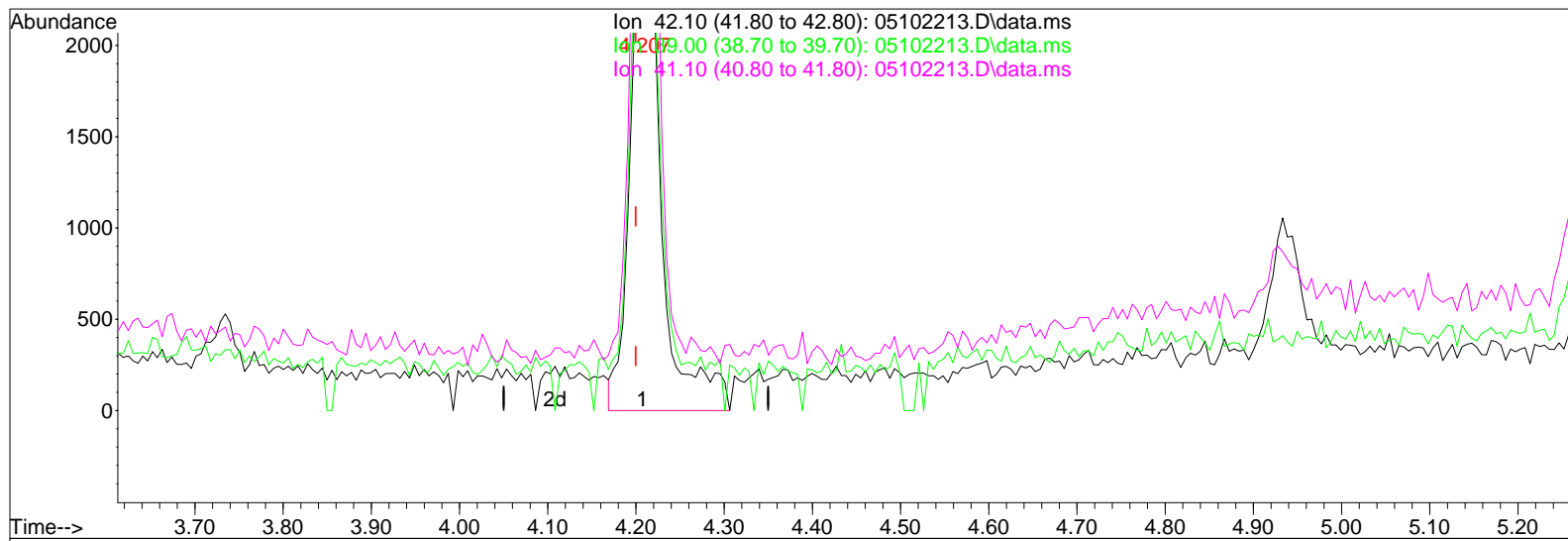
Quant Time: May 10 17:45:45 2022  
Quant Method : I:\MS16\METHODS\R16051022.M  
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
QLast Update : Tue May 10 17:29:58 2022  
Response via : Initial Calibration  
DataAcq Meth:TO15.M



Data File : I:\MS16\DATA\2022\_05\10\05102213.D  
Acq On : 10 May 2022 14:20  
Sample : 0.2ng R16051022 ICAL Std  
Misc : S35-04032201/S35-05052204 (6/09)

Vial: 13  
Operator: TZ/CG  
Inst : GCMS-16

Quant Time: May 10 17:35:42 2022  
Quant Method : I:\MS16\METHODS\R16051022.M  
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
QLast Update : Tue May 10 17:29:58 2022  
Response via : Initial Calibration  
DataAcq Meth:TO15.M



TIC: 05102213.D\data.ms

(2) Propene (T)

4.207min (+0.007) 0.29ng

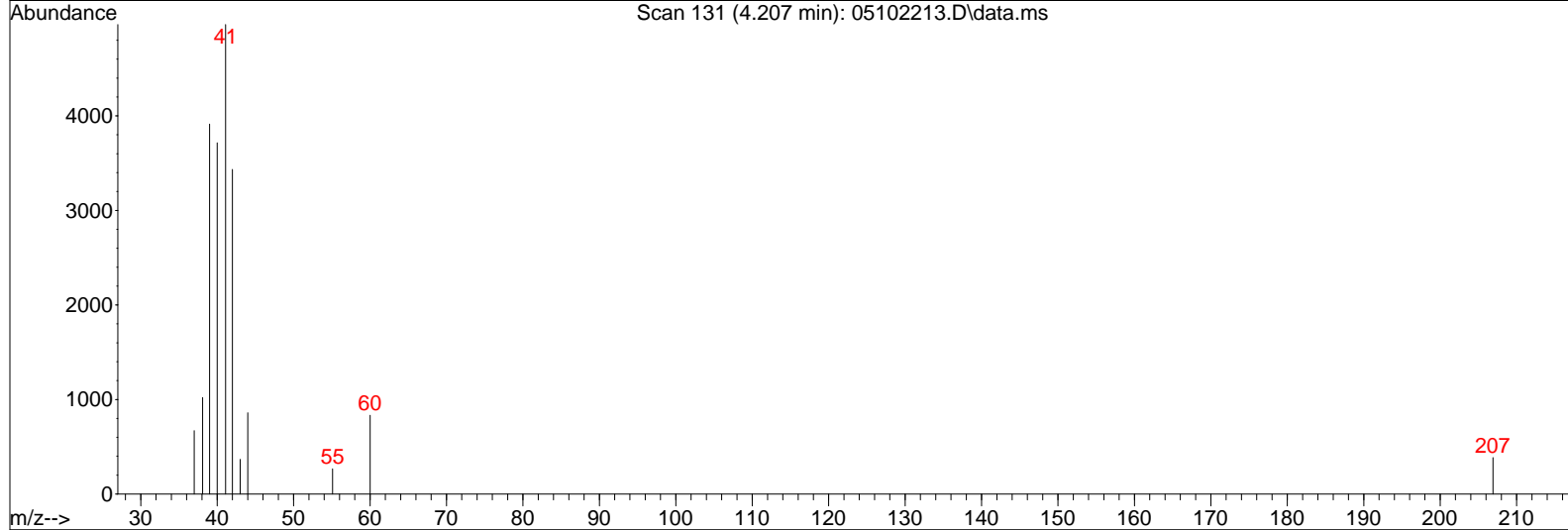
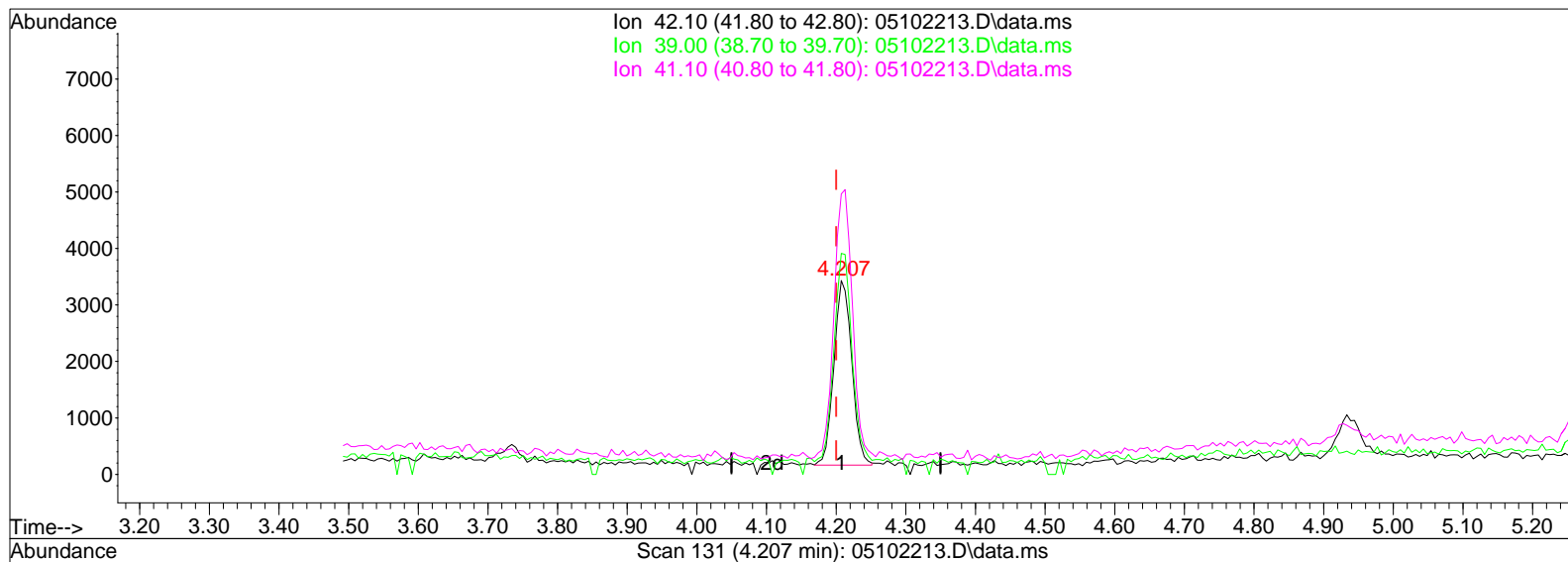
response 7216

Ion	Exp%	Act%
42.10	100	100
39.00	114.30	116.38
41.10	152.50	122.59#
0.00	0.00	0.00

Data File : I:\MS16\DATA\2022\_05\10\05102213.D  
Acq On : 10 May 2022 14:20  
Sample : 0.2ng R16051022 ICAL Std  
Misc : S35-04032201/S35-05102204 (6/09)

Vial: 13  
Operator: TZ/CG  
Inst : GCMS-16

Quant Time: May 10 17:45:45 2022  
Quant Method : I:\MS16\METHODS\R16051022.M  
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
QLast Update : Tue May 10 17:29:58 2022  
Response via : Initial Calibration  
DataAcq Meth:TO15.M



TIC: 05102213.D\data.ms

(2) Propene (T)

4.207min (+0.007) 0.24ng m

response 5830

Ion	Exp%	Act%
42.10	100	100
39.00	114.30	144.05#
41.10	152.50	151.73
0.00	0.00	0.00

BLC

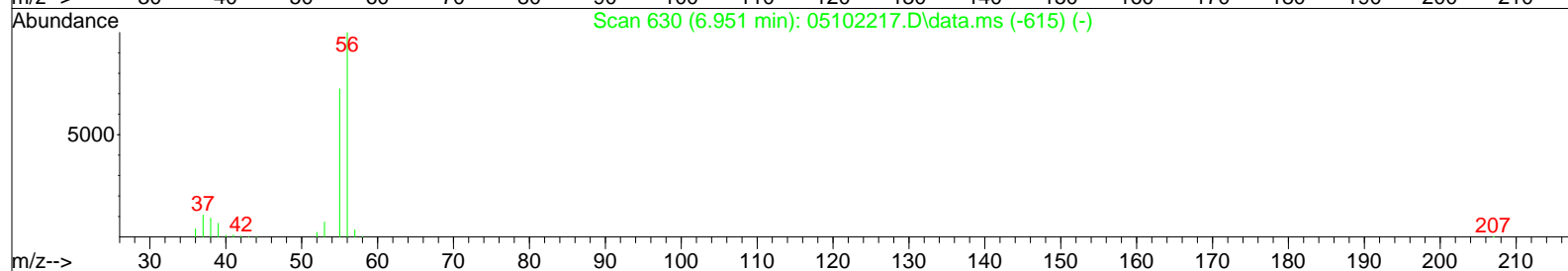
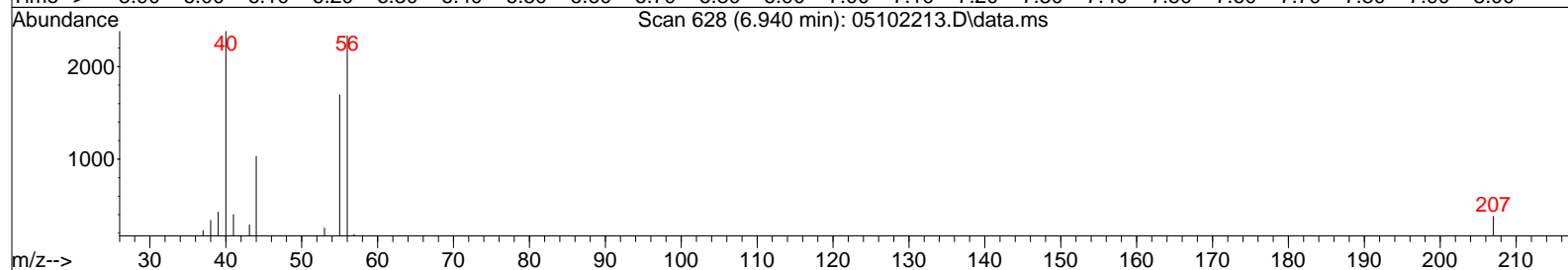
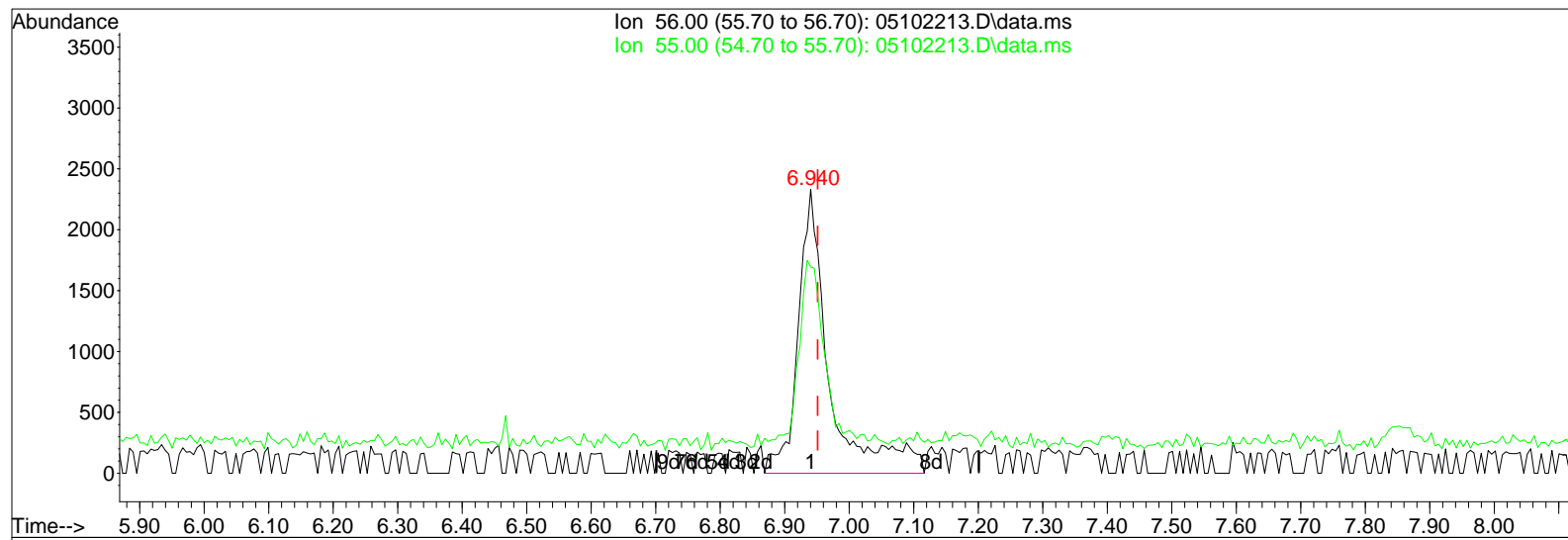
WA 5/11/22

TZ 5/16/22

Data File : I:\MS16\DATA\2022\_05\10\05102213.D  
Acq On : 10 May 2022 14:20  
Sample : 0.2ng R16051022 ICAL Std  
Misc : S35-04032201/S35-05052204 (6/09)

Vial: 13  
Operator: TZ/CG  
Inst : GCMS-16

Quant Time: May 10 17:35:42 2022  
Quant Method : I:\MS16\METHODS\R16051022.M  
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
QLast Update : Tue May 10 17:29:58 2022  
Response via : Initial Calibration  
DataAcq Meth:TO15.M



TIC: 05102213.D\data.ms

(12) Acrolein (T)

6.940min (-0.011) 0.70ng

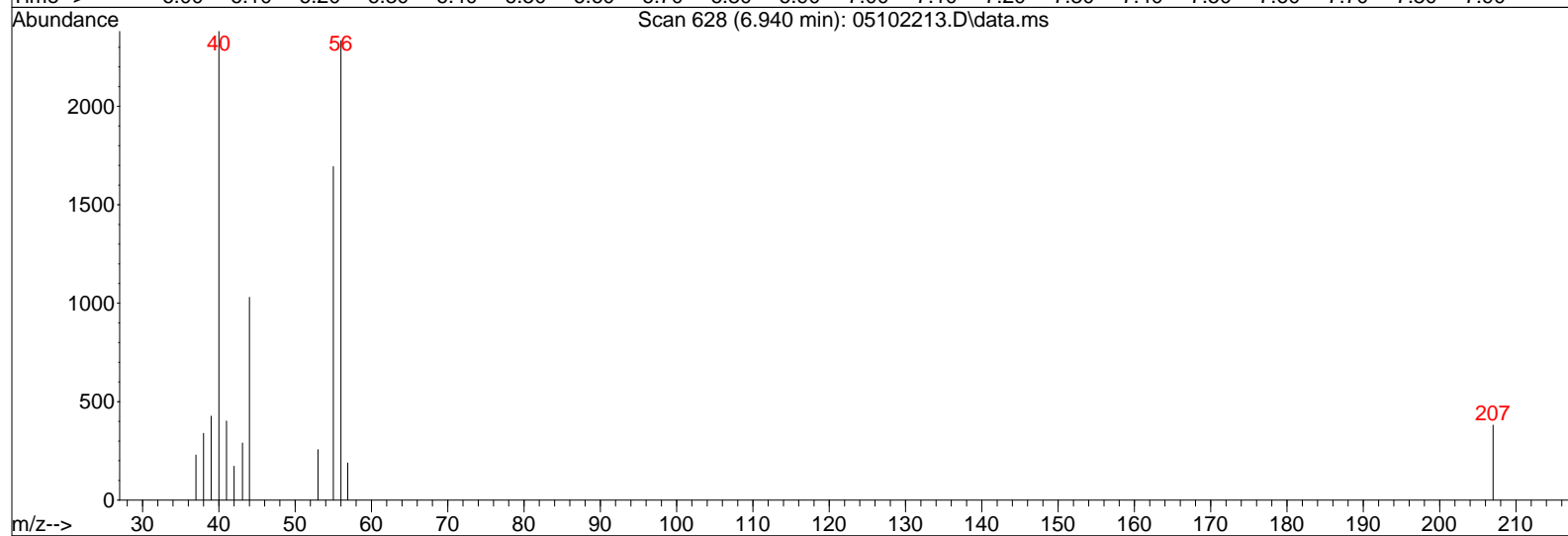
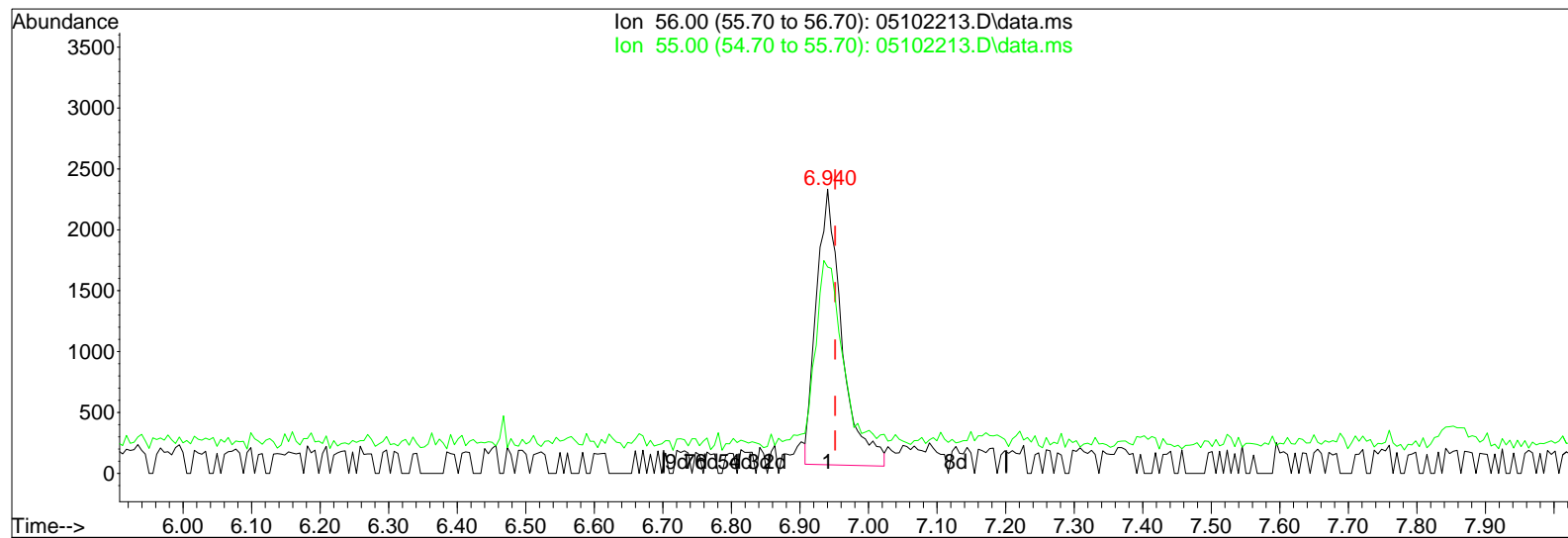
response 7799

Ion	Exp%	Act%
56.00	100	100
55.00	72.10	53.58
0.00	0.00	0.00
0.00	0.00	0.00

Data File : I:\MS16\DATA\2022\_05\10\05102213.D  
 Acq On : 10 May 2022 14:20  
 Sample : 0.2ng R16051022 ICAL Std  
 Misc : S35-04032201/S35-05102204 (6/09)

Vial: 13  
 Operator: TZ/CG  
 Inst : GCMS-16

Quant Time: May 10 17:45:45 2022  
 Quant Method : I:\MS16\METHODS\R16051022.M  
 Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
 QLast Update : Tue May 10 17:29:58 2022  
 Response via : Initial Calibration  
 DataAcq Meth:TO15.M



TIC: 05102213.D\data.ms

(12) Acrolein (T)

6.940min (-0.011) 0.52ng m

response 5863

BLC

Ion	Exp%	Act%
56.00	100	100
55.00	72.10	71.28
0.00	0.00	0.00
0.00	0.00	0.00

DA 5/11/22

TZ 5/16/22



Data File : I:\MS16\DATA\2022\_05\10\05102214.D  
 Acq On : 10 May 2022 14:54  
 Sample : 0.5ng R16051022 ICAL Std  
 Misc : S35-04032201/S35-05102204 (6/09)

Vial: 13  
 Operator: TZ/CG  
 Inst : GCMS-16

Quant Time: May 10 17:59:03 2022

Quant Method : I:\MS16\METHODS\R16051022.M

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 17:29:58 2022

Response via : Initial Calibration

DataAcq Meth:TO15.M

5/11/22

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.30	130	160991	12.500	ng	-0.03
37) 1,4-Difluorobenzene (IS2)	13.42	114	728369	12.500	ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.73	54	164807	12.500	ng	0.00

#### System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...)	12.15	65	293414	13.268	ng	-0.02
Spiked Amount	12.500	Range	70 - 130	Recovery	=	106.16%
57) Toluene-d8 (SS2)	15.88	98	783320	9.835	ng	0.00
Spiked Amount	12.500	Range	70 - 130	Recovery	=	78.72%
73) Bromofluorobenzene (SS3)	19.11	174	284457	11.207	ng	0.00
Spiked Amount	12.500	Range	70 - 130	Recovery	=	89.68%

#### Target Compounds

						Qvalue
2) Propene	4.21	42	16770	0.684	ng	95
3) Dichlorodifluoromethan...	4.37	85	18123	0.447	ng	98
4) Chloromethane	4.65	50	16041	0.544	ng	99
5) 1,2-Dichloro-1,1,2,2-t...	4.92	135	9779	0.451	ng	96
6) Vinyl Chloride	5.07	62	14121	0.467	ng	99
7) 1,3-Butadiene	5.35	54	12309	0.590	ng	95
8) Bromomethane	5.77	94	6736	0.409	ng	95
9) Chloroethane	6.12	64	5831	0.439	ng	98
10) Ethanol	6.46	45	34541	2.278	ng	91
11) Acetonitrile	6.73	41	19719	0.487	ng	93
12) Acrolein	6.93	56	12824m	1.146	ng	
13) Acetone	7.15	58	37113	2.447	ng	92
14) Trichlorofluoromethane	7.40	101	15981	0.464	ng	99
15) 2-Propanol (Isopropanol)	7.64	45	49752	0.962	ng	97
16) Acrylonitrile	7.90	53	26978	1.012	ng	96
17) 1,1-Dichloroethene	8.36	96	8371	0.462	ng	99
18) 2-Methyl-2-Propanol (t...	8.55	59	50078	1.050	ng	94
19) Methylene Chloride	8.57	84	8534	0.432	ng	97
20) 3-Chloro-1-propene (Al...	8.74	41	14452	0.523	ng	98
21) Trichlorotrifluoroethane	9.01	151	7652	0.489	ng	97
22) Carbon Disulfide	8.85	76	58548	0.870	ng	100
23) trans-1,2-Dichloroethene	9.85	61	13068	0.488	ng	96
24) 1,1-Dichloroethane	10.10	63	15964	0.486	ng	99
25) Methyl tert-Butyl Ether	10.23	73	26776	0.490	ng	95
26) Vinyl Acetate	10.37	86	3960	1.033	ng	# 93
27) 2-Butanone (MEK)	10.62	72	11530	0.826	ng	96
28) cis-1,2-Dichloroethene	11.12	61	13083	0.504	ng	97
29) Diisopropyl Ether	11.43	87	15382	0.946	ng	# 90
30) Ethyl Acetate	11.43	61	15013	2.096	ng	99
31) n-Hexane	11.42	57	17499	0.644	ng	94
32) Chloroform	11.47	83	15136	0.465	ng	97
34) Tetrahydrofuran (THF)	11.89	72	10096	0.793	ng	97
35) Ethyl tert-Butyl Ether	12.02	87	20577	0.990	ng	98
36) 1,2-Dichloroethane	12.27	62	13163	0.520	ng	99
38) 1,1,1-Trichloroethane	12.55	97	14369	0.486	ng	99
39) Isopropyl Acetate	0.00	61	0	N.D.	d	
40) 1-Butanol	0.00	56	0	N.D.	d	
41) Benzene	13.03	78	33929	0.448	ng	100
42) Carbon Tetrachloride	13.19	117	12194	0.507	ng	99
43) Cyclohexane	13.32	84	25922	0.931	ng	98
44) tert-Amyl Methyl Ether	13.68	73	51244	1.037	ng	99
45) 1,2-Dichloropropane	13.88	63	9251	0.501	ng	97
46) Bromodichloromethane	14.07	83	12382	0.499	ng	96
47) Trichloroethene	14.13	130	9377	0.463	ng	98
48) 1,4-Dioxane	14.11	88	6883	0.410	ng	94
49) 2,2,4-Trimethylpentane...	14.19	57	43213	0.589	ng	97
50) Methyl Methacrylate	14.34	100	6960	0.885	ng	94

Data File : I:\MS16\DATA\2022\_05\10\05102214.D  
 Acq On : 10 May 2022 14:54  
 Sample : 0.5ng R16051022 ICAL Std  
 Misc : S35-04032201/S35-05102204 (6/09)

Vial: 13  
 Operator: TZ/CG  
 Inst : GCMS-16

Quant Time: May 10 17:59:03 2022

Quant Method : I:\MS16\METHODS\R16051022.M

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 17:29:58 2022

Response via : Initial Calibration

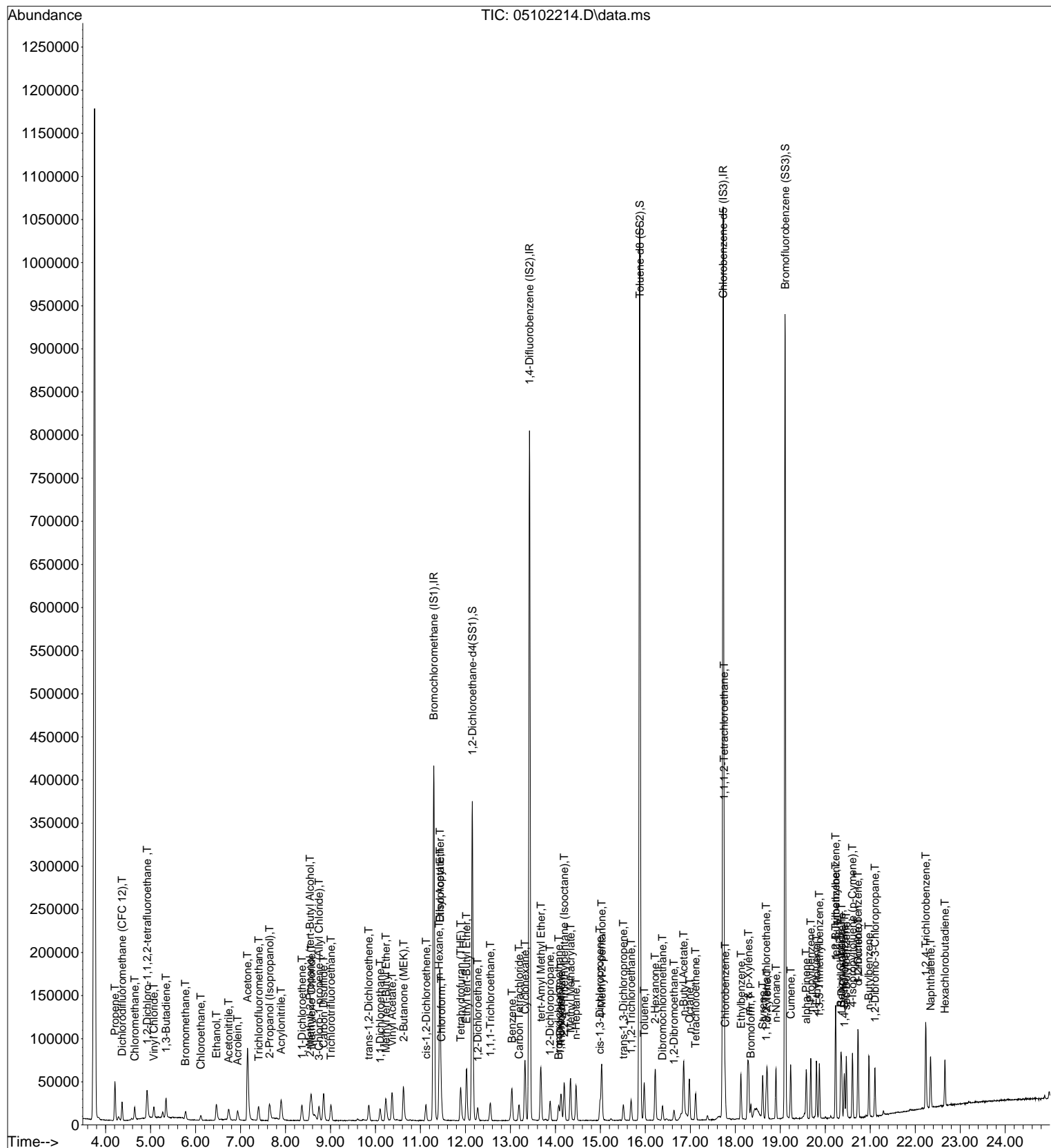
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.46	71	8786	0.467	ng	95
52) cis-1,3-Dichloropropene	14.99	75	13060	0.449	ng	99
53) 4-Methyl-2-pentanone	15.03	58	18715	1.109	ng	95
54) trans-1,3-Dichloropropene	15.51	75	11585	0.434	ng	100
55) 1,1,2-Trichloroethane	15.68	97	8531	0.472	ng	95
58) Toluene	15.98	91	35357	0.367	ng	99
59) 2-Hexanone	16.22	43	53391	0.982	ng	97
60) Dibromochloromethane	16.38	129	10641	0.417	ng	98
61) 1,2-Dibromoethane	16.63	107	9908	0.379	ng	98
62) n-Butyl Acetate	16.85	43	56890	0.955	ng	98
63) n-Octane	16.98	57	9354	0.486	ng	97
64) Tetrachloroethene	17.12	166	10205	0.395	ng	99
65) Chlorobenzene	17.77	112	23702	0.372	ng	99
66) Ethylbenzene	18.13	91	40696	0.380	ng	98
67) m- & p-Xylenes	18.29	91	64870	0.795	ng	96
68) Bromoform	18.35	173	9262	0.424	ng	99
69) Styrene	18.61	104	24247	0.364	ng	99
70) o-Xylene	18.71	91	32709	0.399	ng	97
71) n-Nonane	18.91	43	23678	0.551	ng	98
72) 1,1,2,2-Tetrachloroethane	18.69	83	14815	0.390	ng	99
74) Cumene	19.23	105	41327	0.387	ng	100
75) alpha-Pinene	19.58	93	20744	0.412	ng	96
76) n-Propylbenzene	19.68	91	49742	0.393	ng	97
77) 3-Ethyltoluene	0.00	105	0	N.D.	d	
78) 4-Ethyltoluene	19.80	105	41670	0.403	ng	99
79) 1,3,5-Trimethylbenzene	19.87	105	34508	0.405	ng	98
80) alpha-Methylstyrene	0.00	118	0	N.D.	d	
81) 2-Ethyltoluene	0.00	105	0	N.D.	d	
82) 1,2,4-Trimethylbenzene	20.23	105	34831	0.429	ng	100
83) n-Decane	0.00	58	0	N.D.	d	
84) Benzyl Chloride	20.35	91	45804	0.704	ng	97
85) 1,3-Dichlorobenzene	20.36	146	20534	0.419	ng	99
86) 1,4-Dichlorobenzene	20.42	146	20533	0.403	ng	97
87) sec-Butylbenzene	20.47	105	46692	0.411	ng	98
88) 4-Isopropyltoluene (p-...	20.61	119	40611	0.410	ng	98
89) 1,2,3-Trimethylbenzene	0.00	105	0	N.D.	d	
90) 1,2-Dichlorobenzene	20.73	146	20122	0.435	ng	97
91) d-Limonene	20.73	68	13259	0.456	ng	99
92) 1,2-Dibromo-3-Chloropr...	21.11	157	14894	0.851	ng	# 81
93) n-Undecane	0.00	57	0	N.D.	d	
94) 1,2,4-Trichlorobenzene	22.23	180	31935	0.871	ng	99
95) Naphthalene	22.34	128	48707	0.403	ng	100
96) n-Dodecane	0.00	57	0	N.D.	d	
97) Hexachlorobutadiene	22.66	225	10549	0.472	ng	99
98) Cyclohexanone	0.00	55	0	N.D.	d	
99) tert-Butylbenzene	20.23	119	34236	0.428	ng	99
100) n-Butylbenzene	20.97	91	37365	0.409	ng	98
101) 1,1,1,2-Tetrachloroethane	17.75	131	9502	0.425	ng	98

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Vial: 13  
Operator: TZ/CG  
Inst : GCMS-16

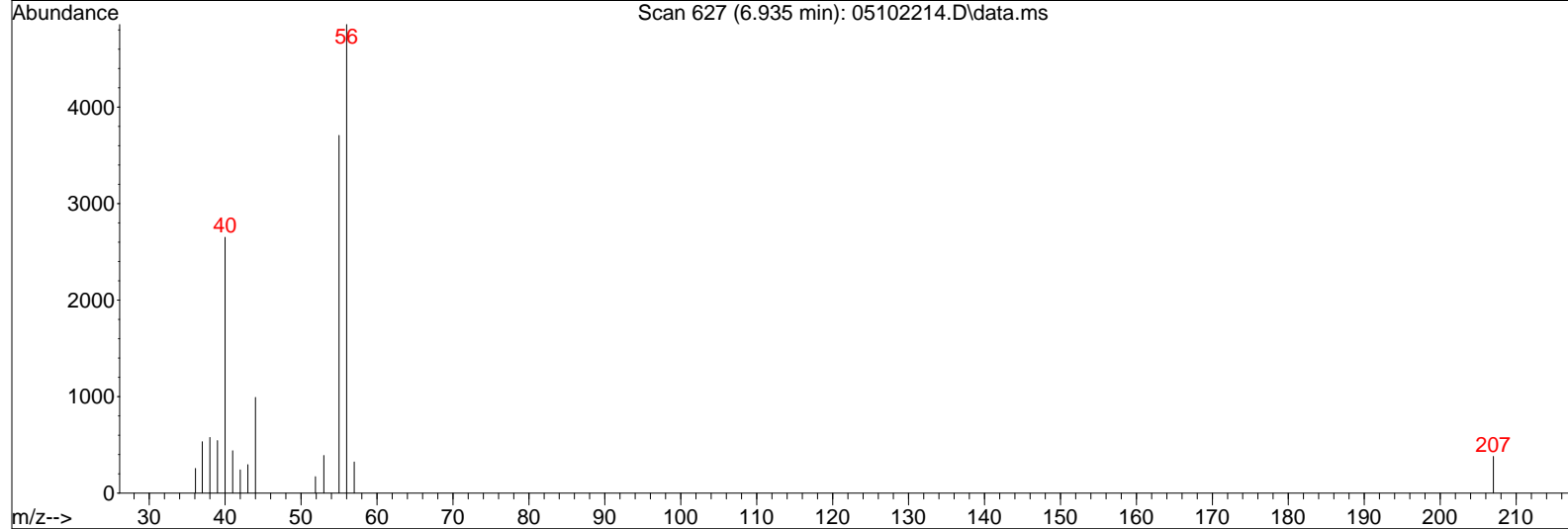
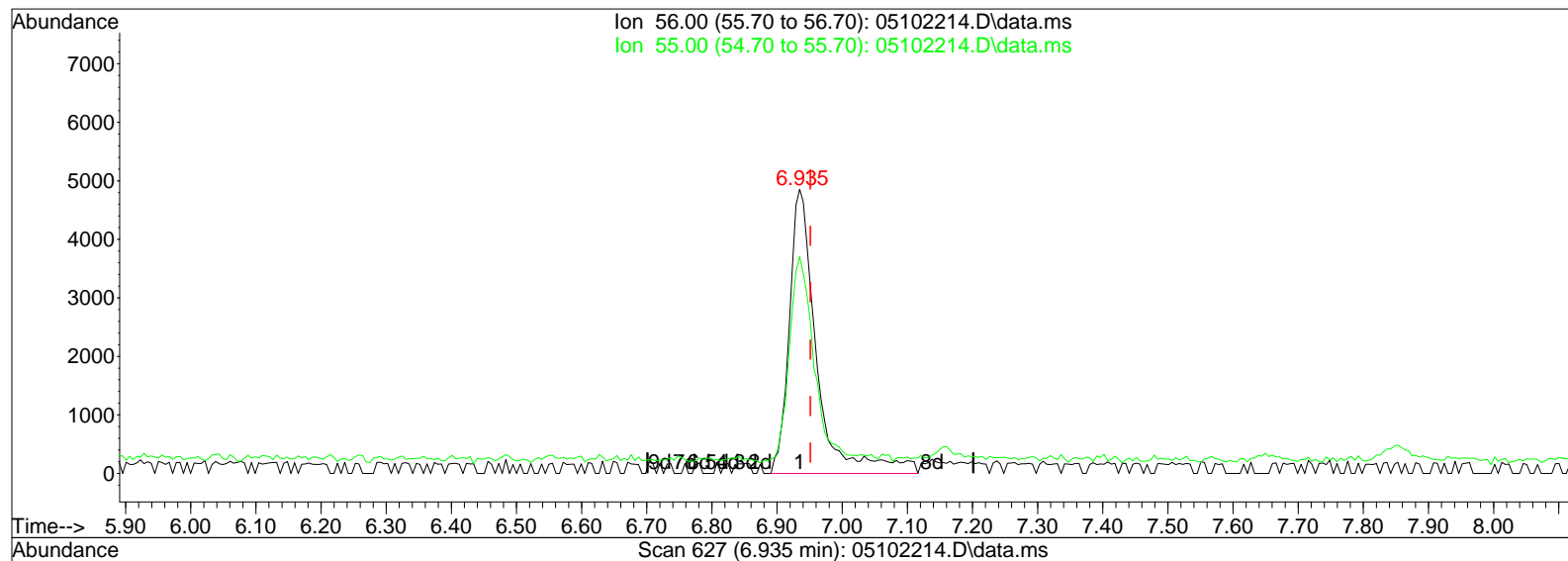
Quant Time: May 10 17:59:03 2022  
Quant Method : I:\MS16\METHODS\R16051022.M  
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
QLast Update : Tue May 10 17:29:58 2022  
Response via : Initial Calibration  
DataAcq Meth:TO15.M



Data File : I:\MS16\DATA\2022\_05\10\05102214.D  
Acq On : 10 May 2022 14:54  
Sample : 0.5ng R16051022 ICAL Std  
Misc : S35-04032201/S35-05052204 (6/09)

Vial: 13  
Operator: TZ/CG  
Inst : GCMS-16

Quant Time: May 10 17:35:17 2022  
Quant Method : I:\MS16\METHODS\R16051022.M  
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
QLast Update : Tue May 10 17:29:58 2022  
Response via : Initial Calibration  
DataAcq Meth:TO15.M



TIC: 05102214.D\data.ms

(12) Acrolein (T)

6.935min (-0.017) 1.27ng

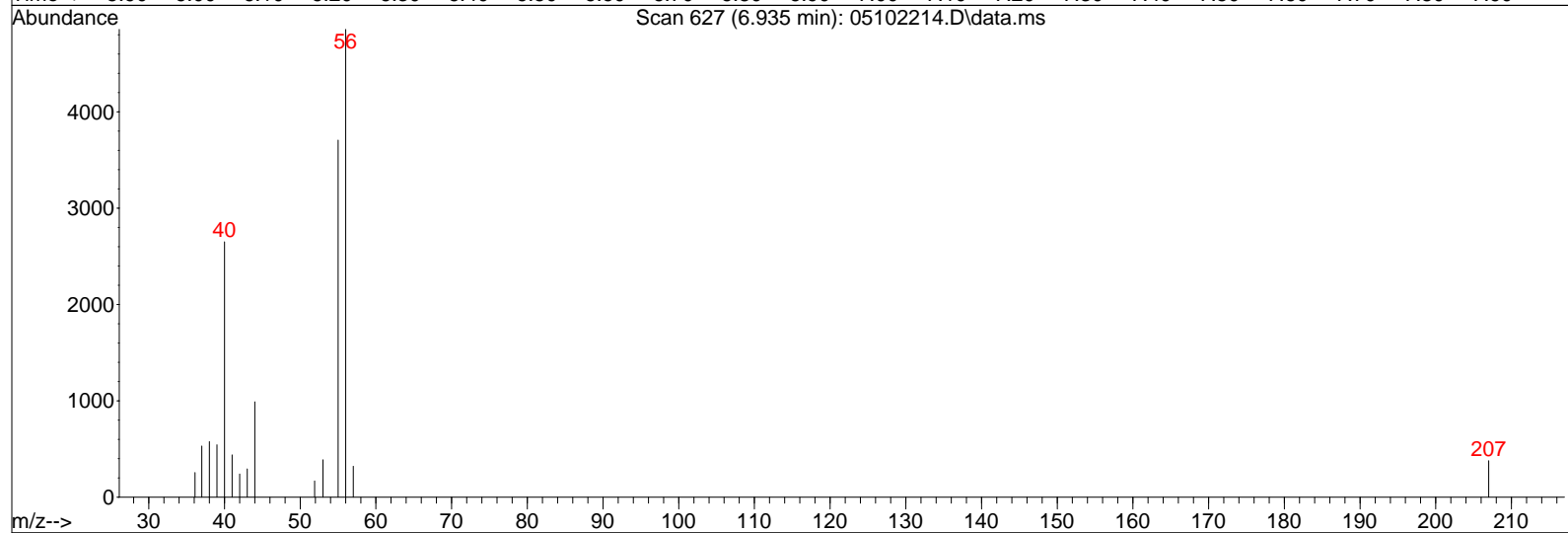
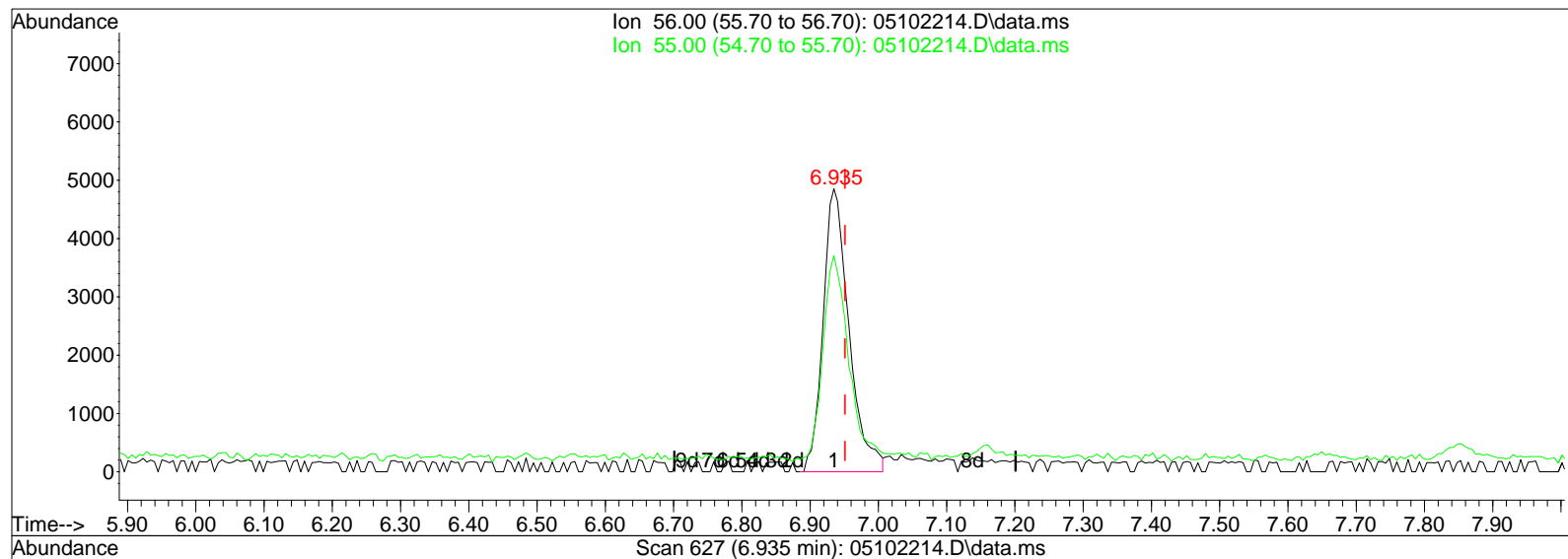
response 14197

Ion	Exp%	Act%
56.00	100	100
55.00	72.10	70.89
0.00	0.00	0.00
0.00	0.00	0.00

Data File : I:\MS16\DATA\2022\_05\10\05102214.D  
Acq On : 10 May 2022 14:54  
Sample : 0.5ng R16051022 ICAL Std  
Misc : S35-04032201/S35-05102204 (6/09)

Vial: 13  
Operator: TZ/CG  
Inst : GCMS-16

Quant Time: May 10 17:59:03 2022  
Quant Method : I:\MS16\METHODS\R16051022.M  
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
QLast Update : Tue May 10 17:29:58 2022  
Response via : Initial Calibration  
DataAcq Meth:TO15.M



TIC: 05102214.D\data.ms

(12) Acrolein (T)

6.935min (-0.017) 1.15ng m

response 12824

Ion	Exp%	Act%
56.00	100	100
55.00	72.10	78.48
0.00	0.00	0.00
0.00	0.00	0.00

DA 5/11/22

BLC

TZ 5/16/22

Data File : I:\MS16\DATA\2022\_05\10\05102215.D  
 Acq On : 10 May 2022 15:28  
 Sample : 1.0ng R16051022 ICAL Std  
 Misc : S35-04032201/S35-05102203 (6/09)

Vial: 14  
 Operator: TZ/CG  
 Inst : GCMS-16

Quant Time: May 10 18:03:42 2022

Quant Method : I:\MS16\METHODS\R16051022.M

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 17:29:58 2022

Response via : Initial Calibration

DataAcq Meth:TO15.M

5/10/22

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.30	130	162687	12.500	ng	-0.03
37) 1,4-Difluorobenzene (IS2)	13.42	114	736519	12.500	ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.73	54	165921	12.500	ng	0.00

#### System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...)	12.15	65	295715	13.233	ng	-0.02
Spiked Amount	12.500	Range	70 - 130	Recovery	=	105.84%
57) Toluene-d8 (SS2)	15.88	98	788105	9.829	ng	0.00
Spiked Amount	12.500	Range	70 - 130	Recovery	=	78.64%
73) Bromofluorobenzene (SS3)	19.11	174	284122	11.118	ng	0.00
Spiked Amount	12.500	Range	70 - 130	Recovery	=	88.96%

#### Target Compounds

						Qvalue
2) Propene	4.20	42	29032	1.171	ng	97
3) Dichlorodifluoromethan...	4.36	85	39956	0.976	ng	99
4) Chloromethane	4.64	50	36765	1.235	ng	100
5) 1,2-Dichloro-1,1,2,2-t...	4.91	135	20918	0.955	ng	99
6) Vinyl Chloride	5.06	62	31096	1.018	ng	99
7) 1,3-Butadiene	5.33	54	26502	1.258	ng	99
8) Bromomethane	5.77	94	14473	0.870	ng	97
9) Chloroethane	6.11	64	13099	0.975	ng	98
10) Ethanol	6.46	45	65917	4.302	ng	99
11) Acetonitrile	6.73	41	41912	1.024	ng	98
12) Acrolein	6.92	56	29768	2.632	ng	95
13) Acetone	7.14	58	80083	5.224	ng	92
14) Trichlorofluoromethane	7.40	101	34392	0.988	ng	99
15) 2-Propanol (Isopropanol)	7.64	45	130016	2.488	ng	98
16) Acrylonitrile	7.90	53	57941	2.151	ng	99
17) 1,1-Dichloroethene	8.36	96	18265	0.998	ng	99
18) 2-Methyl-2-Propanol (t...	8.53	59	115183	2.390	ng	98
19) Methylene Chloride	8.57	84	18317	0.917	ng	99
20) 3-Chloro-1-propene (Al...	8.74	41	32603	1.168	ng	100
21) Trichlorotrifluoroethane	9.01	151	17365	1.099	ng	99
22) Carbon Disulfide	8.85	76	128243	1.886	ng	99
23) trans-1,2-Dichloroethene	9.85	61	29210	1.080	ng	99
24) 1,1-Dichloroethane	10.11	63	35980	1.084	ng	100
25) Methyl tert-Butyl Ether	10.22	73	59016	1.068	ng	99
26) Vinyl Acetate	10.37	86	9344	2.412	ng	# 90
27) 2-Butanone (MEK)	10.61	72	24749	1.754	ng	99
28) cis-1,2-Dichloroethene	11.12	61	28197	1.075	ng	98
29) Diisopropyl Ether	11.43	87	34706	2.112	ng	# 85
30) Ethyl Acetate	11.43	61	32968	4.555	ng	99
31) n-Hexane	11.42	57	38258	1.392	ng	97
32) Chloroform	11.47	83	33230	1.010	ng	97
34) Tetrahydrofuran (THF)	11.89	72	22333	1.735	ng	96
35) Ethyl tert-Butyl Ether	12.02	87	45162	2.150	ng	98
36) 1,2-Dichloroethane	12.27	62	29040	1.136	ng	100
38) 1,1,1-Trichloroethane	12.55	97	31213	1.044	ng	100
39) Isopropyl Acetate	0.00	61	0	N.D.	d	
40) 1-Butanol	0.00	56	0	N.D.	d	
41) Benzene	13.03	78	72874	0.952	ng	100
42) Carbon Tetrachloride	13.19	117	26846	1.103	ng	99
43) Cyclohexane	13.32	84	56834	2.019	ng	100
44) tert-Amyl Methyl Ether	13.67	73	107327	2.148	ng	98
45) 1,2-Dichloropropane	13.89	63	20012	1.071	ng	100
46) Bromodichloromethane	14.07	83	27195	1.085	ng	99
47) Trichloroethene	14.13	130	20239	0.989	ng	99
48) 1,4-Dioxane	14.11	88	15424	0.908	ng	99
49) 2,2,4-Trimethylpentane...	14.19	57	94999	1.280	ng	98
50) Methyl Methacrylate	14.34	100	15229	1.914	ng	95

Data File : I:\MS16\DATA\2022\_05\10\05102215.D  
 Acq On : 10 May 2022 15:28  
 Sample : 1.0ng R16051022 ICAL Std  
 Misc : S35-04032201/S35-05102203 (6/09)

Vial: 14  
 Operator: TZ/CG  
 Inst : GCMS-16

Quant Time: May 10 18:03:42 2022  
 Quant Method : I:\MS16\METHODS\R16051022.M  
 Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
 QLast Update : Tue May 10 17:29:58 2022  
 Response via : Initial Calibration  
 DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.46	71	19151	1.008	ng	97
52) cis-1,3-Dichloropropene	14.99	75	29189	0.993	ng	99
53) 4-Methyl-2-pentanone	15.02	58	41170	2.412	ng	96
54) trans-1,3-Dichloropropene	15.51	75	25497	0.944	ng	98
55) 1,1,2-Trichloroethane	15.68	97	18249	0.999	ng	99
58) Toluene	15.98	91	76036	0.784	ng	99
59) 2-Hexanone	16.22	43	115524	2.110	ng	98
60) Dibromochloromethane	16.38	129	23311	0.907	ng	99
61) 1,2-Dibromoethane	16.63	107	21449	0.814	ng	99
62) n-Butyl Acetate	16.85	43	126521	2.110	ng	100
63) n-Octane	16.98	57	19839	1.024	ng	98
64) Tetrachloroethene	17.12	166	22101	0.849	ng	99
65) Chlorobenzene	17.77	112	50702	0.790	ng	99
66) Ethylbenzene	18.13	91	87325	0.809	ng	99
67) m- & p-Xylenes	18.28	91	135990	1.656	ng	99
68) Bromoform	18.35	173	19960	0.907	ng	99
69) Styrene	18.61	104	52168	0.778	ng	100
70) o-Xylene	18.71	91	69531	0.842	ng	98
71) n-Nonane	18.90	43	51221	1.184	ng	100
72) 1,1,2,2-Tetrachloroethane	18.69	83	31953	0.835	ng	99
74) Cumene	19.23	105	91083	0.848	ng	99
75) alpha-Pinene	19.58	93	44398	0.876	ng	91
76) n-Propylbenzene	19.68	91	108609	0.852	ng	98
77) 3-Ethyltoluene	0.00	105	0	N.D.	d	
78) 4-Ethyltoluene	19.80	105	90457	0.869	ng	99
79) 1,3,5-Trimethylbenzene	19.87	105	73534	0.858	ng	99
80) alpha-Methylstyrene	0.00	118	0	N.D.	d	
81) 2-Ethyltoluene	0.00	105	0	N.D.	d	
82) 1,2,4-Trimethylbenzene	20.23	105	76121	0.931	ng	99
83) n-Decane	0.00	58	0	N.D.	d	
84) Benzyl Chloride	20.35	91	103116	1.573	ng	98
85) 1,3-Dichlorobenzene	20.36	146	43510	0.881	ng	98
86) 1,4-Dichlorobenzene	20.42	146	43358	0.845	ng	98
87) sec-Butylbenzene	20.47	105	101296	0.886	ng	99
88) 4-Isopropyltoluene (p-...	20.61	119	87899	0.881	ng	98
89) 1,2,3-Trimethylbenzene	0.00	105	0	N.D.	d	
90) 1,2-Dichlorobenzene	20.73	146	42028	0.903	ng	97
91) d-Limonene	20.73	68	28470	0.972	ng	99
92) 1,2-Dibromo-3-Chloropr...	21.11	157	32135	1.823	ng	89
93) n-Undecane	0.00	57	0	N.D.	d	
94) 1,2,4-Trichlorobenzene	22.23	180	62871	1.704	ng	99
95) Naphthalene	22.34	128	91053	0.749	ng	100
96) n-Dodecane	0.00	57	0	N.D.	d	
97) Hexachlorobutadiene	22.66	225	21396	0.950	ng	100
98) Cyclohexanone	0.00	55	0	N.D.	d	
99) tert-Butylbenzene	20.23	119	73721	0.915	ng	99
100) n-Butylbenzene	20.97	91	79995	0.871	ng	98
101) 1,1,1,2-Tetrachloroethane	17.75	131	20022	0.890	ng	99

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Vial: 14  
Operator: TZ/CG  
Inst : GCMS-16

[illegible]



Data File : I:\MS16\DATA\2022\_05\10\05102216.D  
 Acq On : 10 May 2022 16:02  
 Sample : 5.0ng R16051022 ICAL Std  
 Misc : S35-04032201/S35-05102203 (6/09)

Vial: 14  
 Operator: TZ/CG  
 Inst : GCMS-16

Quant Time: May 10 18:08:49 2022

Quant Method : I:\MS16\METHODS\R16051022.M

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 17:29:58 2022

Response via : Initial Calibration

DataAcq Meth:TO15.M

5/10/22

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.31	130	161199	12.500	ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.43	114	727569	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	17.73	54	165374	12.500	ng	0.00

#### System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...)	12.16	65	292598	13.214	ng	-0.01
Spiked Amount	12.500	Range 70 - 130	Recovery	=	105.68%	
57) Toluene-d8 (SS2)	15.88	98	777514	9.729	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	77.84%	
73) Bromofluorobenzene (SS3)	19.11	174	284011	11.151	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	89.20%	

#### Target Compounds

						Qvalue
2) Propene	4.17	42	166473	6.779	ng	99
3) Dichlorodifluoromethan...	4.34	85	180887	4.459	ng	99
4) Chloromethane	4.63	50	149993	5.085	ng	99
5) 1,2-Dichloro-1,1,2,2-t...	4.90	135	95263	4.390	ng	100
6) Vinyl Chloride	5.05	62	143115	4.727	ng	100
7) 1,3-Butadiene	5.32	54	120044	5.749	ng	100
8) Bromomethane	5.76	94	69580	4.219	ng	99
9) Chloroethane	6.10	64	59307	4.457	ng	100
10) Ethanol	6.48	45	298411	19.655	ng	100
11) Acetonitrile	6.74	41	195953	4.831	ng	98
12) Acrolein	6.93	56	125234	11.177	ng	99
13) Acetone	7.14	58	364769	24.015	ng	94
14) Trichlorofluoromethane	7.39	101	157831	4.575	ng	99
15) 2-Propanol (Isopropanol)	7.64	45	467807	9.036	ng	99
16) Acrylonitrile	7.91	53	272368	10.203	ng	100
17) 1,1-Dichloroethene	8.36	96	81991	4.522	ng	99
18) 2-Methyl-2-Propanol (t...	8.52	59	512554	10.735	ng	98
19) Methylene Chloride	8.58	84	82881	4.186	ng	99
20) 3-Chloro-1-propene (Al...	8.74	41	155246	5.614	ng	99
21) Trichlorotrifluoroethane	9.00	151	79042	5.047	ng	99
22) Carbon Disulfide	8.84	76	592026	8.788	ng	100
23) trans-1,2-Dichloroethene	9.86	61	135533	5.056	ng	99
24) 1,1-Dichloroethane	10.11	63	162197	4.931	ng	100
25) Methyl tert-Butyl Ether	10.21	73	270070	4.933	ng	100
26) Vinyl Acetate	10.37	86	47682	12.421	ng	# 94
27) 2-Butanone (MEK)	10.61	72	115628	8.272	ng	97
28) cis-1,2-Dichloroethene	11.13	61	131268	5.052	ng	100
29) Diisopropyl Ether	11.43	87	161998	9.947	ng	# 90
30) Ethyl Acetate	11.43	61	160781	22.421	ng	100
31) n-Hexane	11.42	57	176113	6.469	ng	99
32) Chloroform	11.48	83	153433	4.708	ng	100
34) Tetrahydrofuran (THF)	11.88	72	104077	8.160	ng	99
35) Ethyl tert-Butyl Ether	12.02	87	213015	10.233	ng	99
36) 1,2-Dichloroethane	12.27	62	133509	5.269	ng	100
38) 1,1,1-Trichloroethane	12.55	97	143621	4.861	ng	100
39) Isopropyl Acetate	0.00	61	0	N.D.	d	
40) 1-Butanol	0.00	56	0	N.D.	d	
41) Benzene	13.03	78	336056	4.445	ng	100
42) Carbon Tetrachloride	13.19	117	123484	5.137	ng	99
43) Cyclohexane	13.32	84	258834	9.310	ng	100
44) tert-Amyl Methyl Ether	13.67	73	510832	10.350	ng	99
45) 1,2-Dichloropropane	13.89	63	93014	5.040	ng	99
46) Bromodichloromethane	14.07	83	124591	5.030	ng	100
47) Trichloroethene	14.13	130	94618	4.681	ng	100
48) 1,4-Dioxane	14.10	88	71498	4.260	ng	99
49) 2,2,4-Trimethylpentane...	14.20	57	435149	5.936	ng	98
50) Methyl Methacrylate	14.33	100	72954	9.283	ng	98

Data File : I:\MS16\DATA\2022\_05\10\05102216.D  
 Acq On : 10 May 2022 16:02  
 Sample : 5.0ng R16051022 ICAL Std  
 Misc : S35-04032201/S35-05102203 (6/09)

Vial: 14  
 Operator: TZ/CG  
 Inst : GCMS-16

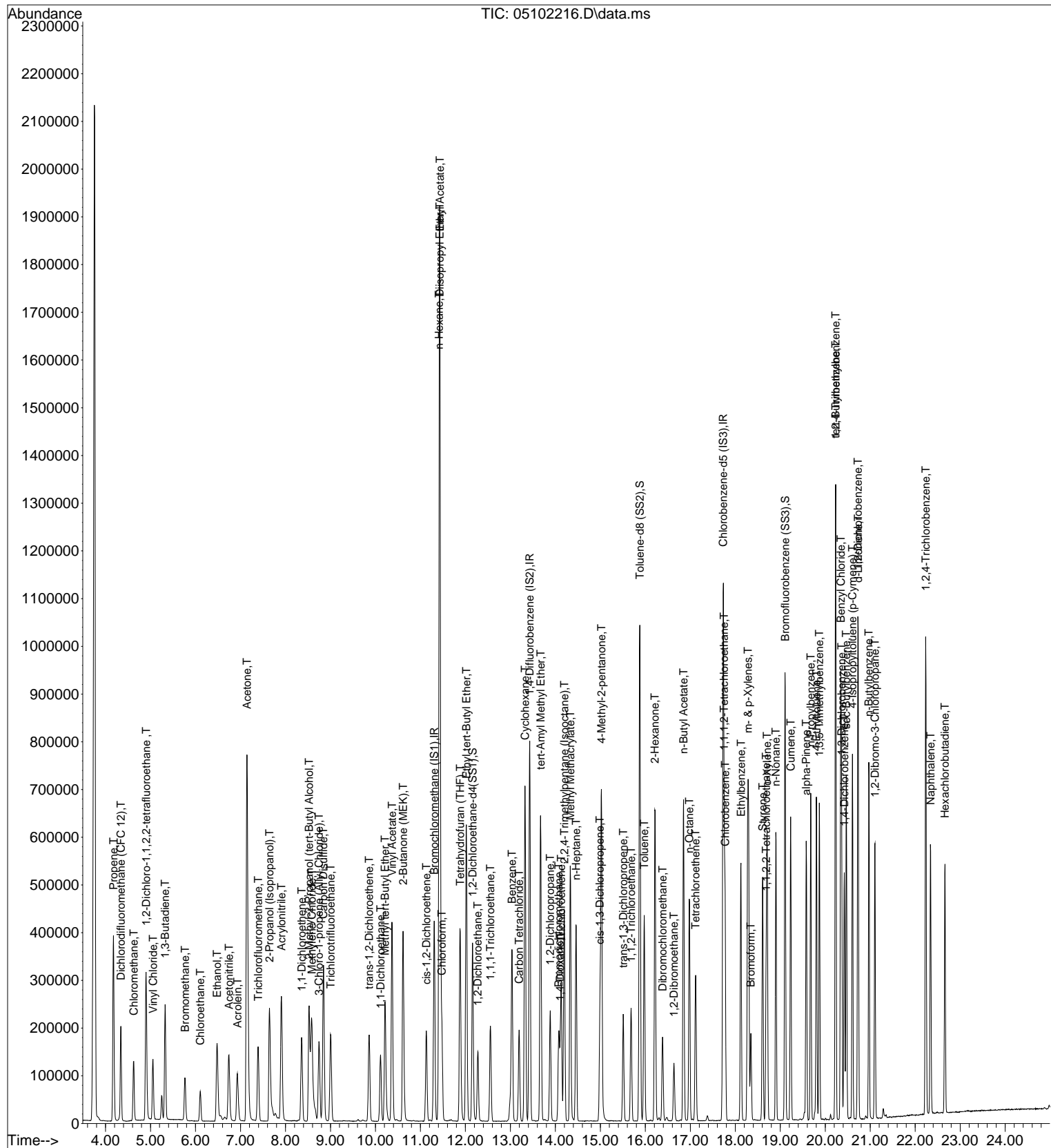
Quant Time: May 10 18:08:49 2022  
 Quant Method : I:\MS16\METHODS\R16051022.M  
 Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
 QLast Update : Tue May 10 17:29:58 2022  
 Response via : Initial Calibration  
 DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.46	71	88895	4.735	ng	100
52) cis-1,3-Dichloropropene	14.99	75	140645	4.844	ng	100
53) 4-Methyl-2-pentanone	15.02	58	194506	11.534	ng	95
54) trans-1,3-Dichloropropene	15.51	75	126817	4.754	ng	99
55) 1,1,2-Trichloroethane	15.68	97	84818	4.700	ng	100
58) Toluene	15.98	91	350678	3.629	ng	100
59) 2-Hexanone	16.21	43	558946	10.241	ng	97
60) Dibromochloromethane	16.38	129	109839	4.287	ng	99
61) 1,2-Dibromoethane	16.64	107	100645	3.832	ng	99
62) n-Butyl Acetate	16.85	43	609015	10.192	ng	99
63) n-Octane	16.98	57	91371	4.733	ng	100
64) Tetrachloroethene	17.12	166	101363	3.906	ng	99
65) Chlorobenzene	17.77	112	237964	3.722	ng	100
66) Ethylbenzene	18.13	91	409343	3.804	ng	99
67) m- & p-Xylenes	18.28	91	642406	7.850	ng	99
68) Bromoform	18.35	173	96118	4.382	ng	100
69) Styrene	18.61	104	252145	3.771	ng	100
70) o-Xylene	18.71	91	327162	3.974	ng	98
71) n-Nonane	18.90	43	243688	5.653	ng	99
72) 1,1,2,2-Tetrachloroethane	18.69	83	152659	4.003	ng	99
74) Cumene	19.23	105	425799	3.976	ng	99
75) alpha-Pinene	19.58	93	216015	4.278	ng	96
76) n-Propylbenzene	19.68	91	514355	4.047	ng	99
77) 3-Ethyltoluene	0.00	105	0	N.D.	d	
78) 4-Ethyltoluene	19.80	105	430042	4.145	ng	99
79) 1,3,5-Trimethylbenzene	19.87	105	352169	4.122	ng	98
80) alpha-Methylstyrene	0.00	118	0	N.D.	d	
81) 2-Ethyltoluene	0.00	105	0	N.D.	d	
82) 1,2,4-Trimethylbenzene	20.23	105	362798	4.450	ng	100
83) n-Decane	0.00	58	0	N.D.	d	
84) Benzyl Chloride	20.35	91	565734	8.660	ng	99
85) 1,3-Dichlorobenzene	20.36	146	208712	4.241	ng	99
86) 1,4-Dichlorobenzene	20.42	146	206302	4.033	ng	99
87) sec-Butylbenzene	20.47	105	480039	4.214	ng	99
88) 4-Isopropyltoluene (p-...	20.61	119	415860	4.184	ng	99
89) 1,2,3-Trimethylbenzene	0.00	105	0	N.D.	d	
90) 1,2-Dichlorobenzene	20.73	146	203913	4.395	ng	99
91) d-Limonene	20.73	68	140258	4.806	ng	99
92) 1,2-Dibromo-3-Chloropr...	21.11	157	157853	8.984	ng	92
93) n-Undecane	0.00	57	0	N.D.	d	
94) 1,2,4-Trichlorobenzene	22.23	180	310883	8.454	ng	99
95) Naphthalene	22.34	128	452213	3.731	ng	100
96) n-Dodecane	0.00	57	0	N.D.	d	
97) Hexachlorobutadiene	22.66	225	102645	4.574	ng	100
98) Cyclohexanone	0.00	55	0	N.D.	d	
99) tert-Butylbenzene	20.23	119	352832	4.395	ng	100
100) n-Butylbenzene	20.97	91	386954	4.225	ng	99
101) 1,1,1,2-Tetrachloroethane	17.75	131	93684	4.180	ng	100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Vial: 14  
Operator: TZ/CG  
Inst : GCMS-16

Quant Time: May 10 18:08:49 2022  
Quant Method : I:\MS16\METHODS\R16051022.M  
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
QLast Update : Tue May 10 17:29:58 2022  
Response via : Initial Calibration  
DataAcq Meth:TO15.M



Data File : I:\MS16\DATA\2022\_05\10\05102217.D

Vial: 15

Acq On : 10 May 2022 16:36

Operator: TZ/CG

Sample : 25ng R16051022 ICAL Std

Inst : GCMS-16

Misc : S35-04032201/S35-05102202 (6/09)

Quant Time: May 10 18:10:42 2022

Quant Method : I:\MS16\METHODS\R16051022.M

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 17:29:58 2022

Response via : Initial Calibration

DataAcq Meth:TO15.M

5/10/22

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.32	130	169128	12.500	ng	0.00
37) 1,4-Difluorobenzene (IS2)	13.43	114	748374	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	17.73	54	172826	12.500	ng	0.00

## System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...)	12.17	65	298966	12.869	ng	0.00
Spiked Amount	12.500	Range	70 - 130	Recovery	=	102.96%
57) Toluene-d8 (SS2)	15.88	98	812433	9.728	ng	0.00
Spiked Amount	12.500	Range	70 - 130	Recovery	=	77.84%
73) Bromofluorobenzene (SS3)	19.11	174	298373	11.209	ng	0.00
Spiked Amount	12.500	Range	70 - 130	Recovery	=	89.68%

## Target Compounds

						Qvalue
2) Propene	4.18	42	845342	32.811	ng	100
3) Dichlorodifluoromethan...	4.34	85	962455	22.611	ng	100
4) Chloromethane	4.64	50	856715	27.680	ng	100
5) 1,2-Dichloro-1,1,2,2-t...	4.91	135	509321	22.370	ng	100
6) Vinyl Chloride	5.07	62	754854	23.764	ng	100
7) 1,3-Butadiene	5.33	54	684091	31.225	ng	100
8) Bromomethane	5.78	94	364401	21.060	ng	100
9) Chloroethane	6.12	64	319182	22.861	ng	100
10) Ethanol	6.52	45	1667593	104.689	ng	100
11) Acetonitrile	6.77	41	1075335	25.270	ng	100
12) Acrolein	6.95	56	689163	58.624	ng	100
13) Acetone	7.17	58	2036328	127.780	ng	100
14) Trichlorofluoromethane	7.40	101	855126	23.626	ng	100
15) 2-Propanol (Isopropanol)	7.67	45	2805508	51.649	ng	100
16) Acrylonitrile	7.94	53	1528378	54.569	ng	100
17) 1,1-Dichloroethene	8.38	96	454280	23.882	ng	100
18) 2-Methyl-2-Propanol (t...	8.55	59	2970531	59.301	ng	100
19) Methylene Chloride	8.61	84	451815	21.747	ng	100
20) 3-Chloro-1-propene (Al...	8.77	41	904705	31.180	ng	100
21) Trichlorotrifluoroethane	9.01	151	435379	26.497	ng	100
22) Carbon Disulfide	8.86	76	3296246	46.636	ng	100
23) trans-1,2-Dichloroethene	9.88	61	747833	26.592	ng	100
24) 1,1-Dichloroethane	10.13	63	890334	25.800	ng	100
25) Methyl tert-Butyl Ether	10.22	73	1467192	25.541	ng	100
26) Vinyl Acetate	10.38	86	298951	74.222	ng	100
27) 2-Butanone (MEK)	10.62	72	649024	44.256	ng	100
28) cis-1,2-Dichloroethene	11.14	61	722860	26.518	ng	100
29) Diisopropyl Ether	11.43	87	856144	50.104	ng	100
30) Ethyl Acetate	11.44	61	948868	126.115	ng	100
31) n-Hexane	11.42	57	1019731	35.699	ng	100
32) Chloroform	11.49	83	819143	23.958	ng	100
34) Tetrahydrofuran (THF)	11.88	72	578505	43.229	ng	100
35) Ethyl tert-Butyl Ether	12.03	87	1200699	54.978	ng	100
36) 1,2-Dichloroethane	12.29	62	717219	26.977	ng	100
38) 1,1,1-Trichloroethane	12.56	97	785702	25.852	ng	100
39) Isopropyl Acetate	0.00	61	0	N.D.	d	
40) 1-Butanol	0.00	56	0	N.D.	d	
41) Benzene	13.04	78	1856401	23.872	ng	100
42) Carbon Tetrachloride	13.20	117	694500	28.089	ng	100
43) Cyclohexane	13.33	84	1452726	50.800	ng	100
44) tert-Amyl Methyl Ether	13.67	73	2873357	56.598	ng	100
45) 1,2-Dichloropropane	13.89	63	510196	26.877	ng	100
46) Bromodichloromethane	14.08	83	692397	27.178	ng	100
47) Trichloroethene	14.13	130	522651	25.140	ng	100
48) 1,4-Dioxane	14.11	88	399089	23.120	ng	100
49) 2,2,4-Trimethylpentane...	14.20	57	2371921	31.455	ng	100
50) Methyl Methacrylate	14.34	100	419971	51.954	ng	100

Data File : I:\MS16\DATA\2022\_05\10\05102217.D

Vial: 15

Acq On : 10 May 2022 16:36

Operator: TZ/CG

Sample : 25ng R16051022 ICAL Std

Inst : GCMS-16

Misc : S35-04032201/S35-05102202 (6/09)

Quant Time: May 10 18:10:42 2022

Quant Method : I:\MS16\METHODS\R16051022.M

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 17:29:58 2022

Response via : Initial Calibration

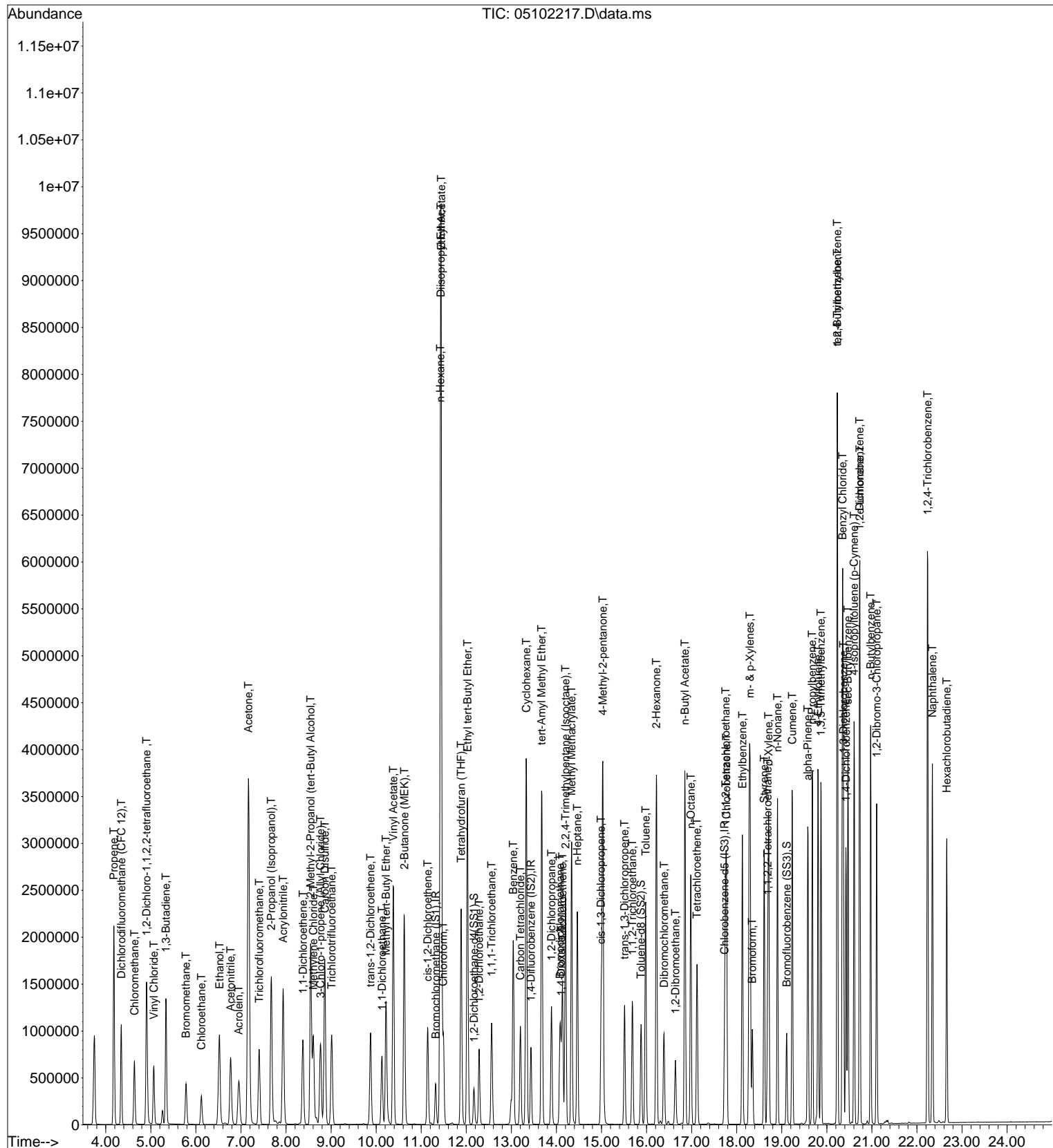
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.46	71	491380	25.447	ng	100
52) cis-1,3-Dichloropropene	14.99	75	799066	26.754	ng	100
53) 4-Methyl-2-pentanone	15.03	58	1115216	64.293	ng	100
54) trans-1,3-Dichloropropene	15.51	75	738348	26.908	ng	100
55) 1,1,2-Trichloroethane	15.68	97	467273	25.175	ng	100
58) Toluene	15.98	91	1942996	19.238	ng	100
59) 2-Hexanone	16.22	43	3100707	54.362	ng	100
60) Dibromochloromethane	16.39	129	621068	23.198	ng	100
61) 1,2-Dibromoethane	16.64	107	564399	20.564	ng	100
62) n-Butyl Acetate	16.85	43	3421097	54.783	ng	100
63) n-Octane	16.98	57	510079	25.284	ng	100
64) Tetrachloroethene	17.12	166	566686	20.896	ng	100
65) Chlorobenzene	17.77	112	1342582	20.091	ng	100
66) Ethylbenzene	18.13	91	2296082	20.420	ng	100
67) m- & p-Xylenes	18.29	91	3613702	42.253	ng	100
68) Bromoform	18.35	173	544006	23.733	ng	100
69) Styrene	18.61	104	1441748	20.632	ng	100
70) o-Xylene	18.71	91	1797188	20.888	ng	100
71) n-Nonane	18.91	43	1355992	30.100	ng	100
72) 1,1,2,2-Tetrachloroethane	18.69	83	854137	21.431	ng	100
74) Cumene	19.23	105	2396765	21.417	ng	100
75) alpha-Pinene	19.58	93	1225664	23.229	ng	100
76) n-Propylbenzene	19.68	91	2869460	21.605	ng	100
77) 3-Ethyltoluene	0.00	105	0	N.D.	d	
78) 4-Ethyltoluene	19.81	105	2435670	22.461	ng	100
79) 1,3,5-Trimethylbenzene	19.87	105	1971831	22.087	ng	100
80) alpha-Methylstyrene	0.00	118	0	N.D.	d	
81) 2-Ethyltoluene	0.00	105	0	N.D.	d	
82) 1,2,4-Trimethylbenzene	20.23	105	2126158	24.957	ng	100
83) n-Decane	0.00	58	0	N.D.	d	
84) Benzyl Chloride	20.35	91	3570170	52.296	ng	100
85) 1,3-Dichlorobenzene	20.37	146	1190248	23.144	ng	100
86) 1,4-Dichlorobenzene	20.42	146	1178321	22.041	ng	100
87) sec-Butylbenzene	20.47	105	2647078	22.238	ng	100
88) 4-Isopropyltoluene (p-...	20.61	119	2373776	22.853	ng	100
89) 1,2,3-Trimethylbenzene	0.00	105	0	N.D.	d	
90) 1,2-Dichlorobenzene	20.73	146	1160911	23.941	ng	100
91) d-Limonene	20.73	68	819741	26.879	ng	100
92) 1,2-Dibromo-3-Chloropr...	21.11	157	924798	50.365	ng	100
93) n-Undecane	0.00	57	0	N.D.	d	
94) 1,2,4-Trichlorobenzene	22.24	180	1959079	50.975	ng	100
95) Naphthalene	22.34	128	2943786	23.238	ng	100
96) n-Dodecane	0.00	57	0	N.D.	d	
97) Hexachlorobutadiene	22.66	225	592149	25.249	ng	100
98) Cyclohexanone	0.00	55	0	N.D.	d	
99) tert-Butylbenzene	20.23	119	2054297	24.485	ng	100
100) n-Butylbenzene	20.97	91	2168582	22.656	ng	100
101) 1,1,1,2-Tetrachloroethane	17.76	131	531837	22.704	ng	100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Vial: 15  
Operator: TZ/CG  
Inst : GCMS-16

Quant Time: May 10 18:10:42 2022  
Quant Method : I:\MS16\METHODS\R16051022.M  
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
QLast Update : Tue May 10 17:29:58 2022  
Response via : Initial Calibration  
DataAcq Meth:TO15.M



Data File : I:\MS16\DATA\2022\_05\10\05102218.D

Vial: 15

Acq On : 10 May 2022 17:10

Operator: TZ/CG

Sample : 50ng R16051022 ICAL Std

Inst : GCMS-16

Misc : S35-04032201/S35-05102202 (6/09)

Quant Time: May 10 18:12:40 2022

Quant Method : I:\MS16\METHODS\R16051022.M

107 5/10/22

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 17:29:58 2022

Response via : Initial Calibration

DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.33	130	176011	12.500	ng	0.00
37) 1,4-Difluorobenzene (IS2)	13.44	114	771444	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	17.73	54	176942	12.500	ng	0.00

## System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...)	12.18	65	304686	12.602	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	100.80%	
57) Toluene-d8 (SS2)	15.88	98	832633	9.738	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	77.92%	
73) Bromofluorobenzene (SS3)	19.11	174	305821	11.222	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	89.76%	

## Target Compounds

						Qvalue
2) Propene	4.19	42	1827832	68.170	ng	99
3) Dichlorodifluoromethan...	4.35	85	1895439	42.788	ng	99
4) Chloromethane	4.64	50	1628078	50.545	ng	100
5) 1,2-Dichloro-1,1,2,2-t...	4.91	135	1048202	44.238	ng	100
6) Vinyl Chloride	5.07	62	1538337	46.535	ng	100
7) 1,3-Butadiene	5.35	54	1402790	61.526	ng	100
8) Bromomethane	5.79	94	745790	41.415	ng	100
9) Chloroethane	6.13	64	658259	45.304	ng	100
10) Ethanol	6.55	45	3460777	208.766	ng	100
11) Acetonitrile	6.79	41	2204420	49.778	ng	100
12) Acrolein	6.97	56	1401745	114.577	ng	99
13) Acetone	7.19	58	4072386	245.550	ng	93
14) Trichlorofluoromethane	7.41	101	1728861	45.898	ng	100
15) 2-Propanol (Isopropanol)	7.69	45	5223219	92.399	ng	99
16) Acrylonitrile	7.96	53	3139847	107.721	ng	99
17) 1,1-Dichloroethene	8.39	96	922599	46.606	ng	99
18) 2-Methyl-2-Propanol (t...	8.57	59	5816899	111.583	ng	99
19) Methylene Chloride	8.62	84	918296	42.472	ng	98
20) 3-Chloro-1-propene (Al...	8.78	41	1835230	60.776	ng	100
21) Trichlorotrifluoroethane	9.02	151	876505	51.257	ng	99
22) Carbon Disulfide	8.87	76	6657059	90.501	ng	100
23) trans-1,2-Dichloroethene	9.88	61	1521842	51.999	ng	99
24) 1,1-Dichloroethane	10.14	63	1792275	49.906	ng	100
25) Methyl tert-Butyl Ether	10.22	73	2962431	49.554	ng	100
26) Vinyl Acetate	10.39	86	615362	146.805	ng	# 93
27) 2-Butanone (MEK)	10.63	72	1332559	87.312	ng	95
28) cis-1,2-Dichloroethene	11.15	61	1463186	51.578	ng	99
29) Diisopropyl Ether	11.44	87	1629659	91.643	ng	# 87
30) Ethyl Acetate	11.46	61	1774024	226.566	ng	99
31) n-Hexane	11.42	57	1982904	66.703	ng	100
32) Chloroform	11.50	83	1623420	45.625	ng	100
34) Tetrahydrofuran (THF)	11.89	72	1183767	84.998	ng	98
35) Ethyl tert-Butyl Ether	12.03	87	2458044	108.149	ng	99
36) 1,2-Dichloroethane	12.29	62	1439345	52.022	ng	100
38) 1,1,1-Trichloroethane	12.57	97	1592758	50.839	ng	100
39) Isopropyl Acetate	0.00	61	0	N.D.	d	
40) 1-Butanol	0.00	56	0	N.D.	d	
41) Benzene	13.04	78	3783740	47.200	ng	100
42) Carbon Tetrachloride	13.20	117	1419289	55.686	ng	100
43) Cyclohexane	13.34	84	2975926	100.953	ng	100
44) tert-Amyl Methyl Ether	13.68	73	5884558	112.445	ng	99
45) 1,2-Dichloropropane	13.89	63	1037523	53.021	ng	100
46) Bromodichloromethane	14.08	83	1404289	53.474	ng	100
47) Trichloroethene	14.14	130	1073083	50.072	ng	100
48) 1,4-Dioxane	14.11	88	815827	45.849	ng	99
49) 2,2,4-Trimethylpentane...	14.20	57	4757511	61.205	ng	98
50) Methyl Methacrylate	14.34	100	853405	102.415	ng	99

Data File : I:\MS16\DATA\2022\_05\10\05102218.D

Vial: 15

Acq On : 10 May 2022 17:10

Operator: TZ/CG

Sample : 50ng R16051022 ICAL Std

Inst : GCMS-16

Misc : S35-04032201/S35-05102202 (6/09)

Quant Time: May 10 18:12:40 2022

Quant Method : I:\MS16\METHODS\R16051022.M

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 17:29:58 2022

Response via : Initial Calibration

DataAcq Meth:TO15.M

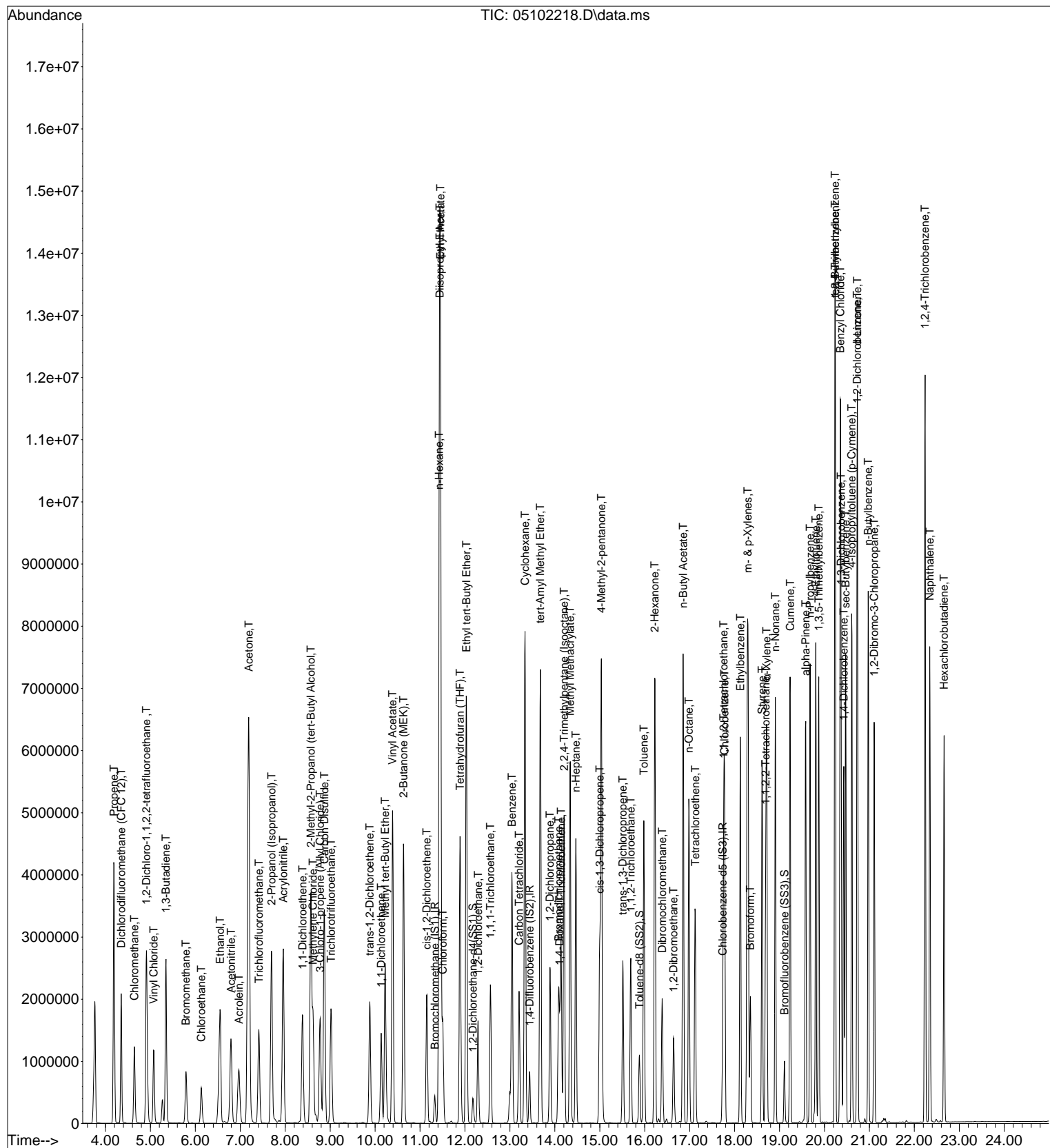
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.47	71	996365	50.055	ng	100
52) cis-1,3-Dichloropropene	15.00	75	1642476	53.348	ng	100
53) 4-Methyl-2-pentanone	15.03	58	2251857	125.939	ng	97
54) trans-1,3-Dichloropropene	15.51	75	1516161	53.602	ng	100
55) 1,1,2-Trichloroethane	15.69	97	951159	49.713	ng	99
58) Toluene	15.98	91	3935746	38.062	ng	100
59) 2-Hexanone	16.22	43	6130959	104.988	ng	98
60) Dibromochloromethane	16.39	129	1277401	46.603	ng	100
61) 1,2-Dibromoethane	16.64	107	1150307	40.936	ng	99
62) n-Butyl Acetate	16.86	43	6816142	106.609	ng	98
63) n-Octane	16.98	57	1043121	50.503	ng	100
64) Tetrachloroethene	17.12	166	1155179	41.605	ng	99
65) Chlorobenzene	17.78	112	2756804	40.295	ng	100
66) Ethylbenzene	18.13	91	4665520	40.527	ng	100
67) m- & p-Xylenes	18.29	91	7302596	83.399	ng	99
68) Bromoform	18.35	173	1095947	46.700	ng	100
69) Styrene	18.61	104	2925626	40.893	ng	100
70) o-Xylene	18.71	91	3607338	40.952	ng	100
71) n-Nonane	18.91	43	2672042	57.934	ng	98
72) 1,1,2,2-Tetrachloroethane	18.69	83	1722797	42.221	ng	100
74) Cumene	19.24	105	4839949	42.243	ng	100
75) alpha-Pinene	19.58	93	2505381	46.377	ng	100
76) n-Propylbenzene	19.68	91	5717356	42.046	ng	100
77) 3-Ethyltoluene	0.00	105	0	N.D.	d	
78) 4-Ethyltoluene	19.81	105	4858806	43.765	ng	100
79) 1,3,5-Trimethylbenzene	19.87	105	3933692	43.037	ng	99
80) alpha-Methylstyrene	0.00	118	0	N.D.	d	
81) 2-Ethyltoluene	0.00	105	0	N.D.	d	
82) 1,2,4-Trimethylbenzene	20.24	105	4152744	47.611	ng	98
83) n-Decane	0.00	58	0	N.D.	d	
84) Benzyl Chloride	20.35	91	7138659	102.136	ng	100
85) 1,3-Dichlorobenzene	20.37	146	2298991	43.663	ng	100
86) 1,4-Dichlorobenzene	20.43	146	2301765	42.055	ng	100
87) sec-Butylbenzene	20.47	105	5077836	41.666	ng	100
88) 4-Isopropyltoluene (p-...	20.61	119	4615978	43.405	ng	100
89) 1,2,3-Trimethylbenzene	0.00	105	0	N.D.	d	
90) 1,2-Dichlorobenzene	20.73	146	2238096	45.082	ng	100
91) d-Limonene	20.73	68	1622490	51.963	ng	99
92) 1,2-Dibromo-3-Chloropr...	21.11	157	1836355	97.682	ng	97
93) n-Undecane	0.00	57	0	N.D.	d	
94) 1,2,4-Trichlorobenzene	22.24	180	3868542	98.317	ng	99
95) Naphthalene	22.34	128	5916022	45.614	ng	100
96) n-Dodecane	0.00	57	0	N.D.	d	
97) Hexachlorobutadiene	22.66	225	1214862	50.597	ng	100
98) Cyclohexanone	0.00	55	0	N.D.	d	
99) tert-Butylbenzene	20.24	119	3928579	45.735	ng	99
100) n-Butylbenzene	20.97	91	4316217	44.044	ng	100
101) 1,1,1,2-Tetrachloroethane	17.76	131	1089720	45.439	ng	100

(#) = qualifier out of range (m) = manual integration (+) = signals summed



Vial: 15  
Operator: TZ/CG  
Inst : GCMS-16

Quant Time: May 10 18:12:40 2022  
Quant Method : I:\MS16\METHODS\R16051022.M  
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
QLast Update : Tue May 10 17:29:58 2022  
Response via : Initial Calibration  
DataAcq Meth:TO15.M



Data File : I:\MS16\DATA\2022\_05\10\05102219.D

Vial: 15

Acq On : 10 May 2022 17:44

Operator: TZ/CG

Sample : 100ng R16051022 ICAL Std

Inst : GCMS-16

Misc : S35-04032201/S35-05102202 (6/09)

Quant Time: May 10 18:15:08 2022

Quant Method : I:\MS16\METHODS\R16051022.M

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 17:29:58 2022

Response via : Initial Calibration

DataAcq Meth:TO15.M

5/10/22

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.34	130	186418	12.500	ng	0.02
37) 1,4-Difluorobenzene (IS2)	13.44	114	799420	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	17.73	54	189901	12.500	ng	0.00

## System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...)	12.19	65	312270	12.195	ng	0.02
Spiked Amount	12.500	Range	70 - 130	Recovery	=	97.52%
57) Toluene-d8 (SS2)	15.89	98	875368	9.539	ng	0.01
Spiked Amount	12.500	Range	70 - 130	Recovery	=	76.32%
73) Bromofluorobenzene (SS3)	19.11	174	325697	11.136	ng	0.00
Spiked Amount	12.500	Range	70 - 130	Recovery	=	89.12%

## Target Compounds

						Qvalue
2) Propene	4.20	42	4507895	158.739	ng	98
3) Dichlorodifluoromethan...	4.36	85	3860524	82.284	ng	99
4) Chloromethane	4.65	50	2414019	70.762	ng	100
5) 1,2-Dichloro-1,1,2,2-t...	4.92	135	2079564	82.867	ng	100
6) Vinyl Chloride	5.08	62	3074764	87.820	ng	100
7) 1,3-Butadiene	5.35	54	2787467	115.433	ng	98
8) Bromomethane	5.80	94	1571560	82.400	ng	100
9) Chloroethane	6.14	64	1362077	88.510	ng	100
10) Ethanol	6.59	45	7119509	405.497	ng	100
11) Acetonitrile	6.82	41	4539787	96.791	ng	99
12) Acrolein	6.98	56	2882532	222.462	ng	100
13) Acetone	7.21	58	7982801	454.463	ng	# 85
14) Trichlorofluoromethane	7.42	101	3510410	87.992	ng	100
15) 2-Propanol (Isopropanol)	7.73	45	7935130	132.536	ng	99
16) Acrylonitrile	7.98	53	6332528	205.126	ng	100
17) 1,1-Dichloroethene	8.39	96	1910035	91.101	ng	98
18) 2-Methyl-2-Propanol (t...	8.60	59	7281537	131.880	ng	99
19) Methylene Chloride	8.63	84	1882668	82.214	ng	97
20) 3-Chloro-1-propene (Al...	8.79	41	3766387	117.765	ng	98
21) Trichlorotrifluoroethane	9.03	151	1764028	97.400	ng	99
22) Carbon Disulfide	8.88	76	13346795	171.318	ng	100
23) trans-1,2-Dichloroethene	9.89	61	3155589	101.801	ng	99
24) 1,1-Dichloroethane	10.15	63	3659812	96.219	ng	100
25) Methyl tert-Butyl Ether	10.23	73	6081042	96.041	ng	100
26) Vinyl Acetate	10.40	86	1249269	281.395	ng	# 77
27) 2-Butanone (MEK)	10.65	72	2678301	165.691	ng	# 89
28) cis-1,2-Dichloroethene	11.16	61	2992999	99.614	ng	99
29) Diisopropyl Ether	11.44	87	2856247	151.653	ng	# 66
30) Ethyl Acetate	11.48	61	2969817	358.111	ng	94
31) n-Hexane	11.43	57	3617171	114.885	ng	99
32) Chloroform	11.52	83	3156526	83.759	ng	100
34) Tetrahydrofuran (THF)	11.90	72	2381604	161.460	ng	95
35) Ethyl tert-Butyl Ether	12.04	87	4826644	200.508	ng	96
36) 1,2-Dichloroethane	12.30	62	2866063	97.805	ng	99
38) 1,1,1-Trichloroethane	12.57	97	3224623	99.324	ng	99
39) Isopropyl Acetate	0.00	61	0	N.D.	d	
40) 1-Butanol	0.00	56	0	N.D.	d	
41) Benzene	13.05	78	7640435	91.975	ng	100
42) Carbon Tetrachloride	13.21	117	2896077	109.651	ng	100
43) Cyclohexane	13.34	84	5790312	189.553	ng	99
44) tert-Amyl Methyl Ether	13.68	73	11406888	210.341	ng	98
45) 1,2-Dichloropropane	13.90	63	2117417	104.421	ng	100
46) Bromodichloromethane	14.09	83	2830814	104.022	ng	100
47) Trichloroethene	14.14	130	2141764	96.442	ng	99
48) 1,4-Dioxane	14.12	88	1671286	90.639	ng	99
49) 2,2,4-Trimethylpentane...	14.21	57	9264212	115.012	ng	96
50) Methyl Methacrylate	14.35	100	1666785	193.027	ng	100

Data File : I:\MS16\DATA\2022\_05\10\05102219.D

Vial: 15

Acq On : 10 May 2022 17:44

Operator: TZ/CG

Sample : 100ng R16051022 ICAL Std

Inst : GCMS-16

Misc : S35-04032201/S35-05102202 (6/09)

Quant Time: May 10 18:15:08 2022

Quant Method : I:\MS16\METHODS\R16051022.M

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 17:29:58 2022

Response via : Initial Calibration

DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.47	71	2004247	97.166	ng	100
52) cis-1,3-Dichloropropene	15.00	75	3369991	105.628	ng	100
53) 4-Methyl-2-pentanone	15.05	58	4403306	237.645	ng	92
54) trans-1,3-Dichloropropene	15.52	75	3117107	106.345	ng	99
55) 1,1,2-Trichloroethane	15.69	97	1948545	98.278	ng	100
58) Toluene	15.99	91	7954691	71.679	ng	99
59) 2-Hexanone	16.23	43	11513050	183.699	ng	95
60) Dibromochloromethane	16.39	129	2588744	87.998	ng	99
61) 1,2-Dibromoethane	16.65	107	2315407	76.775	ng	100
62) n-Butyl Acetate	16.86	43	12759019	185.941	ng	96
63) n-Octane	16.99	57	2098988	94.689	ng	100
64) Tetrachloroethene	17.12	166	2335690	78.382	ng	99
65) Chlorobenzene	17.78	112	5410461	73.686	ng	100
66) Ethylbenzene	18.13	91	9217632	74.605	ng	99
67) m- & p-Xylenes	18.30	91	13894983	147.858	ng	98
68) Bromoform	18.36	173	2112668	83.881	ng	100
69) Styrene	18.61	104	5746974	74.847	ng	99
70) o-Xylene	18.72	91	6906306	73.053	ng	99
71) n-Nonane	18.91	43	4997484	100.958	ng	95
72) 1,1,2,2-Tetrachloroethane	18.70	83	3379742	77.176	ng	100
74) Cumene	19.24	105	9281082	75.477	ng	100
75) alpha-Pinene	19.58	93	4945368	85.297	ng	100
76) n-Propylbenzene	19.68	91	10728101	73.511	ng	99
77) 3-Ethyltoluene	0.00	105	0	N.D.	d	
78) 4-Ethyltoluene	19.81	105	9154960	76.835	ng	100
79) 1,3,5-Trimethylbenzene	19.87	105	7364621	75.075	ng	98
80) alpha-Methylstyrene	0.00	118	0	N.D.	d	
81) 2-Ethyltoluene	0.00	105	0	N.D.	d	
82) 1,2,4-Trimethylbenzene	20.24	105	7208924	77.009	ng	96
83) n-Decane	0.00	58	0	N.D.	d	
84) Benzyl Chloride	20.36	91	12245521	163.246	ng	99
85) 1,3-Dichlorobenzene	20.38	146	3901616	69.043	ng	100
86) 1,4-Dichlorobenzene	20.43	146	4241783	72.212	ng	100
87) sec-Butylbenzene	20.47	105	8931967	68.289	ng	98
88) 4-Isopropyltoluene (p-...	20.61	119	8203808	71.878	ng	98
89) 1,2,3-Trimethylbenzene	0.00	105	0	N.D.	d	
90) 1,2-Dichlorobenzene	20.73	146	3806371	71.440	ng	100
91) d-Limonene	20.74	68	2844737	84.891	ng	100
92) 1,2-Dibromo-3-Chloropr...	21.11	157	3300869	163.603	ng	92
93) n-Undecane	0.00	57	0	N.D.	d	
94) 1,2,4-Trichlorobenzene	22.24	180	6740013	159.605	ng	99
95) Naphthalene	22.35	128	10865528	78.059	ng	99
96) n-Dodecane	0.00	57	0	N.D.	d	
97) Hexachlorobutadiene	22.66	225	2366297	91.827	ng	99
98) Cyclohexanone	0.00	55	0	N.D.	d	
99) tert-Butylbenzene	20.24	119	6694702	72.619	ng	98
100) n-Butylbenzene	20.98	91	8092639	76.944	ng	99
101) 1,1,1,2-Tetrachloroethane	17.76	131	2157184	83.811	ng	100

(#)=qualifier out of range (m)=manual integration (+)=signals summed

Data File : I:\MS16\DATA\2022\_05\10\05102219.D  
Acq On : 10 May 2022 17:44  
Sample : 100ng R16051022 ICAL Std  
Misc : S35-04032201/S35-05102202 (6/09)

Vial: 15  
Operator: TZ/CG  
Inst : GCMS-16

Quant Time: May 10 18:15:08 2022

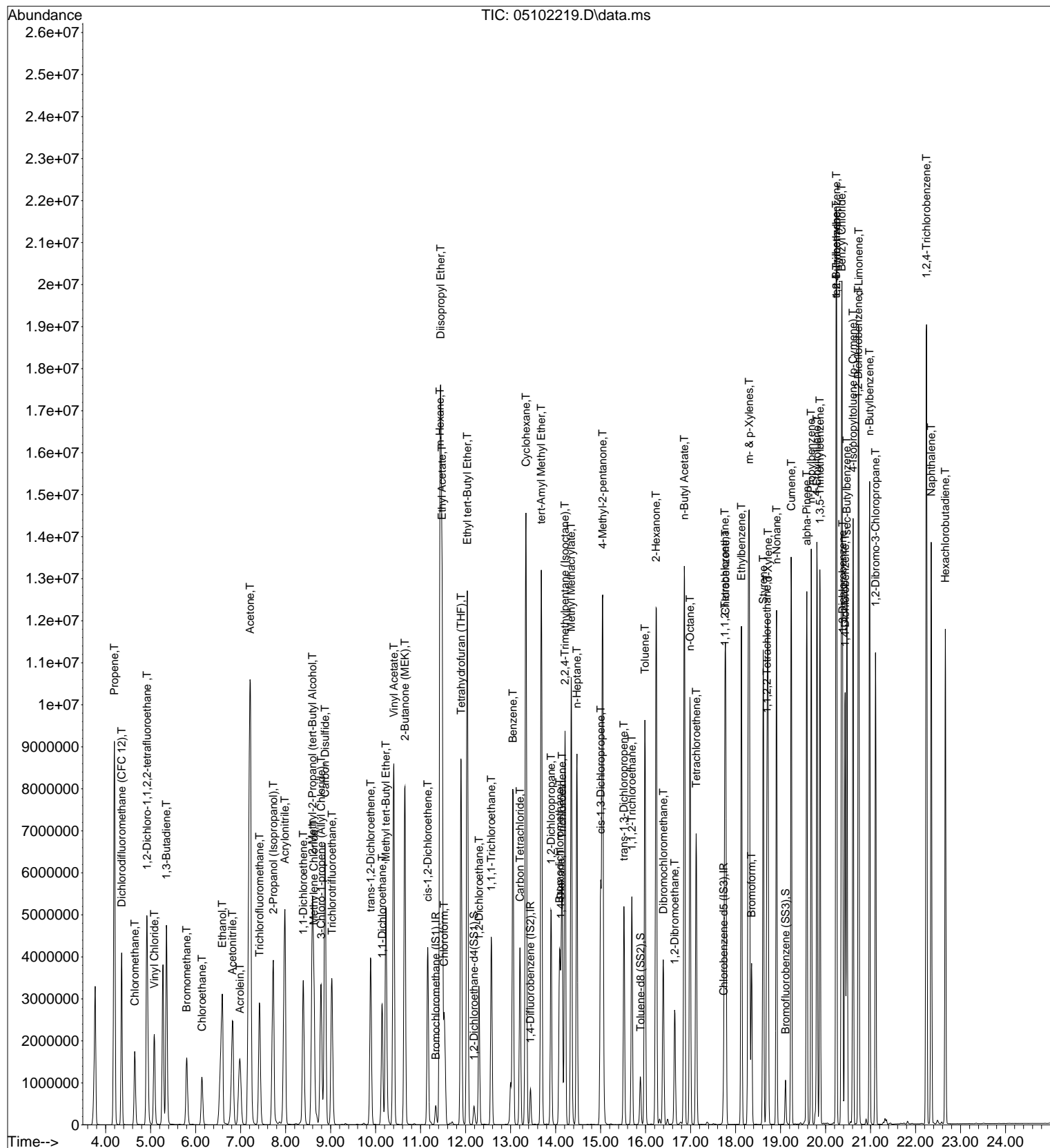
Quant Method : I:\MS16\METHODS\R16051022.M

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 17:29:58 2022

Response via : Initial Calibration

DataAcq Meth:TO15.M



Data File : I:\MS16\DATA\2022\_05\10\05102221.D

Vial: 2

Acq On : 10 May 2022 18:52

Operator: TZ/CG

Sample : 25ng R16051022 ICV

Inst : GCMS-16

Misc : S35-04032201/S35-05062202 (6/5)

Quant Time: May 10 20:37:58 2022

Quant Method : I:\MS16\METHODS\R16051022.M

5/11/22

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 19:05:32 2022

Response via : Initial Calibration

DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.32	130	181873	12.500	ng	0.00
37) 1,4-Difluorobenzene (IS2)	13.43	114	811497	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	17.73	54	181873	12.500	ng	0.00

## System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...)	12.17	65	318751	12.287	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	98.32%	
57) Toluene-d8 (SS2)	15.88	98	869410	12.629	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	101.04%	
73) Bromofluorobenzene (SS3)	19.11	174	314084	12.517	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	100.16%	

## Target Compounds

						Qvalue
2) Propene	4.18	42	883284	24.923	ng	99
3) Dichlorodifluoromethan...	4.34	85	997533	24.429	ng	100
4) Chloromethane	4.64	50	936285	26.158	ng	100
5) 1,2-Dichloro-1,1,2,2-t...	4.91	135	535347	25.593	ng	100
6) Vinyl Chloride	5.06	62	811034	25.558	ng	100
7) 1,3-Butadiene	5.33	54	730876	25.656	ng	99
8) Bromomethane	5.78	94	408839	25.903	ng	100
9) Chloroethane	6.12	64	353776	26.138	ng	100
10) Ethanol	6.52	45	2143265	98.217	ng	100
11) Acetonitrile	6.77	41	1133100	22.248	ng	100
12) Acrolein	6.95	56	750973	47.771	ng	100
13) Acetone	7.17	58	2120479	124.058	ng	97
14) Trichlorofluoromethane	7.40	101	898714	24.965	ng	100
15) 2-Propanol (Isopropanol)	7.67	45	3029882	48.958	ng	100
16) Acrylonitrile	7.94	53	1549984	48.711	ng	100
17) 1,1-Dichloroethene	8.37	96	481082	25.608	ng	99
18) 2-Methyl-2-Propanol (t...	8.55	59	3066599	54.943	ng	100
19) Methylene Chloride	8.61	84	477138	24.424	ng	99
20) 3-Chloro-1-propene (Al...	8.77	41	888325	25.983	ng	100
21) Trichlorotrifluoroethane	9.01	151	459436	26.892	ng	100
22) Carbon Disulfide	8.86	76	3370594	50.298	ng	100
23) trans-1,2-Dichloroethene	9.87	61	776737	26.172	ng	99
24) 1,1-Dichloroethane	10.12	63	946968	26.025	ng	100
25) Methyl tert-Butyl Ether	10.22	73	1500840	24.687	ng	100
26) Vinyl Acetate	10.38	86	471721	151.573	ng	# 96
27) 2-Butanone (MEK)	10.62	72	662618	50.240	ng	99
28) cis-1,2-Dichloroethene	11.14	61	742912	25.201	ng	99
29) Diisopropyl Ether	11.43	87	932525	55.269	ng	# 49
30) Ethyl Acetate	11.44	61	666556	76.559	ng	98
31) n-Hexane	11.42	57	1035469	25.550	ng	100
32) Chloroform	11.49	83	858606	25.764	ng	100
34) Tetrahydrofuran (THF)	11.88	72	622368	49.636	ng	99
35) Ethyl tert-Butyl Ether	12.03	87	1235375	52.217	ng	100
36) 1,2-Dichloroethane	12.29	62	732268	25.201	ng	100
38) 1,1,1-Trichloroethane	12.57	97	818933	24.967	ng	99
39) Isopropyl Acetate	0.00	61	0	N.D.	d	
40) 1-Butanol	0.00	56	0	N.D.	d	
41) Benzene	13.04	78	1958349	25.228	ng	100
42) Carbon Tetrachloride	13.20	117	683307	24.457	ng	100
43) Cyclohexane	13.33	84	1502997	50.183	ng	100
44) tert-Amyl Methyl Ether	13.68	73	2958013	51.250	ng	100
45) 1,2-Dichloropropane	13.89	63	537752	25.274	ng	100
46) Bromodichloromethane	14.08	83	721389	25.587	ng	100
47) Trichloroethene	14.13	130	553602	25.646	ng	100
48) 1,4-Dioxane	14.11	88	412929	25.485	ng	100
49) 2,2,4-Trimethylpentane...	14.20	57	2411419	24.826	ng	99
50) Methyl Methacrylate	14.34	100	429336	53.269	ng	99

Data File : I:\MS16\DATA\2022\_05\10\05102221.D

Vial: 2

Acq On : 10 May 2022 18:52

Operator: TZ/CG

Sample : 25ng R16051022 ICV

Inst : GCMS-16

Misc : S35-04032201/S35-05062202 (6/5)

Quant Time: May 10 20:37:58 2022

Quant Method : I:\MS16\METHODS\R16051022.M

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 19:05:32 2022

Response via : Initial Calibration

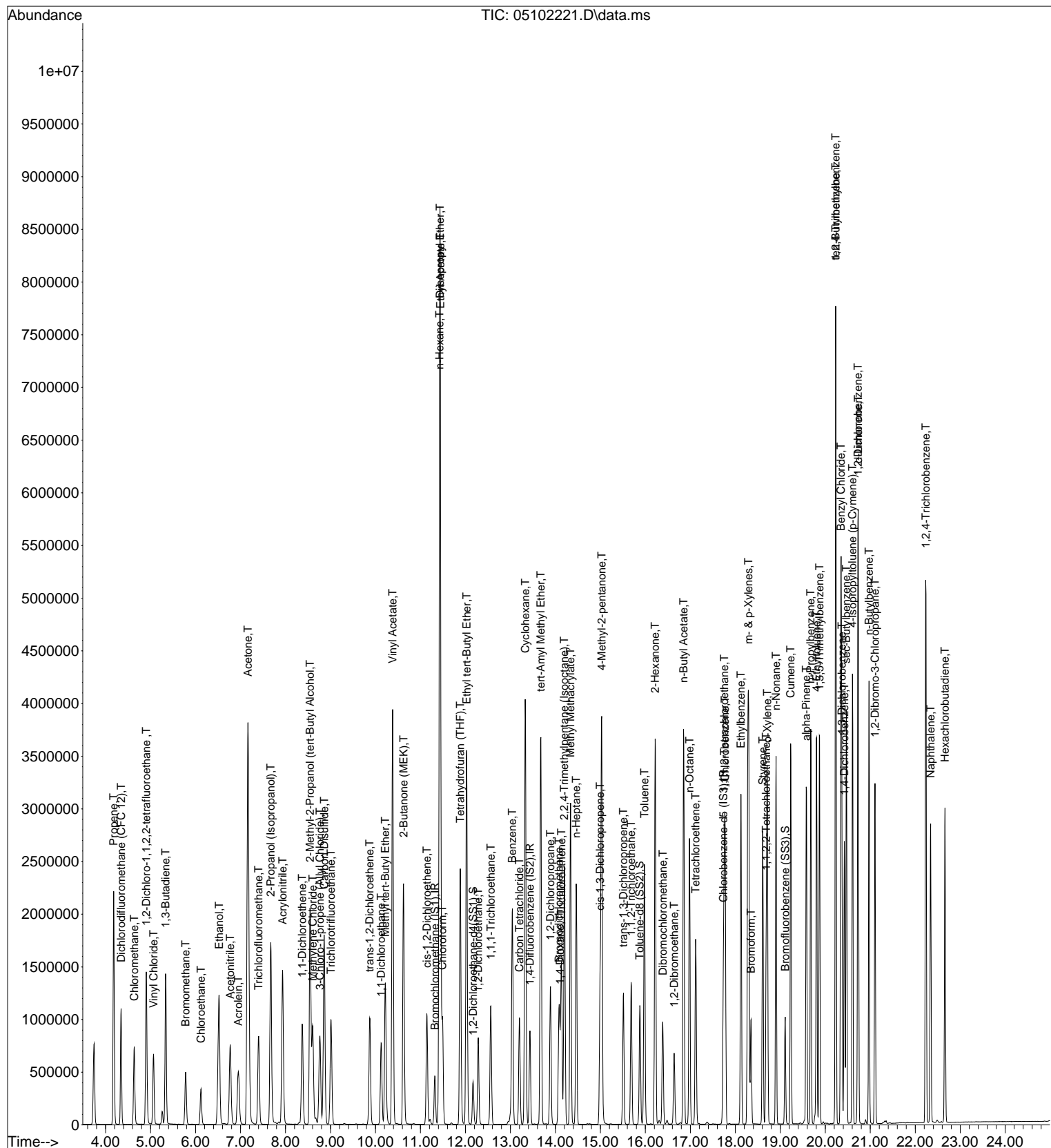
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.46	71	500353	24.586	ng	100
52) cis-1,3-Dichloropropene	15.00	75	817864	26.636	ng	100
53) 4-Methyl-2-pentanone	15.03	58	1130022	51.727	ng	99
54) trans-1,3-Dichloropropene	15.51	75	727180	25.705	ng	100
55) 1,1,2-Trichloroethane	15.68	97	488469	25.249	ng	99
58) Toluene	15.98	91	2007889	24.941	ng	100
59) 2-Hexanone	16.22	43	3050984	49.878	ng	100
60) Dibromochloromethane	16.39	129	620432	25.434	ng	100
61) 1,2-Dibromoethane	16.64	107	564725	25.333	ng	99
62) n-Butyl Acetate	16.85	43	3447273	51.662	ng	100
63) n-Octane	16.98	57	523030	24.142	ng	100
64) Tetrachloroethene	17.12	166	589864	25.889	ng	100
65) Chlorobenzene	17.77	112	1346808	25.126	ng	100
66) Ethylbenzene	18.13	91	2353882	25.184	ng	100
67) m- & p-Xylenes	18.29	91	3681249	50.264	ng	100
68) Bromoform	18.35	173	543643	25.985	ng	100
69) Styrene	18.61	104	1372715	24.496	ng	100
70) o-Xylene	18.71	91	1841739	25.334	ng	100
71) n-Nonane	18.91	43	1379636	25.963	ng	100
72) 1,1,2,2-Tetrachloroethane	18.69	83	878788	25.912	ng	99
74) Cumene	19.23	105	2430342	25.669	ng	100
75) alpha-Pinene	19.58	93	1232506	27.292	ng	99
76) n-Propylbenzene	19.68	91	2865797	25.509	ng	100
77) 3-Ethyltoluene	0.00	105	0	N.D.	d	
78) 4-Ethyltoluene	19.81	105	2406219	25.778	ng	100
79) 1,3,5-Trimethylbenzene	19.87	105	2009092	25.874	ng	100
80) alpha-Methylstyrene	0.00	118	0	N.D.	d	
81) 2-Ethyltoluene	0.00	105	0	N.D.	d	
82) 1,2,4-Trimethylbenzene	20.23	105	2135399	26.598	ng	100
83) n-Decane	0.00	58	0	N.D.	d	
84) Benzyl Chloride	20.35	91	3259097	56.169	ng	100
85) 1,3-Dichlorobenzene	20.37	146	1123247	24.547	ng	100
86) 1,4-Dichlorobenzene	20.42	146	1071777	23.055	ng	100
87) sec-Butylbenzene	20.47	105	2637708	25.548	ng	100
88) 4-Isopropyltoluene (p-...	20.61	119	2329526	25.365	ng	100
89) 1,2,3-Trimethylbenzene	0.00	105	0	N.D.	d	
90) 1,2-Dichlorobenzene	20.73	146	1111478	25.179	ng	99
91) d-Limonene	20.73	68	804659	27.105	ng	99
92) 1,2-Dibromo-3-Chloropr...	21.11	157	894286	50.076	ng	99
93) n-Undecane	0.00	57	0	N.D.	d	
94) 1,2,4-Trichlorobenzene	22.24	180	1659233	44.688	ng	100
95) Naphthalene	22.34	128	2238463	20.884	ng	100
96) n-Dodecane	0.00	57	0	N.D.	d	
97) Hexachlorobutadiene	22.66	225	589374	24.859	ng	100
98) Cyclohexanone	0.00	55	0	N.D.	d	
99) tert-Butylbenzene	20.23	119	2061443	26.740	ng	100
100) n-Butylbenzene	20.97	91	2128679	25.021	ng	100
101) 1,1,1,2-Tetrachloroethane	17.76	131	535696	25.214	ng	100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Vial: 2  
Operator: TZ/CG  
Inst : GCMS-16

Quant Time: May 10 20:37:58 2022  
Quant Method : I:\MS16\METHODS\R16051022.M  
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
QLast Update : Tue May 10 19:05:32 2022  
Response via : Initial Calibration  
DataAcq Meth:TO15.M



**Initial Calibration Verification/LABORATORY CONTROL SAMPLE CHECK SHEET**

Data File Name: 05102221.D

Acq. Method File: TO15.M

5/11/22

Data File Path: I:\MS16\DATA\2022\_05\10\

Sample Name: 25ng R16051022 ICV

Operator: TZ/CG

Misc Info: S35-04032201/S35-05062202 (

Date Acquired: 5/10/2022

18:52

Instrument Name: GCMS-16

#	Compound Name	Ret. Time	Amt. (ng)	Spike Amt.(ng)	% Rec.	Lower Limit	Upper Limit	* OR Fail	ICV/AZ 70-130%
2)	Propene	4.18	24.9	25.75	97	56	128	*	*
3)	Dichlorodifluoromethane (CFC 12)	4.34	24.4	26.00	94	71	112	*	*
4)	Chloromethane	4.64	26.2	25.75	102	53	126	*	*
5)	1,2-Dichloro-1,1,2,2-tetrafluoroethane	4.91	25.6	26.00	98	62	121	*	*
6)	Vinyl Chloride	5.06	25.6	26.00	98	63	123	*	*
7)	1,3-Butadiene	5.33	25.7	25.75	100	63	135	*	*
8)	Bromomethane	5.78	25.9	25.75	101	71	112	*	*
9)	Chloroethane	6.12	26.1	25.75	101	66	117	*	*
10)	Ethanol	6.52	98	104.00	94	57	117	*	*
11)	Acetonitrile	6.77	22.2	25.25	88	59	131	*	*
12)	Acrolein	6.95	47.8	52.00	92	71	123	*	*
13)	Acetone	7.17	124	128.00	97	60	117	*	*
14)	Trichlorofluoromethane	7.40	25.0	25.25	99	71	114	*	*
15)	2-Propanol (Isopropanol)	7.67	49.0	50.00	98	61	124	*	*
16)	Acrylonitrile	7.94	48.7	50.25	97	65	130	*	*
17)	1,1-Dichloroethene	8.37	25.6	26.25	98	74	114	*	*
18)	2-Methyl-2-Propanol (tert-Butyl Alcohol)	8.55	54.9	51.00	108	56	135	*	*
19)	Methylene Chloride	8.61	24.4	26.00	94	75	112	*	*
20)	3-Chloro-1-propene (Allyl Chloride)	8.77	26.0	25.50	102	57	127	*	*
21)	Trichlorotrifluoroethane	9.01	26.9	27.00	100	73	114	*	*
22)	Carbon Disulfide	8.86	50.3	51.75	97	70	113	*	*
23)	trans-1,2-Dichloroethene	9.87	26.2	26.00	101	76	119	*	*
24)	1,1-Dichloroethane	10.12	26.0	26.75	97	70	114	*	*
25)	Methyl tert-Butyl Ether	10.22	24.7	25.75	96	72	118	*	*
26)	Vinyl Acetate	10.38	152	117.75	129	56	137	*	*
27)	2-Butanone (MEK)	10.62	50.2	51.00	98	74	121	*	*
28)	cis-1,2-Dichloroethene	11.14	25.2	25.75	98	73	117	*	*
29)	Diisopropyl Ether	11.43	55.3	52.25	106	58	124	*	*
30)	Ethyl Acetate	11.44	76.6	72.50	106	59	161	*	*
31)	n-Hexane	11.42	25.6	26.00	98	55	130	*	*
32)	Chloroform	11.49	25.8	26.25	98	71	114	*	*
34)	Tetrahydrofuran (THF)	11.88	49.6	50.50	98	73	114	*	*
35)	Ethyl tert-Butyl Ether	12.03	52.2	51.75	101	76	119	*	*
36)	1,2-Dichloroethane	12.29	25.2	26.25	96	71	119	*	*
38)	1,1,1-Trichloroethane	12.57	25.0	26.00	96	73	119	*	*
41)	Benzene	13.04	25.2	26.00	97	72	113	*	*
42)	Carbon Tetrachloride	13.20	24.5	25.25	97	67	123	*	*
43)	Cyclohexane	13.33	50.2	51.50	97	70	119	*	*
44)	tert-Amyl Methyl Ether	13.68	51.3	51.50	100	74	120	*	*
45)	1,2-Dichloropropane	13.89	25.3	25.75	98	70	118	*	*
46)	Bromodichloromethane	14.08	25.6	26.00	98	74	119	*	*
47)	Trichloroethene	14.13	25.6	25.50	100	74	115	*	*
48)	1,4-Dioxane	14.11	25.5	25.75	99	77	124	*	*
49)	2,2,4-Trimethylpentane (Isooctane)	14.20	24.8	26.25	94	65	120	*	*



**Initial Calibration Verification/LABORATORY CONTROL SAMPLE CHECK SHEET**Data File Name: **05102221.D****TO15.M**Data File Path: **I:\MS16\DATA\2022\_05\10\**Sample Name: **25ng R16051022 ICV**Operator: **TZ/CG**Misc Info: **S35-04032201/S35-05062202 (**Date Acquired: **5/10/2022****18:52**Instrument Name: **GCMS-16**

#	Compound Name	Ret. Time	Amt. (ng)	Spike Amt.(ng)	% Rec.	Lower Limit	Upper Limit	* OR Fail	ICV/AZ 70-130%
50)	Methyl Methacrylate	14.34	53.3	51.25	104	78	126	*	*
51)	n-Heptane	14.46	24.6	25.75	96	70	119	*	*
52)	cis-1,3-Dichloropropene	15.00	26.6	26.00	102	81	126	*	*
53)	4-Methyl-2-pentanone	15.03	51.7	51.50	100	73	129	*	*
54)	trans-1,3-Dichloropropene	15.51	25.7	25.00	103	80	127	*	*
55)	1,1,2-Trichloroethane	15.68	25.2	26.00	97	78	117	*	*
58)	Toluene	15.98	24.9	25.75	97	70	118	*	*
59)	2-Hexanone	16.22	49.9	50.75	98	74	132	*	*
60)	Dibromochloromethane	16.39	25.4	26.25	97	69	137	*	*
61)	1,2-Dibromoethane	16.64	25.3	26.00	97	76	128	*	*
62)	n-Butyl Acetate	16.85	51.7	50.75	102	75	134	*	*
63)	n-Octane	16.98	24.1	26.00	93	68	120	*	*
64)	Tetrachloroethene	17.12	25.9	26.50	98	63	130	*	*
65)	Chlorobenzene	17.77	25.1	25.75	97	70	118	*	*
66)	Ethylbenzene	18.13	25.2	25.75	98	71	123	*	*
67)	m- & p-Xylenes	18.29	50.3	52.00	97	67	127	*	*
68)	Bromoform	18.35	26.0	26.25	99	65	149	*	*
69)	Styrene	18.61	24.5	25.25	97	76	132	*	*
70)	o-Xylene	18.71	25.3	26.00	97	69	124	*	*
71)	n-Nonane	18.91	26.0	26.00	100	64	127	*	*
72)	1,1,2,2-Tetrachloroethane	18.69	25.9	26.00	100	69	128	*	*
74)	Cumene	19.23	25.7	25.75	100	69	125	*	*
75)	alpha-Pinene	19.58	27.3	26.25	104	68	129	*	*
76)	n-Propylbenzene	19.68	25.5	26.00	98	70	127	*	*
78)	4-Ethyltoluene	19.81	25.8	26.00	99	69	127	*	*
79)	1,3,5-Trimethylbenzene	19.87	25.9	26.00	100	66	129	*	*
82)	1,2,4-Trimethylbenzene	20.23	26.6	25.75	103	63	142	*	*
84)	Benzyl Chloride	20.35	56.2	52.00	108	73	145	*	*
85)	1,3-Dichlorobenzene	20.37	24.5	26.00	94	67	136	*	*
86)	1,4-Dichlorobenzene	20.42	23.1	26.25	88	63	134	*	*
87)	sec-Butylbenzene	20.47	25.5	25.50	100	68	130	*	*
88)	4-Isopropyltoluene (p-Cymene)	20.61	25.4	25.75	99	60	139	*	*
90)	1,2-Dichlorobenzene	20.73	25.2	26.25	96	64	139	*	*
91)	d-Limonene	20.73	27.1	25.75	105	63	137	*	*
92)	1,2-Dibromo-3-Chloropropane	21.11	50.1	50.50	99	72	145	*	*
94)	1,2,4-Trichlorobenzene	22.24	44.7	52.50	85	62	154	*	*
95)	Naphthalene	22.34	20.9	26.25	80	62	156	*	*
97)	Hexachlorobutadiene	22.66	24.9	26.50	94	55	142	*	*
99)	tert-Butylbenzene	20.23	26.7	25.75	104	61	140	*	*
100)	n-Butylbenzene	20.97	25.0	26.00	96	70	131	*	*
101)	1,1,1,2-Tetrachloroethane	17.76	25.2	25.75	98	70	130	*	*

**Bold = 75 Compound List****\* = Pass**

Data File : I:\MS16\DATA\2022\_06\16\06162204.D

Vial: 2

Acq On : 16 Jun 2022 5:13

Operator: WA

Sample : CCV R16061622\_25ng

Inst : GCMS-16

Misc : S35-04032201/S25-05242205 (6/23)

Quant Time: Jun 16 06:04:09 2022

Quant Method : I:\MS16\METHODS\R16051022.M

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 19:05:32 2022

WA 6/16/22

Response via : Initial Calibration

DataAcq Meth:TO15.M

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min

Max. RRF Dev : 30% Max. Rel. Area : 200%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1 IR	Bromochloromethane (IS1)	1.000	1.000	0.0	82	0.00
2 T	Propene	2.436	2.850	-17.0	98	0.00
3 T	Dichlorodifluoromethane (CF	2.806	2.846	-1.4	86	0.00
4 T	Chloromethane	2.460	2.540	-3.3	84	0.00
5 T	1,2-Dichloro-1,1,2,2-tetra	1.438	1.501	-4.4	89	0.00
6 T	Vinyl Chloride	2.181	2.404	-10.2	92	0.00
7 T	1,3-Butadiene	1.958	2.214	-13.1	94	0.00
8 T	Bromomethane	1.085	1.208	-11.3	94	0.00
9 T	Chloroethane	0.930	0.968	-4.1	86	0.00
10 T	Ethanol	1.500	1.563	-4.2	94	0.00
11 T	Acetonitrile	3.500	3.895	-11.3	94	0.00
12 T	Acrolein	1.080	1.055	2.3	85	0.00
13 T	Acetone	1.175	1.295	-10.2	92	0.00
14 T	Trichlorofluoromethane	2.474	2.547	-3.0	85	0.00
15 T	2-Propanol (Isopropanol)	4.253	4.303	-1.2	86	0.00
16 T	Acrylonitrile	2.187	2.387	-9.1	88	0.00
17 T	1,1-Dichloroethene	1.291	1.275	1.2	84	0.00
18 T	2-Methyl-2-Propanol (tert-B	3.836	3.615	5.8	71	0.00
19 T	Methylene Chloride	1.343	1.311	2.4	84	0.00
20 T	3-Chloro-1-propene (Allyl C	2.350	2.722	-15.8	88	0.00
21 T	Trichlorotrifluoroethane	1.174	1.147	2.3	79	0.00
22 T	Carbon Disulfide	4.606	4.929	-7.0	87	0.00
23 T	trans-1,2-Dichloroethene	2.040	2.140	-4.9	84	0.00
24 T	1,1-Dichloroethane	2.501	2.533	-1.3	83	0.00
25 T	Methyl tert-Butyl Ether	4.178	4.185	-0.2	83	0.00
26 T	Vinyl Acetate	0.214	0.258	-20.6	82	0.00
27 T	2-Butanone (MEK)	0.906	0.959	-5.8	85	0.00
28 T	cis-1,2-Dichloroethene	2.026	2.096	-3.5	84	0.00
29 T	Diisopropyl Ether	1.160	1.400	-20.7	96	0.00
30 T	Ethyl Acetate	0.598	0.858	-43.5#	103	0.00
31 T	n-Hexane	2.785	3.449	-23.8	99	0.00
32 T	Chloroform	2.290	2.429	-6.1	88	0.00
33 S	1,2-Dichloroethane-d4(SS1)	1.783	1.875	-5.2	87	0.00
34 T	Tetrahydrofuran (THF)	0.862	0.888	-3.0	84	0.00
35 T	Ethyl tert-Butyl Ether	1.626	1.753	-7.8	85	0.00
36 T	1,2-Dichloroethane	1.997	2.122	-6.3	87	0.00
37 IR	1,4-Difluorobenzene (IS2)	1.000	1.000	0.0	82	0.00
38 T	1,1,1-Trichloroethane	0.505	0.510	-1.0	83	0.00
39 T	Isopropyl Acetate	0.000	0.000	0.0	0#	0.00
40 T	1-Butanol	0.000	0.000	0.0	0#	0.00
41 T	Benzene	1.196	1.216	-1.7	84	0.00
42 T	Carbon Tetrachloride	0.430	0.442	-2.8	82	0.00
43 T	Cyclohexane	0.461	0.489	-6.1	85	0.00
44 T	tert-Amyl Methyl Ether	0.889	0.979	-10.1	87	0.00
45 T	1,2-Dichloropropane	0.328	0.347	-5.8	86	0.00
46 T	Bromodichloromethane	0.434	0.460	-6.0	86	0.00
47 T	Trichloroethene	0.333	0.346	-3.9	84	0.00
48 T	1,4-Dioxane	0.250	0.261	-4.4	83	0.00
49 T	2,2,4-Trimethylpentane (Iso	1.496	1.625	-8.6	89	0.00
50 T	Methyl Methacrylate	0.124	0.135	-8.9	82	0.00
51 T	n-Heptane	0.313	0.320	-2.2	84	0.00
52 T	cis-1,3-Dichloropropene	0.473	0.514	-8.7	83	0.00
53 T	4-Methyl-2-pentanone	0.337	0.395	-17.2	90	0.00
54 T	trans-1,3-Dichloropropene	0.436	0.480	-10.1	81	0.00
55 T	1,1,2-Trichloroethane	0.298	0.304	-2.0	83	0.00

Data File : I:\MS16\DATA\2022\_06\16\06162204.D  
 Acq On : 16 Jun 2022 5:13  
 Sample : CCV R16061622\_25ng  
 Misc : S35-04032201/S25-05242205 (6/23)

Vial: 2  
 Operator: WA  
 Inst : GCMS-16

Quant Time: Jun 16 06:04:09 2022  
 Quant Method : I:\MS16\METHODS\R16051022.M  
 Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
 QLast Update : Tue May 10 19:05:32 2022  
 Response via : Initial Calibration  
 DataAcq Meth:TO15.M

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min  
 Max. RRF Dev : 30% Max. Rel. Area : 200%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
56 IR	Chlorobenzene-d5 (IS3)	1.000	1.000	0.0	94	0.00
57 S	Toluene-d8 (SS2)	4.732	3.990	15.7	80	0.00
58 T	Toluene	5.533	4.905	11.4	85	0.00
59 T	2-Hexanone	4.204	4.473	-6.4	97	0.00
60 T	Dibromochloromethane	1.677	1.508	10.1	83	0.00
61 T	1,2-Dibromoethane	1.532	1.348	12.0	81	0.00
62 T	n-Butyl Acetate	4.586	4.888	-6.6	95	0.00
63 T	n-Octane	1.489	1.318	11.5	89	0.00
64 T	Tetrachloroethene	1.566	1.350	13.8	81	0.00
65 T	Chlorobenzene	3.684	3.269	11.3	83	0.00
66 T	Ethylbenzene	6.424	5.821	9.4	85	0.00
67 T	m- & p-Xylenes	5.034	4.718	6.3	88	0.00
68 T	Bromoform	1.438	1.300	9.6	81	0.00
69 T	Styrene	3.851	3.477	9.7	81	0.00
70 T	o-Xylene	4.997	4.666	6.6	88	0.00
71 T	n-Nonane	3.652	3.786	-3.7	95	0.00
72 T	1,1,2,2-Tetrachloroethane	2.331	2.199	5.7	87	0.00
73 S	Bromofluorobenzene (SS3)	1.725	1.511	12.4	83	0.00
74 T	Cumene	6.507	6.076	6.6	86	0.00
75 T	alpha-Pinene	3.104	2.911	6.2	84	0.00
76 T	n-Propylbenzene	7.721	7.355	4.7	88	0.00
77 T	3-Ethyltoluene	0.000	0.000	0.0	0#	0.00
78 T	4-Ethyltoluene	6.415	6.097	5.0	87	0.00
79 T	1,3,5-Trimethylbenzene	5.337	5.074	4.9	87	0.00
80 T	alpha-Methylstyrene	0.000	0.000	0.0	0#	0.00
81 T	2-Ethyltoluene	0.000	0.000	0.0	0#	0.00
82 T	1,2,4-Trimethylbenzene	5.518	5.835	-5.7	92	0.00
83 T	n-Decane	0.000	0.000	0.0	0#	0.00
84 T	Benzyl Chloride	3.988	4.393	-10.2	83	0.00
85 T	1,3-Dichlorobenzene	3.145	3.017	4.1	86	0.00
86 T	1,4-Dichlorobenzene	3.195	2.808	12.1	81	0.00
87 T	sec-Butylbenzene	7.096	7.014	1.2	90	0.00
88 T	4-Isopropyltoluene (p-Cymen	6.312	6.020	4.6	86	0.00
89 T	1,2,3-Trimethylbenzene	0.000	0.000	0.0	0#	0.00
90 T	1,2-Dichlorobenzene	3.034	2.957	2.5	87	0.00
91 T	d-Limonene	2.040	2.172	-6.5	91	0.00
92 T	1,2-Dibromo-3-Chloropropane	1.227	1.162	5.3	82	0.00
93 T	n-Undecane	0.000	0.000	0.0	0#	0.08
94 T	1,2,4-Trichlorobenzene	2.552	2.181	14.5	74	0.00
95 T	Naphthalene	7.367	6.018	18.3	69	0.00
96 T	n-Dodecane	0.000	0.000	0.0	0#	0.00
97 T	Hexachlorobutadiene	1.629	1.346	17.4	76	0.00
98 T	Cyclohexanone	0.000	0.000	0.0	0#	-0.01
99 T	tert-Butylbenzene	5.298	5.580	-5.3	92	0.00
100 T	n-Butylbenzene	5.847	5.639	3.6	88	0.00
101 T	1,1,1,2-Tetrachloroethane	1.460	1.302	10.8	83	0.00

(#) = Out of Range

SPCC's out = 0 CCC's out = 0

Data File : I:\MS16\DATA\2022\_06\16\06162204.D

Vial: 2

Acq On : 16 Jun 2022 5:13

Operator: WA

Sample : CCV R16061622\_25ng

Inst : GCMS-16

Misc : S35-04032201/S25-05242205 (6/23)

Quant Time: Jun 16 06:04:09 2022

Quant Method : I:\MS16\METHODS\R16051022.M

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 19:05:32 2022

Response via : Initial Calibration

DataAcq Meth:TO15.M

6/16/22

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.32	130	139120	12.500	ng	0.00
37) 1,4-Difluorobenzene (IS2)	13.43	114	613367	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	17.73	54	163194	12.500	ng	0.00

## System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...)	12.17	65	260794	13.143	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	105.12%	
57) Toluene-d8 (SS2)	15.88	98	651103	10.540	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	84.32%	
73) Bromofluorobenzene (SS3)	19.11	174	246573	10.951	ng	0.00
Spiked Amount	12.500	Range 70 - 130	Recovery	=	87.60%	

## Target Compounds

						Qvalue
2) Propene	4.18	42	824744	30.423	ng	99
3) Dichlorodifluoromethan...	4.34	85	831406	26.618	ng	100
4) Chloromethane	4.63	50	720762	26.325	ng	99
5) 1,2-Dichloro-1,1,2,2-t...	4.91	135	450904	28.181	ng	100
6) Vinyl Chloride	5.07	62	695564	28.655	ng	100
7) 1,3-Butadiene	5.33	54	640555	29.395	ng	96
8) Bromomethane	5.78	94	342798	28.393	ng	100
9) Chloroethane	6.12	64	274778	26.541	ng	100
10) Ethanol	6.52	45	1574204	94.308	ng	100
11) Acetonitrile	6.77	41	1007809	25.870	ng	100
12) Acrolein	6.95	56	587319	48.842	ng	99
13) Acetone	7.17	58	1870015	143.026	ng	# 87
14) Trichlorofluoromethane	7.40	101	729994	26.510	ng	99
15) 2-Propanol (Isopropanol)	7.67	45	2418373	51.086	ng	98
16) Acrylonitrile	7.94	53	1348037	55.384	ng	99
17) 1,1-Dichloroethene	8.37	96	379677	26.421	ng	94
18) 2-Methyl-2-Propanol (t...	8.54	59	2112037	49.469	ng	96
19) Methylene Chloride	8.60	84	379345	25.386	ng	87
20) 3-Chloro-1-propene (Al...	8.76	41	795232	30.408	ng	94
21) Trichlorotrifluoroethane	9.01	151	344732	26.379	ng	95
22) Carbon Disulfide	8.86	76	2879745	56.179	ng	100
23) trans-1,2-Dichloroethene	9.87	61	631307	27.809	ng	98
24) 1,1-Dichloroethane	10.12	63	740163	26.593	ng	99
25) Methyl tert-Butyl Ether	10.22	73	1222597	26.290	ng	98
26) Vinyl Acetate	10.38	86	244128	102.549	ng	# 62
27) 2-Butanone (MEK)	10.62	72	549774	54.494	ng	# 76
28) cis-1,2-Dichloroethene	11.14	61	606427	26.893	ng	97
29) Diisopropyl Ether	11.43	87	825972	63.998	ng	# 63
30) Ethyl Acetate	11.44	61	973630	146.194	ng	94
31) n-Hexane	11.42	57	1007596	32.503	ng	99
32) Chloroform	11.49	83	723237	28.372	ng	100
34) Tetrahydrofuran (THF)	11.88	72	486941	50.770	ng	# 86
35) Ethyl tert-Butyl Ether	12.03	87	1024047	56.587	ng	91
36) 1,2-Dichloroethane	12.29	62	625717	28.152	ng	99
38) 1,1,1-Trichloroethane	12.56	97	650607	26.242	ng	98
39) Isopropyl Acetate	12.99	61	38512	No Calib	#	
40) 1-Butanol	13.01	56	25100	No Calib	#	
41) Benzene	13.04	78	1551511	26.443	ng	100
42) Carbon Tetrachloride	13.20	117	568981	26.944	ng	100
43) Cyclohexane	13.33	84	1241728	54.852	ng	93
44) tert-Amyl Methyl Ether	13.67	73	2509855	57.532	ng	96
45) 1,2-Dichloropropane	13.89	63	438164	27.245	ng	100
46) Bromodichloromethane	14.08	83	592806	27.818	ng	100
47) Trichloroethene	14.13	130	437068	26.788	ng	100
48) 1,4-Dioxane	14.11	88	332511	27.150	ng	97
49) 2,2,4-Trimethylpentane...	14.20	57	2112936	28.779	ng	95
50) Methyl Methacrylate	14.34	100	344962	56.626	ng	92

Data File : I:\MS16\DATA\2022\_06\16\06162204.D

Vial: 2

Acq On : 16 Jun 2022 5:13

Operator: WA

Sample : CCV R16061622\_25ng

Inst : GCMS-16

Misc : S35-04032201/S25-05242205 (6/23)

Quant Time: Jun 16 06:04:09 2022

Quant Method : I:\MS16\METHODS\R16051022.M

Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

QLast Update : Tue May 10 19:05:32 2022

Response via : Initial Calibration

DataAcq Meth:TO15.M

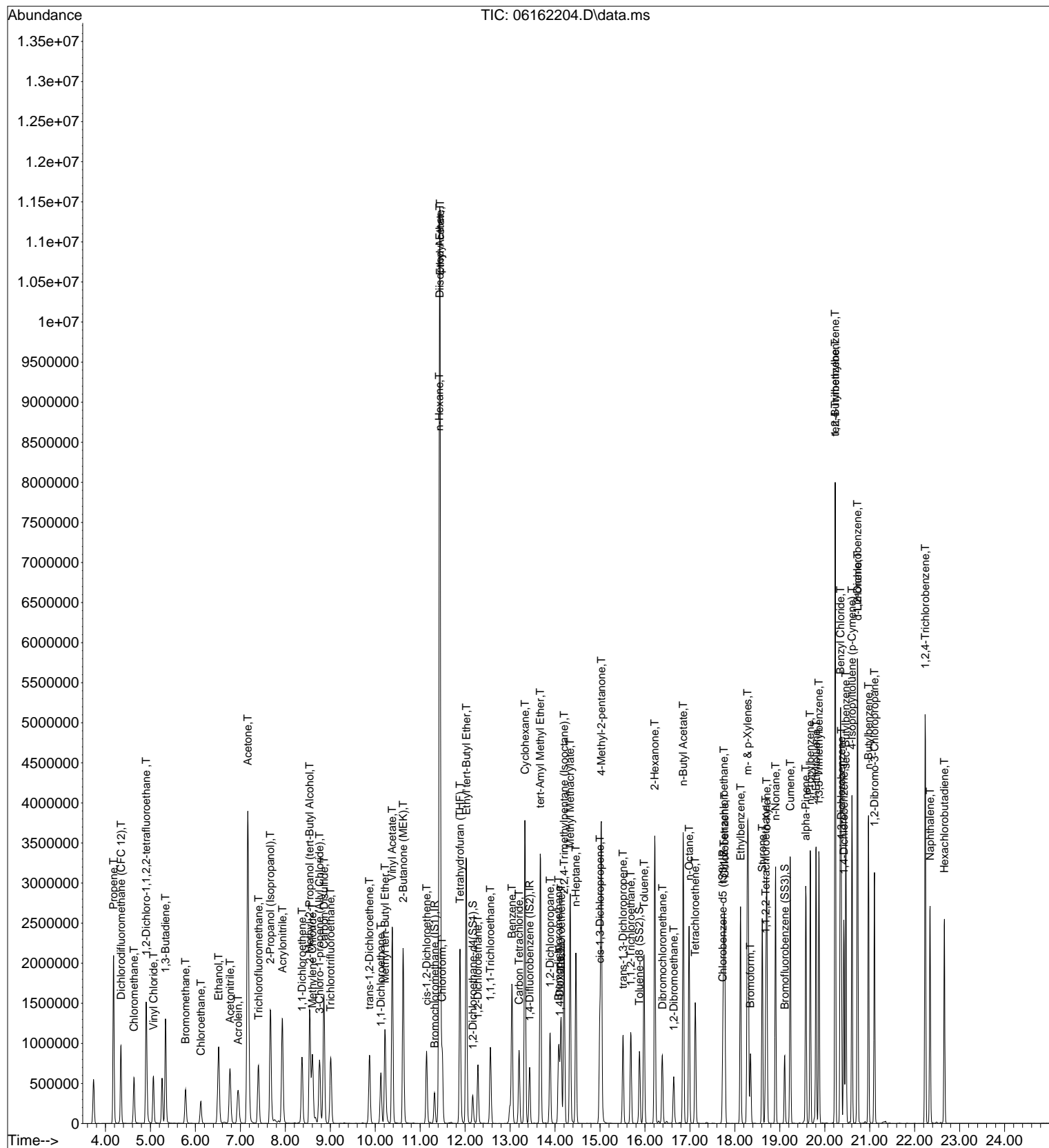
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.46	71	412209	26.797	ng	95
52) cis-1,3-Dichloropropene	15.00	75	662652	28.552	ng	100
53) 4-Methyl-2-pentanone	15.03	58	1009106	61.113	ng	87
54) trans-1,3-Dichloropropene	15.51	75	595073	27.830	ng	100
55) 1,1,2-Trichloroethane	15.68	97	387569	26.505	ng	100
58) Toluene	15.98	91	1649064	22.829	ng	99
59) 2-Hexanone	16.22	43	2992628	54.524	ng	94
60) Dibromochloromethane	16.39	129	516915	23.616	ng	100
61) 1,2-Dibromoethane	16.64	107	457411	22.867	ng	100
62) n-Butyl Acetate	16.85	43	3254264	54.352	ng	95
63) n-Octane	16.98	57	451787	23.240	ng	93
64) Tetrachloroethene	17.12	166	458249	22.415	ng	100
65) Chlorobenzene	17.77	112	1109560	23.069	ng	100
66) Ethylbenzene	18.13	91	1956994	23.334	ng	99
67) m- & p-Xylenes	18.28	91	3172123	48.270	ng	99
68) Bromoform	18.35	173	441372	23.512	ng	100
69) Styrene	18.61	104	1169013	23.249	ng	100
70) o-Xylene	18.71	91	1583916	24.281	ng	98
71) n-Nonane	18.91	43	1285156	26.954	ng	93
72) 1,1,2,2-Tetrachloroethane	18.69	83	746471	24.530	ng	99
74) Cumene	19.23	105	2062520	24.277	ng	99
75) alpha-Pinene	19.58	93	1026277	25.326	ng	98
76) n-Propylbenzene	19.68	91	2520643	25.005	ng	98
77) 3-Ethyltoluene	19.81	105	2109331	No Calib		
78) 4-Ethyltoluene	19.81	105	2109331	25.184	ng	98
79) 1,3,5-Trimethylbenzene	19.87	105	1722392	24.721	ng	98
80) alpha-Methylstyrene	19.87	118	13337	No Calib	#	
81) 2-Ethyltoluene	19.87	105	1722392	No Calib		
82) 1,2,4-Trimethylbenzene	20.23	105	1961697	27.232	ng	98
83) n-Decane	20.23	58	125406	No Calib	#	
84) Benzyl Chloride	20.35	91	2953515	56.728	ng	97
85) 1,3-Dichlorobenzene	20.37	146	1024223	24.945	ng	100
86) 1,4-Dichlorobenzene	20.42	146	953299	22.853	ng	100
87) sec-Butylbenzene	20.47	105	2380800	25.699	ng	99
88) 4-Isopropyltoluene (p-...	20.61	119	2043342	24.796	ng	99
89) 1,2,3-Trimethylbenzene	20.61	105	79966	No Calib		
90) 1,2-Dichlorobenzene	20.73	146	1013501	25.588	ng	100
91) d-Limonene	20.73	68	744291	27.941	ng	97
92) 1,2-Dibromo-3-Chloropr...	21.11	157	758504	47.334	ng	87
93) n-Undecane	22.33	57	1045	No Calib	#	
94) 1,2,4-Trichlorobenzene	22.23	180	1452343	43.593	ng	100
95) Naphthalene	22.34	128	2042720	21.239	ng	100
96) n-Dodecane	22.33	57	871	No Calib	#	
97) Hexachlorobutadiene	22.66	225	452545	21.273	ng	99
98) Cyclohexanone	18.28	55	3556	No Calib		
99) tert-Butylbenzene	20.23	119	1894246	27.384	ng	100
100) n-Butylbenzene	20.97	91	1914216	25.075	ng	98
101) 1,1,1,2-Tetrachloroethane	17.76	131	441928	23.181	ng	100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Data File : I:\MS16\DATA\2022\_06\16\06162204.D  
Acq On : 16 Jun 2022 5:13  
Sample : CCV R16061622\_25ng  
Misc : S35-04032201/S25-05242205 (6/23)

Vial: 2  
Operator: WA  
Inst : GCMS-16

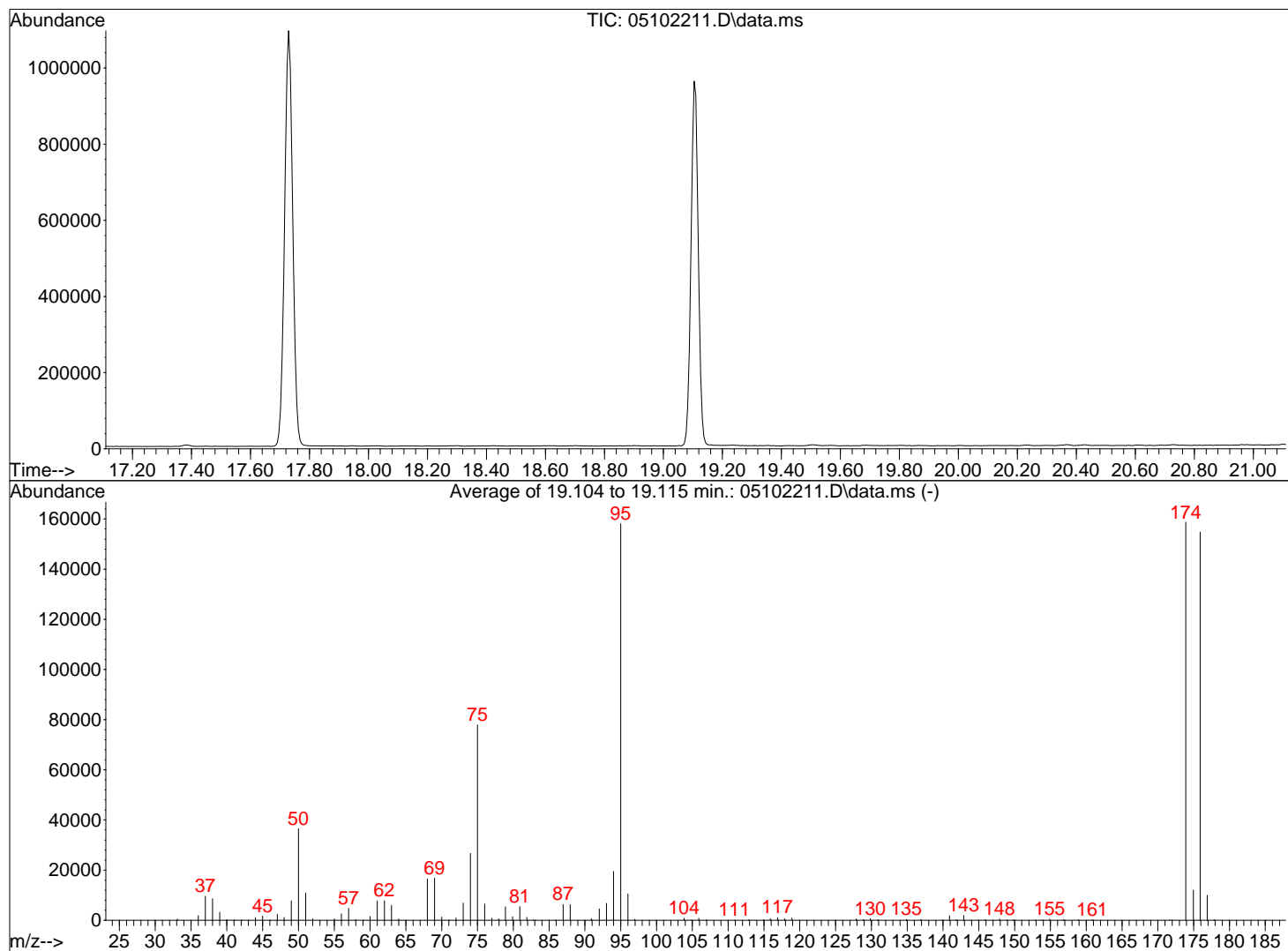
Quant Time: Jun 16 06:04:09 2022  
Quant Method : I:\MS16\METHODS\R16051022.M  
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
QLast Update : Tue May 10 19:05:32 2022  
Response via : Initial Calibration  
DataAcq Meth:TO15.M



Data Path : I:\MS16\DATA\2022\_05\10\  
 Data File : 05102211.D  
 Acq On : 10 May 2022 13:12  
 Operator : TZ/CG  
 Sample : R16051022\_BFB Std  
 Misc : S35-04032201  
 ALS Vial : 2 Sample Multiplier: 1

Integration File: LSCINT.P

Method : I:\MS16\METHODS\R16051022.M  
 Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
 Last Update : Tue May 10 19:05:32 2022



AutoFind: Scans 2840, 2841, 2842; Background Corrected with Scan 2831

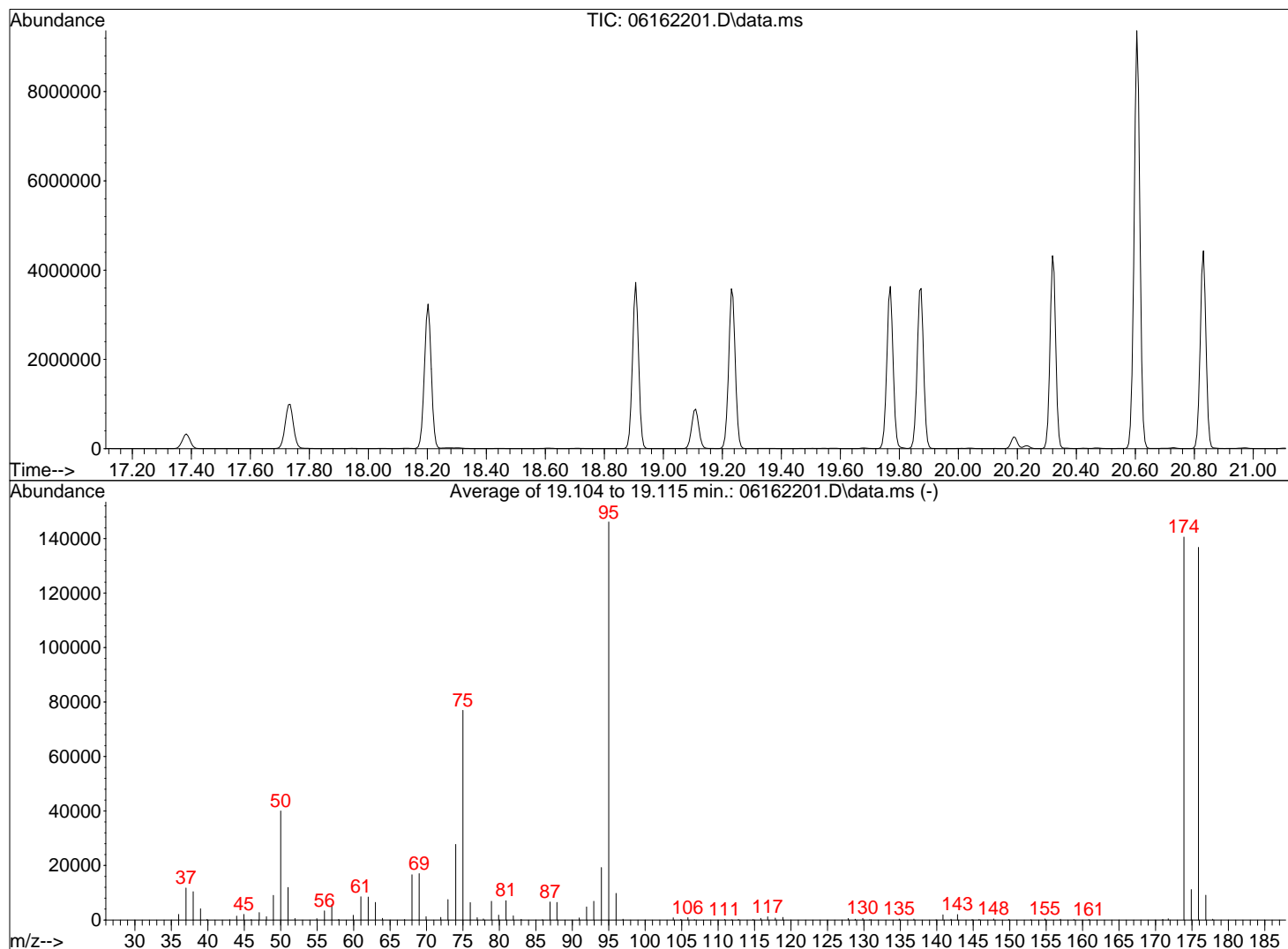
*USA* 5/10/22

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	23.1	36512	PASS
75	95	30	66	49.2	77896	PASS
95	95	100	100	100.0	158197	PASS
96	95	5	9	6.6	10511	PASS
173	174	0.00	2	0.0	0	PASS
174	95	50	120	100.4	158784	PASS
175	174	4	9	7.6	12026	PASS
176	174	93	101	97.5	154795	PASS
177	176	5	9	6.4	9945	PASS

Data Path : I:\MS16\DATA\2022\_06\16\  
 Data File : 06162201.D  
 Acq On : 16 Jun 2022 3:32  
 Operator : WA  
 Sample : CCV M16061622\_25ng  
 Misc : S35-04032201/S35-05232201 (7/23)  
 ALS Vial : 4 Sample Multiplier: 1

Integration File: LSCINT.P

Method : I:\MS16\METHODS\R16051022.M  
 Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)  
 Last Update : Tue May 10 19:05:32 2022



AutoFind: Scans 2840, 2841, 2842; Background Corrected with Scan 2832

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	27.4	40003	PASS
75	95	30	66	52.7	76968	PASS
95	95	100	100	100.0	146147	PASS
96	95	5	9	6.7	9755	PASS
173	174	0.00	2	0.0	0	PASS
174	95	50	120	96.2	140587	PASS
175	174	4	9	7.9	11155	PASS
176	174	93	101	97.3	136795	PASS
177	176	5	9	6.6	9082	PASS

WA 6/16/22



## Injection Log

Directory: J:\MS16\DATA\2022\_05\10\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
11	5/10/22 13:12	05102211.D	R16051022_BFB Std	S35-04032201	TZ/CG	2	Pass
12	5/10/22 13:46	05102212.D	0.1ng R16051022 ICAL Std	S35-04032201/S35-05102204 (6/09)	TZ/CG	13	<b>R16051022.M</b>
14	5/10/22 14:20	05102213.D	0.2ng R16051022 ICAL Std	S35-04032201/S35-05102204 (6/09)	TZ/CG	13	
16	5/10/22 14:54	05102214.D	0.5ng R16051022 ICAL Std	S35-04032201/S35-05102204 (6/09)	TZ/CG	13	
18	5/10/22 15:28	05102215.D	1.0ng R16051022 ICAL Std	S35-04032201/S35-05102203 (6/09)	TZ/CG	14	
19	5/10/22 16:02	05102216.D	5.0ng R16051022 ICAL Std	S35-04032201/S35-05102203 (6/09)	TZ/CG	14	
20	5/10/22 16:36	05102217.D	25ng R16051022 ICAL Std	S35-04032201/S35-05102202 (6/09)	TZ/CG	15	
22	5/10/22 17:10	05102218.D	50ng R16051022 ICAL Std	S35-04032201/S35-05102202 (6/09)	TZ/CG	15	
23	5/10/22 17:44	05102219.D	100ng R16051022 ICAL Std	S35-04032201/S35-05102202 (6/09)	TZ/CG	15	
24	5/10/22 18:18	05102220.D	Blank	S35-04032201	TZ/CG	2	
25	5/10/22 18:52	05102221.D	25ng R16051022 ICV	S35-04032201/S35-05062202 (6/5)	TZ/CG	2	Pass
26	5/10/22 19:26	05102222.D	25ng R16051022 ICV	S35-04032201/S35-05062202 (6/5)	TZ/CG	2	Pass
R16051022.M : good for low level compounds and DoD; ranges from 0.1ng --> 100ng, except: naphthalene: from 0.2ng --> 100ng							

DA 5/11/22

Directory: I:\MS16\DATA\2022\_06\14\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	6/16/22 3:32	06162201.D	CCV M16061622_25ng	S35-04032201/S35-05232201 (7/23)	WA	4	Passed
2	6/16/22 4:06	06162202.D	Std check_5ng	S35-04032201/S25-05242205 (6/23)	WA	2	
3	6/16/22 4:39	06162203.D	CCV C16061622_25ng	S35-04032201/S35-05272206 (6/26)	WA	16	Passed
4	6/16/22 5:13	06162204.D	CCV R16061622_25ng	S35-04032201/S25-05242205 (6/23)	WA	2	Passed
5	6/16/22 5:47	06162205.D	Blank	S35-04032201	WA	1	
6	6/16/22 6:21	06162206.D	MB R16061622_1000mL	S35-04032201	WA	2	Passed
7	6/16/22 6:56	06162207.D	LCS R16061622_25ng	S35-04032201/S35-05312201 (6/30)	WA	2	Passed
8	6/16/22 7:46	06162208.D	P2202599-001 (10mL)	S35-04032201	WA	1	
9	6/16/22 8:20	06162209.D	P2202599-001dil (4.0mL)	S35-04032201	WA	1	
10	6/16/22 8:54	06162210.D	P2202599-002 (10mL)	S35-04032201	WA	1	
11	6/16/22 9:28	06162211.D	P2202599-003 (1000mL)	S35-04032201	WA	3	
12	6/16/22 10:02	06162212.D	P2202599-004 (1000mL)	S35-04032201	WA	4	
13	6/16/22 10:55	06162213.D	P2202582-001dil (50mL)	S35-04032201	WA	3	over diluted
14	6/16/22 11:29	06162214.D	LCSD R16061622_25ng	S35-04032201/S35-05312201 (6/30)	WA	2	Passed
15	6/16/22 12:02	06162215.D	P2202555-001 (0.050mL)	S35-04032201/ 2mL--> 1L; 25mL	WA	13	close
16	6/16/22 12:36	06162216.D	P2202555-002 (0.040mL)	S35-04032201/ 2mL--> 1L; 20mL	WA	14	close
17	6/16/22 13:18	06162217.D	P2202468-001 (1000mL)	S35-04032201	WA	9	
18	6/16/22 14:02	06162218.D	P2202468-001Dil (100mL)	S35-04032201	WA	9	
19	6/16/22 14:36	06162219.D	P2202468-002 (1000mL)	S35-04032201	WA	10	
20	6/16/22 15:17	06162220.D	P2202059-008 (0.3ng LOD_MDL)	S35-04032201/S35-06092203 (7/8)	WA	15	
21	6/16/22 15:51	06162221.D	P2202468-003 (1000mL)	S35-04032201	WA	11	
22	6/16/22 16:25	06162222.D	P2202468-004 (1000mL)	S35-04032201	WA	12	
23	6/16/22 16:59	06162223.D	P2202059-007 (0.16ng LOD_MDL)	S35-04032201/S35-06092203 (7/8)	WA	15	
24	6/16/22 17:33	06162224.D	P2202582-001 (500mL)	S35-04032201	WA	3	
25	6/16/22 18:07	06162225.D	P2202582-001dup (500mL)	S35-04032201	WA	3	Passed
26	6/16/22 18:41	06162226.D	P2202059-006 (0.10ng LOD_MDL)	S35-04032201	WA	15	
27	6/16/22 19:15	06162227.D	P2202606-001 (1000mL)	S35-04032201	WA	4	
28	6/16/22 19:49	06162228.D	P2202606-002 (1000mL)	S35-04032201	WA	5	
29	6/16/22 20:22	06162229.D	P2202606-003 (1000mL)	S35-04032201	WA	6	
30	6/16/22 20:57	06162230.D	P2202606-004 (1000mL)	S35-04032201	WA	7	
31	6/16/22 21:31	06162231.D	P2202606-005 (1000mL)	S35-04032201	WA	8	
32	6/16/22 22:05	06162232.D	P2202555-001 (0.05mL)	S35-04032201/ 2mL--> 1L; 25mL	WA	13	
33	6/16/22 22:40	06162233.D	P2202555-002 (0.04mL)	S35-04032201/ 2mL--> 1L; 20mL	WA	14	
34	6/16/22 23:14	06162234.D	System	S35-04032201	WA	2	
	CCV: Ethyl acetate out high						
					WA 6/17/22		

GWTP QUARTERLY EVALUATION REPORT – 2<sup>ND</sup> QUARTER 2022  
LONGHORN ARMY AMMUNITION PLANT

**APPENDIX F**  
**PROTOCOL FOR DISCHARGING GWTP EFFLUENT**

GWTP QUARTERLY EVALUATION REPORT – 2<sup>ND</sup> QUARTER 2022  
LONGHORN ARMY AMMUNITION PLANT

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**MEMORANDUM**

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**DATE:** August 28, 2017

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

**TO:** Richard Mayer      Senior Project Engineer  
US Environmental Protection Agency  
Federal Facilities Section (6PD-F)

April Palmie      Project and Grant Manager  
Superfund Section, Remediation Division  
Texas Commission on Environmental Quality

**FROM:** Rose M. Zeiler, Ph.D.   Longhorn AAP Site Manager

**SUBJECT:**      **Protocol for Discharging GWTP Effluent**  
**Longhorn Army Ammunition Plant, Karnack, TX**  
**(Contract: W912DY-09-D-0059, Task Order DS01)**

## **INTRODUCTION**

The purpose of this memo is to document the protocol for discharging Longhorn Army Ammunition Plant groundwater treatment plant (GWTP) effluent to Harrison Bayou, the INF-Pond, or LHAAP-18/24.

The GWTP is designed to:

- Extract groundwater from LHAAP-18/24 and LHAAP-16 for hydraulic control;
- Remove metals by pH adjustment, polymer addition, and gravity separation;
- Remove volatile organic compounds (VOCs) by air stripping;
- Remove perchlorate in a fluidized bed reactor (FBR) and an ion exchange scavenger system; and
- Discharge the effluent continuously.

## DISCHARGE CRITERIA

The discharge criteria established for discharge to Harrison Bayou are:

Parameter	Discharge Criteria (µg/L)	
	Daily Average	Daily Maximum
<b>Volatiles</b>		
1,1,1-Trichloroethane	3,417	7,230
1,1,2-Trichloroethane	102.5	216.9
1,1-Dichloroethane	6,633	14,032
1,1-Dichloroethene	119	253
1,2-Dichloroethane	85	181
Acetone	1,132	2,395
Benzene	85	181
Carbon Tetrachloride	85	181
Chlorobenzene	22,300	47,180
Chloroform	1,708	3,615
Ethylbenzene	26,954	57,025
Xylenes	39.5	83.6
Methylene Chloride	803	1,699
Styrene	2,829	5,987
Tetrachloroethene	85.4	180.7
Toluene	1,980	4,189
Trichloroethene	85	181
Vinyl Chloride	34	72
<b>Anions</b>		
Chloride	*	*
Sulfate	*	*
Perchlorate**	278	589
<b>Metals</b>		
Aluminum	777	1,644
Arsenic	365	772
Barium	1,000	2,000
Cadmium	1.6	3.4
Chromium, Total	355	752
Chromium, Hexavalent	58	124
Cobalt	5,433	11,495
Iron	1,132	2,395
Lead	2.2	4.6
Nickel	87	184
Manganese	7,323	15,494
Silver	1.4	3
Selenium	5.7	12
Vanadium	1,698	3,592
Zinc	146	310
<b>Other</b>		
Hexachlorobenzene	0.22	0.47
1,4-Dioxane		134.2
Oil and Grease		15
Chemical Oxygen Demand		200

\* - Based upon flow in Harrison Bayou

\*\* - Discharge criteria, when diverted to the INF Pond, is 17 µg/L

## PROTOCOL FOR DISCHARGING GWTP EFFLUENT

In accordance with the *Sampling and Analysis Plan, Groundwater Treatment Plant and Well Fields* (SAP) Table 2-2, indicator parameters for the FBR, such as temperature, pH and oxidation reduction potential (ORP), are monitored in real time to predict FBR performance and perchlorate removal. Based upon these indicator parameters, the operator of the GWTP can make adjustments such as:

- Bring the ion exchange system online;
- Increase or decrease the addition rate of electron donor (acetic acid);
- Increase or decrease the nutrient addition rate (urea or phosphoric acid); or
- Increase or decrease the FBR recirculation rate

Samples of the GWTP effluent are collected weekly, analyzed for perchlorate, nutrients (ammonia-nitrogen and ortho-phosphate), total organic carbon (TOC), chloride, and sulfate, with the results received from the laboratory 14 days later. Other parameters (e.g. Record of Decision metals and volatiles) are collected and analyzed in GWTP effluent samples according to the frequencies listed in Table 2-1 of the SAP.

As shown in Figure 1, groundwater is continuously extracted, treated, and discharged. If Harrison Bayou is flowing and indicator parameters are within their historical optimal ranges, then the ion exchange vessels can be bypassed and the GWTP effluent sample will be collected after the FBR. If Harrison Bayou is not flowing or the indicator parameters are not within historical optimal ranges, then the ion exchange vessels will be put on line, and the GWTP effluent sample will be collected between the lead and lag ion exchange vessel. Professional judgement may also be used as to when to bring the ion exchange vessels online, such as after a power outage or during anticipated cold temperatures when the FBR has historically not performed optimally.

If a parameter is measured in the effluent at a concentration above the discharge criteria, then a confirmation sample and an effluent sample after the lag ion exchange vessel will be collected and analyzed for the parameter with a 24-hour turnaround time. Corrective measures (e.g. increased nutrient or electron donor addition rates, bring ion exchange vessels on line) will be implemented as appropriate to bring the parameter back within the discharge criteria. ***If an upset condition in the FBR leads to high concentrations of perchlorate going into the lead ion exchange vessel and breaking through at the sample location between the vessels, the lag vessel will still remove perchlorate before it is discharged to Harrison Bayou, the INF Pond, or LHAAP-18/24.*** It is estimated that the lag ion exchange vessel can remove all of the perchlorate from two weeks of typical groundwater extraction at a concentration of 920 µg/L. If the residual perchlorate concentration after the FBR and lead ion exchange vessel is only 600 µg/L, the lag ion exchange vessel could last almost 2.5 years before perchlorate would be detected in the discharged effluent.

If a parameter exceeds the discharge criteria by more than 40% (see Appendix A-2, SAP, Section 7c of Monitoring and Reporting Requirements) or reaches 920 µg/L of perchlorate, then the GWTP will be put into full recycle mode (no discharge) until the parameter is below the discharge criteria again. Appendix A-2 of the SAP requires GWTP data to be provided to TCEQ monthly including a list of noncompliance(s), if applicable.

### ***Discharge to Harrison Bayou***

As shown in Figure 1, the GWTP effluent will be discharged to Harrison Bayou as long as it has a measurable flow. The flowrate in Harrison Bayou is estimated by measuring the height of water with a staff gauge and velocity in feet/sec at intervals along the width as described in the Installation-Wide Work Plan, Standard Operating Procedures, Attachment 18 – Water Depth and Velocity Measurements (AECOM, July 2014).

The allowable flow rate of GWTP effluent that can be discharged to Harrison Bayou is given by:

$$Q_E \leq \frac{Q_S (C_C - C_A)}{(C_E - C_C)}$$

where  $Q_E$  = GWTP effluent flow  $Q_S$  = Harrison Bayou flow

$C_C$  = Criteria concentration (100 mg/L for chloride, 50 mg/L for sulfate)

$C_A$  = Ambient concentration = 10 mg/L

$C_E$  = Chloride or sulfate concentration in GWTP effluent

The allowable GWTP effluent flow will be the lower of the calculated values given the measured concentrations of chloride and sulfate in the discharge stream. For each day that GWTP effluent is discharged to Harrison Bayou, the measured Harrison Bayou flow, the allowable effluent flow, and the actual effluent flow are recorded.

### ***Discharge to INF Pond***

If Harrison Bayou is not flowing, then GWTP effluent will be discharged to the Intermediate-Range Nuclear Forces (INF) Pond for temporary storage until Harrison Bayou flow resumes. Perchlorate concentration detected in the effluent must be 17 µg/L or less, when this occurs.

The INF Pond has a flexible membrane liner protected by a soil cover with a gravity discharge pipe (and valve) to Harrison Bayou. The INF Pond has a nominal capacity of 3 million gallons with a staff gage to measure the height of water stored in the pond. The GWTP operator maintains the INF Pond by visually inspecting for erosion, vegetative growth including tree growth along the anchor trench, and liner integrity and making necessary repairs. Periodically, accumulated debris must be removed from the influent and effluent piping to the INF Pond.

Prior to discharging to the INF Pond, a lead and lag ion exchange vessel will be brought online. The GWTP Operator will also confirm that the discharge valve is closed, will record the reading on the effluent totalizer, and will record the height of water using the staff gage. The GWTP Operator will then configure valves and pumps to direct GWTP effluent to the INF Pond. The height of water in the INF Pond and totalizer reading will be recorded at the beginning and end of each shift for the duration of active discharge. When the height of water in the pond reaches 3 feet below the height of the berm (freeboard), the GWTP Operator will stop discharging to the INF Pond and TCEQ will be notified. After the TCEQ acknowledges the INF Pond level, GWTP effluent may be discharged to the INF Pond again until 2 feet of freeboard is reached. The GWTP Operator will stop discharging to the INF Pond and TCEQ will be notified again. After the TCEQ acknowledges 2 feet of freeboard in the INF Pond, GWTP effluent may be discharged again until 1 foot of freeboard remains. No additional GWTP effluent can be accepted at the INF Pond until greater than 1 foot of freeboard is measured.



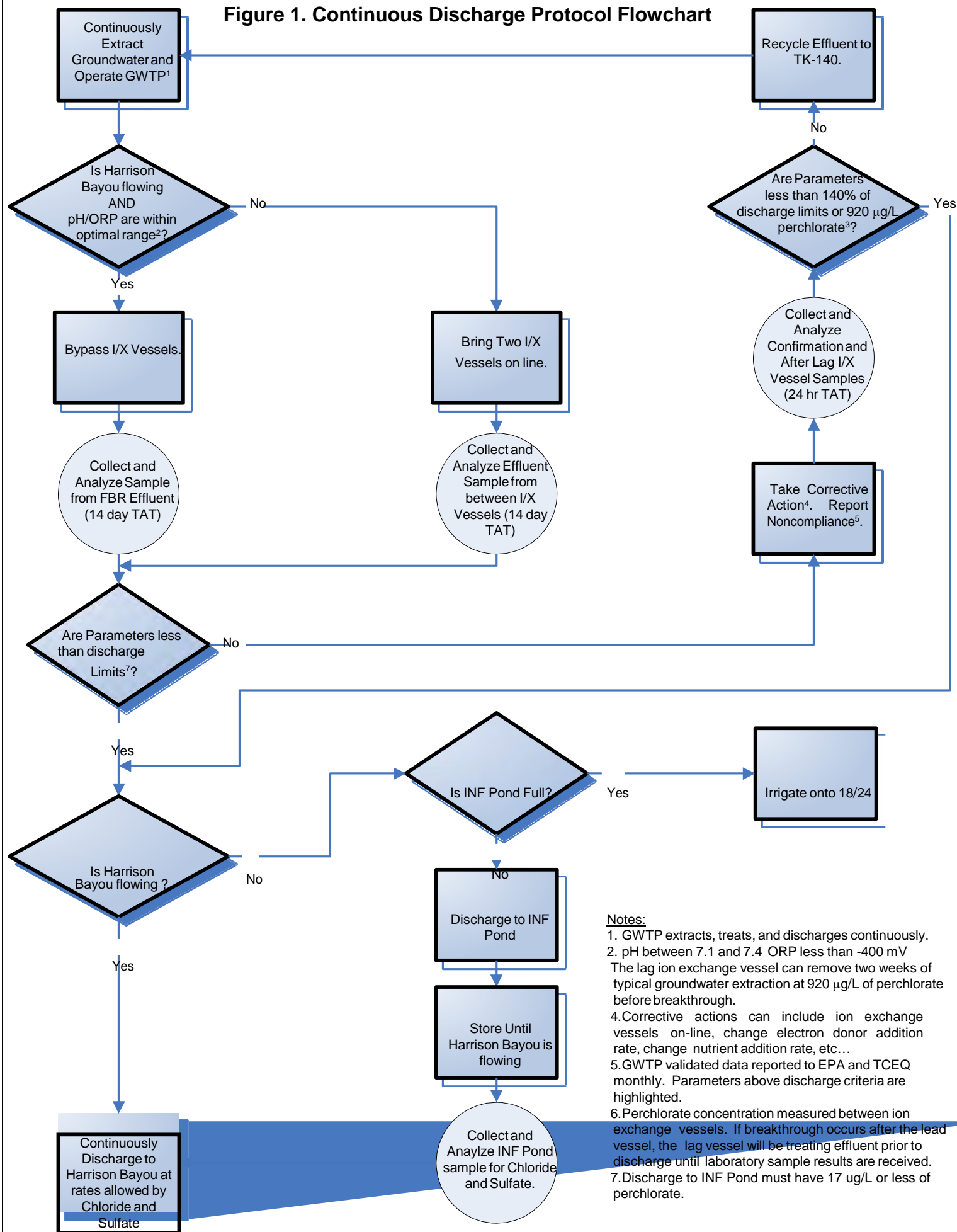
As soon as flow in Harrison Bayou returns, stored GWTP effluent from the INF Pond will be discharged. As with direct discharges from the GWTP to Harrison Bayou, the allowable flowrate of effluent from the INF Pond is calculated based upon the chloride and sulfate concentrations in the pond and the flow in Harrison Bayou. If effluent from the INF Pond and the GWTP are discharged simultaneously, total flow of both streams together should not exceed the calculated discharge level for either discharge location. For each day that INF Pond contents are discharged to Harrison Bayou, the measured Harrison Bayou flow, the allowable effluent flow, and the actual effluent flow are recorded.

#### ***Irrigation onto LHAAP-18/24***

If Harrison Bayou is not flowing and the INF Pond has less than 1 foot of freeboard, then GWTP effluent will be irrigated onto LHAAP-18/24 using one of the three main sprinkler lines. To avoid pooling and runoff of irrigation water, only one line will be used for half a day at a time, with a separate line being used the second half of the day. If needed, the irrigation will occur 5 days a week for 8 hours each day (using 3 sprinklers in each line). If conditions are wet due to rain events, irrigation will not be conducted to avoid ponding and potential runoff, the GWTP will be put into recycle mode, and groundwater extraction will be interrupted if storage space is not available.

While irrigating, site inspections will be performed to ensure pooling and runoff are not occurring. During the irrigation activities, inspections will be performed twice a day, once approximately three hours and again approximately six hours into the 8-hour irrigation shift. The system will be inspected to ensure that the sprinkler heads are operating properly and not leaking large amounts of water. If ponding or runoff is observed, irrigation at that sprinkler line will cease, and irrigation at another sprinkler line will be started if possible. Volumes of GWTP effluent and twice daily inspections will be recorded daily and reported monthly until flow resumes in Harrison Bayou or greater than 1 foot of freeboard is available in the INF Pond.

Figure 1. Continuous Discharge Protocol Flowchart



GWTP QUARTERLY EVALUATION REPORT – 2<sup>ND</sup> QUARTER 2022  
LONGHORN ARMY AMMUNITION PLANT

**APPENDIX G**  
**AIR DATA TABLES, PID READINGS, AND CALIBRATION LOGS**

GWTP QUARTERLY EVALUATION REPORT – 2<sup>ND</sup> QUARTER 2022  
LONGHORN ARMY AMMUNITION PLANT

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**Appendix G Table 1. Ambient Air Data - June 2022**  
**Longhorn Army Ammunition Plant**  
**Groundwater Treatment Plant**

Pollutant	CAS #	Short Term ESL March 2012 $\mu\text{g}/\text{m}^3$	AMCVs (Short Term Health) $\mu\text{g}/\text{m}^3$	GWTP Ambient Air Concentrations (1) $\mu\text{g}/\text{m}^3$	Status (3)	Downwind Ambient Air Concentrations (2) $\mu\text{g}/\text{m}^3$	Status (3)
1,1-Dichloroethane	75-34-3	4,000	4,047	0.85 U	PASS	0.64 U	PASS
1,1-Dichloroethene	75-35-4	210	714	0.86 U	PASS	0.65 U	PASS
1,2-Dichloroethane	107-06-2	160	162	0.85 U	PASS	0.64 U	PASS
Acetone	67-64-1	5,900	NA	22	PASS	46	PASS
Benzene	71-43-2	170	575	0.80 U	PASS	1.3	PASS
Carbon disulfide	75-15-0	30	NA	1.8 U	PASS	1.3 U	PASS
Chloroform	67-66-3	100	98	0.86 U	PASS	0.65 U	PASS
cis-1,2-Dichloroethene	156-59-2	7,900	NA	5.9	PASS	0.63 U	PASS
Methylene chloride	75-09-2	3,600	12,158	0.83 U	PASS	0.63 U	PASS
Tetrachloroethene	127-18-4	2,000	6,782	0.83 U	PASS	0.63 U	PASS
trans-1,2-Dichloroethene	156-60-5	7,900	NA	0.85 U	PASS	0.64 U	PASS
Trichloroethene	79-01-6	540	537	7.0	PASS	0.63 U	PASS
Vinyl chloride	75-01-4	20,000	66,460	0.83 U	PASS	0.63 U	PASS
n-Hexane	110-54-3	5,300	6,336	8.8	PASS	43	PASS
Styrene	100-42-5	110	21,725	0.80 U	PASS	0.61 U	PASS
Toluene	108-88-3	640	15,074	2.3	PASS	7.9	PASS
Ethylbenzene	100-41-4	740	86,844	0.83 U	PASS	1.2	PASS
m,p-Xylenes	179601-23-1	180	7,382	1.8 U	PASS	3.9	PASS
o-Xylene	95-47-6	1,600	7,382	0.83 U	PASS	1.3	PASS
1,3-Dichlorobenzene	541-73-1	720	NA	0.83 U	PASS	0.63 U	PASS
Propene (C3H6)	115-07-1	Asphyxiant	Asphyxiant	14	NA	27	NA
Dichlorodifluoromethane (CFC 12)	75-71-8	50,000	49,452	2.8	PASS	4.4	PASS
Ethanol	64-17-5	18,800	NA	16	PASS	67	PASS
Trichlorofluoromethane (CFC 11)	75-69-4	28,000	56,184	3.0	PASS	10	PASS
Trichlorotrifluoroethane (CFC 113)	76-13-1	38,000	NA	4.8	PASS	0.70	PASS
alpha-Pinene	80-56-8	60	3,499	1.1	PASS	2.1	PASS
d-Limonene	5989-27-5	1,100	NA	0.80 U	PASS	0.77	PASS

**Notes:**

(1) Sample collected over an 8-hour period on June 6, 2022, between 06:30 AM and 02:30 PM

(2) Sample collected over a 24-hour period beginning on June 6 2022, at 07:00 AM and ending on June, 7 2022 at 07:00 AM

(3) Status based on comparison of air sample result to Air Monitoring Comparison Values (AMCVs). When there is no AMCV value for a chemical, the air sample concentration is compared to the short-term Effects Screening Level (ESL).

CAS # = Chemical Abstracts Service Number

GWTP = Groundwater Treatment Plant

U = non-detect

$\mu\text{g}/\text{m}^3$  = micrograms per cubic meter

g/mole = gram/mole

mol/m3 = mole per cubic meter

Appendix G Table 2. Emission Stack Air Data - June 2022

**Longhorn Army Ammunition Plant  
Groundwater Treatment Plant**

Pollutant	CAS #	Measured Air Stripper Stack Concentrations (1)	Air Stripper Emission Rates (2)	Air Stripper Emission Rates (2a)	Allowable Annual Emission (3)	Status (4)	TLV (5)	TLV Reference	Compliance section	Distance Downwind to nearest off-site Receptor (D)	(K) conversion value	Allowable Maximum Hourly Emission Limit at Nearest off-site Receptor (6)(7) (E) = L/K	Status (8)
		µg/m <sup>3</sup>	lb/hr	tpy	tpy		mg/m <sup>3</sup>			feet		lb/hr	
1,1-Dichloroethane	75-34-3	68 U	5.57E-04	3.62E-04	5	PASS	405	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2,000	14	1.0	PASS
1,1-Dichloroethene	75-35-4	140 J	2.30E-03	1.49E-03	5	PASS	20	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2,000	14	1.4	PASS
1,2-Dichloroethane	107-06-2	160	2.62E-03	1.71E-03	5	PASS	40	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2,000	14	2.9	PASS
Acetone	67-64-1	670 U	5.49E-03	3.57E-03	5	PASS	590	106.262 List	30 TAC 106.533(f)(1)(A)(ii)	2,000	14	1.0	PASS
Benzene	71-43-2	64 U	5.25E-04	3.41E-04	5	PASS	3	106.262 List	30 TAC 106.533(f)(1)(A)(ii)	2,000	14	0.21	PASS
Carbon disulfide	75-15-0	140 U	1.15E-03	7.46E-04	5	PASS	31	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2,000	14	2.2	PASS
Chloroform	67-66-3	69 U	5.66E-04	3.68E-04	5	PASS	10	106.262 List	30 TAC 106.533(f)(1)(A)(ii)	2,000	14	0.71	PASS
cis-1,2-Dichloroethene	156-59-2	15,000 J	2.46E-01	1.60E-01	5	PASS	793	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2,000	14	1.0	PASS
Methylene chloride	75-09-2	67 U	5.49E-04	3.57E-04	5	PASS	26	106.262 List	30 TAC 106.533(f)(1)(A)(ii)	2,000	14	1.9	PASS
Tetrachloroethene	127-18-4	68	1.11E-03	7.25E-04	5	PASS	33.5	106.262 List	30 TAC 106.533(f)(1)(A)(ii)	2,000	14	2.4	PASS
trans-1,2-Dichloroethene	156-60-5	68 U	5.57E-04	3.62E-04	5	PASS	793	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2,000	14	1.0	PASS
Trichloroethene	79-01-6	17,000 J	2.79E-01	1.81E-01	5	PASS	135	106.262 List	30 TAC 106.533(f)(1)(A)(ii)	2,000	14	6.0	PASS
Vinyl chloride	75-01-4	650	1.07E-02	6.93E-03	5	PASS	2	106.262 List	30 TAC 106.533(f)(1)(A)(ii)	2,000	14	0.14	PASS
n-Hexane	110-54-3	68 U	5.57E-04	3.62E-04	5	PASS	1,800	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2,000	14	1.0	PASS
Styrene	100-42-5	64 U	5.25E-04	3.41E-04	5	PASS	21	106.262 List	30 TAC 106.533(f)(1)(A)(ii)	2,000	14	1.5	PASS
Toluene	108-88-3	67 U	5.49E-04	3.57E-04	5	PASS	188	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2,000	14	6.0	PASS
Ethylbenzene	100-41-4	67 U	5.49E-04	3.57E-04	5	PASS	434	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2,000	14	1.0	PASS
m,p-Xylenes	179601-23-1	140 U	1.15E-03	7.46E-04	5	PASS	434	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2,000	14	1.0	PASS
o-Xylene	95-47-6	67 U	5.49E-04	3.57E-04	5	PASS	434	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2,000	14	1.0	PASS
1,3-Dichlorobenzene	541-73-1	67 U	5.49E-04	3.57E-04	5	PASS	(5) --	30 TAC 106.533(f)(1)(A)(i)	2,000	14	1.0	PASS	
Propene (C3H6)	115-07-1	67 U	5.49E-04	3.57E-04	5	PASS	(5) --	30 TAC 106.533(f)(1)(A)(i)	2,000	14	6.0	PASS	
Dichlorodifluoromethane (CFC 12)	75-71-8	68 U	1.11E-03	7.25E-04	5	PASS	4,950	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2,000	14	1.0	PASS
Ethanol	64-17-5	640 U	5.25E-03	3.41E-03	5	PASS	1,880	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2,000	14	1.0	PASS
Trichlorofluoromethane (CFC 11)	75-69-4	67 U	5.49E-04	3.57E-04	5	PASS	5,620	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2,000	14	1.0	PASS
Trichlorotrifluoroethane (CFC 113)	76-13-1	6,400 J	1.05E-01	6.82E-02	5	PASS	7,670	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2,000	14	1.0	PASS
alpha-Pinene	80-56-8	69 U	5.66E-04	3.68E-04	5	PASS	(5) --	30 TAC 106.533(f)(1)(A)(i)	2,000	14	1.0	PASS	
d-Limonene	5989-27-5	64 U	5.25E-04	3.41E-04	5	PASS	(5) --	30 TAC 106.533(f)(1)(A)(i)	2,000	14	1.0	PASS	
TOTAL			0.669										

Notes:

(1) Sample collected on June 6, 2022. The higher value of the sample or duplicate is reported.

(2) Based on a blower flow rate of 4,390 cubic feet per minute (cfm). Note that plant operates less than or equal to 25 hours per week. 1/2 of detection limit was used for estimating mass rate

(2a) Based on operation of 25 hours per week, 52 weeks per year.

(3) Per 30TAC 106.533(f)(1)(B)

(4) Based on comparing the calculated air stripper stack sample emission rate in tons per year (tpy) to the allowable annual emission limit per chemical of 5 tpy.

(5) No Threshold Limit Values (TLVs) for these chemicals

(6) The maximum hourly limit allowed by 30 Texas Administrative Code (TAC) 106.262, per pollutant, is 6 pounds per hour (lb/hr) per "Figure 1: 30 TAC 106.262(a)". The E value was overridden with 6 lb/hr when the calculated E was higher.

(7) The maximum hourly emission rate allowed by 30 TAC 106.261(a)(3) for chemicals with a limit value (L) greater than 200 mg/m<sup>3</sup> is 1 lb/hr.

(8) Based on comparing the calculated air stripper stack sample emission rate in pounds per hour (lb/hr) to the allowable maximum emission limit per chemical based on distance downwind to nearest off-site receptor.

CAS # = Chemical Abstracts Service Number

mg/m<sup>3</sup> = milligrams per cubic meterµg/m<sup>3</sup> = micrograms per cubic meter

ACGIH = American Conference of Governmental Industrial Hygienists

U = non-detect

**Appendix G Table 3. PID Readings - 2nd Quarter 2022**  
**Longhorn Army Ammunition Plant**  
**Groundwater Treatment Plant**

Date	Time	Location	Air Flow Rate at Blower	Instrument ID	Person Collecting	PID Reading	Weather Conditions
4/4/2022	8:00	Outside GWTP Office	3021 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 52°F
4/4/2022	8:00	Downwind	3021 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 52°F
4/4/2022	8:00	Stripper	3021 ACFM	MiniRAE 3000	Kennie Moore	Max. 22.8 ppm Steady State 6.7 ppm	Clear 52°F
4/4/2022	12:00	Outside GWTP Office	2869 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 76°F
4/4/2022	12:00	Downwind	2869 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 76°F
4/4/2022	12:00	Stripper	2861 ACFM	MiniRAE 3000	Kennie Moore	Max. 21.3 ppm Steady State 5.6 ppm	Clear 76°F
4/7/2022	8:00	Outside GWTP Office	3065 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 55°F
4/7/2022	8:00	Downwind	3065 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 55°F
4/7/2022	8:00	Stripper	3065 ACFM	MiniRAE 3000	Kennie Moore	Max. 23.6 ppm Steady State 6.6 ppm	Clear 55°F
4/7/2022	10:00	Outside GWTP Office	2896 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 59°F
4/7/2022	10:00	Downwind	2896 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 59°F
4/7/2022	10:00	Stripper	2896 ACFM	MiniRAE 3000	Kennie Moore	Max. 22.1 ppm Steady State 5.4 ppm	Clear 59°F
4/11/2022	8:00	Outside GWTP Office	3063 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 67°F
4/11/2022	8:00	Downwind	3063 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 67°F
4/11/2022	8:00	Stripper	3063 ACFM	MiniRAE 3000	Kennie Moore	Max. 22.7 ppm Steady State 6.3 ppm	Clear 67°F
4/11/2022	13:00	Outside GWTP Office	2869 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 82°F
4/11/2022	13:00	Downwind	2869 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 82°F
4/11/2022	13:00	Stripper	2869 ACFM	MiniRAE 3000	Kennie Moore	Max. 21.1 ppm Steady State 5.4 ppm	Clear 82°F
4/14/2022	8:00	Outside GWTP Office	3192 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 57°F
4/14/2022	8:00	Downwind	3192 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 57°F
4/14/2022	8:00	Stripper	3192 ACFM	MiniRAE 3000	Kennie Moore	Max. 23.3 ppm Steady State 6.5 ppm	Clear 57°F
4/14/2022	10:00	Outside GWTP Office	3057 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 64°F
4/14/2022	10:00	Downwind	3057 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 64°F
4/14/2022	10:00	Stripper	3057 ACFM	MiniRAE 3000	Kennie Moore	Max. 21.7 ppm Steady State 5.2 ppm	Clear 64°F
4/18/2022	11:00	Outside GWTP Office	3157 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 60°F
4/18/2022	11:00	Downwind	3157 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 60°F
4/18/2022	11:00	Stripper	3157 ACFM	MiniRAE 3000	Kennie Moore	Max. 23.1 ppm Steady State 5.9 ppm	Clear 60°F
4/18/2022	15:00	Outside GWTP Office	2949 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 72°F
4/18/2022	15:00	Downwind	2949 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 72°F
4/18/2022	15:00	Stripper	2949 ACFM	MiniRAE 3000	Kennie Moore	Max. 21.6 ppm Steady State 5.2 ppm	Clear 72°F
4/21/2022	8:00	Outside GWTP Office	3072 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 72°F
4/21/2022	8:00	Downwind	3072 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 72°F
4/21/2022	8:00	Stripper	3072 ACFM	MiniRAE 3000	Kennie Moore	Max. 24.7 ppm Steady State 7.2 ppm	Clear 72°F
4/21/2022	10:00	Outside GWTP Office	2866 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 73°F
4/21/2022	10:00	Downwind	2866 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 73°F
4/21/2022	10:00	Stripper	2866 ACFM	MiniRAE 3000	Kennie Moore	Max. 23.1 ppm Steady State 6.2 ppm	Clear 73°F

**Appendix G Table 3. PID Readings - 2nd Quarter 2022**  
**Longhorn Army Ammunition Plant**  
**Groundwater Treatment Plant**

4/25/2022	8:00	Outside GWTP Office	3074 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Rain 65°F
4/25/2022	8:00	Downwind	3074 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Rain 65°F
4/25/2022	8:00	Stripper	3074 ACFM	MiniRAE 3000	Kennie Moore	Max. 22.9 ppm	Steady State 5.9 ppm	Rain 65°F
4/25/2022	14:00	Outside GWTP Office	2800 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm		Cloudy 68°F
4/25/2022	14:00	Downwind	2800 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm		Cloudy 68°F
4/25/2022	14:00	Stripper	2800 ACFM	MiniRAE 3000	Scott Beesinger	Max. 24.2 ppm	Steady State 6.7 ppm	Cloudy 68°F
4/28/2022	8:00	Outside GWTP Office	3067 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Clear 60°F
4/28/2022	8:00	Downwind	3067 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Clear 60°F
4/28/2022	8:00	Stripper	3067 ACFM	MiniRAE 3000	Kennie Moore	Max. 22.2 ppm	Steady State 5.5 ppm	Clear 60°F
4/28/2022	12:00	Outside GWTP Office	2808 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Clear 76°F
4/28/2022	12:00	Downwind	2808 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Clear 76°F
4/28/2022	12:00	Stripper	2808 ACFM	MiniRAE 3000	Kennie Moore	Max. 23.4 ppm	Steady State 5.9 ppm	Clear 76°F
5/2/2022	8:00	Outside GWTP Office	3034 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Clear 72°F
5/2/2022	8:00	Downwind	3034 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Clear 72°F
5/2/2022	8:00	Stripper	3034 ACFM	MiniRAE 3000	Kennie Moore	Max. 21.7 ppm	Steady State 5.1 ppm	Clear 72°F
5/2/2022	14:00	Outside GWTP Office	2724 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm		Clear 85°F
5/2/2022	14:00	Downwind	2724 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm		Clear 85°F
5/2/2022	14:00	Stripper	2724 ACFM	MiniRAE 3000	Scott Beesinger	Max. 23.9 ppm	Steady State 6.8 ppm	Clear 85°F
5/13/2022	8:00	Outside GWTP Office	2716 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Clear 73°F
5/13/2022	8:00	Downwind	2716 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Clear 73°F
5/13/2022	8:00	Stripper	2716 ACFM	MiniRAE 3000	Kennie Moore	Max. 21.6 ppm	Steady State 5.8 ppm	Clear 73°F
5/13/2022	10:00	Outside GWTP Office	2578 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm		Clear 81°F
5/13/2022	10:00	Downwind	2578 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm		Clear 81°F
5/13/2022	10:00	Stripper	2578 ACFM	MiniRAE 3000	Scott Beesinger	Max. 22.9 ppm	Steady State 6.1 ppm	Clear 81°F
5/16/2022	8:00	Outside GWTP Office	2752 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Clear 73°F
5/16/2022	8:00	Downwind	2752 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Clear 73°F
5/16/2022	8:00	Stripper	2752 ACFM	MiniRAE 3000	Kennie Moore	Max. 22.3 ppm	Steady State 6.1 ppm	Clear 73°F
5/16/2022	14:00	Outside GWTP Office	2493 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Clear 90°F
5/16/2022	14:00	Downwind	2493 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Clear 90°F
5/16/2022	14:00	Stripper	2493 ACFM	MiniRAE 3000	Kennie Moore	Max. 21.4 ppm	Steady State 5.3 ppm	Clear 90°F
5/19/2022	8:00	Outside GWTP Office	2686 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Clear 77°F
5/19/2022	8:00	Downwind	2686 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Clear 77°F
5/19/2022	8:00	Stripper	2686 ACFM	MiniRAE 3000	Kennie Moore	Max. 23.7 ppm	Steady State 7.0 ppm	Clear 77°F
5/19/2022	12:00	Outside GWTP Office	2571 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm		Clear 88°F
5/19/2022	12:00	Downwind	2571 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm		Clear 88°F
5/19/2022	12:00	Stripper	2571 ACFM	MiniRAE 3000	Scott Beesinger	Max. 22.0 ppm	Steady State 6.4 ppm	Clear 88°F
5/23/2022	8:00	Outside GWTP Office	2662 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Clear 62°F
5/23/2022	8:00	Downwind	2662 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Clear 62°F



Appendix G Table 3. PID Readings - 2nd Quarter 2022

**Longhorn Army Ammunition Plant  
Groundwater Treatment Plant**

5/23/2022	8:00	Stripper	2662 ACFM	MiniRAE 3000	Kennie Moore	Max. 22.1 ppm Steady State 5.8 ppm	Clear 62°F
5/23/2022	14:00	Outside GWTP Office	2450 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Clear 70°F
5/23/2022	14:00	Downwind	2450 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Clear 70°F
5/23/2022	14:00	Stripper	2450 ACFM	MiniRAE 3000	Scott Beesinger	Max. 23.9 ppm Steady State 6.5 ppm	Clear 70°F
5/26/2022	8:00	Outside GWTP Office	2539 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 59°F
5/26/2022	8:00	Downwind	2539 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 59°F
5/26/2022	8:00	Stripper	2539 ACFM	MiniRAE 3000	Kennie Moore	Max. 24.5 ppm Steady State 7.7 ppm	Clear 59°F
5/26/2022	11:00	Outside GWTP Office	2493 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Clear 75°F
5/26/2022	11:00	Downwind	2493 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Clear 75°F
5/26/2022	11:00	Stripper	2493 ACFM	MiniRAE 3000	Scott Beesinger	Max. 22.9 ppm Steady State 7.0 ppm	Clear 75°F
6/2/2022	8:00	Outside GWTP Office	2587 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Overcast 75°F
6/2/2022	8:00	Downwind	2587 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Overcast 75°F
6/2/2022	8:00	Stripper	2587 ACFM	MiniRAE 3000	Kennie Moore	Max. 24.7 ppm Steady State 6.8 ppm	Overcast 75°F
6/2/2022	14:00	Outside GWTP Office	2416 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Clear 78°F
6/2/2022	14:00	Downwind	2416 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Clear 78°F
6/2/2022	14:00	Stripper	2416 ACFM	MiniRAE 3000	Scott Beesinger	Max. 22.3 ppm Steady State 5.9 ppm	Clear 78°F
6/6/2022	8:00	Outside GWTP Office	2605 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 75°F
6/6/2022	8:00	Downwind	2605 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 75°F
6/6/2022	8:00	Stripper	2605 ACFM	MiniRAE 3000	Kennie Moore	Max. 22.1 ppm Steady State 6.2 ppm	Clear 75°F
6/6/2022	14:00	Outside GWTP Office	2482 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 89°F
6/6/2022	14:00	Downwind	2482 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 89°F
6/6/2022	14:00	Stripper	2482 ACFM	MiniRAE 3000	Kennie Moore	Max. 23.2 ppm Steady State 6.8 ppm	Clear 89°F
6/9/2022	8:00	Outside GWTP Office	2594 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 72°F
6/9/2022	8:00	Downwind	2594 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 72°F
6/9/2022	8:00	Stripper	2594 ACFM	MiniRAE 3000	Kennie Moore	Max. 22.4 ppm Steady State 6.1 ppm	Clear 72°F
6/9/2022	10:30	Outside GWTP Office	2463 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 84°F
6/9/2022	10:30	Downwind	2463 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 84°F
6/9/2022	10:30	Stripper	2463 ACFM	MiniRAE 3000	Kennie Moore	Max. 21.6 ppm Steady State 5.7 ppm	Clear 84°F
6/13/2022	8:00	Outside GWTP Office	2624 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 81°F
6/13/2022	8:00	Downwind	2624 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 81°F
6/13/2022	8:00	Stripper	2624 ACFM	MiniRAE 3000	Kennie Moore	Max. 23.7 ppm Steady State 5.4 ppm	Clear 81°F
6/13/2022	14:00	Outside GWTP Office	2465 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 93°F
6/13/2022	14:00	Downwind	2465 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 93°F
6/13/2022	14:00	Stripper	2465 ACFM	MiniRAE 3000	Kennie Moore	Max. 21.5 ppm Steady State 5.1 ppm	Clear 93°F
6/16/2022	8:00	Outside GWTP Office	2631 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 83°F
6/16/2022	8:00	Downwind	2631 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 83°F
6/16/2022	8:00	Stripper	2631 ACFM	MiniRAE 3000	Kennie Moore	Max. 22.1 ppm Steady State 5.7 ppm	Clear 83°F
6/16/2022	9:30	Outside GWTP Office	2469 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 85°F

## Appendix G Table 3. PID Readings - 2nd Quarter 2022

## Longhorn Army Ammunition Plant

## Groundwater Treatment Plant

6/16/2022	9:30	Downwind	2469 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Clear 85°F
6/16/2022	9:30	Stripper	2469 ACFM	MiniRAE 3000	Kennie Moore	Max. 21.6 ppm	Steady State 4.9 ppm	Clear 85°F
6/20/2022	8:00	Outside GWTP Office	2564 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Clear 72°F
6/20/2022	8:00	Downwind	2564 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Clear 72°F
6/20/2022	8:00	Stripper	2564 ACFM	MiniRAE 3000	Kennie Moore	Max. 22.1 ppm	Steady State 6.3 ppm	Clear 72°F
6/20/2022	14:00	Outside GWTP Office	2495 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Clear 96°F
6/20/2022	14:00	Downwind	2495 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Clear 96°F
6/20/2022	14:00	Stripper	2495 ACFM	MiniRAE 3000	Kennie Moore	Max. 23.9 ppm	Steady State 6.8 ppm	Clear 96°F
6/23/2022	8:00	Outside GWTP Office	2572 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Clear 80°F
6/23/2022	8:00	Downwind	2572 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Clear 80°F
6/23/2022	8:00	Stripper	2572 ACFM	MiniRAE 3000	Kennie Moore	Max. 21.6 ppm	Steady State 6.1 ppm	Clear 80°F
6/23/2022	10:00	Outside GWTP Office	2421 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Clear 88°F
6/23/2022	10:00	Downwind	2421 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Clear 88°F
6/23/2022	10:00	Stripper	2421 ACFM	MiniRAE 3000	Kennie Moore	Max. 20.2 ppm	Steady State 5.3 ppm	Clear 88°F
6/27/2022	8:00	Outside GWTP Office	2742 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Clear 80°F
6/27/2022	8:00	Downwind	2742 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Clear 80°F
6/27/2022	8:00	Stripper	2742 ACFM	MiniRAE 3000	Kennie Moore	Max. 22.3 ppm	Steady State 6.1 ppm	Clear 80°F
6/27/2022	14:00	Outside GWTP Office	2426 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Clear 89°F
6/27/2022	14:00	Downwind	2426 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Clear 89°F
6/27/2022	14:00	Stripper	2426 ACFM	MiniRAE 3000	Kennie Moore	Max. 24.7 ppm	Steady State 7.2 ppm	Clear 89°F
6/30/2022	8:00	Outside GWTP Office	2593 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Clear 75°F
6/30/2022	8:00	Downwind	2593 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Clear 75°F
6/30/2022	8:00	Stripper	2593 ACFM	MiniRAE 3000	Kennie Moore	Max. 21.8 ppm	Steady State 6.1 ppm	Clear 75°F
6/30/2022	10:30	Outside GWTP Office	2426 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Clear 83°F
6/30/2022	10:30	Downwind	2426 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm		Clear 83°F
6/30/2022	10:30	Stripper	2426 ACFM	MiniRAE 3000	Kennie Moore	Max. 20.9 ppm	Steady State 5.3 ppm	Clear 83°F

**EQUIPMENT CALIBRATION DAILY LOG**

Date: 4/4/22

Project Number: NW01312.0150

Project Name: LITAKAR G WTP

Recorded By: Kennie Moore

PID	Model: <u>mini Rae 3000</u> Sub: <u>11.8</u>				Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Equipment ID #						
	Parameter	Standard	Exp. Date	Lot #	Time: <u>0630</u>	Time:	Time:
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Initials: <u>KM</u>	Initials:	Initials:
					Value: <u>TO ZERO</u>	Value:	Value:
					Value: <u>KM</u>	Value:	Value:
Second Point Calibration	Vapor conc. (ppm)	<u>100 ppm</u> (isobutylene)	<u>11/12/22</u>	<u>J8H-250-100-20</u>	Value: <u>KM</u>	Value:	Value:

COMB. GAS/O <sub>2</sub> WATER	Model:				Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Equipment ID #						
	Parameter	Standard	Exp. Date	Lot #	Time:	Time:	Time:
First Point Calibration	O <sub>2</sub> (%)				Initials:	Initials:	Initials:
					Value:	Value:	Value:
	% LEL Pentane				Value:	Value:	Value:

WATER QUALITY METER	Model:				Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
	Equipment ID #						
	Parameter	Standard	Exp. Date	Lot #	Time:	Time:	Time:
First Point Calibration (Awate)	pH	4.00			Initials:	Initials:	Initials:
	Conductivity (mS/cm)	4.40			Value:	Value:	Value:
	Turbidity (NTU)	0			Value:	Value:	Value:
	DO (mg/L)	8.8-9.1 (ambient air)	NA	NA	Value:	Value:	Value:
Second Point Calibration	pH	6.86			Value:	Value:	Value:
	Conductivity (mS/cm)	53.7			Value:	Value:	Value:
	Turbidity (NTU)	100			Value:	Value:	Value:
Third Point Calibration	pH	9.18			Value:	Value:	Value:
	Conductivity (mS/cm)	53.7			Value:	Value:	Value:
	Turbidity (NTU)	100			Value:	Value:	Value:

Additional Remarks:



**EQUIPMENT CALIBRATION DAILY LOG**

Date: 4/7/22

Project Number: NW01312.0150

Project Name: LHAAP-GWTP

Recorded By: Scott Beasly

PID	Model: <u>Mini RAe 3000</u>		Serial: <u>77.8</u>		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Equipment ID #	Parameter	Standard	Exp. Date			
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Time: <u>0630</u> Initials: <u>SB</u> Value: <u>TO ZERO</u> <u>SB</u>	Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>
Second Point Calibration	Vapor conc. (ppm)	<u>100 ppm</u> (isobutylene)	<u>11/12/22</u>	<u>JBH-250-</u> <u>100-20</u>	Value: <u>SB</u>	Value: <u></u>	Value: <u></u>

COMB. GAS/O <sub>2</sub> METER	Model: <u></u>		Serial: <u></u>		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Equipment ID #	Parameter	Standard	Exp. Date			
First Point Calibration	O <sub>2</sub> (%)				Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>
	% LEL Pentane				Value: <u></u>	Value: <u></u>	Value: <u></u>

WATER QUALITY METER	Model: <u></u>		Serial: <u></u>		Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
	Equipment ID #	Parameter	Standard	Exp. Date			
First Point Calibration (Auto)	pH	4.00			Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>
	Conductivity (mS/cm)	4.49			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Turbidity (NTU)	0			Value: <u></u>	Value: <u></u>	Value: <u></u>
	DO (mg/L)	8.8-9.1 (ambient air)	NA	NA	Value: <u></u>	Value: <u></u>	Value: <u></u>
Second Point Calibration	pH	6.86			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Conductivity (mS/cm)	53.7			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Turbidity (NTU)	100			Value: <u></u>	Value: <u></u>	Value: <u></u>
Third Point Calibration	pH	9.18			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Conductivity (mS/cm)	53.7			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Turbidity (NTU)	100			Value: <u></u>	Value: <u></u>	Value: <u></u>

Additional Remarks:



**EQUIPMENT CALIBRATION DAILY LOG**

Date: 4/11/22

Project Number: NW01312.0150

Project Name: LHAAP - GWTP

Recorded By: Scott Beasinger

PID	Model: <u>mini RAE 3000</u>		Bulb: <u>11.8</u> <u>100 meV</u>		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Equipment ID #	Parameter	Standard	Exp. Date			
First Point Calibration		Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Time: <u>0640</u> Initials: <u>SB</u> Value: <u>TO 2400</u> <u>SB</u>	Time: Initials: Value:
Second Point Calibration		Vapor conc. (ppm)	100 ppm (isobutylene)	11/12/22	JBH-250-100-20	Value: <u>SB</u>	Time: Initials: Value:

COMB. GAS/O <sub>2</sub> METER	Model:		Equipment ID #		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration	O <sub>2</sub> (%)				Time: Initials: Value:	Time: Initials: Value:	Time: Initials: Value:
	% LEL Pentane				Value:	Value:	Value:

WATER QUALITY METER	Model:		Equipment ID #		Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration (Aspirated)	pH	4.00			Time: Initials: Value:	Time: Initials: Value:	Time: Initials: Value:
	Conductivity (mS/cm)	4.40			Value:	Value:	Value:
	Turbidity (NTU)	0			Value:	Value:	Value:
	DO (mg/L)	8.8-9.1 (ambient air)	NA	NA	Value:	Value:	Value:
Second Point Calibration	pH	6.86			Value:	Value:	Value:
	Conductivity (mS/cm)	58.7			Value:	Value:	Value:
	Turbidity (NTU)	100			Value:	Value:	Value:
Third Point Calibration	pH	9.18			Value:	Value:	Value:
	Conductivity (mS/cm)	53.7			Value:	Value:	Value:
	Turbidity (NTU)	100			Value:	Value:	Value:

Additional Remarks:



**EQUIPMENT CALIBRATION DAILY LOG**

Date: 4/14/22

Project Number: NW01312.0150

Project Name: LHAAP-CWTP

Recorded By: Scott Beasinger

PID	Model: <u>Mini RAE 3000</u>		Bulb: <u>71.8</u> <del>100</del> <u>meV</u>		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Equipment ID #	Parameter	Standard	Exp. Date			
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Time: <u>0645</u> Initials: <u>SB</u> Value: <u>TO ZERO</u> <u>SB</u>	Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>
Second Point Calibration	Vapor conc. (ppm)	<u>100 ppm</u> (isobutylene)	<u>11/12/22</u>	<u>JBH-250-</u> <u>100-20</u>	Value: <u>SB</u>	Value: <u></u>	Value: <u></u>

COMB. GAS/O <sub>2</sub> METER	Model:		Equipment ID #		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration	O <sub>2</sub> (%)				Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>
	% LEL Pentane				Value: <u></u>	Value: <u></u>	Value: <u></u>

WATER QUALITY METER	Model:		Equipment ID #		Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration (Ambient)	pH	4.00			Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>
	Conductivity (mS/cm)	4.49			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Turbidity (NTU)	0			Value: <u></u>	Value: <u></u>	Value: <u></u>
	DO (mg/L)	8.8-9.1 (ambient air)	NA	NA	Value: <u></u>	Value: <u></u>	Value: <u></u>
Second Point Calibration	pH	6.86			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Conductivity (mS/cm)	53.7			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Turbidity (NTU)	100			Value: <u></u>	Value: <u></u>	Value: <u></u>
Third Point Calibration	pH	9.18			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Conductivity (mS/cm)	53.7			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Turbidity (NTU)	100			Value: <u></u>	Value: <u></u>	Value: <u></u>

Additional Remarks:



**EQUIPMENT CALIBRATION DAILY LOG**

Date: 4/18/22

Project Number: NW01312.0150

Project Name: LHAAP-GWTP

Recorded By: Scott Beasly

PID	Model: <u>Mini Rae 3000</u>		Bulb: <u>11.8</u>		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Equipment ID #	Parameter	Standard	Exp. Date			
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Time: <u>0635</u> Initials: <u>SB</u> Value: <u>TO ZERO</u> <u>SB</u>	Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>
Second Point Calibration	Vapor conc. (ppm)	<u>100 ppm</u> (isobutylene)	<u>11/12/22</u>	<u>JBH-250-</u> <u>100-20</u>	Value: <u>SB</u>	Value: <u></u>	Value: <u></u>

COMB. GAS/O <sub>2</sub> METER	Model: <u></u>		Equipment ID #		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration	O <sub>2</sub> (%)				Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>
	% LEL Pentane				Value: <u></u>	Value: <u></u>	Value: <u></u>

WATER QUALITY METER	Model: <u></u>		Equipment ID #		Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration (Auto)	pH	4.00	NA	NA	Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>
	Conductivity (mS/cm)	4.49			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Turbidity (NTU)	0			Value: <u></u>	Value: <u></u>	Value: <u></u>
	DO (mg/L)	8.8-9.1 (ambient air)			Value: <u></u>	Value: <u></u>	Value: <u></u>
Second Point Calibration	pH	6.86			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Conductivity (mS/cm)	58.7			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Turbidity (NTU)	100			Value: <u></u>	Value: <u></u>	Value: <u></u>
Third Point Calibration	pH	9.18			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Conductivity (mS/cm)	58.7			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Turbidity (NTU)	100			Value: <u></u>	Value: <u></u>	Value: <u></u>

Additional Remarks:



**EQUIPMENT CALIBRATION DAILY LOG**

Date: 4/21/22  
 Project Number: NW01312.0150  
 Project Name: LHAAP - CWT  
 Recorded By: Scott Beasinger

PID	Model: <u>Mini RAe 3000</u>		Bolt: <u>11.8</u>		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Equipment ID #	Parameter	Standard	Exp. Date			
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Time: <u>0625</u> Initials: <u>SB</u> Value: <u>TO ZERO</u> <u>SB</u>	Time: _____ Initials: _____ Value: _____	Time: _____ Initials: _____ Value: _____
Second Point Calibration	Vapor conc. (ppm)	<u>100 ppm</u> (isobutylene)	<u>11/12/22</u>	<u>JBH-250-</u> <u>100-20</u>	Value: <u>SB</u>	Value: _____	Value: _____

COMB. GAS/O <sub>2</sub> METER	Model: _____		Equipment ID #		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration	O <sub>2</sub> (%)				Time: _____ Initials: _____ Value: _____	Time: _____ Initials: _____ Value: _____	Time: _____ Initials: _____ Value: _____
	% LEL Pentane				Value: _____	Value: _____	Value: _____

WATER QUALITY METER	Model: _____		Equipment ID #		Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration (Aver)	pH	4.00	NA	NA	Time: _____ Initials: _____ Value: _____	Time: _____ Initials: _____ Value: _____	Time: _____ Initials: _____ Value: _____
	Conductivity (mS/cm)	4.40			Value: _____	Value: _____	Value: _____
	Turbidity (NTU)	0			Value: _____	Value: _____	Value: _____
	DO (mg/L)	8.8-9.1 (ambient air)			Value: _____	Value: _____	Value: _____
Second Point Calibration	pH	6.86			Value: _____	Value: _____	Value: _____
	Conductivity (mS/cm)	53.7			Value: _____	Value: _____	Value: _____
	Turbidity (NTU)	100			Value: _____	Value: _____	Value: _____
Third Point Calibration	pH	9.18			Value: _____	Value: _____	Value: _____
	Conductivity (mS/cm)	53.7			Value: _____	Value: _____	Value: _____
	Turbidity (NTU)	100			Value: _____	Value: _____	Value: _____

Additional Remarks:



## EQUIPMENT CALIBRATION DAILY LOG

Date:

4/25/22

Project Number:

NW01312.0150

Project Name:

LHAAP-GWTP

Recorded By:

Scott Beasly

PID	Model: MNI RAe 3000		Bulb: 11.8 meV		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot #	Time: 0620	Time:	Time:
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Initials: SB	Initials:	Initials:
Second Point Calibration	Vapor conc. (ppm)	100 ppm (isobutylene)	11/12/22	JBH-250-100-20	Value: TO 2420 SB	Value:	Value:

COMB. GAS/O <sub>2</sub> METER	Model:				Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot #	Time:	Time:	Time:
First Point Calibration	O <sub>2</sub> (%)				Initials:	Initials:	Initials:
	% LEL Pentane				Value:	Value:	Value:

WATER QUALITY METER	Model:				Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot #	Time:	Time:	Time:
First Point Calibration (Auto)	pH	4.00			Initials:	Initials:	Initials:
	Conductivity (mS/cm)	4.49			Value:	Value:	Value:
	Turbidity (NTU)	0			Value:	Value:	Value:
	DO (mg/L)	8.9-9.1 (ambient air)	NA	NA	Value:	Value:	Value:
Second Point Calibration	pH	6.86			Value:	Value:	Value:
	Conductivity (mS/cm)	53.7			Value:	Value:	Value:
	Turbidity (NTU)	100			Value:	Value:	Value:
Third Point Calibration	pH	9.18			Value:	Value:	Value:
	Conductivity (mS/cm)	53.7			Value:	Value:	Value:
	Turbidity (NTU)	100			Value:	Value:	Value:

Additional Remarks:



**EQUIPMENT CALIBRATION DAILY LOG**

Date: 4/28/22

Project Number: NW01312.0150

Project Name: LHAAP-GWTP

Recorded By: Scott Beasinger

PID	Model: <u>mini RAe 3000</u>		Bolt: <u>71.8 meV</u>		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Equipment ID #	Parameter	Standard	Exp. Date			
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Time: <u>0635</u> Initials: <u>SB</u> Value: <u>TO ZERO SB</u>	Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>
Second Point Calibration	Vapor conc. (ppm)	100 ppm (Isobutylene)	11/12/22	JBH-250-100-20	Value: <u>SB</u>	Value: <u></u>	Value: <u></u>

COMB. GAS/O <sub>2</sub> METER	Model: <u></u>		Equipment ID #		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration	O <sub>2</sub> (%)				Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>
	% LEL Pentane				Value: <u></u>	Value: <u></u>	Value: <u></u>

WATER QUALITY METER	Model: <u></u>		Equipment ID #		Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration (Auto)	pH	4.00	NA	NA	Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>
	Conductivity (mS/cm)	4.49			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Turbidity (NTU)	0			Value: <u></u>	Value: <u></u>	Value: <u></u>
	DO (mg/L)	8.9-9.1 (ambient air)			Value: <u></u>	Value: <u></u>	Value: <u></u>
Second Point Calibration	pH	6.86			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Conductivity (mS/cm)	53.7			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Turbidity (NTU)	100			Value: <u></u>	Value: <u></u>	Value: <u></u>
Third Point Calibration	pH	9.18			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Conductivity (mS/cm)	53.7			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Turbidity (NTU)	100			Value: <u></u>	Value: <u></u>	Value: <u></u>

Additional Remarks:



**EQUIPMENT CALIBRATION DAILY LOG**

Date: 5/2/22

Project Number: NW01312.0150

Project Name: LHAAP-GWTP

Recorded By: Scott Beasly

PID	Model: <u>Mini RAe 3000</u>		Build: <u>11.8 meV</u>		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Equipment ID #	Parameter	Standard	Exp. Date			
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Time: <u>0645</u> Initials: <u>SB</u> Value: <u>TO 2420 SB</u>	Time: Initials: Value: 	Time: Initials: Value: 
Second Point Calibration	Vapor conc. (ppm)	<u>100 ppm</u> (isobutylene)	<u>11/12/22</u>	<u>JBH-250-100-20</u>	Value: <u>SB</u>	Value: 	Value: 

COMB. GAS/O <sub>2</sub> METER	Model:		Equipment ID #		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration	O <sub>2</sub> (%)				Time: Initials: Value: 	Time: Initials: Value: 	Time: Initials: Value: 
	% LEL Pentane				Value: 	Value: 	Value: 

WATER QUALITY METER	Model:		Equipment ID #		Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration (Auto)	pH	4.00			Time: Initials: Value: 	Time: Initials: Value: 	Time: Initials: Value: 
	Conductivity (mS/cm)	4.40			Value: 	Value: 	Value: 
	Turbidity (NTU)	0			Value: 	Value: 	Value: 
	DO (mg/L)	8.8-9.1 (ambient air)	NA	NA	Value: 	Value: 	Value: 
Second Point Calibration	pH	6.86			Value: 	Value: 	Value: 
	Conductivity (mS/cm)	58.7			Value: 	Value: 	Value: 
	Turbidity (NTU)	100			Value: 	Value: 	Value: 
Third Point Calibration	pH	9.18			Value: 	Value: 	Value: 
	Conductivity (mS/cm)	53.7			Value: 	Value: 	Value: 
	Turbidity (NTU)	100			Value: 	Value: 	Value: 

Additional Remarks:



**EQUIPMENT CALIBRATION DAILY LOG**

Date: 5/13/22  
 Project Number: NW01312.0150  
 Project Name: LHAAP - GWTP  
 Recorded By: Scott Beas. NGA

PID	Model: <u>Mini RAe 3000</u>		Bolt: <u>11.8</u>		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Equipment ID #	Parameter	Standard	Exp. Date			
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Time: <u>0630</u> Initials: <u>SB</u> Value: <u>TO ZERO</u> <u>SB</u>	Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>
Second Point Calibration	Vapor conc. (ppm)	100 ppm (isobutylene)	11/12/22	JBH-250-100-20	Value: <u>SB</u>	Value: <u></u>	Value: <u></u>

COMB. GAS/O <sub>2</sub> METER	Model:		Equipment ID #		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration	O <sub>2</sub> (%)				Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>
	% LEL Pentane				Value: <u></u>	Value: <u></u>	Value: <u></u>

WATER QUALITY METER	Model:		Equipment ID #		Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration (Auto)	pH	4.00			Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>
	Conductivity (mS/cm)	4.40			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Turbidity (NTU)	0			Value: <u></u>	Value: <u></u>	Value: <u></u>
	DO (mg/L)	8.9-9.1 (ambient air)	NA	NA	Value: <u></u>	Value: <u></u>	Value: <u></u>
Second Point Calibration	pH	6.66			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Conductivity (mS/cm)	53.7			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Turbidity (NTU)	100			Value: <u></u>	Value: <u></u>	Value: <u></u>
Third Point Calibration	pH	9.18			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Conductivity (mS/cm)	53.7			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Turbidity (NTU)	100			Value: <u></u>	Value: <u></u>	Value: <u></u>

Additional Remarks:



**EQUIPMENT CALIBRATION DAILY LOG**

Date: 5/16/22

Project Number: NW01312.0150

Project Name: LHAAP-GWTP

Recorded By: Scott Beasly

PID	Model: <u>Mini RAe 3000</u>		Sub: <u>11.8 meV</u>		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Equipment ID #	Parameter	Standard	Exp. Date			
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Time: <u>0625</u> Initials: <u>SB</u> Value: <u>TO ZERO</u> <u>SB</u>	Time: Initials: Value:	Time: Initials: Value:
Second Point Calibration	Vapor conc. (ppm)	100 ppm (isobutylene)	11/12/22	JBH-250-100-20	Value: <u>SB</u>	Value:	Value:

COMP. GAS/O <sub>2</sub> METER	Model:		Equipment ID #		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration	O <sub>2</sub> (%)				Time: Initials: Value:	Time: Initials: Value:	Time: Initials: Value:
	% LEL Pentane				Value: Value:	Value: Value:	Value: Value:

WATER QUALITY METER	Model:		Equipment ID #		Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration (Auto)	pH	4.00			Time: Initials: Value:	Time: Initials: Value:	Time: Initials: Value:
	Conductivity (mS/cm)	4.40			Value: Value:	Value: Value:	Value: Value:
	Turbidity (NTU)	0			Value: Value:	Value: Value:	Value: Value:
	DO (mg/L)	8.9-9.1 (ambient air)	NA	NA	Value: Value:	Value: Value:	Value: Value:
Second Point Calibration	pH	6.86			Value: Value:	Value: Value:	Value: Value:
	Conductivity (mS/cm)	53.7			Value: Value:	Value: Value:	Value: Value:
	Turbidity (NTU)	100			Value: Value:	Value: Value:	Value: Value:
Third Point Calibration	pH	9.18			Value: Value:	Value: Value:	Value: Value:
	Conductivity (mS/cm)	53.7			Value: Value:	Value: Value:	Value: Value:
	Turbidity (NTU)	100			Value: Value:	Value: Value:	Value: Value:

Additional Remarks:



EQUIPMENT CALIBRATION DAILY LOG						
Date: <u>5/19/22</u>		Project Name: <u>LHAAP-GWTP</u>				
Project Number: <u>NW01312.0150</u>		Recorded By: <u>Scott Beasinger</u>				

PID	Model: <u>Mini RAe 3000</u>		Bulb: <u>11.8 meV</u>		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Equipment ID #	Parameter	Standard	Exp. Date			
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Time: <u>0700</u> Initials: <u>SB</u> Value: <u>TO 2400 SB</u>	Time: _____ Initials: _____ Value: _____	Time: _____ Initials: _____ Value: _____
	Vapor conc. (ppm)	100 ppm (Isobutylene)	11/12/22	JBH-250-100-20	Value: <u>SB</u>	Value: _____ Initials: _____ Value: _____	Value: _____ Initials: _____ Value: _____

COMP. GAS/O <sub>2</sub> METER	Model: _____		Equipment ID #: _____		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration	O <sub>2</sub> (%)				Time: _____ Initials: _____ Value: _____	Time: _____ Initials: _____ Value: _____	Time: _____ Initials: _____ Value: _____
	% LEL Pentane				Value: _____	Value: _____	Value: _____

WATER QUALITY METER	Model: _____		Equipment ID #: _____		Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration (Aver)	pH	4.00			Time: _____ Initials: _____ Value: _____	Time: _____ Initials: _____ Value: _____	Time: _____ Initials: _____ Value: _____
	Conductivity (mS/cm)	4.40			Value: _____	Value: _____	Value: _____
	Turbidity (NTU)	0			Value: _____	Value: _____	Value: _____
	DO (mg/L)	8.9-9.1 (ambient air)	NA	NA	Value: _____	Value: _____	Value: _____
Second Point Calibration	pH	6.66			Value: _____	Value: _____	Value: _____
	Conductivity (mS/cm)	53.7			Value: _____	Value: _____	Value: _____
	Turbidity (NTU)	100			Value: _____	Value: _____	Value: _____
Third Point Calibration	pH	9.18			Value: _____	Value: _____	Value: _____
	Conductivity (mS/cm)	53.7			Value: _____	Value: _____	Value: _____
	Turbidity (NTU)	100			Value: _____	Value: _____	Value: _____

Additional Remarks:



EQUIPMENT CALIBRATION DAILY LOG					
Date: <u>5/23/22</u>		Project Name: <u>LHAAP-GWTP</u>			
Project Number: <u>NW01312.0150</u>		Recorded By: <u>Scott Beas. NGA</u>			

PID	Model: <u>Mini RAE 3000</u>		Bolt: <u>11.8</u>		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Equipment ID #	Parameter	Standard	Exp. Date			
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Time: <u>0610</u> Initials: <u>SB</u> Value: <u>TO ZERO</u> <u>SB</u>	Time: Initials: Value: 	Time: Initials: Value: 
Second Point Calibration	Vapor conc. (ppm)	100 ppm (Isobutylene)	11/12/22	JBH-250-100-20	Value: <u>SB</u>	Value: 	Value: 

COMB. GAS/O <sub>2</sub> METER	Model:		Equipment ID #		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration	O <sub>2</sub> (%)				Time: Initials: Value: 	Time: Initials: Value: 	Time: Initials: Value: 
	% LEL Pentane				Value: 	Value: 	Value: 

WATER QUALITY METER	Model:		Equipment ID #		Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration (Auto)	pH	4.00	NA	NA	Time: Initials: Value: 	Time: Initials: Value: 	Time: Initials: Value: 
	Conductivity (mS/cm)	449			Value: 	Value: 	Value: 
	Turbidity (NTU)	0			Value: 	Value: 	Value: 
	DO (mg/L)	8.8-9.1 (ambient air)			Value: 	Value: 	Value: 
Second Point Calibration	pH	6.86			Value: 	Value: 	Value: 
	Conductivity (mS/cm)	53.7			Value: 	Value: 	Value: 
	Turbidity (NTU)	100			Value: 	Value: 	Value: 
Third Point Calibration	pH	9.18			Value: 	Value: 	Value: 
	Conductivity (mS/cm)	53.7			Value: 	Value: 	Value: 
	Turbidity (NTU)	100			Value: 	Value: 	Value: 

Additional Remarks:



EQUIPMENT CALIBRATION DAILY LOG						
Date: <u>5/26/22</u>		Project Name: <u>LHAAP-GWTP</u>				
Project Number: <u>NW01312.0150</u>		Recorded By: <u>Scott Beasly</u>				

PID	Model: <u>Mini RAE 3000</u>		Equiv. ID #: <u>11.8 meV</u>		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Time: <u>0630</u> Initials: <u>SB</u> Value: <u>TO ZERO</u> <u>SB</u>	Time: _____ Initials: _____ Value: _____	Time: _____ Initials: _____ Value: _____
	Vapor conc. (ppm)	<u>100 ppm</u> (isobutylene)	<u>11/12/22</u>	<u>JBH-250-100-20</u>	Value: <u>SB</u>	Value: _____	Value: _____

COMB. GAS/O <sub>2</sub> METER	Model: _____		Equiv. ID #: _____		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration	O <sub>2</sub> (%)	_____	_____	_____	Time: _____ Initials: _____ Value: _____	Time: _____ Initials: _____ Value: _____	Time: _____ Initials: _____ Value: _____
	% LEL Pentane	_____	_____	_____	Value: _____	Value: _____	Value: _____

WATER QUALITY METER	Model: _____		Equiv. ID #: _____		Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration (Auto)	pH	4.00	NA	NA	Time: _____ Initials: _____ Value: _____	Time: _____ Initials: _____ Value: _____	Time: _____ Initials: _____ Value: _____
	Conductivity (mS/cm)	4.40			Value: _____	Value: _____	Value: _____
	Turbidity (NTU)	0			Value: _____	Value: _____	Value: _____
	DO (mg/L)	8.8-9.1 (ambient air)			Value: _____	Value: _____	Value: _____
Second Point Calibration	pH	6.86			Value: _____	Value: _____	Value: _____
	Conductivity (mS/cm)	53.7			Value: _____	Value: _____	Value: _____
	Turbidity (NTU)	100			Value: _____	Value: _____	Value: _____
Third Point Calibration	pH	9.18			Value: _____	Value: _____	Value: _____
	Conductivity (mS/cm)	53.7			Value: _____	Value: _____	Value: _____
	Turbidity (NTU)	100			Value: _____	Value: _____	Value: _____

Additional Remarks:



**EQUIPMENT CALIBRATION DAILY LOG**

Date: 6/2/22

Project Number: NW01312.0150

Project Name: LHAAP-GWTP

Recorded By: Scott Beasinger

PID	Model: <u>Mini RAe 3000</u>		Sub: <u>11.8 meV</u>		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Equipment ID #	Parameter	Standard	Exp. Date			
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Time: <u>0640</u> Initials: <u>SB</u> Value: <u>TO ZERO SB</u>	Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>
Second Point Calibration	Vapor conc. (ppm)	<u>100 ppm</u> (isobutylene)	<u>11/12/22</u>	<u>JBH-250-100-20</u>	Value: <u>SB</u>	Value: <u></u>	Value: <u></u>

COMB. GAS/O <sub>2</sub> METER	Model:		Equipment ID #		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration	O <sub>2</sub> (%)				Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>
	% LEL Pentane				Value: <u></u>	Value: <u></u>	Value: <u></u>

WATER QUALITY METER	Model:		Equipment ID #		Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration (Point)	pH	4.00			Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>
	Conductivity (mS/cm)	4.40			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Turbidity (NTU)	0			Value: <u></u>	Value: <u></u>	Value: <u></u>
	DO (mg/L)	8.9-9.1 (ambient air)	NA	NA	Value: <u></u>	Value: <u></u>	Value: <u></u>
Second Point Calibration	pH	6.86			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Conductivity (mS/cm)	53.7			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Turbidity (NTU)	100			Value: <u></u>	Value: <u></u>	Value: <u></u>
Third Point Calibration	pH	9.18			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Conductivity (mS/cm)	53.7			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Turbidity (NTU)	100			Value: <u></u>	Value: <u></u>	Value: <u></u>

Additional Remarks:



**EQUIPMENT CALIBRATION DAILY LOG**

Date: 6/6/22  
 Project Number: NW01312.0150  
 Project Name: LHAAP-GWTP  
 Recorded By: Scott Beasink

PID	Model: <u>Mini RAe 3000</u>		Sub: <u>11.8</u>		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Equipment ID #	Parameter	Standard	Exp. Date			
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Time: <u>0625</u> Initials: <u>SB</u> Value: <u>TO ZERO</u> <u>SB</u>	Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>
Second Point Calibration	Vapor conc. (ppm)	<u>100 ppm</u> (Isobutylene)	<u>11/12/22</u>	<u>JBH-250-</u> <u>100-20</u>	Value: <u>SB</u>	Value: <u></u>	Value: <u></u>

COMB. GAS/O <sub>2</sub> METER	Model: <u></u>		Equipment ID #		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration	O <sub>2</sub> (%)				Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>
	% LEL Pentane				Value: <u></u>	Value: <u></u>	Value: <u></u>

WATER QUALITY METER	Model: <u></u>		Equipment ID #		Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration (Amper)	pH	4.00			Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>
	Conductivity (mS/cm)	4.40			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Turbidity (NTU)	0			Value: <u></u>	Value: <u></u>	Value: <u></u>
	DO (mg/L)	8.9-9.1 (ambient air)	NA	NA	Value: <u></u>	Value: <u></u>	Value: <u></u>
Second Point Calibration	pH	6.86			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Conductivity (mS/cm)	53.7			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Turbidity (NTU)	100			Value: <u></u>	Value: <u></u>	Value: <u></u>
Third Point Calibration	pH	9.18			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Conductivity (mS/cm)	53.7			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Turbidity (NTU)	100			Value: <u></u>	Value: <u></u>	Value: <u></u>

Additional Remarks:



**EQUIPMENT CALIBRATION DAILY LOG**

Date: 6/9/22

Project Number: NW01312.0150

Project Name: LHAAP-GWTP

Recorded By: Scott Beasinger

PID	Model: <u>Mini RAE 3000</u>		Bulb: <u>71.8</u>		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Equipment ID #	Parameter	Standard	Exp. Date			
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Time: <u>0645</u> Initials: <u>SB</u> Value: <u>TO ZERO</u> <u>SB</u>	Time: _____ Initials: _____ Value: _____	Time: _____ Initials: _____ Value: _____
Second Point Calibration	Vapor conc. (ppm)	<u>100 ppm</u> (Isobutylene)	<u>11/12/22</u>	<u>JBH-250-</u> <u>100-20</u>	Value: <u>SB</u>	Value: _____	Value: _____

COMB. GAS/O <sub>2</sub> METER	Model: _____		Equipment ID #		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration	O <sub>2</sub> (%)				Time: _____ Initials: _____ Value: _____	Time: _____ Initials: _____ Value: _____	Time: _____ Initials: _____ Value: _____
	% LEL Pentane				Value: _____	Value: _____	Value: _____

WATER QUALITY METER	Model: _____		Equipment ID #		Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration (Auto)	pH	<u>4.00</u>			Time: _____ Initials: _____ Value: _____	Time: _____ Initials: _____ Value: _____	Time: _____ Initials: _____ Value: _____
	Conductivity (mS/cm)	<u>4.49</u>			Value: _____	Value: _____	Value: _____
	Turbidity (NTU)	<u>0</u>			Value: _____	Value: _____	Value: _____
	DO (mg/L)	<u>8.9-9.1</u> (ambient air)	<u>NA</u>	<u>NA</u>	Value: _____	Value: _____	Value: _____
Second Point Calibration	pH	<u>6.86</u>			Value: _____	Value: _____	Value: _____
	Conductivity (mS/cm)	<u>53.7</u>			Value: _____	Value: _____	Value: _____
	Turbidity (NTU)	<u>100</u>			Value: _____	Value: _____	Value: _____
Third Point Calibration	pH	<u>9.18</u>			Value: _____	Value: _____	Value: _____
	Conductivity (mS/cm)	<u>53.7</u>			Value: _____	Value: _____	Value: _____
	Turbidity (NTU)	<u>100</u>			Value: _____	Value: _____	Value: _____

Additional Remarks:



**EQUIPMENT CALIBRATION DAILY LOG**

Date: 6/13/22

Project Number: NW01312.0150

Project Name: LHAAP-GWTP

Recorded By: Scott Beasinger

PID	Model: <u>Mini RAe 3000</u>		Bolt: <u>11.8</u>		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Equipment ID #	Parameter	Standard	Exp. Date			
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Time: <u>0620</u> Initials: <u>SB</u> Value: <u>TO ZERO</u> <u>SB</u>	Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>
Second Point Calibration	Vapor conc. (ppm)	<u>100 ppm</u> (isobutylene)	<u>11/12/22</u>	<u>JBH-250-</u> <u>100-20</u>	Value: <u>SB</u>	Value: <u></u>	Value: <u></u>

COMB. GAS/O <sub>2</sub> METER	Model:		Equipment ID #		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration	O <sub>2</sub> (%)				Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>
	% LEL Pentane				Value: <u></u>	Value: <u></u>	Value: <u></u>

WATER QUALITY METER	Model:		Equipment ID #		Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration (Auto)	pH	4.00			Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>
	Conductivity (mS/cm)	4.40			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Turbidity (NTU)	0			Value: <u></u>	Value: <u></u>	Value: <u></u>
	DO (mg/L)	8.9-9.1 (ambient air)	NA	NA	Value: <u></u>	Value: <u></u>	Value: <u></u>
Second Point Calibration	pH	6.86			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Conductivity (mS/cm)	53.7			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Turbidity (NTU)	100			Value: <u></u>	Value: <u></u>	Value: <u></u>
Third Point Calibration	pH	9.18			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Conductivity (mS/cm)	53.7			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Turbidity (NTU)	100			Value: <u></u>	Value: <u></u>	Value: <u></u>

Additional Remarks:



**EQUIPMENT CALIBRATION DAILY LOG**

Date: 6/16/22  
 Project Number: NW01312.0150  
 Project Name: LHAAP-GWTP  
 Recorded By: Scott Beasly

PID	Model: <u>Mini RAE 3000</u>		Sub: <u>11.8 meV</u>		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Equipment ID #	Parameter	Standard	Exp. Date			
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Time: <u>0650</u> Initials: <u>SB</u> Value: <u>TO ZERO SB</u>	Time: _____ Initials: _____ Value: _____	Time: _____ Initials: _____ Value: _____
	Vapor conc. (ppm)	100 ppm (Isobutylene)	11/12/22	JBH-250-100-20	Value: <u>SB</u>	Value: _____	Value: _____

COMB. GAS/O <sub>2</sub> METER	Model: _____		Equipment ID #		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration	O <sub>2</sub> (%)				Time: _____ Initials: _____ Value: _____	Time: _____ Initials: _____ Value: _____	Time: _____ Initials: _____ Value: _____
	% LEL Pentane				Value: _____	Value: _____	Value: _____

WATER QUALITY METER	Model: _____		Equipment ID #		Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration (Auto)	pH	4.00			Time: _____ Initials: _____ Value: _____	Time: _____ Initials: _____ Value: _____	Time: _____ Initials: _____ Value: _____
	Conductivity (mS/cm)	4.40			Value: _____	Value: _____	Value: _____
	Turbidity (NTU)	0			Value: _____	Value: _____	Value: _____
	DO (mg/L)	8.8-9.1 (ambient air)	NA	NA	Value: _____	Value: _____	Value: _____
Second Point Calibration	pH	6.86			Value: _____	Value: _____	Value: _____
	Conductivity (mS/cm)	53.7			Value: _____	Value: _____	Value: _____
	Turbidity (NTU)	100			Value: _____	Value: _____	Value: _____
Third Point Calibration	pH	9.18			Value: _____	Value: _____	Value: _____
	Conductivity (mS/cm)	53.7			Value: _____	Value: _____	Value: _____
	Turbidity (NTU)	100			Value: _____	Value: _____	Value: _____

Additional Remarks:



EQUIPMENT CALIBRATION DAILY LOG						
Date: <u>6/20/22</u>		Project Name: <u>LHAAP-GWTP</u>				
Project Number: <u>NW01312.0150</u>		Recorded By: <u>Scott Beas. Ngar</u>				

PID	Model: <u>Mini RAE 3000</u>		Bulb: <u>11.8</u>		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Equipment ID #	Parameter	Standard	Exp. Date			
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Time: <u>0700</u> Initials: <u>SB</u> Value: <u>TO ZERO SB</u>	Time: Initials: Value: 	Time: Initials: Value: 
Second Point Calibration	Vapor conc. (ppm)	<u>100 ppm</u> (Isobutylene)	<u>11/12/22</u>	<u>JBH-250-100-20</u>	Value: <u>SB</u>	Value: 	Value: 

COMB. GAS/O <sub>2</sub> METER	Model:		Equipment ID #		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration	O <sub>2</sub> (%)				Time: Initials: Value: 	Time: Initials: Value: 	Time: Initials: Value: 
	% LEL Pentane				Value: 	Value: 	Value: 

WATER QUALITY METER	Model:		Equipment ID #		Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration (Auto)	pH	4.00			Time: Initials: Value: 	Time: Initials: Value: 	Time: Initials: Value: 
	Conductivity (mS/cm)	4.49			Value: 	Value: 	Value: 
	Turbidity (NTU)	0			Value: 	Value: 	Value: 
	DO (mg/L)	8.9-9.1 (ambient air)	NA	NA	Value: 	Value: 	Value: 
Second Point Calibration	pH	6.86			Value: 	Value: 	Value: 
	Conductivity (mS/cm)	53.7			Value: 	Value: 	Value: 
	Turbidity (NTU)	100			Value: 	Value: 	Value: 
Third Point Calibration	pH	9.18			Value: 	Value: 	Value: 
	Conductivity (mS/cm)	53.7			Value: 	Value: 	Value: 
	Turbidity (NTU)	100			Value: 	Value: 	Value: 

Additional Remarks:



**EQUIPMENT CALIBRATION DAILY LOG**

Date: 6/23/22

Project Number: NW01312.0150

Project Name: LHAAP - GWTP

Recorded By: Scott Beasinger

PID	Model: <u>mini RAE 3000</u>		Sulfoxide <u>11.8</u>		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Equipment ID #	Parameter	Standard	Exp. Date			
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Time: <u>SB</u>	Time: <u>SB</u>	Time: <u>SB</u>
Second Point Calibration	Vapor conc. (ppm)	100 ppm (isobutylene)	11/12/22	SBH-250-100-20	Initials: <u>SB</u>	Initials: <u>SB</u>	Initials: <u>SB</u>

COMB. GAS/O <sub>2</sub> METER	Model:		Equipment ID #		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration	O <sub>2</sub> (%)				Time: <u>SB</u>	Time: <u>SB</u>	Time: <u>SB</u>
	% LEL Pentane				Initials: <u>SB</u>	Initials: <u>SB</u>	Initials: <u>SB</u>

WATER QUALITY METER	Model:		Equipment ID #		Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration (Auto)	pH	4.00			Time: <u>SB</u>	Time: <u>SB</u>	Time: <u>SB</u>
	Conductivity (mS/cm)	4.40			Initials: <u>SB</u>	Initials: <u>SB</u>	Initials: <u>SB</u>
	Turbidity (NTU)	0			Value: <u>SB</u>	Value: <u>SB</u>	Value: <u>SB</u>
	DO (mg/L)	8.8-9.1 (ambient air)	NA	NA	Value: <u>SB</u>	Value: <u>SB</u>	Value: <u>SB</u>
Second Point Calibration	pH	6.86			Value: <u>SB</u>	Value: <u>SB</u>	Value: <u>SB</u>
	Conductivity (mS/cm)	53.7			Value: <u>SB</u>	Value: <u>SB</u>	Value: <u>SB</u>
	Turbidity (NTU)	100			Value: <u>SB</u>	Value: <u>SB</u>	Value: <u>SB</u>
Third Point Calibration	pH	9.18			Value: <u>SB</u>	Value: <u>SB</u>	Value: <u>SB</u>
	Conductivity (mS/cm)	53.7			Value: <u>SB</u>	Value: <u>SB</u>	Value: <u>SB</u>
	Turbidity (NTU)	100			Value: <u>SB</u>	Value: <u>SB</u>	Value: <u>SB</u>

Additional Remarks:



**EQUIPMENT CALIBRATION DAILY LOG**

Date: 6/27/22

Project Number: NW01312.0150

Project Name: LHAAP-GWTP

Recorded By: Scott Beasly

PID	Model: <u>Mini RAe 3000</u>		Bolt: <u>11.8</u>		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Equipment ID #	Parameter	Standard	Exp. Date			
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Time: <u>0640</u> Initials: <u>SB</u> Value: <u>TO ZERO</u> <u>SB</u>	Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>
Second Point Calibration	Vapor conc. (ppm)	100 ppm (isobutylene)	11/12/22	JBH-250-100-20	Value: <u>SB</u>	Value: <u></u>	Value: <u></u>

COMB. GAS/O <sub>2</sub> METER	Model:		Equipment ID #		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration	O <sub>2</sub> (%)				Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>
	% LEL Pentane				Value: <u></u>	Value: <u></u>	Value: <u></u>

WATER QUALITY METER	Model:		Equipment ID #		Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
	Parameter	Standard	Exp. Date	Lot #			
First Point Calibration (Auto)	pH	4.00			Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>	Time: <u></u> Initials: <u></u> Value: <u></u>
	Conductivity (mS/cm)	4.49			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Turbidity (NTU)	0			Value: <u></u>	Value: <u></u>	Value: <u></u>
	DO (mg/L)	8.8-9.1 (ambient air)	NA	NA	Value: <u></u>	Value: <u></u>	Value: <u></u>
Second Point Calibration	pH	6.86			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Conductivity (mS/cm)	53.7			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Turbidity (NTU)	100			Value: <u></u>	Value: <u></u>	Value: <u></u>
Third Point Calibration	pH	9.18			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Conductivity (mS/cm)	53.7			Value: <u></u>	Value: <u></u>	Value: <u></u>
	Turbidity (NTU)	100			Value: <u></u>	Value: <u></u>	Value: <u></u>

Additional Remarks:



## EQUIPMENT CALIBRATION DAILY LOG

Date:

6/30/22

Project Number:

NW01312.0150

Project Name:

LHAAP - GWTP

Recorded By:

Scott Beasly

PID	Model: Mini RAe 3000		Sub: 71.8 meV		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Equipment ID #		Lot #				
	Parameter	Standard	Exp. Date	Lot #	Time: 0625	Time:	Time:
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Initials: SB	Initials:	Initials:
Second Point Calibration	Vapor conc. (ppm)	100 ppm (isobutylene)	11/12/22	JBH-250-100-20	Value: TO ZERO SB	Value:	Value:

COMB. GAS/O <sub>2</sub> METER	Model:		Equipment ID #		Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
	Parameter		Standard				
	Parameter	Standard	Exp. Date	Lot #	Time:	Time:	Time:
First Point Calibration	O <sub>2</sub> (%)				Initials:	Initials:	Initials:
	% LEL Pentane				Value:	Value:	Value:

WATER QUALITY METER	Model:		Equipment ID #		Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
	Parameter		Standard				
	Parameter	Standard	Exp. Date	Lot #	Time:	Time:	Time:
First Point Calibration (Auto)	pH	4.00			Initials:	Initials:	Initials:
	Conductivity (mS/cm)	4.49			Value:	Value:	Value:
	Turbidity (NTU)	0			Value:	Value:	Value:
	DO (mg/L)	8.8-9.1 (ambient air)	NA	NA	Value:	Value:	Value:
Second Point Calibration	pH	6.86			Value:	Value:	Value:
	Conductivity (mS/cm)	53.7			Value:	Value:	Value:
	Turbidity (NTU)	100			Value:	Value:	Value:
Third Point Calibration	pH	9.18			Value:	Value:	Value:
	Conductivity (mS/cm)	53.7			Value:	Value:	Value:
	Turbidity (NTU)	100			Value:	Value:	Value:

Additional Remarks: