LONGHORN ARMY AMMUNITION PLANT KARNACK, TEXAS

ADMINISTRATIVE RECORD

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KARNACK, TEXAS
ADMINISTRATIVE RECORD – CHRONOLOGICAL INDEX

VOLUME 23

2020

A. Title: Report – Draft Final Remedial Action Completion Report for Contingency Remedy, LHAAP-50, Former Sump Water Tank, Longhorn Army Ammunition Plant, Karnack, Texas, November 2020
Author(s): Department of the Army
Recipient: U.S. Environmental Protection Agency and Texas Commission on Environmental Quality
Date: November 5, 2020
Bate Stamp: 00987941 – 00988870

B. Title: Minutes – Final Monthly Managers' Meeting (MMM), Longhorn Army Ammunition Plant (LHAAP), November 18, 2020
Author(s): Department of the Army
Recipient: All Parties
Date: December 1, 2020
Bate Stamp: 00988871 – 00988887

C. Title: Transmittal Letter – Draft Sixth Annual Remedial Action Operation Report, LHAAP-50, Former Sump Water Tank, Longhorn Army Ammunition Plant, Karnack, Texas, December 2020
Author(s): Department of the Army
Recipient: Environmental Protection Agency
Date: December 3, 2020
Bate Stamp: 00988888 – 00988888

D. Title: Transmittal Letter – Draft Sixth Annual Remedial Action Operation Report, LHAAP-50, Former Sump Water Tank, Longhorn Army Ammunition Plant, Karnack, Texas, December 2020
Author(s): Department of the Army
Recipient: Texas Commission on Environmental Quality
Date: December 3, 2020
Bate Stamp: 00988889 – 00988889

E. Title: Report – Quarterly Evaluation Report, 3rd Quarter (April-September) 2020, Groundwater Treatment Plant, Longhorn Army Ammunition Plant, Karnack, Texas, December 2020
Author(s): Bhate Environmental Associates, Inc.
Recipient: U.S. Army Corps of Engineers
Date: December 3, 2020
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KARNACK, TEXAS
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2020

F. Title: (cont'd) Report – Level IV DOD to Quarterly Evaluation Report, 3rd Quarter (April-September) 2020, Groundwater Treatment Plant, Longhorn Army Ammunition Plant, Karnack, Texas, December 2020
Author(s): Bhate Environmental Associates, Inc.
Recipient: U.S. Army Corps of Engineers
Date: December 3, 2020
Bate Stamp: 00989172 – 00989849

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

November 5, 2020

DAIN-ODB-LO

Mr. William Rhotenberry
U.S. Environmental Protection Agency
1201 Elm Street, Suite 500
Dallas, TX 75270-2002

Re: Draft Final Remedial Action Completion Report for Contingency Remedy, LHAAP-50, Former Sump Water Tank, Longhorn Army Ammunition Plant, Karnack, Texas, November 2020

Dear Mr. Rhotenberry,

An electronic copy of the above referenced document has been added to the project portal's "Documents" folder at the following address for your review: (https://docs.cbifederalservices.com/sites/501032/regulators/Shared%20Documents/Forms/AllItems.aspx). An electronic copy of this letter and download instructions for the electronic file have been sent via email. The document includes revisions based upon the Environmental Protection Agency's (EPA) comment on the Draft version received on October 21, 2020. A response to the EPA comment on the Draft version of the document is included with this Draft Final. In accordance with Federal Facility Agreement, this Draft Final will be considered Final after 30 days without further comment.

The document was prepared by Bhate Environmental Associates, Inc., (Bhate) team, on behalf of the Army as part of Bhate's Performance Based Remediation contract for the facility. I ask that Kim Nemmers, Bhate's Project Manager, be copied on any communications related to the project.

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

Sincerely,

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

Copies furnished:
A. Palmie, TCEQ, Austin, TX (letter)
P. Bruckwicki, Caddo Lake NWR, TX (1 hard copy and 1 CD)

R. Smith USACE, Tulsa District, OK (1 hard copy and 1 CD)
A. Williams, USACE, Tulsa District, OK (1 CD)
A. Maly USAEC, San Antonio, TX (1 CD)
K. Nemmers, Bhate, Lakewood, CO (1 hard copy and 1 CD)
P. Srivastav, APTIM, Houston, TX (letter)

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

November 5, 2020

DAIN-ODB-LO

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

Re: Draft Final Remedial Action Completion Report for Contingency Remedy, LHAAP-50, Former Sump Water Tank, Longhorn Army Ammunition Plant, Karnack, Texas, November 2020

Dear Ms. Palmie,

An electronic copy of the above referenced document has been added to the project portal's "Documents" folder at the following address for your review: (https://docs.cbifederalservices.com/sites/501032/regulators/Shared%20Documents/Forms/AllItems.aspx). An electronic copy of this letter and download instructions for the electronic file have been sent via email. The document includes revisions based upon the Environmental Protection Agency's (EPA) comment on the Draft version received on October 21, 2020. A response to the EPA comment on the Draft version of the document is included with this Draft Final. In accordance with Federal Facility Agreement, this Draft Final will be considered Final after 30 days without further comment.

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Sincerely,

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

Copies furnished (letter only):
W. Rhotenberry, USEPA Region 6, Dallas, TX
P. Bruckwicki, Caddo Lake NWR, TX

R. Smith, USACE, Tulsa District, OK
A. Williams, USACE, Tulsa District, OK
A. Maly, USAEC, San Antonio, TX (1 CD)
K. Nemmers, Bhate, Lakewood, CO
P. Srivastav, APTIM, Houston, TX

Response to Comments on
Draft Remedial Action Completion Report, Contingency Remedy, LHAAP-50 Former Sump Water Tank
Longhorn Army Ammunition Plant, Karnack, Texas

Document Date: 16 September 2020
Comment Date: 21 October 2020

Reviewer: Mr. William Rhotenberry, USEPA
Respondent: Dr. Rose Zeiler

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

Comment No.	Section/ Page Ref.	USEPA Comment	C, D, E, or X[1]	Response	A or D[2]
1	Table 2-2, Wells 50WW11 and 50WW13, minor comment	VC should be highlighted for both wells since reporting level is over the MCL. However, they are both U qualified, so maybe just use a different color to indicate laboratory didn't meet the MCL reporting level for reporting level. Suggest mention these two VC samples in Section 2.	C	The vinyl chloride results for 50WW11 and 50WW13 have been highlighted on Table 2-2 in light blue and the following note has been added to the table: *Blue highlighted results for vinyl chloride were not detected, but the reporting limit was above the MCL due to sample dilution.* The following text has been added to Section 2.0 to address the U qualified results exceeding the MCL: *At two monitoring wells, 50WW11 and 50WW13, the reporting limit for vinyl chloride was higher than the maximum contaminant level due to sample dilution. The 50WW11 and 50WW13 results are highlighted as an exceedance with a "U" qualification on* ***Table 2-2****.*	

Draft Final
Remedial Action Completion Report, Contingency Remedy, LHAAP-50 Former Sump Water Tank
Longhorn Army Ammunition Plant
Karnack, Texas

Prepared for U.S. Army Corps of Engineers, Tulsa District
Contracting Division
2488 East 81st Street
Tulsa, Oklahoma 74137-4290

Prepared by

bhate

1608 13th Avenue South, Suite 300
Birmingham, Alabama 35205
1-800-806-4001 • www.bhate.com

Prepared by

APTIM

Aptim Federal Services, LLC
2500 CityWest, Suite 1700
Houston, Texas 77042

Contract No. W9128F-13-D-0012
Task Order No. W9128BV17F0150
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Acronyms and Abbreviations

µg/L	micrograms per liter
AECOM	AECOM Technical Services, Inc.
APTIM	Aptim Federal Services, LLC
AST	aboveground storage tank
bgs	below ground surface
Bhate	Bhate Environmental Associates, Inc.
COCs	contaminants of concern
DCA	dichloroethane
DCE	dichloroethene
DO	dissolved oxygen
DPT	direct-push technology
EPA	see USEPA
ESD	Explanation of Significant Differences
EVO	emulsified vegetable oil
GWTP	groundwater treatment plant
ISB	in situ bioremediation
Jacobs	Jacobs Engineering Group, Inc.
LHAAP	Longhorn Army Ammunition Plant
LTM	long-term monitoring
LUC	land use control
MNA	monitored natural attenuation
psi	pounds per square inch
RACR	Remedial Action Completion Report
RA-O	Remedial Action Operation
RAOs	remedial action objectives
RAWP	Remedial Action Work Plan
RD	remedial design
ROD	Record of Decision
SDC-9™	APTIM's dechlorinating culture
Shaw	Shaw Environmental & Infrastructure, Inc.
TCE	trichloroethene
TCEQ	Texas Commission on Environmental Quality
U.S.	United States
U.S. Army	U.S. Department of the Army
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound

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1.0 INTRODUCTION

The United States (U.S.) Army Corps of Engineers (USACE), Tulsa District, contracted Bhate Environmental Associates, Inc. (Bhate), under the Omaha Multiple Environmental Government Acquisition National Small Business Multiple Award Task Order Contract Environmental Remediation Services with Military Munitions Response Program, Task Order No. W9128BV17F0150 to conduct environmental restoration of site LHAAP-50 at Longhorn Army Ammunition Plant (LHAAP). The Bhate Team is comprised of Bhate and Aptim Federal Services, LLC (APTIM). LHAAP is an inactive, government owned formerly contractor operated and maintained Department of Defense facility located central east Texas (**Figure 1-1**). Remedial activities have been conducted at LHAAP-50 in accordance with the *Final Record of Decision* (USACE 2010) with a monitored natural attenuation (MNA) remedy for the comingled volatile organic compounds (VOCs) and perchlorate plume. The Record of Decision (ROD) called for an evaluation of the remedy after two years of MNA remedial action operation (RA-O) implementation. The Third Year RA-O Report determined that MNA was ineffective and implementation of a contingency remedy was appropriate. The contingency remedy is in situ bioremediation (ISB) (Bhate 2018a).

This Remedial Action Completion Report (RACR) describes contingency remedial actions taken to address risks associated with contaminated groundwater at LHAAP-50 (former sump water tank). Specifically, this RACR describes activities associated with field implementation of a contingency ISB remedy in accordance with the *Final Remedial Design and Remedial Action Work Plan, Contingency Remedy for LHAAP-50* (Bhate 2019a).

1.1 Organization of Remedial Action Completion Report

This RACR is composed of the following sections:

- **Section 1.0:** "Introduction" summarizes the site description, remedial action objectives (RAOs), the contaminants of concern (COCs) and their respective cleanup levels, the selected contingency remedy, and the associated land use control (LUC) plan.
- **Section 2.0:** "Baseline Sampling" describes the sampling activities that were conducted prior to the beginning of the ISB injections and presents the associated results.
- **Section 3.0:** "In Situ Bioremediation" describes the injection of amendments to enhance microbial degradation of contaminants.

- **Section 4.0:** "Performance Monitoring" describes remedial performance monitoring and reporting that will be performed after ISB injections.
- **Section 5.0:** References" provides a list of references cited in the document.

This work plan also includes the following appendices to support the text:

- **Appendix A** includes the laboratory analytical reports for the baseline samples that were collected prior to implementation of the ISB injections.
- **Appendix B** includes the Data Quality Summary Report for the laboratory analyses.
- **Appendix C** includes site photographs from the ISB injections.

1.2 Site Description

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

When operational, LHAAP-50 contained a 47,000-gallon capacity aboveground storage tank (AST) which received industrial wastewater from various industrial waste production sumps throughout LHAAP between 1955 and 1988. After the solids were filtered, the storage tank contents were discharged into Goose Prairie Creek upstream of the Goose Prairie Creek bridge on South Crockett Avenue, south of 51st Street. The flow in the creek was sufficient to dilute the water to safe levels (Jacobs 2002). If natural flow in the creek was considered insufficient, clean water was reportedly pumped into the creek to dilute the contents. The AST is no longer present.

The LUC area for groundwater use restrictions established in the 2016 Final RACR for LHAAP-50 (AECOM 2016) extends beyond the northern, southern, eastern, and western historical site boundaries and encompasses a total of approximately 77.19 acres (see **Figure 1-3**). The nearest significant surface water body to LHAAP-50 is Goose Prairie Creek, located approximately 80 feet north of the site, which eventually flows into Caddo Lake. LHAAP-50 has no known areas of archaeological or historical importance.

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A Final ROD was executed for LHAAP-50 in September 2010 (USACE 2010). The ROD designated COCs for groundwater are tetrachloroethene, trichloroethene (TCE), cis-1,2-dichloroethene (DCE), 1,1-DCE, 1,2-dichloroethane (DCA), vinyl chloride, and perchlorate. The cleanup levels for the COCs are included in **Table 1-1**. The Remedial Action Work Plan (RAWP) for the entire site was prepared in June 2013 in accordance with the ROD and implemented in July 2013 (AECOM 2013). Groundwater monitoring for the MNA remedy at LHAAP-50 began in October 2013 and was conducted as described in the *Final Remedial Action Completion Report* (AECOM 2016). The MNA remedy for the comingled VOCs and perchlorate plume at this site, as presented in the ROD called for an evaluation of the remedy after two years of MNA RA-O and implementation. The ROD also provided for the implementation of a contingency remedy to enhance MNA if the selected remedy is found to be ineffective.

The *Draft Final Third Annual Remedial Action Operation Report* (Bhate 2018a) concluded that MNA was ineffective and implementation of a contingency remedy would be appropriate. A *Final Explanation of Significant Differences* (Bhate 2019b) was submitted to the U.S. Environmental Protection Agency (USEPA) and the Texas Commission on Environmental Quality (TCEQ) in September 2019 for changes to the ROD to implement the ISB contingency remedy. The Remedial Design (RD)/RAWP (Bhate 2019a) for the contingency remedy addresses ISB implementation for the groundwater plume at this site, based on the RD for LHAAP-50, which was approved by regulatory agencies in September 2011 (Shaw 2011). The Final RD/RAWP for Contingency Remedy (Bhate 2019a) was approved by TCEQ and USEPA in January 2020.

1.3 Remedial Action Objectives

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

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

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1.4 Selected Remedy

The description of the proposed groundwater remedy at LHAAP-50 in Section 2.9.1 of the ROD was excavation, MNA, and LUCs (USACE 2010). Implementation of the excavation, MNA, and LUC remedy was documented in the 2016 RACR (AECOM 2016). The Final Explanation of Significant Differences (ESD) added ISB as a contingency remedy due to the determination that MNA was ineffective (Bhate 2019b).

The remedy at LHAAP-50 is intended to protect human health and the environment by preventing human exposure to the contaminated groundwater and preventing contaminated groundwater from migrating into nearby surface water. The final remedy identified by the ESD, consists of excavation of soil (complete), LUCs (already implemented), ISB, MNA, and long-term monitoring (LTM).

The specific remedy components are discussed below:

- **LUCs.** LUCs have been implemented for the impacted area as described in the RACR (AECOM 2016) to ensure the protection of human health by restricting the use of groundwater. The groundwater use restriction will remain in place until the COCs in groundwater and soil allow unrestricted use and unlimited exposure.
- **ISB.** ISB will be implemented in the area where the highest concentrations are observed in the upper and lower shallow groundwater in the vicinity of wells 50WW11 and 50WW13, and in the shallow groundwater in the vicinity of well 50WW12. ISB is the process of removing contaminant mass by enhancing microbial populations that will utilize the contaminants in groundwater during respiratory or metabolic activities. The treatment involves injecting amendments which may include microbial cultures, electron donor sources, and nutrients into the subsurface. This RACR documents the implementation of the contingency ISB.
- **MNA.** MNA constitutes a passive treatment where the contaminant concentrations decrease through natural attenuation processes such as biodegradation, dispersion, dilution, sorption, and volatilization (USEPA 1998).
- Data from performance monitoring are used to evaluate whether natural attenuation is occurring and reducing COCs. MNA will be implemented to verify that the TCE and perchlorate plumes are stable and will not migrate to nearby surface water at levels that may present an unacceptable risk to human health and the environment. MNA will return groundwater to its potential beneficial use, wherever practicable, after successful implementation of the ISB. MNA will be evaluated annually, with groundwater monitoring performed on a quarterly basis for the first two years after implementation of ISB.

- **LTM.** LTM will be conducted annually until the next Five Year Review. However, LTM will continue at least once in five years until cleanup levels are achieved. A cleanup time has not been estimated and will be evaluated following the implementation of ISB.

1.5 Land Use Control Plan

The Land Use Control Implementation Plan was finalized in the 2016 Final RACR (documenting the previous soil removal action and implementation of the MNA remedy) for LHAAP-50 (AECOM 2016).

The Comprehensive LUC Management Plan (U.S. Army 2019) provides a repository for LUC plans for sites throughout the former LHAAP. The LUC Plan for LHAAP-50 can be found within the Comprehensive LUC Management Plan, including blank copies of the Inspection and Maintenance Checklist and the Land Use Control Compliance Inspection Form.

1.6 Performance Monitoring and Follow-up Activities

While this RACR documents the implementation of ISB, the RD/RAWP (Bhate 2019a) describes several activities that are to be conducted following ISB. Those activities are briefly described below. The RD/RAWP should be referenced for detailed information (including reporting requirements) regarding all these activities.

- **Performance Monitoring Year 1 and Year 2.** Quarterly sampling will be conducted to evaluate geochemical conditions and to determine VOC and perchlorate concentrations. Any recommendations to modify the sampling frequency, analytical parameters, or wells will be made in the Annual RA-O Report and only implemented following regulatory approval. As stated in Section 5.3.1 of the RD/RAWP for the Contingency Remedy, follow-up injections may be needed if the remedy is determined to be not performing, although reinjections are not expected to be needed within the 3 to 5 year span lifespan of the emulsified vegetable oil (EVO) mixture selected. The decision for reapplication of organic carbon will be made based on performance monitoring results.
- **LTM.** Annual monitoring will continue following the first two years of performance monitoring. Monitoring will be discontinued with regulatory concurrence after perchlorate/VOCs concentrations in the wells in the treatment area drop below the cleanup levels. The need for any additional LTM will be discussed on the next Five Year Review.

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2.0 BASELINE SAMPLING

The RD/RAWP (Bhate 2019a) for Contingency Remedy presented a baseline sampling plan for the shallow and intermediate groundwater zones at LHAAP-50 (**Table 2-1**). The Year 6 RA-O sampling event conducted in November 2019 is considered the baseline sampling event. The sampling network for Year 6 RA-O that was proposed in the Year 5 RA-O Report (Bhate 2020) included a shortened list of 14 wells. However, regulatory approval for the Year 5 RA-O Report and RD/RAWP was obtained after the Year 6 RA-O/November 2019 sampling event was conducted; therefore, the longer list of wells (19 wells) were sampled in November 2019. The baseline sampling event was conducted to characterize the perchlorate and VOC concentrations and the geochemical conditions prior to ISB injections.

The baseline samples were collected between November 8 and November 13, 2019, for all the locations on **Table 2-1** and the results are shown on **Table 2-2**. The baseline sample locations and results are also included on **Figure 2-1**. Nine of the 19 wells have COC concentrations above cleanup levels for one or more COCs. Five samples contained perchlorate concentrations above cleanup levels; nine samples contained TCE above cleanup levels; two samples contained cis-1,2-DCE concentrations above cleanup levels, two samples contained 1,1-DCE and 1,2-DCA above cleanup levels. The highest perchlorate concentration continues to be detected at upper shallow well, 50WW12 at 47,000 micrograms per liter (µg/L), and the highest TCE concentration was detected in the center of the plume at upper shallow well 50WW13 at 7,300 µg/L. At two monitoring wells, 50WW11 and 50WW13, the reporting limit for vinyl chloride was higher than the maximum contaminant level due to sample dilution. The 50WW11 and 50WW13 results are highlighted as an exceedance with a "U" qualification on **Table 2-2**. COCs were not detected in the intermediate well 50WW10. The laboratory data package is included in **Appendix A**, and the Data Quality Summary Report is included in **Appendix B**.

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3.0 IN SITU BIOREMEDIATION

ISB was conducted at LHAAP-50 in accordance with the RD/RAWP (Bhate 2019a) to treat the areas of historical hotspots of VOCs and perchlorate, in the vicinity of wells 50WW12, 50WW11, and 50WW13. Injections were performed at 12 direct-push technology (DPT) locations as shown on **Figure 3-1**. The implementation of ISB involved steps prior to and following the injections. The sections below describe the major steps, from notifications through demobilization, in approximate chronological order.

3.1 Notification

On February 5, 2020, a Memorandum for Record was provided to TCEQ (Bhate 2020) regarding planned injections to demonstrate compliance with the substantive requirements of 30 Texas Administrative Code Section 331, Subchapters A, C, and H for Class V Injections Wells. The memorandum described the planned injection of EVO, microbial nutrients and APTIM's dechlorinating culture (SDC-9^{TM}) at 12 DPT injection locations.

TCEQ and USEPA were notified two weeks in advance of commencement of fieldwork activities.

3.2 Utility Clearance

Utility location and clearance for intrusive activities were conducted prior to drilling and in accordance with Section 3.1 of the Installation-Wide Work Plan (Bhate 2018b). Utility clearance tasks included the following:

- Contacting the Texas Excavation Safety System, Inc. utility notification service
- Manually probe all boreholes to at least 5 feet prior to driving the injection rods
- Holding safety meetings and completing job safety analyses with all personnel who were involved in intrusive activities

3.3 Site Clearance and Staking Locations

Prior to the ISB injection, the site was cleared of tall vegetation. The DPT injection point locations were staked out using global positioning system or relative to existing wells.

3.4 Mobilization

Personnel were mobilized to LHAAP-50 on March 6, 2020, and injections began on March 9, 2020.

The following major pieces of equipment were mobilized over the course of the injections:

- DPT drill rig
- 20,000-gallon tanks (two)
- 8,000-gallon tank
- 2,000-gallon water truck
- Injection system trailer

The EVO and nutrients to be injected were delivered directly to site LHAAP-50. Two 20,000-gallon tanks were present on site at LHAAP-50 closer to the entrance. The two tanks were used to mix and store the amendment solution. The EVO and nutrient solution were brought to injection area using a 2,000-gallon water truck and stored in the 8,000-gallon tank prior to injection. Water for mixing the EVO solution was obtained from the Leigh Water Company from a public hydrant located in Karnack, Texas and trucked to the 20,000-gallon tanks using the 2,000-gallon water truck.

3.5 Injections

The injection amendments were mixed as shown on **Table 3-1** and injected in accordance with the RD/RAWP (Bhate 2019a), with the exception of the work plan deviation described in **Section 3.5.3**. The actual depths and injection volumes injected at each location are shown in **Table 3-2**. The injections were conducted from March 9 to March 20, 2020, and the injection locations are shown in **Figure 3-1**. Details of the injections are described in the following sections.

3.5.1 Amendment Preparation

The amendment solution was prepared in accordance with the RD/RAWP (Bhate 2019a), as shown on **Table 3-1**. The primary injection components were potable water, the EVO carbon source (Electron Donor Solution–Extended Release™ from Tersus Environmental, LLC), diammonium phosphate, and SDC-9™. Approximately 24 hours prior to the start of each injection cycle, the solution of ISB amendments was prepared in a 20,000-gallon mixing tank located on site. The solution was prepared by adding the required volume of EVO, dilution water, SDC-9™, and nutrients into the mixing tank.

3.5.2 Injection Process

The amendments were injected into the subsurface at the depths ranges shown on **Table 3-2**, using the system shown schematically in **Figure 3-2**.

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Four locations were connected to the injection manifold at a time, and flow rates and injection pressures were controlled by individual control valves for each injection line. Injection pressures as high as 120 pounds per square inch (psi) were necessary due to tight lithologies at locations 50DPT01 through 50DPT06. The injection pressures were at or below 50 psi at locations 50DPT07 through 50DPT12. Flow rates ranged from 1 to 5 gallons per minute.

When necessary, injections were shut down and locations were allowed to "rest" before proceeding with the injections to minimize daylighting. After each injection location was completed, the probe was withdrawn and the DPT point was abandoned by filling with grout. No soil cuttings were generated using DPT.

The creek was monitored visually, and dissolved oxygen (DO) was measured each morning and afternoon. No significant changes were observed visually or in the DO measurements. DO measurements are included in **Table 3-3**.

During the injection activities, field personnel performed the following:

- Checking the injection system gauges to monitor pressure, volume, and flow into each injection point
- Recording injection interval, volume, and time (**Table 3-2**)
- Monitoring injection pressures for sudden decreases that might indicate the loss of amendment in the subsurface (possibly due to fracturing induced by the injection or encountering a high-permeability zone)
- Visually monitoring the injection locations for surfacing of injected material
- Monitoring the creek throughout the day visually and with DO readings measured in the morning and in the afternoon

3.5.3 Deviation from Work Plan

The planned injection interval included in the RD/RAWP for 50DPT01 through 50DPT06 was 18 to 60 feet below ground surface (bgs). However, DPT points 50DPT01 through 50DPT06 were unable to achieve the desired depth of 60 feet bgs due to extremely tight lithologic conditions encountered at 54 to 56 feet bgs in all six locations.

On March 12, 2020, while attempting to push the injection rods at location 50DPT03, refusal was encountered at approximately 56 feet bgs. The crew moved over to location 50DPT04 to see if the refusal was a localized condition. The rig also encountered refusal at 50DPT04 at 56 feet bgs. Based on the tight lithological conditions encountered in this area, it was proposed to inject from 18 feet to whatever depth beyond 50 feet bgs that refusal was encountered for 50DPT01 through 50DPT06. The planned injection volume for these locations was

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121.5 gallons per foot in the RD/RAWP. For any injection interval that was inaccessible due to refusal during drilling, the planned volume from that interval in the bottom 2 to 6 feet of the injection location was injected in addition to the planned volume for that interval. Please refer to **Table 3-2** for actual volumes injected at each interval and location. TCEQ and USEPA were included in the discussion of the proposed deviation and approved the deviation on March 12, 2020 (APTIM 2020, TCEQ 2020, USEPA 2020).

Refusal was also encountered at less than 50 feet bgs at the planned location for 50DPT01. Additional attempts were made to achieve target depth by moving 50DPT01 closer to 50DPT02 with regulatory consultation and approval via conference call. The new location of 50DPT01 is shown in **Figure 3-1**. Refusal was encountered at the new 50DPT01 location at 54 feet bgs and documented in **Table 3-2**.

Due to the lower permeability of the lower portions of the formation, the planned injection pressure of 40 psi was exceeded in the field where necessary to inject the planned volume of solution. The injection pressures used, ranged from 16 to 120 psi, but did not exceed 50 psi at depths less than 30 feet, and surfacing of injected solution was not observed when the elevated pressures were used. **Table 3-2** shows the injection pressure used for each injection interval.

3.6 Management of Remediation Derived Waste

During the activities described above, various types of waste were generated. Those wastes are identified in the table provided below. The table also summarizes the storage and disposal for each waste type.

Waste Type	Storage and Disposal [a]
Groundwater from purging of wells prior to sampling	Collected in 5-gallon containers or drums and transported to the GWTP [a] for disposal
Disposable personal protective equipment and disposable supplies	Disposed as municipal solid waste

Notes:

[a] GWTP refers to the Groundwater Treatment Plant at site LHAAP-18/24.

3.7 Demobilization

After completion of the final injections on March 20, 2020, the injection rig and amendment tanks were demobilized from LHAAP-50.

4.0 FUTURE MONITORING

As noted in **Section 1.6**, this RACR documents the implementation of the contingency ISB remedy, but activities that follow the ISB are described in the RD/RAWP (Bhate 2019a). Performance monitoring is being conducted to monitor ISB in the treatment area and will be documented in Annual RA-O Reports. The performance monitoring network is included in **Table 4-1** of this report. For the first two years post-injection, eight ISB performance monitoring wells will be sampled quarterly. Performance monitoring samples will be analyzed for VOCs, perchlorate, MNA parameters (anions, dissolved gases [ethane, methane, and carbon dioxide], and total organic carbon) and field parameters (DO, oxidation reduction potential, pH, and ferrous iron). The performance well locations are shown in **Figure 4-1**.

LTM will continue to be conducted annually to monitor stability of the plumes and will also be documented in the Annual RA-O Reports. LTM will be conducted annually at 14 wells until the perchlorate and VOC concentrations are below the Maximum Contaminant Level/Protective Concentration Level or the regulators agree that a less frequent sampling schedule is more appropriate. The annual LTM network and analytical parameters are included in **Table 4-2**. For additional details about post-injection monitoring, please refer to **Section 5.0** of the RD/RAWP, Contingency Remedy.

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Tables

Table 1-1
Groundwater Cleanup Levels, LHAAP-50

Chemical	Concentration (µg/L)	Basis
Perchlorate	17	PCL
Trichloroethene	5	MCL
cis-1,2-dichloroethene	70	MCL
Vinyl chloride	2	MCL
1,1-dichloroethene	7	MCL
1,2-dichloroethane	5	MCL
Tetrachloroethene	5	MCL

Notes:

µg/L - microgram per liter

MCL - maximum contaminant level

PCL - Texas residential groundwater protective concentration level

Table 2-1

Baseline / Year 6 RA-O Sampling Network, LHAAP-50

Well ID	VOCs	Perchlorate	Field Parameters	TOC	Anions (chloride, nitrate, sulfate)	Dissolved Gases (ethene, ethane, methane)	Carbon dioxide	Ferrous Iron (field only)
Groundwater Sample Locations - Planned for Year 6 RA-O / Baseline Event								
50WW08	X	X	X					
50WW11	X	X	X	X	X	X	X	X
50WW12	X	X	X	X	X	X	X	X
50WW13	X	X	X	X	X	1	X	X
50WW15	X	X	X					
50WW16	X	X	X					
50WW18	X	X	X					
50WW22	X	X	X					
50WW23	X	X	X					
50WW05	X	X	X					
50WW06	X	X	X	X	X	X	X	X
50WW09	X	X	X					
50WW14	X	X	X	X	X	X	X	X
50WW29	X	X	X					
Additional Wells added								
50WW10	X	X	X					
50WW17	X	X	X					
50WW21	X	X	X					
50WW24	X	X	X					
50WW27	X	X	X					

Notes:

Field Parameters: DO, ORP, pH, specific conductivity, temperature

DO - dissolved oxygen

ID - identifier

ORP - oxidation reduction potential

RA-O - remedial action operation

TOC - total organic carbon

VOCs - volatile organic compounds

Table 2-2
Baseline Sampling Results, November 2019, LHAAP-50

Location Code			50WW05		50WW06		50WW08		50WW09				50WW10		50WW11		50WW12		
Sample ID			50WW05-191108		50WW06-191112		50WW08-191112		50WW09-191111		50WW09-191111-FD		50WW10-191111		50WW11-191112		50WW12-191112		50WW12-191112-FD
Sample Date			11/8/2019		11/12/2019		11/12/2019		11/11/2019		11/11/2019		11/11/2019		11/12/2019		11/12/2019		11/12/2019
Location Description			Site 50 - NE, lower shallow, outside site boundary.		Site 50 - ENE, lower shallow, outside site boundary.		Site 50 - E, upper shallow, inside site boundary.		Site 50 - E, lower shallow, inside site boundary.				Site 50 - E, intermediate, inside site boundary.		Site 50 - ENE, upper shallow, outside site boundary.		Site 50 - ENE, upper shallow, outside site boundary.		
Parameter	Units	MCL/PCL [a]	Result	Val Qual	Result	Val Qual	Result	Val Qual	Result	Val Qual	Result	Val Qual	Result	Val Qual	Result	Val Qual	Result	Val Qual	Result	Val Qual
PERCHLORATE																				
Perchlorate	µg/L	17 [a]	2	U	4,300		83		6.6		7.4		2	U	8,000		47,000		43,000	
VOLATILES																				
1,1-Dichloroethene	µg/L	7	4.8		0.5	U	1.2		0.5	U	0.5	U	0.5	U	26		4.6		4.1	
1,2-Dichloroethane	µg/L	5	2.7		0.5	U	2.2		0.5	U	0.5	U	0.5	U	28		2.7		2.7	
cis-1,2-Dichloroethene	µg/L	70	200		1.2		39		4.1		4		0.5	U	58		0.5	U	0.76	J
Tetrachloroethene	µg/L	5	1.2		0.5	U	1.3		0.5	U	0.5	U	0.5	U	5	U	0.5	U	0.5	U
Trichloroethene	µg/L	5	290		41		420		30		30		0.5	U	3,300		280		260	
Vinyl chloride	µg/L	2	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	5	U	0.5	U	0.5	U
GASES																				
Carbon dioxide	µg/L	NV	NA		120,000		69,000		NA		NA		NA		270,000		250,000		300,000	
Ethane	µg/L	NV	NA		0.47	U	0.47	U	NA		NA		NA		0.47	U	0.47	U	0.47	U
Ethylene	µg/L	NV	NA		0.55	U	0.55	U	NA		NA		NA		0.55	U	0.55	U	0.55	U
Methane	µg/L	NV	NA		1.1	J	3		NA		NA		NA		6.8		1.5		1.6	
GENERAL CHEMISTRY																				
Chloride	mg/L	NV	NA		84.1		361		NA		NA		NA		294		1,070		1,060	
Nitrate	mg/L	10	NA		0.1	U	0.118		NA		NA		NA		0.1	U	0.1	U	0.1	U
Sulfate	mg/L	NV	NA		20.8		304		NA		NA		NA		351		531		533	
Total organic carbon	mg/L	NV	NA		1.63		0.83		NA		NA		NA		1.49		1.11		1.19	
FIELD PARAMETERS																				
Dissolved Oxygen	mg/L	NV	0.02		0.03		0.14		0.25		NM		0.12		0.71		0.14		NM	
ORP	mV	NV	58		157		153		116		NM		-153		145		156		NM	
pH	pH units	NV	6.75		6.45		6.99		6.62		NM		8.03		6.39		6.22		NM	

Notes:

Aqua highlighted/ **bold** results indicate concentrations above the MCL/PCL.

Blue highlighted results for vinyl chloride were not detected, but the reporting limit was above the MCL due to sample dilution.

[a] Texas Risk Reduction Program (TRRP) Tier 1 Residential Protective Concentration Level (PCL) for groundwater.

µg/L - micrograms per liter

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

U - Undetected. The analyte was analyzed for, but not detected.

mg/L - milligrams per liter

FD - field duplicate

ID - identifier

MCL - maximum contaminant level

NA - not analyzed

NM - not measured

NV - no value established

Val Qual - validation qualifier

VOCs - volatile organic compounds

Table 2-2
Baseline Sampling Results, November 2019, LHAAP-50

		Location Code	50WW13		50WW14		50WW15		50WW16		50WW17		50WW18		50WW21		50WW22	
		Sample ID	50WW13-191113		50WW14-191113		50WW15-191108		50WW16-191113		50WW17-191108		50WW18-191108		50WW21-191108		50WW22-191112	
		Sample Date	11/13/2019		11/13/2019		11/8/2019		11/13/2019		11/8/2019		11/8/2019		11/8/2019		11/12/2019	
		Location Description	Site 50 - E, upper shallow, outside site boundary.		Site 50 - E, lower shallow, outside site boundary, along S. Crockett Ave.		Site 50 - NNE, upper shallow, outside site boundary, along Goose Prairie Creek bridge.		Site 50 - NE, upper shallow, outside site boundary, along Goose Prairie Creek.		Site 50 - NE, fully penetrating shallow, outside site, near Goose Prairie Creek.		Site 50 - NE, upper shallow, outside site boundary, along Goose Prairie Creek.		Site 50 - E, upper shallow, outside site boundary, east side of S. Crockett Ave.		Site 50 - SE, upper shallow, outside site boundary.	
Parameter	Units	MCL/PCL [a]	Result	Val Qual	Result	Val Qual	Result	Val Qual	Result	Val Qual	Result	Val Qual	Result	Val Qual	Result	Val Qual	Result	Val Qual
PERCHLORATE																		
Perchlorate	µg/L	17 [a]	4,900		2	U	2	U	1.6	J	2	U	2	U	2	U	2	U
VOLATILES																		
1,1-Dichloroethene	µg/L	7	17	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethane	µg/L	5	39		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
cis-1,2-Dichloroethene	µg/L	70	230		1.7		5.5		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Tetrachloroethene	µg/L	5	12	U	0.5	U	2.1		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Trichloroethene	µg/L	5	7,300		37		7.2		1.5		0.5	U	0.5	U	0.5	U	0.5	U
Vinyl chloride	µg/L	2	12	U	0.5	U	1.7		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GASES																		
Carbon dioxide	µg/L	NV	86,000		97,000		NA		26,000		NA		NA		NA		79,000	
Ethane	µg/L	NV	0.47	U	0.47	U	NA		0.47	U	NA		NA		NA		0.47	U
Ethylene	µg/L	NV	0.55	U	0.55	U	NA		0.55	U	NA		NA		NA		0.55	U
Methane	µg/L	NV	4.7		1.8		NA		3		NA		NA		NA		0.55	J
GENERAL CHEMISTRY																		
Chloride	mg/L	NV	308		395		NA		6.07		NA		NA		NA		773	
Nitrate	mg/L	10	0.1	U	0.1	U	NA		0.1	U	NA		NA		NA		0.1	U
Sulfate	mg/L	NV	316		357		NA		28.7		NA		NA		NA		587	
Total organic carbon	mg/L	NV	1.78		0.88		NA		1.05		NA		NA		NA		1.01	
FIELD PARAMETERS																		
Dissolved Oxygen	mg/L	NV	0.02		0.03		0.04		0.07		0.06		0.05		1.06		1.83	
ORP	mV	NV	40		-20		29		104		36		102		192		193	
pH	pH units	NV	6.77		6.53		6.93		6.97		6.18		6.59		5.97		6.76	

Notes:

Aqua highlighted/ **bold** results indicate concentrations above the MCL/PCL.

Blue highlighted results for vinyl chloride were not detected, but the reporting limit was above the MCL due to sample dilution.

[a] Texas Risk Reduction Program (TRRP) Tier 1 Residential Protective Concentration Level (PCL) for groundwater.

µg/L - micrograms per liter

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

U - Undetected. The analyte was analyzed for, but not detected.

mg/L - milligrams per liter

FD - field duplicate

ID - identifier

MCL - maximum contaminant level

NA - not analyzed

NM - not measured

NV - no value established

Val Qual - validation qualifier

VOCs - volatile organic compounds

Table 2-2
Baseline Sampling Results, November 2019, LHAAP-50

		Location Code	50WW23		50WW24		50WW27		50WW29	
		Sample ID	50WW23-191113		50WW24-191108		50WW27-191108		50WW29-191111	
		Sample Date	11/13/2019		11/8/2019		11/8/2019		11/11/2019	
		Location Description	Site 50 - E, upper shallow, outside site boundary.		Site 50 - ENE, upper shallow, outside site boundary.		Site 50 - N, upper shallow, outside site boundary, east of S. Crockett Ave.		Site 50 - ENE, upper shallow	
Parameter	Units	MCL/PCL [a]	Result	Val Qual	Result	Val Qual	Result	Val Qual	Result	Val Qual
PERCHLORATE										
Perchlorate	µg/L	17 [a]	2	U	2	U	2	U	2	U
VOLATILES										
1,1-Dichloroethene	µg/L	7	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethane	µg/L	5	0.5	U	0.5	U	0.5	U	0.5	U
cis-1,2-Dichloroethene	µg/L	70	0.5	U	0.5	U	0.92	J	0.5	U
Tetrachloroethene	µg/L	5	0.5	U	0.5	U	0.5	U	0.5	U
Trichloroethene	µg/L	5	0.5	U	0.5	U	0.5	U	0.5	U
Vinyl chloride	µg/L	2	0.5	U	0.5	U	0.5	U	0.5	U
GASES										
Carbon dioxide	µg/L	NV	190,000		NA		NA		NA	
Ethane	µg/L	NV	0.47	U	NA		NA		NA	
Ethylene	µg/L	NV	0.55	U	NA		NA		NA	
Methane	µg/L	NV	1	U	NA		NA		NA	
GENERAL CHEMISTRY										
Chloride	mg/L	NV	1,290		NA		NA		NA	
Nitrate	mg/L	10	0.104		NA		NA		NA	
Sulfate	mg/L	NV	181		NA		NA		NA	
Total organic carbon	mg/L	NV	0.2	J	NA		NA		NA	
FIELD PARAMETERS										
Dissolved Oxygen	mg/L	NV	0.71		0.05		0,06		0.05	
ORP	mV	NV	172		85		-26		70	
pH	pH units	NV	6.18		6.48		6.72		6.45	

Notes:

Aqua highlighted/ **bold** results indicate concentrations above the MCL/PCL.

Blue highlighted results for vinyl chloride were not detected, but the reporting limit was above the MCL due to sample dilution.

[a] Texas Risk Reduction Program (TRRP) Tier 1 Residential Protective Concentration Level (PCL) for groundwater.

µg/L - micrograms per liter

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

U - Undetected. The analyte was analyzed for, but not detected.

mg/L - milligrams per liter

FD - field duplicate

ID - identifier

MCL - maximum contaminant level

NA - not analyzed

NM - not measured

NV - no value established

Val Qual - validation qualifier

VOCs - volatile organic compounds

Table 3-1
Injection Locations and Amendment Volumes, LHAAP-50

DPT Location	Amendment Volume per Location					Nearest Monitoring Well	DPT Injection Depths [a] (ft bgs)
	Gallons of EVO (EDS-ER™ or Equivalent)	Liters of SDC-9™	Pounds of Nutrients (DAP)	Pounds of Buffer (sodium bicarbonate)	Gallons of Water		
50DPT01 - 06	110	12	308	222	4,990	50WW14	18 - 60
50DPT07- 10	51	5	143	96	2,304	50WW12	19 - 37

Notes:

[a] Depths were altered in the field as described in Section 3.5.3 and documented in Table 3-2

APTIM - Aptim Federal Services, LLC

DAP - Diammonium phosphate

DPT - direct-push technology

EDS-ER™ - electron donor solution–extended release

EVO - emulsified vegetable oil

ft bgs - feet below ground surface

SDC-9™ - APTIM's dechlorinating culture

Table 3-2
Field Injection Log, LHAAP-50

Injection Location	Injection Interval (ft)	Expected Volume (gallons)	Volume per Foot (gallons)	Injection Interval	Volume per Interval (gallons)	Date (mm/dd/yy)	Flow Rate (gpm)	Pressure (psi)	Volume Injected (gallons)	Total Volume Injected (gallons)	Comments
50DPT01	18-60	5,103	122	58-60	243	3/18/2020			0	5,103	Refusal at 54' / Couldn't get to target depth of 60'.
				54-58	486	3/18/2020			0		Refusal at 54' / Couldn't get to target depth of 60'.
				50-54	486	3/18/2020 3/19/2020	2.12 3.91	115 120	972		1356-1820 / 0745-1153
				46-50	486	3/19/2020	4.9	30	729		1200-1427
				42-46	486	3/19/2020	4.86	25	486		1432-1612
				38-42	486	3/19/2020	4.9	20	486		1617-1800
				34-38	486	3/20/2020	4.84	20	486		0717-0857
				30-34	486	3/20/2020	4.71	20	486		0902-1045
				26-30	486	3/20/2020	4.81	20	486		1049-1230
				22-26	486	3/20/2020	4.86	10	486		1245-1425
				18-22	486	3/20/2020	4.62	40	486		Date/Time Completed: 03-20-20/ 1430-1615 Initials: MSM
50DPT02	18-60	5,103	122	58-60	243	3/16/2020			0	5103	Refusal at 54' / Couldn't get to target depth of 60'.
				54-58	486	3/16/2020			0		Attempted to inject from 50'-54'/ ground would not take amendments.
				50-54	486	3/16/2020	4.82	70	972		0850-1240
				46-50	486	3/16/2020	4.82	70	729		1245-1515
				42-46	486	3/16/2020 3/17/2020	4.41 3.39	65 65	486		1523-1630 / 0730-0823
				38-42	486	3/17/2020	3.42	65	486		0826-1045
				34-38	486	3/17/2020	4.34	65	486		1102-1300
				30-34	486	3/17/2020	4.62	55	486		1310-1455
				26-30	486	3/17/2020	4.01	25	486		1505-1706
				22-26	486	3/18/2020	4.05	25	486		0800-1000
				18-22	486	3/18/2020	4.58	25	486		Date/Time Completed: 03-18-20 1005-1154 Initials: MSM
50DPT03	18-60	5,103	122	58-60	243	3/12/2020			0	5103	Refusal at 56' / Couldn't get to target depth of 60'.
				54-58	486	3/12/2020			0		Attempted to inject/ ground would not take amendments.
				50-54	486	3/12/2020 3/13/2020	2.08 5.00	100 90	972		0935-1720 / 1722-1730
				46-50	486	3/13/2020	3.88	90	729		0745-1044
				42-46	486	3/13/2020	4.58	90	486		1048-1234
				38-42	486	3/13/2020	4.78	25	486		1244-1431
				34-38	486	3/16/2020	4.96	40	486		0800-0940
				30-34	486	3/16/2020	4.26	25	486		0945-1139
				26-30	486	3/16/2020	4.26	25	486		1149-1351
				22-26	486	3/16/2020	4.26	25	486		1359-1554
				18-22	486	3/16/2020 3/17/2020	4.27 4.96	25 25	486		1600-1630 Date/Time Completed: 03-17-20 0730-0842 Initials: MSM

Table 3-2
Field Injection Log, LHAAP-50

Injection Location	Injection Interval (ft)	Expected Volume (gallons)	Volume per Foot (gallons)	Injection Interval	Volume per Interval (gallons)	Date (mm/dd/yy)	Flow Rate (gpm)	Pressure (psi)	Volume Injected (gallons)	Total Volume Injected (gallons)	Comments
50DPT04	18-60	5,103	122	58-60	243	3/11/2020			0	5103	Refusal at 56' / Couldn't get to target depth of 60'.
				54-58	486	3/11/2020			0		Refusal at attempt to inject.
				50-54	486	3/11/2020 3/12/2020	1.18	100	972		1705-1830 / 0830-1500
				46-50	486	3/12/2020 3/13/2020	5 3.87	95 95	729		1510-1725 / 0745-0811
				42-46	486	3/13/2020	4.58	90	486		0814-1000
				38-42	486	3/13/2020	4.78	25	486		1006-1148
				34-38	486	3/13/2020	4.95	25	486		1152-1330
				30-34	486	3/13/2020	5	25	486		1342-1521
				26-30	486	3/13/2020	4.92	35	486		0800-0947
				22-26	486	3/16/2020	3.88	40	486		0955-1200
				18-22	486	3/16/2000	4.37	40	486		Date/Time Completed: 03-16-20 1205-1356 Initials: MSM
50DPT05	18-60	5,103	122	58-60	243	3/16/2020			0	5103	Refusal at 54' / Couldn't get to target depth of 60'.
				54-58	486	3/16/2020			0		Refusal at attempt to inject.
				50-54	486	3/16/2020 3/17/2020	3.96 2.47	95 110	972		1510-1630 / 0730-1143
				46-50	486	3/17/2020	4.84	20	729		1151-1435
				42-46	486	3/17/2020	4.88	25	486		1140-1625
				38-42	486	3/18/2020	4.22	25	486		0800-0955
				34-38	486	3/18/2020	4.51	35	486		1000-1152
				30-34	486	3/18/2020	4.87	45	486		1230-1409
				26-30	486	3/18/2020	4.51	35	486		1413-1613
				22-26	486	3/18/2020	4.51	35	486		1630-1804
				18-22	486	3/19/2020	4.76	20	486		Date/Time Completed: 03-19-20 0745-0928 Initials: MSM
50DPT06	18-60	5,103	122	58-60	243	3/17/2020			0	5158	Refusal at 54' / Couldn't get to target depth of 60'.
				54-58	486	3/17/2020			0		Refusal at attempt to inject.
				50-54	486	3/17/2020	3.5	112	972		1258-1710
				46-50	486	3/18/2020	5	25	729		0800-1026
				42-46	486	3/18/2020	4.51	35	486		1030-1212
				38-42	486	3/18/2020	5	45	486		1230-1425
				34-38	486	3/18/2020	4.51	35	486		1430-1618
				30-34	486	3/18/2020	4.51	35	486		1623-1808
				26-30	486	3/19/2020	4.54	25	486		0745-0932
				22-26	486	3/19/2020	4.86	25	486		0940-1120
				18-22	486	3/19/2020	4.62	20	541		Date/Time Completed: 03-19-20/1129-1327 Initials: MSM
50DPT07	17-35	2,188	122	33-35	243	3/9/2020	3.14	50	243	2187	1212-1334
				29-33	486	3/9/2020	3.46	50	486		1348-1603
				25-29	486	3/9/2020 3/10/2020	3.52 3.89	50 38	486		1610-1640 / 0742-0916
				21-25	486	3/10/2020	3.14	38	486		0930-1145
				17-21	486	3/10/2020	3.57	40	486		Date/Time Completed: 03-10-20/1201-1420 Initials: MSM

Table 3-2
Field Injection Log, LHAAP-50

Injection Location	Injection Interval (ft)	Expected Volume (gallons)	Volume per Foot (gallons)	Injection Interval	Volume per Interval (gallons)	Date (mm/dd/yy)	Flow Rate (gpm)	Pressure (psi)	Volume Injected (gallons)	Total Volume Injected (gallons)	Comments
50DPT08	17-35	2,188	122	33-35	243	3/9/2020	50	50	243	2188	1212-1338
				29-33	486	3/9/2020	4.38	40	486		1349-1535
				25-29	486	3/9/2020 3/10/2020	4.40 4.22	30 30	486		1540-1640 / 0742-0833
				21-25	486	3/10/2020	4.96	30	486		0845-1020
				17-21	486	3/10/2020	4.48	25	487		Date/Time Completed: 03-10-20/1030-1215 Initials: MSM
50DPT09	17-35	2,188	122	33-35	243	3/9/2020	4.06	30	243	2187	1212-1312
				29-33	486	3/9/2020	4.5	30	486		1318-1507
				25-29	486	3/9/2020 3/10/2020	4.30 4.13	40 37	486		1515-1640 / 0742-0805
				21-25	486	3/10/2020	4.84	40	486		0824-1000
				17-21	486	3/10/2020	5	20	486		Date/Time Completed: 03-10-20/1015-1155 Initials: MSM
50DPT10	17-35	2,188	122	33-35	243	3/10/2020	4.43	40	243	2187	1232-1326
				29-33	486	3/10/2020	3.69	35	486		1331-1553
				25-29	486	3/10/2020 3/11/2020	3.42 4.96	35 25	486		1603-1640 / 0723-0846
				21-25	486	3/11/2020	4.84	20	486		0900-1040
				17-21	486	3/11/2020	4.74	20	486		Date/Time Completed: 03-11-20/1050-1218 Initials: MSM
50DPT11	17-35	2,188	122	33-35	243	3/10/2020	4.97	18	243	2187	1258-1347
				29-33	486	3/10/2020	4.8	16	486		1352-1539
				25-29	486	3/10/2020 3/11/2020	4.43 4.13	20 37	486		1548-1640 / 0723-0836
				21-25	486	3/11/2020	4.94	25	486		0847-1038
				17-21	486	3/11/2020	4.9	20	486		Date/Time Completed: 03-11-20/1052-1216 Initials: MSM
50DPT12	17-35	2,188	122	33-35	243	3/10/2020	3.7	35	243	2242	1510-1620
				29-33	486	3/11/2020	5	30	486		0723-0902
				25-29	486	3/11/2020	4.96	30	486		0917-1052
				21-25	486	3/11/2020	3.44	30	486		1059-1320
				17-21	486	3/11/2020	4.94	30	541		Date/Time Completed: 03-11-20/1400-1551 Initials: MSM

Personnel: APTIM: Michael Martinez / Kevin Saxton

Best Drilling: Ramon Gutierrez / Michael Marlin

437.6

Notes:

ft - feet

gpm - gallons per minute

mm/dd/yy - month/day/year

psi - pound per square inch

Table 3-3
Dissolved Oxygen Measurements during Injections, LHAAP-50

Location	Date / Time	Dissolved Oxygen (mg/L)
At bridge [a]	3/9/2020 / 7:00 AM	8.5
Near 50WW29 [b]		8.56
At bridge	3/9/2020 / 5:00 PM	8.35
Near 50WW29		8.45
At bridge	3/10/2020 / 7:00 AM	7.92
Near 50WW29		8.38
At bridge	3/10/2020 / 5:00 PM	8.11
Near 50WW29		8.21
At bridge	3/11/2020 / 7:00 AM	7.24
Near 50WW29		7.74
At bridge	3/11/2020 / 5:00 PM	7.59
Near 50WW29		7.71
At bridge	3/12/2020 / 7:00 AM	6.8
Near 50WW29		7.17
At bridge	3/12/2020 / 5:00 PM	6.21
Near 50WW29		7.12
At bridge	3/13/2020 / 7:00 AM	6.21
Near 50WW29		7.36
At bridge	3/13/2020 / 5:00 PM	6.17
Near 50WW29		7.16
At bridge	3/16/2020 / 7:10 AM	7.12
Near 50WW29		8.16
At bridge	3/16/2020 / 5:00 PM	7.21
Near 50WW29		8.32
At bridge	3/17/2020 / 7:30 AM	7.58
Near 50WW29		8.43
At bridge	3/17/2020 / 4:45 PM	7.45
Near 50WW29		8.48
At bridge	3/18/2020 / 7:30 AM	8.03
Near 50WW29		8.27
At bridge	3/18/2020 / 6:45 PM	7.88
Near 50WW29		8.06
At bridge	3/19/2020 / 7:30 AM	7.27
Near 50WW29		7.6
At bridge	3/19/2020 / 6:45 PM	7.31
Near 50WW29		7.81
At bridge	3/20/2020 / 7:10 AM	7.92
Near 50WW29		7.92
At bridge	3/20/2020 / 5:00 PM	7.32
Near 50WW29		8.04

Notes:

mg/L - milligrams per liter

[a] The "At bridge" measurement location is upstream of the injection area.

[b] The Near 50WW29 measurement location is downstream of the injection area.

Table 4-1
ISB Performance Monitoring Network Locations and Analyses

Monitoring Location	Primary Rationale for Well Selection	Analyses: Performance – Years 1 and 2 (Quarterly)								
		Perchlorate (SW6850)	VOCs	DO (field reading)	ORP (field reading)	pH (field reading)	Ferrous Iron (field reading)	Anions (E300.0)	Dissolved Gases (ethene, ethane, methane & carbon dioxide)	TOC (SW9060)
50WW08	Upgradient well	✓	✓	✓	✓	✓				
50WW05	Crossgradient well	✓	✓	✓	✓	✓				
50WW06	Performance data within the plume	✓	✓	✓	✓	✓	✓	✓	✓	✓
50WW11	Performance data within the treatment zone	✓	✓	✓	✓	✓	✓	✓	✓	✓
50WW12	Performance data within the treatment zone	✓	✓	✓	✓	✓	✓	✓	✓	✓
50WW13	Performance data within the treatment zone	✓	✓	✓	✓	✓	✓	✓	✓	✓
50WW14	Performance data within the treatment zone	✓	✓	✓	✓	✓	✓	✓	✓	✓
50WW29	Downgradient well	✓	✓	✓	✓	✓				

Notes:

Anions include chloride, nitrate, and sulfate.

✓ Indicates that sample will be collected and analyzed for the listed analyte.

DO - dissolved oxygen

ISB - In situ bioremediation

ORP - oxidation reduction potential

TOC - total organic carbon

VOCs - volatile organic compounds

Table 4-2
RA-O / Long-Term Monitoring Network, LHAAP-50

Well ID	VOCs	Perchlorate	Field Parameters	TOC	Anions (chloride, nitrate, sulfate)	Dissolved Gases (ethene, ethane, methane)	Carbon Dioxide	Ferrous Iron (only field)
Groundwater Sample Locations								
50WW08	X	X	X					
50WW11	X	X	X	X	X	X	X	X
50WW12	X	X	X	X	X	X	X	X
50WW13	X	X	X	X	X	X	X	X
50WW15	X	X	X					
50WW16	X	X	X					
50WW18	X	X	X					
50WW22	X	X	X					
50WW23	X	X	X					
50WW05	X	X	X					
50WW06	X	X	X	X	X	X	X	X
50WW09	X	X	X					
50WW14	X	X	X	X	X	X	X	X
50WW29	X	X	X					

Notes:

Field Parameters: DO, ORP, pH, specific conductivity, temperature

ID - identifier

DO - dissolved oxygen

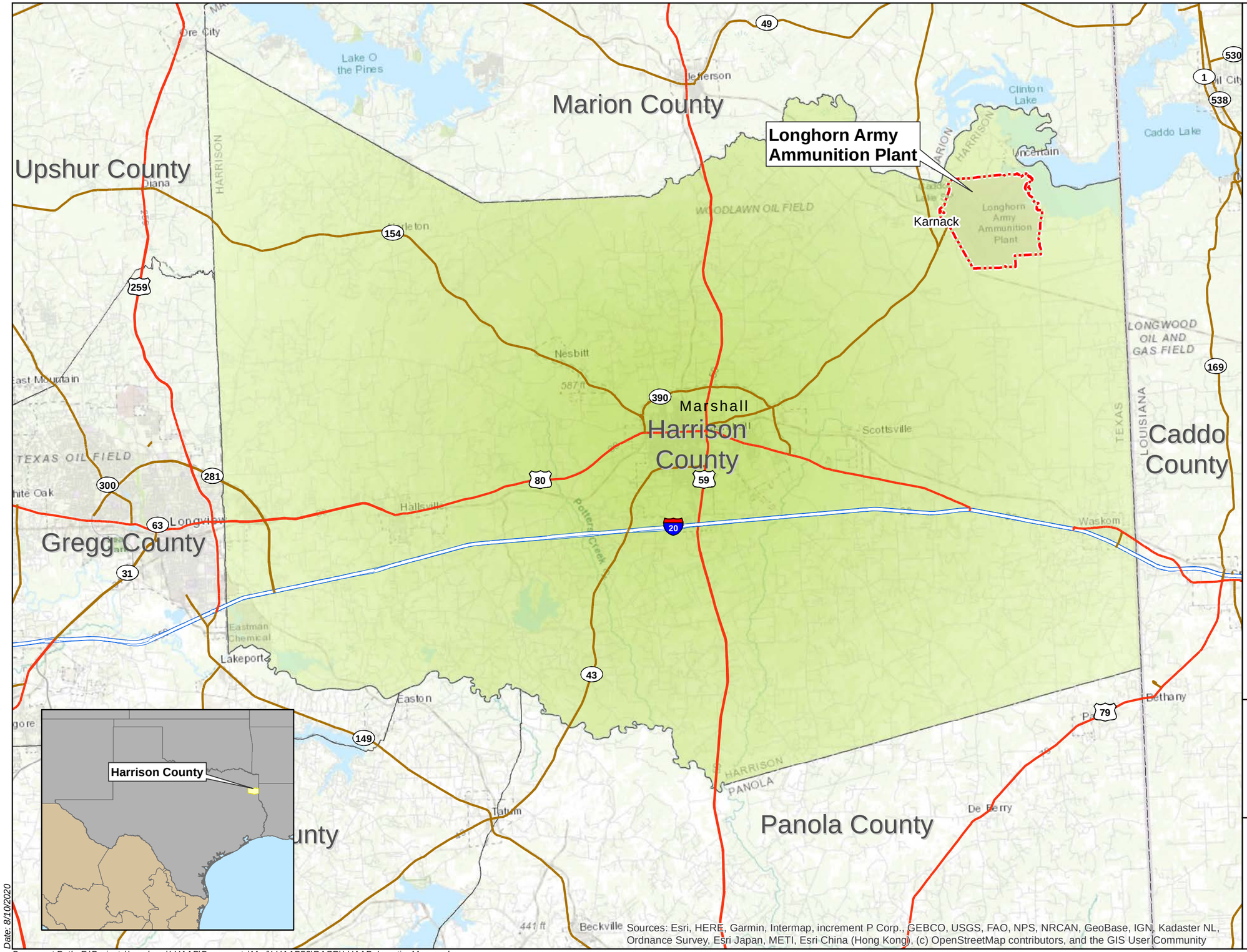
ORP - oxidation reduction potential

RA-O - remedial action operation

TOC - total organic carbon

VOCs - volatile organic compounds

Figures



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

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Figure 1-1

LHAAP Location Map

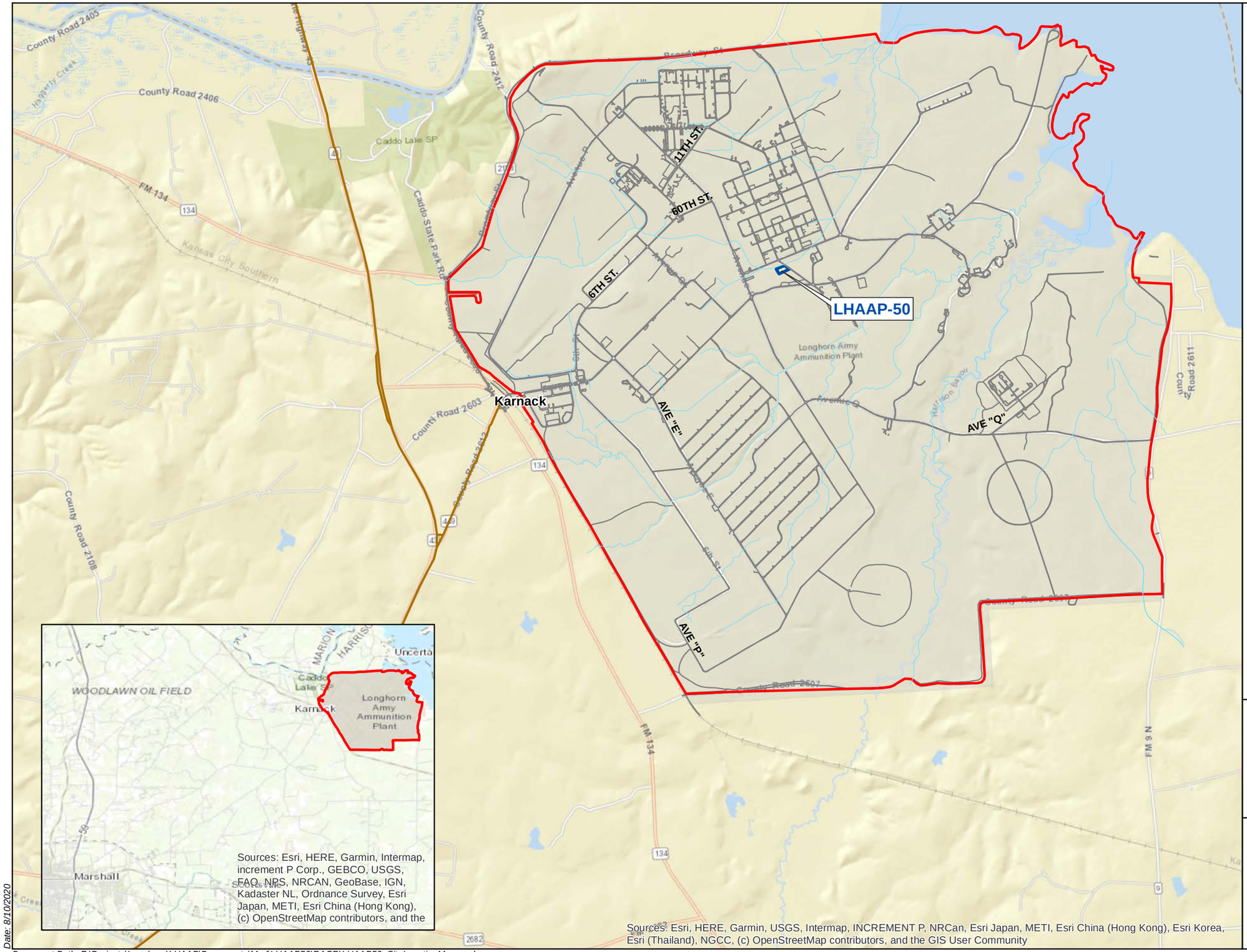
Remedial Action Completion Report,
Contigency Remedy, LHAAP-50

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

Date: 8/10/2020

Document Path: F:\Projects\Longhorn\LHAAP\Documents\Mxd\LHAAP50\RACR\LHAAP_LocationMap.mxd

00987982



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Figure 1-2
LHAAP Site Location Map

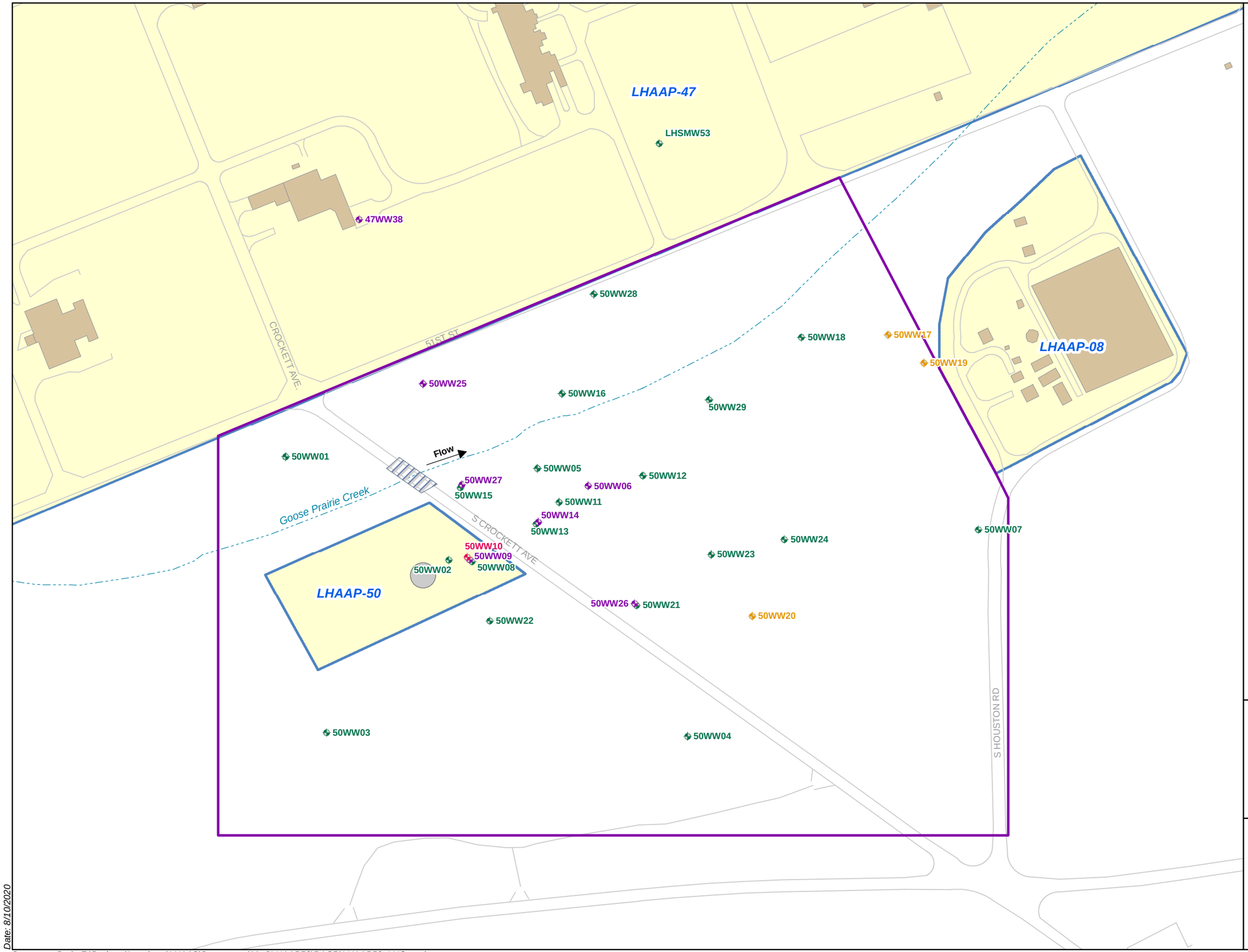
Remedial Action Completion Report,
Contigency Remedy, LHAAP-50

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

Date: 8/10/2020

Document Path: F:\Projects\Longhorn\LHAAP\Documents\Mxd\LHAAP50\RACR\LHAAP50_SiteLocationMap.mxd

00987983



- Lower Shallow Monitoring Well
- Upper Shallow Monitoring Well
- Fully Penetrating Shallow Monitoring Well
- Intermediate Monitoring Well
- Goose Prairie Creek
- Roads
- Land Use Control Boundary
- Bridges
- Former Storage Tank Location
- Buildings
- Site Boundaries

Note:
LUC boundary established in the 2016 Final Remedial Action Completion Report, LHAAP-50, Former Sump Water Tank (AECOM 2016)

N

0 75 150 Feet

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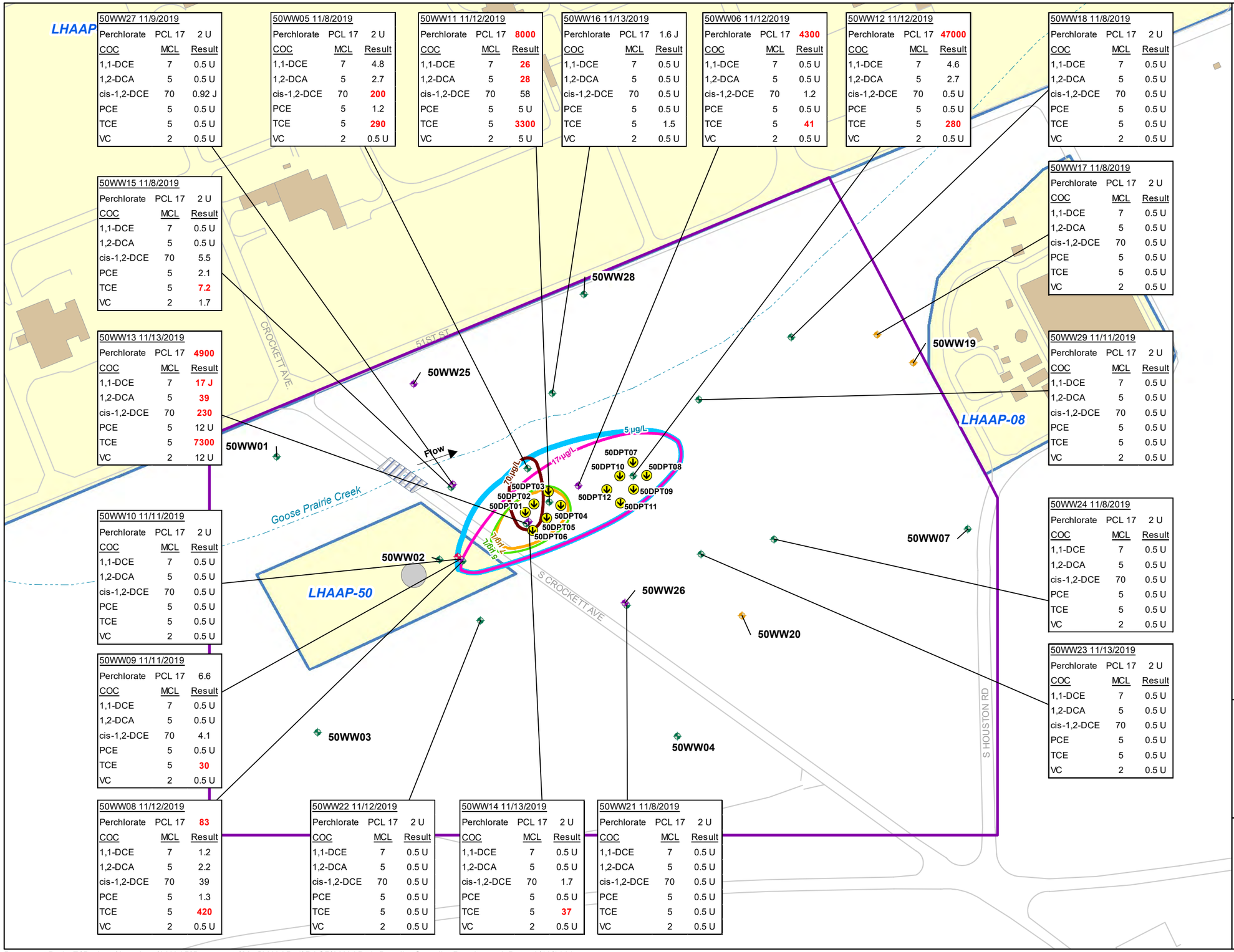
Figure 1-3
Land Use Control Boundary

Remedial Action Completion Report,
Contigency Remedy, LHAAP-50

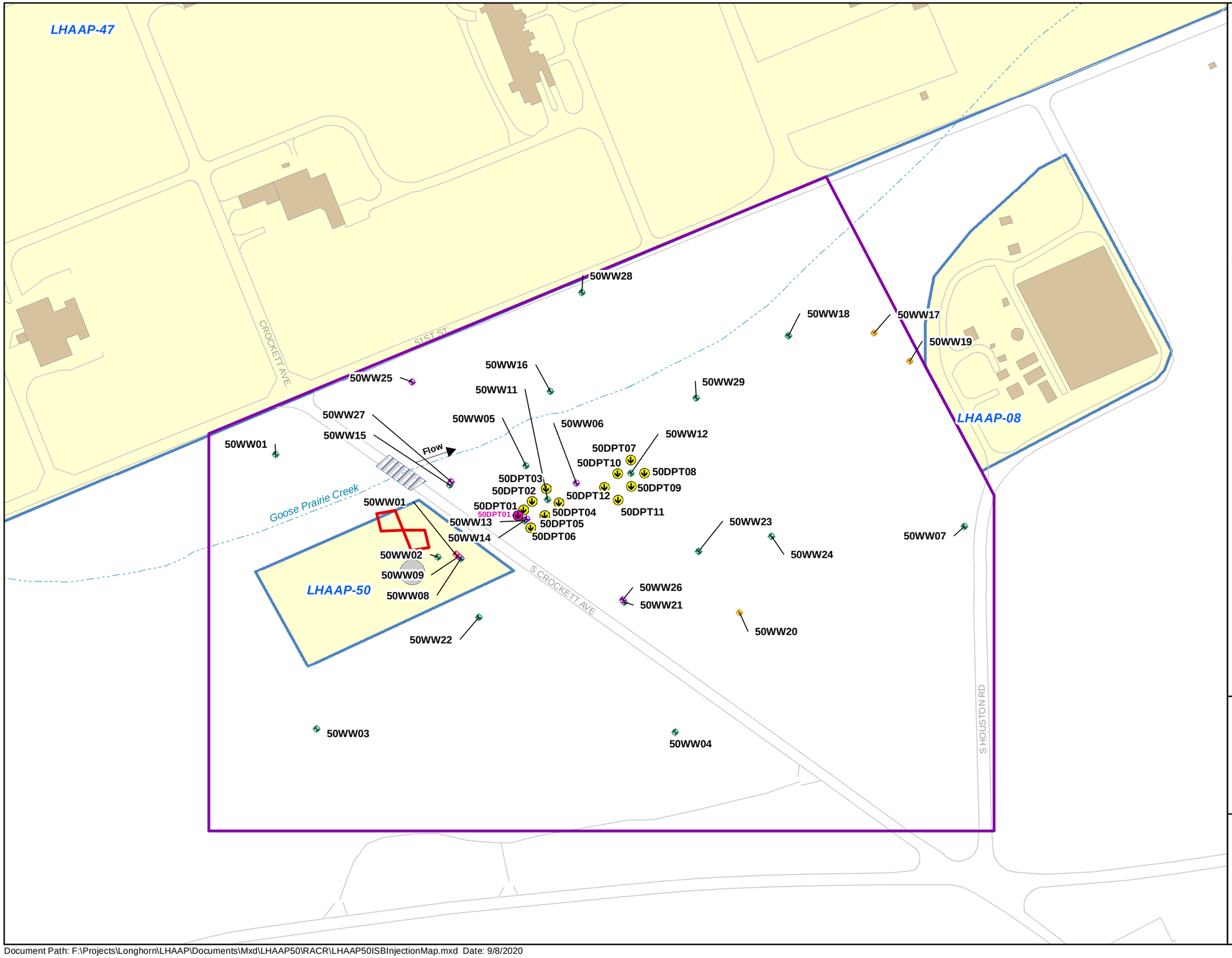
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

Date: 8/10/2020

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Document Path: F:\Projects\Longhorn\LHAAP\Documents\Mxd\LHAAP50\RACR\LHAAP50_BaselineSamplingResults.mxd Date: 8/10/2020



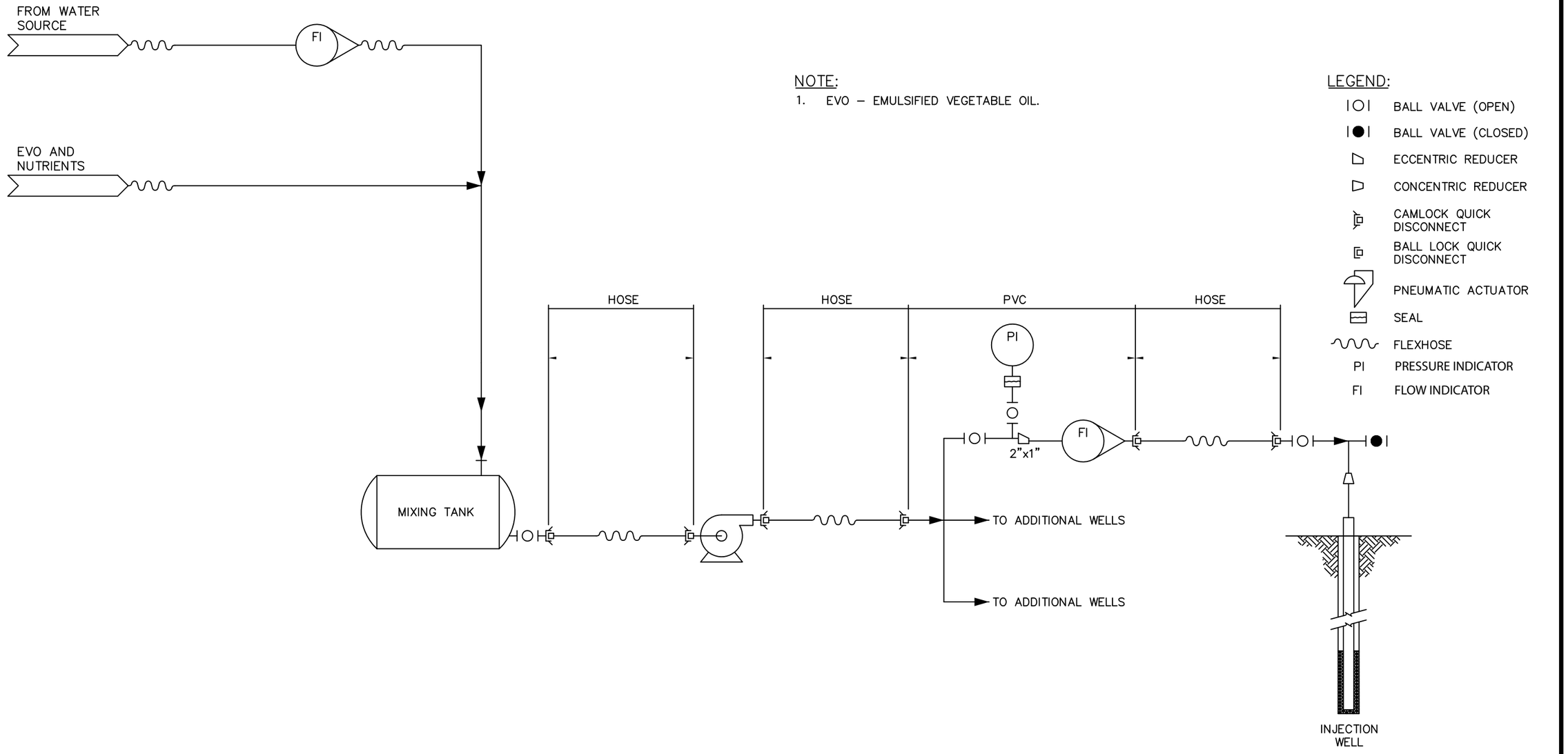
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Figure 3-1
In Situ Bioremediation Injection Map

Remedial Action Completion Report,
Contigency Remedy, LHAAP-50
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

Document Path: F:\Projects\Longhorn\LHAAP\Documents\Mxd\LHAAP50\RACR\LHAAP50ISBInjectionMap.mxd Date: 9/8/2020



NOTE:

1. EVO – EMULSIFIED VEGETABLE OIL.

LEGEND:

- BALL VALVE (OPEN)
- BALL VALVE (CLOSED)
- ECCENTRIC REDUCER
- CONCENTRIC REDUCER
- CAMLOCK QUICK DISCONNECT
- BALL LOCK QUICK DISCONNECT
- PNEUMATIC ACTUATOR
- SEAL
- FLEXHOSE
- PI PRESSURE INDICATOR
- FI FLOW INDICATOR

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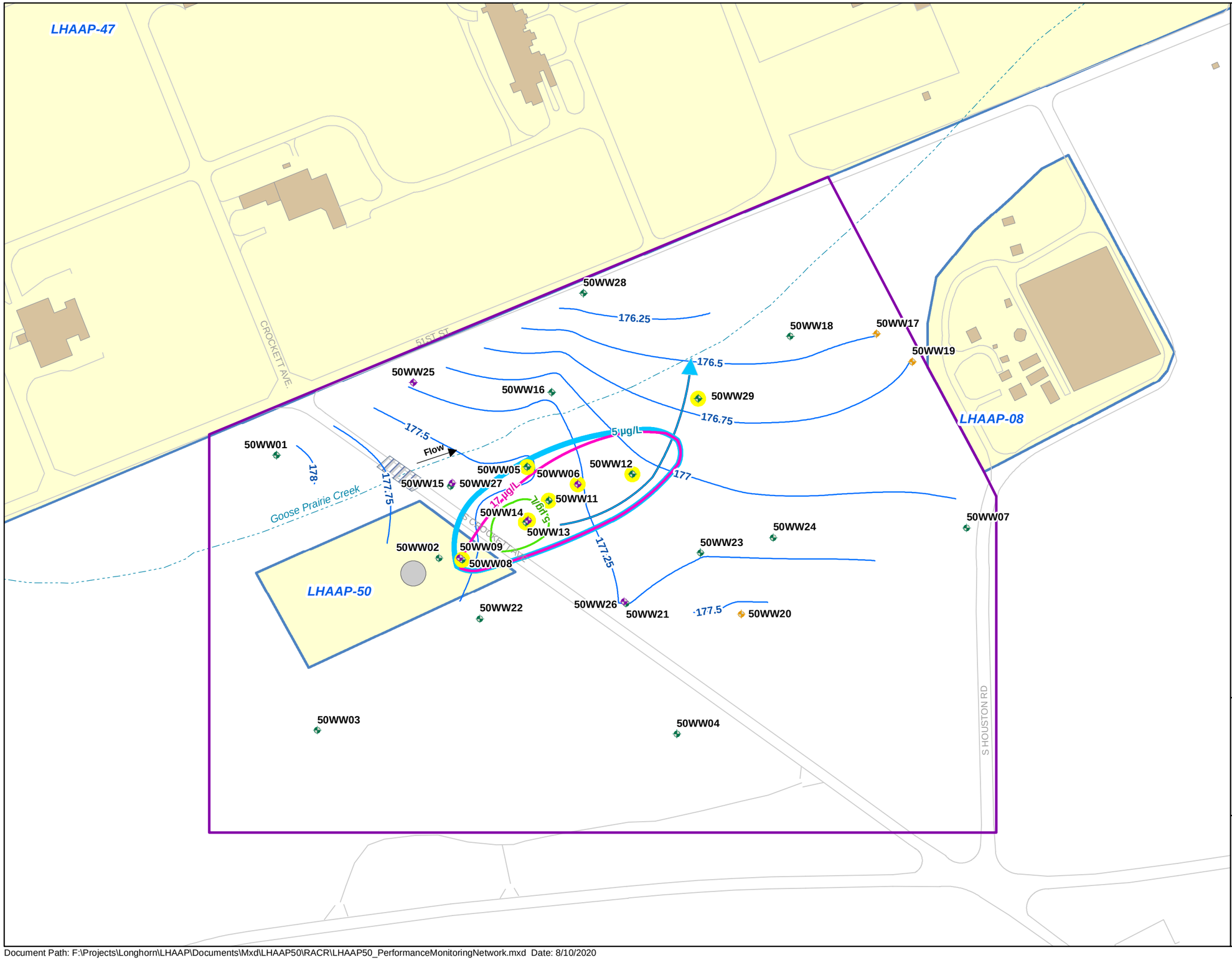
Figure 3-2

ISB DPT Injection System

Remedial Action Completion Report,
Contigency Remedy, LHAAP-50

LONGHORN ARMY AMMUNITION PLAN
KARNACK, TEXAS

G:\Ft_Gillem\GIS_Documents\Output\FTG_07\FTG07_Treatment_System_Diagrams\FTG07_ISEB-DPT Injection System.ai



- Lower Shallow Monitoring Well
- Upper Shallow Monitoring Well
- Fully Penetrating Shallow Monitoring Well
- Performance Monitoring Well
- 1,2-DCA Contour
- Perchlorate Contour (*Dashed where inferred*)
- TCE Contour
- Groundwater Flow Direction
- Groundwater Contour
- Land Use Control Boundary
- Bridges
- Former Storage Tank Location
- Goose Prairie Creek
- Roads
- Buildings
- Site Boundaries

0 75 150
Feet

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Figure 4-1

Performance Monitoring Network
Remedial Action Completion Report,
Contigency Remedy, LHAAP-50

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

Document Path: F:\Projects\Longhorn\LHAAP\Documents\Mxd\LHAAP50\RACR\LHAAP50_PerformanceMonitoringNetwork.mxd Date: 8/10/2020

Appendix A

Laboratory Analytical Reports

10450 Stancliff Rd. Suite 210
Houston, TX 77099
T: +1 281 530 5656
F: +1 281 530 5887

November 21, 2019

Susan Huang
Aptim Environmental & Infrastucture, Inc.
2500 City West Blvd., Suite 1700
Houston, TX 77042

Work Order: **HS19110486**

Laboratory Results for: **LHAAP-50**

Dear Susan,

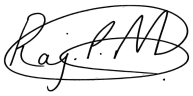
ALS Environmental received 8 sample(s) on Nov 09, 2019 for the analysis presented in the following report.

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
RJ Modashia
Project Manager

ALS Houston, US Date: 21-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50
Work Order: HS19110486

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19110486-01	50WW21-191108	Groundwater		08-Nov-2019 08:25	09-Nov-2019 08:50	☐
HS19110486-02	50WW24-191108	Groundwater		08-Nov-2019 09:15	09-Nov-2019 08:50	☐
HS19110486-03	50WW27-191108	Groundwater		08-Nov-2019 10:05	09-Nov-2019 08:50	☐
HS19110486-04	50WW15-191108	Groundwater		08-Nov-2019 10:50	09-Nov-2019 08:50	☐
HS19110486-05	50WW05-191108	Groundwater		08-Nov-2019 11:45	09-Nov-2019 08:50	☐
HS19110486-06	50WW18-191108	Groundwater		08-Nov-2019 12:35	09-Nov-2019 08:50	☐
HS19110486-07	50WW17-191108	Groundwater		08-Nov-2019 13:25	09-Nov-2019 08:50	☐
HS19110486-08	Trip Blank	Water	C&G-101419-12	08-Nov-2019 00:00	09-Nov-2019 08:50	☐

ALS Houston, US Date: 21-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50
Work Order: HS19110486

CASE NARRATIVE

Work Order Comments

- The analysis for Perchlorate was subcontracted to ALS Salt Lake City, UT. Final report attached.

GCMS Volatiles by Method SW8260

Batch ID: R350401

Sample ID: HS19110613-01MS

- MS and MSD are for an unrelated sample

ALS Houston, US Date: 21-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50
Sample ID: 50WW21-191108
Collection Date: 08-Nov-2019 08:25

ANALYTICAL REPORT
WorkOrder:HS19110486
Lab ID:HS19110486-01
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C	**Method:SW8260**							Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:20
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:20
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 17:20
1,1,2-Trichlor-1,2,2-trifluoroethane	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 17:20
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:20
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:20
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:20
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:20
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 17:20
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 17:20
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 17:20
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:20
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:20
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:20
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 17:20
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:20
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 17:20
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:20
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 17:20
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:20
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 17:20
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:20
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	13-Nov-2019 17:20
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:20
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	13-Nov-2019 17:20
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 17:20
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:20
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	13-Nov-2019 17:20
Acetone	2.0	U	0.40	2.0	2.0	UG/L	1	13-Nov-2019 17:20
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:20
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 17:20
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:20
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:20
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 17:20
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 17:20
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	13-Nov-2019 17:20
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 17:20
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:20
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:20

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

ALS Houston, US Date: 21-Nov-19

Client: Aptim Environmental & Infrastucture, Inc. **ANALYTICAL REPORT**
Project: LHAAP-50 WorkOrder:HS19110486
Sample ID: 50WW21-191108 Lab ID:HS19110486-01
Collection Date: 08-Nov-2019 08:25 Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:20
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:20
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:20
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	13-Nov-2019 17:20
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:20
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:20
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:20
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:20
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	13-Nov-2019 17:20
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:20
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	13-Nov-2019 17:20
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	13-Nov-2019 17:20
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 17:20
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:20
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:20
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:20
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:20
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:20
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:20
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:20
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:20
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:20
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:20
Trichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:20
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:20
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:20
Surr: 1,2-Dichloroethane-d4	*95.0*			**0**	*81-118*	*%REC*	*1*	*13-Nov-2019 17:20*
Surr: 4-Bromofluorobenzene	*98.5*			**0**	*85-114*	*%REC*	*1*	*13-Nov-2019 17:20*
Surr: Dibromofluoromethane	*90.8*			**0**	*80-119*	*%REC*	*1*	*13-Nov-2019 17:20*
Surr: Toluene-d8	*108*			**0**	*89-112*	*%REC*	*1*	*13-Nov-2019 17:20*
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		**Method:NA**						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	21-Nov-2019 16:31

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

ALS Houston, US Date: 21-Nov-19

Client: Aptim Environmental & Infrastructure, Inc.
Project: LHAAP-50
Sample ID: 50WW24-191108
Collection Date: 08-Nov-2019 09:15

ANALYTICAL REPORT
WorkOrder:HS19110486
Lab ID:HS19110486-02
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C	**Method:SW8260**							Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:44
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:44
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 17:44
1,1,2-Trichlor-1,2,2-trifluoroethane	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 17:44
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:44
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:44
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:44
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:44
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 17:44
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 17:44
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 17:44
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:44
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:44
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:44
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 17:44
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:44
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 17:44
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:44
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 17:44
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:44
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 17:44
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:44
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	13-Nov-2019 17:44
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:44
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	13-Nov-2019 17:44
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 17:44
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:44
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	13-Nov-2019 17:44
Acetone	2.0	U	0.40	2.0	2.0	UG/L	1	13-Nov-2019 17:44
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:44
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 17:44
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:44
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:44
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 17:44
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 17:44
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	13-Nov-2019 17:44
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 17:44
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:44
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:44

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

ALS Houston, US Date: 21-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50
Sample ID: 50WW24-191108
Collection Date: 08-Nov-2019 09:15

ANALYTICAL REPORT
WorkOrder:HS19110486
Lab ID:HS19110486-02
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:44
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:44
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:44
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	13-Nov-2019 17:44
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:44
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:44
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:44
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:44
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	13-Nov-2019 17:44
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:44
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	13-Nov-2019 17:44
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	13-Nov-2019 17:44
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 17:44
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:44
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:44
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:44
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:44
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:44
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:44
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:44
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:44
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:44
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:44
Trichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:44
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 17:44
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 17:44
Surr: 1,2-Dichloroethane-d4	*95.7*			**0**	*81-118*	*%REC*	*1*	*13-Nov-2019 17:44*
Surr: 4-Bromofluorobenzene	*95.0*			**0**	*85-114*	*%REC*	*1*	*13-Nov-2019 17:44*
Surr: Dibromofluoromethane	*89.1*			**0**	*80-119*	*%REC*	*1*	*13-Nov-2019 17:44*
Surr: Toluene-d8	*105*			**0**	*89-112*	*%REC*	*1*	*13-Nov-2019 17:44*
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		**Method:NA**						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	21-Nov-2019 16:31

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

ALS Houston, US Date: 21-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50
Sample ID: 50WW27-191108
Collection Date: 08-Nov-2019 10:05

ANALYTICAL REPORT
WorkOrder:HS19110486
Lab ID:HS19110486-03
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C	**Method:SW8260**							Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:08
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:08
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 18:08
1,1,2-Trichlor-1,2,2-trifluoroethane	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 18:08
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:08
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:08
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:08
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:08
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 18:08
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 18:08
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 18:08
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:08
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:08
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:08
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 18:08
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:08
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 18:08
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:08
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 18:08
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:08
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 18:08
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:08
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	13-Nov-2019 18:08
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:08
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	13-Nov-2019 18:08
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 18:08
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:08
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	13-Nov-2019 18:08
Acetone	2.0	U	0.40	2.0	2.0	UG/L	1	13-Nov-2019 18:08
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:08
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 18:08
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:08
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:08
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 18:08
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 18:08
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	13-Nov-2019 18:08
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 18:08
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:08
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:08

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

ALS Houston, US Date: 21-Nov-19

Client: Aptim Environmental & Infrastucture, Inc. **ANALYTICAL REPORT**
Project: LHAAP-50 WorkOrder:HS19110486
Sample ID: 50WW27-191108 Lab ID:HS19110486-03
Collection Date: 08-Nov-2019 10:05 Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:08
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:08
cis-1,2-Dichloroethene	**0.92**	J	**0.20**	**0.50**	**1.0**	**UG/L**	1	13-Nov-2019 18:08
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	13-Nov-2019 18:08
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:08
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:08
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:08
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:08
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	13-Nov-2019 18:08
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:08
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	13-Nov-2019 18:08
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	13-Nov-2019 18:08
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 18:08
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:08
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:08
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:08
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:08
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:08
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:08
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:08
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:08
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:08
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:08
Trichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:08
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:08
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:08
Surr: 1,2-Dichloroethane-d4	*94.4*			**0**	*81-118*	*%REC*	*1*	*13-Nov-2019 18:08*
Surr: 4-Bromofluorobenzene	*94.1*			**0**	*85-114*	*%REC*	*1*	*13-Nov-2019 18:08*
Surr: Dibromofluoromethane	*85.3*			**0**	*80-119*	*%REC*	*1*	*13-Nov-2019 18:08*
Surr: Toluene-d8	*103*			**0**	*89-112*	*%REC*	*1*	*13-Nov-2019 18:08*
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		**Method:NA**						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	21-Nov-2019 16:31

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

ALS Houston, US Date: 21-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50
Sample ID: 50WW15-191108
Collection Date: 08-Nov-2019 10:50

ANALYTICAL REPORT
WorkOrder:HS19110486
Lab ID:HS19110486-04
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C	**Method:SW8260**							Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:33
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:33
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 18:33
1,1,2-Trichlor-1,2,2-trifluoroethane	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 18:33
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:33
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:33
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:33
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:33
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 18:33
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 18:33
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 18:33
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:33
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:33
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:33
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 18:33
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:33
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 18:33
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:33
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 18:33
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:33
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 18:33
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:33
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	13-Nov-2019 18:33
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:33
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	13-Nov-2019 18:33
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 18:33
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:33
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	13-Nov-2019 18:33
Acetone	2.0	U	0.40	2.0	2.0	UG/L	1	13-Nov-2019 18:33
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:33
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 18:33
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:33
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:33
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 18:33
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 18:33
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	13-Nov-2019 18:33
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 18:33
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:33
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:33

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

ALS Houston, US Date: 21-Nov-19

Client: Aptim Environmental & Infrastucture, Inc. **ANALYTICAL REPORT**
Project: LHAAP-50 WorkOrder:HS19110486
Sample ID: 50WW15-191108 Lab ID:HS19110486-04
Collection Date: 08-Nov-2019 10:50 Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:33
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:33
cis-1,2-Dichloroethene	**5.5**		**0.20**	**0.50**	**1.0**	**UG/L**	1	13-Nov-2019 18:33
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	13-Nov-2019 18:33
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:33
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:33
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:33
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:33
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	13-Nov-2019 18:33
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:33
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	13-Nov-2019 18:33
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	13-Nov-2019 18:33
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 18:33
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:33
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:33
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:33
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:33
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:33
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:33
Tetrachloroethene	**2.1**		**0.30**	**0.50**	**1.0**	**UG/L**	1	13-Nov-2019 18:33
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:33
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:33
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:33
Trichloroethene	**7.2**		**0.20**	**0.50**	**1.0**	**UG/L**	1	13-Nov-2019 18:33
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:33
Vinyl chloride	**1.7**		**0.20**	**0.50**	**1.0**	**UG/L**	1	13-Nov-2019 18:33
Surr: 1,2-Dichloroethane-d4	*95.3*			**0**	*81-118*	*%REC*	*1*	*13-Nov-2019 18:33*
Surr: 4-Bromofluorobenzene	*95.5*			**0**	*85-114*	*%REC*	*1*	*13-Nov-2019 18:33*
Surr: Dibromofluoromethane	*89.1*			**0**	*80-119*	*%REC*	*1*	*13-Nov-2019 18:33*
Surr: Toluene-d8	*103*			**0**	*89-112*	*%REC*	*1*	*13-Nov-2019 18:33*
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		**Method:NA**						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	21-Nov-2019 16:31

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

ALS Houston, US Date: 21-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50
Sample ID: 50WW05-191108
Collection Date: 08-Nov-2019 11:45

ANALYTICAL REPORT
WorkOrder:HS19110486
Lab ID:HS19110486-05
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C	**Method:SW8260**							Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 15:18
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 15:18
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 15:18
1,1,2-Trichlor-1,2,2-trifluoroethane	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 15:18
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 15:18
1,1-Dichloroethane	**0.41**	J	**0.20**	**0.50**	**1.0**	**UG/L**	1	13-Nov-2019 15:18
1,1-Dichloroethene	**4.8**		**0.20**	**0.50**	**1.0**	**UG/L**	1	13-Nov-2019 15:18
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 15:18
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 15:18
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 15:18
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 15:18
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 15:18
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 15:18
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 15:18
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 15:18
1,2-Dichloroethane	**2.7**		**0.20**	**0.50**	**1.0**	**UG/L**	1	13-Nov-2019 15:18
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 15:18
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 15:18
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 15:18
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 15:18
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 15:18
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 15:18
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	13-Nov-2019 15:18
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 15:18
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	13-Nov-2019 15:18
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 15:18
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 15:18
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	13-Nov-2019 15:18
Acetone	2.0	U	0.40	2.0	2.0	UG/L	1	13-Nov-2019 15:18
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 15:18
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 15:18
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 15:18
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 15:18
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 15:18
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 15:18
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	13-Nov-2019 15:18
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 15:18
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 15:18
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 15:18

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

ALS Houston, US Date: 21-Nov-19

Client: Aptim Environmental & Infrastucture, Inc. **ANALYTICAL REPORT**
Project: LHAAP-50 WorkOrder:HS19110486
Sample ID: 50WW05-191108 Lab ID:HS19110486-05
Collection Date: 08-Nov-2019 11:45 Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 15:18
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 15:18
cis-1,2-Dichloroethene	**200**		**0.20**	**0.50**	**1.0**	**UG/L**	1	13-Nov-2019 15:18
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	13-Nov-2019 15:18
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 15:18
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 15:18
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 15:18
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 15:18
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	13-Nov-2019 15:18
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 15:18
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	13-Nov-2019 15:18
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	13-Nov-2019 15:18
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 15:18
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 15:18
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 15:18
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 15:18
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 15:18
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 15:18
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 15:18
Tetrachloroethene	**1.2**		**0.30**	**0.50**	**1.0**	**UG/L**	1	13-Nov-2019 15:18
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 15:18
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 15:18
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 15:18
Trichloroethene	**290**		**1.0**	**2.5**	**5.0**	**UG/L**	5	13-Nov-2019 16:31
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 15:18
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 15:18
Surr: 1,2-Dichloroethane-d4	*91.7*			**0**	*81-118*	*%REC*	*5*	*13-Nov-2019 16:31*
Surr: 1,2-Dichloroethane-d4	*93.1*			**0**	*81-118*	*%REC*	*1*	*13-Nov-2019 15:18*
Surr: 4-Bromofluorobenzene	*96.9*			**0**	*85-114*	*%REC*	*1*	*13-Nov-2019 15:18*
Surr: 4-Bromofluorobenzene	*92.7*			**0**	*85-114*	*%REC*	*5*	*13-Nov-2019 16:31*
Surr: Dibromofluoromethane	*84.3*			**0**	*80-119*	*%REC*	*5*	*13-Nov-2019 16:31*
Surr: Dibromofluoromethane	*88.9*			**0**	*80-119*	*%REC*	*1*	*13-Nov-2019 15:18*
Surr: Toluene-d8	*103*			**0**	*89-112*	*%REC*	*5*	*13-Nov-2019 16:31*
Surr: Toluene-d8	*107*			**0**	*89-112*	*%REC*	*1*	*13-Nov-2019 15:18*
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		**Method:NA**						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	21-Nov-2019 16:31

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

ALS Houston, US Date: 21-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50
Sample ID: 50WW18-191108
Collection Date: 08-Nov-2019 12:35

ANALYTICAL REPORT
WorkOrder:HS19110486
Lab ID:HS19110486-06
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C	**Method:SW8260**							Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:57
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:57
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 18:57
1,1,2-Trichlor-1,2,2-trifluoroethane	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 18:57
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:57
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:57
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:57
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:57
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 18:57
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 18:57
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 18:57
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:57
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:57
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:57
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 18:57
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:57
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 18:57
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:57
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 18:57
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:57
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 18:57
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:57
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	13-Nov-2019 18:57
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:57
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	13-Nov-2019 18:57
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 18:57
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:57
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	13-Nov-2019 18:57
Acetone	2.0	U	0.40	2.0	2.0	UG/L	1	13-Nov-2019 18:57
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:57
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 18:57
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:57
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:57
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 18:57
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 18:57
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	13-Nov-2019 18:57
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 18:57
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:57
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:57

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

ALS Houston, US Date: 21-Nov-19

Client: Aptim Environmental & Infrastucture, Inc. **ANALYTICAL REPORT**
Project: LHAAP-50 WorkOrder:HS19110486
Sample ID: 50WW18-191108 Lab ID:HS19110486-06
Collection Date: 08-Nov-2019 12:35 Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:57
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:57
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:57
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	13-Nov-2019 18:57
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:57
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:57
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:57
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:57
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	13-Nov-2019 18:57
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:57
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	13-Nov-2019 18:57
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	13-Nov-2019 18:57
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 18:57
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:57
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:57
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:57
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:57
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:57
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:57
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:57
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:57
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:57
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:57
Trichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:57
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 18:57
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 18:57
Surr: 1,2-Dichloroethane-d4	*96.8*			**0**	*81-118*	*%REC*	*1*	*13-Nov-2019 18:57*
Surr: 4-Bromofluorobenzene	*99.7*			**0**	*85-114*	*%REC*	*1*	*13-Nov-2019 18:57*
Surr: Dibromofluoromethane	*84.4*			**0**	*80-119*	*%REC*	*1*	*13-Nov-2019 18:57*
Surr: Toluene-d8	*110*			**0**	*89-112*	*%REC*	*1*	*13-Nov-2019 18:57*
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		**Method:NA**						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	21-Nov-2019 16:31

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

ALS Houston, US Date: 21-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50
Sample ID: 50WW17-191108
Collection Date: 08-Nov-2019 13:25

ANALYTICAL REPORT
WorkOrder:HS19110486
Lab ID:HS19110486-07
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C	**Method:SW8260**							Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 19:21
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 19:21
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 19:21
1,1,2-Trichlor-1,2,2-trifluoroethane	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 19:21
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 19:21
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 19:21
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 19:21
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 19:21
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 19:21
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 19:21
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 19:21
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 19:21
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 19:21
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 19:21
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 19:21
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 19:21
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 19:21
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 19:21
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 19:21
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 19:21
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 19:21
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 19:21
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	13-Nov-2019 19:21
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 19:21
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	13-Nov-2019 19:21
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 19:21
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 19:21
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	13-Nov-2019 19:21
Acetone	2.0	U	0.40	2.0	2.0	UG/L	1	13-Nov-2019 19:21
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 19:21
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 19:21
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 19:21
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 19:21
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 19:21
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 19:21
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	13-Nov-2019 19:21
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 19:21
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 19:21
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 19:21

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

ALS Houston, US Date: 21-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50
Sample ID: 50WW17-191108
Collection Date: 08-Nov-2019 13:25

ANALYTICAL REPORT
WorkOrder:HS19110486
Lab ID:HS19110486-07
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 19:21
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 19:21
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 19:21
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	13-Nov-2019 19:21
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 19:21
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 19:21
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 19:21
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 19:21
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	13-Nov-2019 19:21
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 19:21
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	13-Nov-2019 19:21
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	13-Nov-2019 19:21
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 19:21
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 19:21
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 19:21
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 19:21
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 19:21
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 19:21
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 19:21
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 19:21
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 19:21
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 19:21
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 19:21
Trichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 19:21
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 19:21
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 19:21
Surr: 1,2-Dichloroethane-d4	*96.4*			**0**	*81-118*	*%REC*	*1*	*13-Nov-2019 19:21*
Surr: 4-Bromofluorobenzene	*99.5*			**0**	*85-114*	*%REC*	*1*	*13-Nov-2019 19:21*
Surr: Dibromofluoromethane	*88.1*			**0**	*80-119*	*%REC*	*1*	*13-Nov-2019 19:21*
Surr: Toluene-d8	*105*			**0**	*89-112*	*%REC*	*1*	*13-Nov-2019 19:21*
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		**Method:NA**						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	21-Nov-2019 16:31

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

ALS Houston, US Date: 21-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50
Sample ID: Trip Blank
Collection Date: 08-Nov-2019 00:00

ANALYTICAL REPORT
WorkOrder:HS19110486
Lab ID:HS19110486-08
Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C	**Method:SW8260**							Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 16:55
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 16:55
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 16:55
1,1,2-Trichlor-1,2,2-trifluoroethane	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 16:55
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 16:55
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 16:55
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 16:55
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 16:55
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 16:55
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 16:55
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 16:55
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 16:55
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 16:55
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 16:55
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 16:55
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 16:55
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 16:55
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 16:55
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 16:55
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 16:55
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 16:55
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 16:55
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	13-Nov-2019 16:55
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 16:55
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	13-Nov-2019 16:55
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 16:55
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 16:55
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	13-Nov-2019 16:55
Acetone	2.0	U	0.40	2.0	2.0	UG/L	1	13-Nov-2019 16:55
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 16:55
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 16:55
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 16:55
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 16:55
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 16:55
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 16:55
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	13-Nov-2019 16:55
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	13-Nov-2019 16:55
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 16:55
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 16:55

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

ALS Houston, US Date: 21-Nov-19

Client: Aptim Environmental & Infrastucture, Inc. **ANALYTICAL REPORT**
Project: LHAAP-50 WorkOrder:HS19110486
Sample ID: Trip Blank Lab ID:HS19110486-08
Collection Date: 08-Nov-2019 00:00 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C	**Method:SW8260**							Analyst: PC
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 16:55
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 16:55
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 16:55
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	13-Nov-2019 16:55
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 16:55
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 16:55
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 16:55
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 16:55
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	13-Nov-2019 16:55
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 16:55
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	13-Nov-2019 16:55
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	13-Nov-2019 16:55
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	13-Nov-2019 16:55
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 16:55
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 16:55
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 16:55
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 16:55
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 16:55
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 16:55
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 16:55
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 16:55
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 16:55
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 16:55
Trichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 16:55
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	13-Nov-2019 16:55
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	13-Nov-2019 16:55
Surr: 1,2-Dichloroethane-d4	*92.6*			**0**	*81-118*	*%REC*	*1*	*13-Nov-2019 16:55*
Surr: 4-Bromofluorobenzene	*92.2*			**0**	*85-114*	*%REC*	*1*	*13-Nov-2019 16:55*
Surr: Dibromofluoromethane	*85.1*			**0**	*80-119*	*%REC*	*1*	*13-Nov-2019 16:55*
Surr: Toluene-d8	*107*			**0**	*89-112*	*%REC*	*1*	*13-Nov-2019 16:55*

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

ALS Houston, US Date: 21-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50
WorkOrder: HS19110486

DATES REPORT

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
Batch ID: R350401 (0)	**Test Name :** VOLATILES ORGANICS BY METHOD 8260C				**Matrix:** Water	
HS19110486-08	Trip Blank	08 Nov 2019 00:00			13 Nov 2019 16:55	1
Batch ID: R350401 (0)	**Test Name :** VOLATILES ORGANICS BY METHOD 8260C				**Matrix:** Groundwater	
HS19110486-01	50WW21-191108	08 Nov 2019 08:25			13 Nov 2019 17:20	1
HS19110486-02	50WW24-191108	08 Nov 2019 09:15			13 Nov 2019 17:44	1
HS19110486-03	50WW27-191108	08 Nov 2019 10:05			13 Nov 2019 18:08	1
HS19110486-04	50WW15-191108	08 Nov 2019 10:50			13 Nov 2019 18:33	1
HS19110486-05	50WW05-191108	08 Nov 2019 11:45			13 Nov 2019 16:31	5
HS19110486-05	50WW05-191108	08 Nov 2019 11:45			13 Nov 2019 15:18	1
HS19110486-06	50WW18-191108	08 Nov 2019 12:35			13 Nov 2019 18:57	1
HS19110486-07	50WW17-191108	08 Nov 2019 13:25			13 Nov 2019 19:21	1
Batch ID: R351046 (0)	**Test Name :** SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)				**Matrix:** Groundwater	
HS19110486-01	50WW21-191108	08 Nov 2019 08:25			21 Nov 2019 16:31	1
HS19110486-02	50WW24-191108	08 Nov 2019 09:15			21 Nov 2019 16:31	1
HS19110486-03	50WW27-191108	08 Nov 2019 10:05			21 Nov 2019 16:31	1
HS19110486-04	50WW15-191108	08 Nov 2019 10:50			21 Nov 2019 16:31	1
HS19110486-05	50WW05-191108	08 Nov 2019 11:45			21 Nov 2019 16:31	1
HS19110486-06	50WW18-191108	08 Nov 2019 12:35			21 Nov 2019 16:31	1
HS19110486-07	50WW17-191108	08 Nov 2019 13:25			21 Nov 2019 16:31	1

ALS Houston, US Date: 21-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50
WorkOrder: HS19110486

QC BATCH REPORT

Batch ID: R350401 (0) **Instrument: VOA9** **Method: VOLATILES ORGANICS BY METHOD 8260C**

MBLK Sample ID: **VBLKW-191113** Units: **UG/L** Analysis Date: **13-Nov-2019 13:17**
Client ID: Run ID: **VOA9_350401** SeqNo: **5342322** 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-Trichlor-1,2,2-trifluoroethane	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	0.50	1.0								U
1,2,3-Trichloropropane	0.50	1.0								U
1,2,4-Trichlorobenzene	0.50	1.0								U
1,2,4-Trimethylbenzene	0.50	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	0.50	1.0								U
1,3-Dichlorobenzene	0.50	1.0								U
1,3-Dichloropropane	0.50	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	0.50	1.0								U
2-Hexanone	1.0	2.0								U
4-Chlorotoluene	0.50	1.0								U
4-Isopropyltoluene	0.50	1.0								U
4-Methyl-2-pentanone	1.0	2.0								U
Acetone	2.0	2.0								U
Benzene	0.50	1.0								U
Bromobenzene	0.50	1.0								U
Bromochloromethane	0.50	1.0								U
Bromodichloromethane	0.50	1.0								U
Bromoform	0.50	1.0								U

ALS Houston, US Date: 21-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50
WorkOrder: HS19110486

QC BATCH REPORT

Batch ID: R350401 (0) **Instrument: VOA9** **Method: VOLATILES ORGANICS BY METHOD 8260C**

MBLK Sample ID: **VBLKW-191113** Units: **UG/L** Analysis Date: **13-Nov-2019 13:17**
Client ID: Run ID: **VOA9_350401** SeqNo: **5342322** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Bromomethane	0.50	1.0								U
Carbon disulfide	1.0	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	1.0	2.0								U
Naphthalene	0.50	1.0								U
n-Butylbenzene	0.50	1.0								U
n-Propylbenzene	0.50	1.0								U
o-Xylene	0.50	1.0								U
sec-Butylbenzene	0.50	1.0								U
Styrene	0.50	1.0								U
tert-Butylbenzene	0.50	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	*47.37*	*1.0*	*50*	*0*	*94.7*	*81 - 118*				
Surr: 4-Bromofluorobenzene	*47.37*	*1.0*	*50*	*0*	*94.7*	*85 - 114*				
Surr: Dibromofluoromethane	*41.11*	*1.0*	*50*	*0*	*82.2*	*80 - 119*				

ALS Houston, US Date: 21-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50
WorkOrder: HS19110486

QC BATCH REPORT

Batch ID: R350401 (0) **Instrument:** VOA9 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MBLK Sample ID: **VBLKW-191113** Units: **UG/L** Analysis Date: **13-Nov-2019 13:17**
Client ID: Run ID: **VOA9_350401** SeqNo: **5342322** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Surr: Toluene-d8	*52.4*	*1.0*	*50*	*0*	*105*	*89 - 112*				

ALS Houston, US Date: 21-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50
WorkOrder: HS19110486

QC BATCH REPORT

Batch ID: R350401 (0) **Instrument: VOA9** **Method: VOLATILES ORGANICS BY METHOD 8260C**

LCS Sample ID: **VLCSW-191113** Units: **UG/L** Analysis Date: **13-Nov-2019 12:28**
Client ID: Run ID: **VOA9_350401** SeqNo: **5342321** 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	18.03	1.0	20	0	90.1	78 - 124				
1,1,1-Trichloroethane	19.26	1.0	20	0	96.3	74 - 131				
1,1,2,2-Tetrachloroethane	20.18	1.0	20	0	101	71 - 121				
1,1,2-Trichlor-1,2,2-trifluoroethane	21.76	1.0	20	0	109	70 - 136				
1,1,2-Trichloroethane	20.04	1.0	20	0	100	80 - 119				
1,1-Dichloroethane	20.48	1.0	20	0	102	77 - 125				
1,1-Dichloroethene	20.98	1.0	20	0	105	71 - 131				
1,1-Dichloropropene	21.53	1.0	20	0	108	78 - 125				
1,2,3-Trichlorobenzene	19.51	1.0	20	0	97.6	69 - 129				
1,2,3-Trichloropropane	20.45	1.0	20	0	102	73 - 122				
1,2,4-Trichlorobenzene	18.9	1.0	20	0	94.5	69 - 130				
1,2,4-Trimethylbenzene	20.23	1.0	20	0	101	76 - 124				
1,2-Dibromo-3-chloropropane	16.98	1.0	20	0	84.9	62 - 128				
1,2-Dibromoethane	18.9	1.0	20	0	94.5	77 - 121				
1,2-Dichlorobenzene	18.97	1.0	20	0	94.8	80 - 119				
1,2-Dichloroethane	19.75	1.0	20	0	98.8	73 - 128				
1,2-Dichloropropane	21.99	1.0	20	0	110	78 - 122				
1,3,5-Trimethylbenzene	20.08	1.0	20	0	100	75 - 124				
1,3-Dichlorobenzene	18.23	1.0	20	0	91.2	80 - 119				
1,3-Dichloropropane	21.42	1.0	20	0	107	80 - 119				
1,4-Dichlorobenzene	18.23	1.0	20	0	91.1	79 - 118				
2,2-Dichloropropane	19.66	1.0	20	0	98.3	60 - 139				
2-Butanone	43.26	2.0	40	0	108	56 - 143				
2-Chlorotoluene	21.35	1.0	20	0	107	79 - 122				
2-Hexanone	38.05	2.0	40	0	95.1	57 - 139				
4-Chlorotoluene	19.28	1.0	20	0	96.4	78 - 122				
4-Isopropyltoluene	20.02	1.0	20	0	100	77 - 127				
4-Methyl-2-pentanone	40.29	2.0	40	0	101	67 - 130				
Acetone	50.16	2.0	40	0	125	39 - 160				
Benzene	20.89	1.0	20	0	104	79 - 120				
Bromobenzene	18.98	1.0	20	0	94.9	80 - 120				
Bromochloromethane	20.3	1.0	20	0	102	78 - 123				
Bromodichloromethane	20.8	1.0	20	0	104	79 - 125				
Bromoform	16.82	1.0	20	0	84.1	66 - 130				

ALS Houston, US Date: 21-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50
WorkOrder: HS19110486

QC BATCH REPORT

Batch ID: R350401 (0) **Instrument: VOA9** **Method: VOLATILES ORGANICS BY METHOD 8260C**

LCS Sample ID: **VLCSW-191113** Units: **UG/L** Analysis Date: **13-Nov-2019 12:28**
Client ID: Run ID: **VOA9_350401** SeqNo: **5342321** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Bromomethane	22.97	1.0	20	0	115	53 - 141				
Carbon disulfide	40.98	2.0	40	0	102	64 - 133				
Carbon tetrachloride	20.22	1.0	20	0	101	72 - 136				
Chlorobenzene	19.37	1.0	20	0	96.9	82 - 118				
Chloroethane	23.68	1.0	20	0	118	60 - 138				
Chloroform	20.51	1.0	20	0	103	79 - 124				
Chloromethane	24.59	1.0	20	0	123	50 - 139				
cis-1,2-Dichloroethene	19.53	1.0	20	0	97.6	78 - 123				
cis-1,3-Dichloropropene	21.17	1.0	20	0	106	75 - 124				
Dibromochloromethane	17.93	1.0	20	0	89.6	74 - 126				
Dibromomethane	20.18	1.0	20	0	101	79 - 123				
Dichlorodifluoromethane	20.89	1.0	20	0	104	32 - 152				
Ethylbenzene	19.85	1.0	20	0	99.3	79 - 121				
Hexachlorobutadiene	18.05	1.0	20	0	90.3	66 - 134				
Isopropylbenzene	19.54	1.0	20	0	97.7	72 - 131				
m,p-Xylene	40.09	2.0	40	0	100	80 - 121				
Methylene chloride	21.36	2.0	20	0	107	74 - 124				
Naphthalene	20.97	1.0	20	0	105	61 - 128				
n-Butylbenzene	20.56	1.0	20	0	103	75 - 128				
n-Propylbenzene	20.74	1.0	20	0	104	76 - 126				
o-Xylene	18.39	1.0	20	0	92.0	78 - 122				
sec-Butylbenzene	20.77	1.0	20	0	104	77 - 126				
Styrene	20.01	1.0	20	0	100	78 - 123				
tert-Butylbenzene	19.99	1.0	20	0	100.0	78 - 124				
Tetrachloroethene	19.34	1.0	20	0	96.7	74 - 129				
Toluene	19.33	1.0	20	0	96.6	80 - 121				
trans-1,2-Dichloroethene	20.07	1.0	20	0	100	75 - 124				
trans-1,3-Dichloropropene	17.76	1.0	20	0	88.8	73 - 127				
Trichloroethene	19.52	1.0	20	0	97.6	79 - 123				
Trichlorofluoromethane	21.29	1.0	20	0	106	65 - 141				
Vinyl chloride	21.85	1.0	20	0	109	58 - 137				
Surr: 1,2-Dichloroethane-d4	*54.1*	*1.0*	*50*	*0*	*108*	*81 - 118*				
Surr: 4-Bromofluorobenzene	*47.96*	*1.0*	*50*	*0*	*95.9*	*85 - 114*				
Surr: Dibromofluoromethane	*52.24*	*1.0*	*50*	*0*	*104*	*80 - 119*				

ALS Houston, US Date: 21-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50
WorkOrder: HS19110486

QC BATCH REPORT

Batch ID: R350401 (0) **Instrument:** VOA9 **Method:** VOLATILES ORGANICS BY METHOD 8260C

LCS Sample ID: **VLCSW-191113** Units: **UG/L** Analysis Date: **13-Nov-2019 12:28**
Client ID: Run ID: **VOA9_350401** SeqNo: **5342321** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Surr: Toluene-d8	*51.2*	*1.0*	*50*	*0*	*102*	*89 - 112*				

ALS Houston, US Date: 21-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50
WorkOrder: HS19110486

QC BATCH REPORT

Batch ID: R350401 (0) **Instrument: VOA9** **Method: VOLATILES ORGANICS BY METHOD 8260C**

MS Sample ID: **HS19110613-01MS** Units: **UG/L** Analysis Date: **13-Nov-2019 15:43**
Client ID: Run ID: **VOA9_350401** SeqNo: **5342334** 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	22.43	1.0	20	0	112	78 - 124				
1,1,1-Trichloroethane	23.98	1.0	20	0	120	74 - 131				
1,1,2,2-Tetrachloroethane	25.11	1.0	20	0	126	71 - 121				S
1,1,2-Trichlor-1,2,2-trifluoroethane	28.28	1.0	20	0	141	70 - 136				S
1,1,2-Trichloroethane	25.27	1.0	20	0	126	80 - 119				S
1,1-Dichloroethane	24.48	1.0	20	0	122	77 - 125				
1,1-Dichloroethene	26.81	1.0	20	0	134	71 - 131				S
1,1-Dichloropropene	29.49	1.0	20	0	147	78 - 125				S
1,2,3-Trichlorobenzene	23.75	1.0	20	0	119	69 - 129				
1,2,3-Trichloropropane	24.54	1.0	20	0	123	73 - 122				S
1,2,4-Trichlorobenzene	23.2	1.0	20	0	116	69 - 130				
1,2,4-Trimethylbenzene	25.62	1.0	20	0	128	76 - 124				S
1,2-Dibromo-3-chloropropane	20.42	1.0	20	0	102	62 - 128				
1,2-Dibromoethane	23.13	1.0	20	0	116	77 - 121				
1,2-Dichlorobenzene	23.56	1.0	20	0	118	80 - 119				
1,2-Dichloroethane	26.44	1.0	20	2.058	122	73 - 128				
1,2-Dichloropropane	27.98	1.0	20	0	140	78 - 122				S
1,3,5-Trimethylbenzene	26.16	1.0	20	0	131	75 - 124				S
1,3-Dichlorobenzene	24.2	1.0	20	0	121	80 - 119				S
1,3-Dichloropropane	26.98	1.0	20	0	135	80 - 119				S
1,4-Dichlorobenzene	22.93	1.0	20	0	115	79 - 118				
2,2-Dichloropropane	22.33	1.0	20	0	112	60 - 139				
2-Butanone	44.47	2.0	40	0	111	56 - 143				
2-Chlorotoluene	27.41	1.0	20	0	137	79 - 122				S
2-Hexanone	45.29	2.0	40	0	113	57 - 139				
4-Chlorotoluene	24.68	1.0	20	0	123	78 - 122				S
4-Isopropyltoluene	25.89	1.0	20	0	129	77 - 127				S
4-Methyl-2-pentanone	48.47	2.0	40	0	121	67 - 130				
Acetone	45.3	2.0	40	0	113	39 - 160				
Benzene	28.02	1.0	20	0	140	79 - 120				S
Bromobenzene	22.97	1.0	20	0	115	80 - 120				
Bromochloromethane	22.73	1.0	20	0	114	78 - 123				
Bromodichloromethane	25.49	1.0	20	0	127	79 - 125				S
Bromoform	20.28	1.0	20	0	101	66 - 130				

ALS Houston, US Date: 21-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50
WorkOrder: HS19110486

QC BATCH REPORT

Batch ID: R350401 (0) **Instrument: VOA9** **Method: VOLATILES ORGANICS BY METHOD 8260C**

MS Sample ID: **HS19110613-01MS** Units: **UG/L** Analysis Date: **13-Nov-2019 15:43**
Client ID: Run ID: **VOA9_350401** SeqNo: **5342334** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Bromomethane	27.49	1.0	20	0	137	53 - 141				
Carbon disulfide	50.27	2.0	40	0	126	64 - 133				
Carbon tetrachloride	27.38	1.0	20	0	137	72 - 136				S
Chlorobenzene	24.32	1.0	20	0	122	82 - 118				S
Chloroethane	29.41	1.0	20	0	147	60 - 138				S
Chloroform	23.49	1.0	20	0	117	79 - 124				
Chloromethane	29.08	1.0	20	0	145	50 - 139				S
cis-1,2-Dichloroethene	85.93	1.0	20	63.59	112	78 - 123				
cis-1,3-Dichloropropene	26.67	1.0	20	0	133	75 - 124				S
Dibromochloromethane	21.93	1.0	20	0	110	74 - 126				
Dibromomethane	26.2	1.0	20	0	131	79 - 123				S
Dichlorodifluoromethane	21.63	1.0	20	0	108	32 - 152				
Ethylbenzene	25.45	1.0	20	0	127	79 - 121				S
Hexachlorobutadiene	25.14	1.0	20	0	126	66 - 134				
Isopropylbenzene	26.16	1.0	20	0	131	72 - 131				
m,p-Xylene	51.07	2.0	40	0	128	80 - 121				S
Methylene chloride	39.43	2.0	20	16.33	116	74 - 124				
Naphthalene	24.94	1.0	20	0	125	61 - 128				
n-Butylbenzene	27.33	1.0	20	0	137	75 - 128				S
n-Propylbenzene	27.18	1.0	20	0	136	76 - 126				S
o-Xylene	25.43	1.0	20	0	127	78 - 122				S
sec-Butylbenzene	26.86	1.0	20	0	134	77 - 126				S
Styrene	25.39	1.0	20	0	127	78 - 123				S
tert-Butylbenzene	26.91	1.0	20	0	135	78 - 124				S
Tetrachloroethene	24.94	1.0	20	0	125	74 - 129				
Toluene	24.88	1.0	20	0	124	80 - 121				S
trans-1,2-Dichloroethene	22.64	1.0	20	0	113	75 - 124				
trans-1,3-Dichloropropene	21.63	1.0	20	0	108	73 - 127				
Trichloroethene	36.94	1.0	20	11.69	126	79 - 123				S
Trichlorofluoromethane	26.24	1.0	20	0	131	65 - 141				
Vinyl chloride	27.93	1.0	20	1.692	131	58 - 137				
Surr: 1,2-Dichloroethane-d4	*44.56*	*1.0*	*50*	*0*	*89.1*	*81 - 118*				
Surr: 4-Bromofluorobenzene	*49.36*	*1.0*	*50*	*0*	*98.7*	*85 - 114*				
Surr: Dibromofluoromethane	*44.53*	*1.0*	*50*	*0*	*89.1*	*80 - 119*				

ALS Houston, US Date: 21-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50
WorkOrder: HS19110486

QC BATCH REPORT

Batch ID: R350401 (0) **Instrument:** VOA9 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MS Sample ID: **HS19110613-01MS** Units: **UG/L** Analysis Date: **13-Nov-2019 15:43**
Client ID: Run ID: **VOA9_350401** SeqNo: **5342334** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Surr: Toluene-d8	*52.03*	*1.0*	*50*	*0*	*104*	*89 - 112*				

ALS Houston, US Date: 21-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50
WorkOrder: HS19110486

QC BATCH REPORT

Batch ID: R350401 (0) **Instrument: VOA9** **Method: VOLATILES ORGANICS BY METHOD 8260C**

MSD Sample ID: **HS19110613-01MSD** Units: **UG/L** Analysis Date: **13-Nov-2019 16:07**
Client ID: Run ID: **VOA9_350401** SeqNo: **5342335** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	22.26	1.0	20	0	111	78 - 124	22.43	0.775	20	
1,1,1-Trichloroethane	22.11	1.0	20	0	111	74 - 131	23.98	8.09	20	
1,1,2,2-Tetrachloroethane	24.63	1.0	20	0	123	71 - 121	25.11	1.9	20	S
1,1,2-Trichlor-1,2,2-trifluoroethane	26.3	1.0	20	0	131	70 - 136	28.28	7.28	20	
1,1,2-Trichloroethane	25.42	1.0	20	0	127	80 - 119	25.27	0.569	20	S
1,1-Dichloroethane	23.83	1.0	20	0	119	77 - 125	24.48	2.7	20	
1,1-Dichloroethene	24.63	1.0	20	0	123	71 - 131	26.81	8.48	20	
1,1-Dichloropropene	27.29	1.0	20	0	136	78 - 125	29.49	7.77	20	S
1,2,3-Trichlorobenzene	25.89	1.0	20	0	129	69 - 129	23.75	8.59	20	S
1,2,3-Trichloropropane	24.98	1.0	20	0	125	73 - 122	24.54	1.77	20	S
1,2,4-Trichlorobenzene	22.26	1.0	20	0	111	69 - 130	23.2	4.12	20	
1,2,4-Trimethylbenzene	24.52	1.0	20	0	123	76 - 124	25.62	4.37	20	
1,2-Dibromo-3-chloropropane	20.36	1.0	20	0	102	62 - 128	20.42	0.314	20	
1,2-Dibromoethane	23.5	1.0	20	0	118	77 - 121	23.13	1.6	20	
1,2-Dichlorobenzene	24.04	1.0	20	0	120	80 - 119	23.56	2.02	20	S
1,2-Dichloroethane	27.26	1.0	20	2.058	126	73 - 128	26.44	3.05	20	
1,2-Dichloropropane	30.06	1.0	20	0	150	78 - 122	27.98	7.18	20	S
1,3,5-Trimethylbenzene	23.85	1.0	20	0	119	75 - 124	26.16	9.24	20	
1,3-Dichlorobenzene	22.95	1.0	20	0	115	80 - 119	24.2	5.31	20	
1,3-Dichloropropane	25.74	1.0	20	0	129	80 - 119	26.98	4.69	20	S
1,4-Dichlorobenzene	21.65	1.0	20	0	108	79 - 118	22.93	5.77	20	
2,2-Dichloropropane	22.14	1.0	20	0	111	60 - 139	22.33	0.862	20	
2-Butanone	46.96	2.0	40	0	117	56 - 143	44.47	5.44	20	
2-Chlorotoluene	24.94	1.0	20	0	125	79 - 122	27.41	9.46	20	S
2-Hexanone	47.05	2.0	40	0	118	57 - 139	45.29	3.82	20	
4-Chlorotoluene	24.44	1.0	20	0	122	78 - 122	24.68	0.972	20	S
4-Isopropyltoluene	24.74	1.0	20	0	124	77 - 127	25.89	4.57	20	
4-Methyl-2-pentanone	49.85	2.0	40	0	125	67 - 130	48.47	2.81	20	
Acetone	42.43	2.0	40	0	106	39 - 160	45.3	6.53	20	
Benzene	26.57	1.0	20	0	133	79 - 120	28.02	5.32	20	S
Bromobenzene	21.7	1.0	20	0	109	80 - 120	22.97	5.67	20	
Bromochloromethane	23.05	1.0	20	0	115	78 - 123	22.73	1.4	20	
Bromodichloromethane	25.4	1.0	20	0	127	79 - 125	25.49	0.373	20	S
Bromoform	20.32	1.0	20	0	102	66 - 130	20.28	0.165	20	

ALS Houston, US Date: 21-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50
WorkOrder: HS19110486

QC BATCH REPORT

Batch ID: R350401 (0) **Instrument: VOA9** **Method: VOLATILES ORGANICS BY METHOD 8260C**

MSD Sample ID: **HS19110613-01MSD** Units: **UG/L** Analysis Date: **13-Nov-2019 16:07**
Client ID: Run ID: **VOA9_350401** SeqNo: **5342335** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual
Bromomethane	25.44	1.0	20	0	127	53 - 141	27.49	7.75	20	
Carbon disulfide	48.94	2.0	40	0	122	64 - 133	50.27	2.67	20	
Carbon tetrachloride	25.64	1.0	20	0	128	72 - 136	27.38	6.56	20	
Chlorobenzene	22.84	1.0	20	0	114	82 - 118	24.32	6.25	20	
Chloroethane	27.04	1.0	20	0	135	60 - 138	29.41	8.4	20	
Chloroform	23.1	1.0	20	0	116	79 - 124	23.49	1.67	20	
Chloromethane	27.31	1.0	20	0	137	50 - 139	29.08	6.26	20	
cis-1,2-Dichloroethene	83.57	1.0	20	63.59	99.9	78 - 123	85.93	2.78	20	
cis-1,3-Dichloropropene	27.77	1.0	20	0	139	75 - 124	26.67	4.04	20	S
Dibromochloromethane	20.92	1.0	20	0	105	74 - 126	21.93	4.74	20	
Dibromomethane	27.31	1.0	20	0	137	79 - 123	26.2	4.15	20	S
Dichlorodifluoromethane	20.74	1.0	20	0	104	32 - 152	21.63	4.17	20	
Ethylbenzene	24.21	1.0	20	0	121	79 - 121	25.45	5	20	S
Hexachlorobutadiene	23.23	1.0	20	0	116	66 - 134	25.14	7.89	20	
Isopropylbenzene	24.92	1.0	20	0	125	72 - 131	26.16	4.84	20	
m,p-Xylene	48.6	2.0	40	0	121	80 - 121	51.07	4.96	20	S
Methylene chloride	39.65	2.0	20	16.33	117	74 - 124	39.43	0.573	20	
Naphthalene	24.88	1.0	20	0	124	61 - 128	24.94	0.234	20	
n-Butylbenzene	25.5	1.0	20	0	127	75 - 128	27.33	6.94	20	
n-Propylbenzene	25.65	1.0	20	0	128	76 - 126	27.18	5.77	20	S
o-Xylene	24.26	1.0	20	0	121	78 - 122	25.43	4.69	20	
sec-Butylbenzene	25.92	1.0	20	0	130	77 - 126	26.86	3.56	20	S
Styrene	23.77	1.0	20	0	119	78 - 123	25.39	6.58	20	
tert-Butylbenzene	25.79	1.0	20	0	129	78 - 124	26.91	4.25	20	S
Tetrachloroethene	23.7	1.0	20	0	118	74 - 129	24.94	5.12	20	
Toluene	23.48	1.0	20	0	117	80 - 121	24.88	5.8	20	
trans-1,2-Dichloroethene	23.14	1.0	20	0	116	75 - 124	22.64	2.21	20	
trans-1,3-Dichloropropene	21.66	1.0	20	0	108	73 - 127	21.63	0.133	20	
Trichloroethene	36.06	1.0	20	11.69	122	79 - 123	36.94	2.43	20	
Trichlorofluoromethane	24.77	1.0	20	0	124	65 - 141	26.24	5.74	20	
Vinyl chloride	26.62	1.0	20	1.692	125	58 - 137	27.93	4.82	20	
Surr: 1,2-Dichloroethane-d4	*44.09*	*1.0*	*50*	*0*	*88.2*	*81 - 118*	*44.56*	*1.04*	*20*	
Surr: 4-Bromofluorobenzene	*48.7*	*1.0*	*50*	*0*	*97.4*	*85 - 114*	*49.36*	*1.36*	*20*	
Surr: Dibromofluoromethane	*46.14*	*1.0*	*50*	*0*	*92.3*	*80 - 119*	*44.53*	*3.55*	*20*	

ALS Houston, US Date: 21-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50
WorkOrder: HS19110486

QC BATCH REPORT

Batch ID: R350401 (0) **Instrument:** VOA9 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MSD Sample ID: **HS19110613-01MSD** Units: **UG/L** Analysis Date: **13-Nov-2019 16:07**
Client ID: Run ID: **VOA9_350401** SeqNo: **5342335** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Surr: Toluene-d8	*50.76*	*1.0*	*50*	*0*	*102*	*89 - 112*	*52.03*	*2.47*	*20*	

The following samples were analyzed in this batch:

HS19110486-01	HS19110486-02	HS19110486-03	HS19110486-04
HS19110486-05	HS19110486-06	HS19110486-07	HS19110486-08

ALS Houston, US Date: 21-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50
WorkOrder: **HS19110486**

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	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

Acronym	Description
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 Quantitaion Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Arkansas	19-028-0	27-Mar-2020
California	2919, 2019-2020	30-Apr-2020
Dept of Defense	ANAB L2231	20-Dec-2021
Florida	E87611-28	30-Jun-2020
Illinois	2000322019-2	09-May-2020
Kansas	E-10352 2019-2020	31-Jul-2020
Kentucky	123043, 2019-2020	30-Apr-2020
Louisiana	03087, 2019-2020	30-Jun-2020
Maryland	343, 2019-2020	30-Jun-2020
North Carolina	624-2019	31-Dec-2019
North Dakota	R-193 2019-2020	30-Apr-2020
Oklahoma	2019-067	31-Aug-2020
Texas	TX104704231-19-23	30-Apr-2020

ALS Houston, US Date: 21-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50
Work Order: HS19110486

SAMPLE TRACKING

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19110486-01	50WW21-191108	Login	11/9/2019 1:34:32 PM	AC	Sub
HS19110486-01	50WW21-191108	Login	11/9/2019 1:34:32 PM	AC	Disposed
HS19110486-02	50WW24-191108	Login	11/9/2019 1:34:32 PM	AC	Sub
HS19110486-02	50WW24-191108	Login	11/9/2019 1:34:32 PM	AC	Disposed
HS19110486-03	50WW27-191108	Login	11/9/2019 1:34:32 PM	AC	Sub
HS19110486-03	50WW27-191108	Login	11/9/2019 1:34:32 PM	AC	Disposed
HS19110486-04	50WW15-191108	Login	11/9/2019 1:34:32 PM	AC	Sub
HS19110486-04	50WW15-191108	Login	11/9/2019 1:34:32 PM	AC	Disposed
HS19110486-04	50WW15-191108	Login	11/9/2019 1:34:32 PM	AC	Disposed
HS19110486-04	50WW15-191108	Login	11/9/2019 1:34:32 PM	AC	Sub
HS19110486-04	50WW15-191108	Login	11/9/2019 1:34:32 PM	AC	Sub
HS19110486-04	50WW15-191108	Login	11/9/2019 1:34:32 PM	AC	Sub
HS19110486-05	50WW05-191108	Login	11/9/2019 1:34:32 PM	AC	Sub
HS19110486-05	50WW05-191108	Login	11/9/2019 1:34:32 PM	AC	Disposed
HS19110486-05	50WW05-191108	Login	11/9/2019 1:34:32 PM	AC	Disposed
HS19110486-05	50WW05-191108	Login	11/9/2019 1:34:32 PM	AC	Sub
HS19110486-05	50WW05-191108	Login	11/9/2019 1:34:32 PM	AC	Sub
HS19110486-05	50WW05-191108	Login	11/9/2019 1:34:32 PM	AC	Sub

ALS Houston, US Date: 21-Nov-19

Sample Receipt Checklist

Client Name: CBI-Houston
Work Order: HS19110486
Date/Time Received: **09-Nov-2019 08:50**
Received by: **JRM**

Checklist completed by: *Asad Chaudhry* eSignature 9-Nov-2019 Date
Reviewed by: *RJ Modashia* eSignature 11-Nov-2019 Date

Matrices: **GW**
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:N/A
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):	2.1c/1.6c u/C	IR 25	
Cooler(s)/Kit(s):	44854		
Date/Time sample(s) sent to storage:	11/09/2019 13:45		
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:

APTIM

COC ID: 50NOV2019-1911__-ALS

TURNAROUND TIME:

Page 1 of

RUSH:

HS19110486

Aptim Environmental & Infrastucture, Inc.

LHAAP-50

PROJECT/CLIENT INFO

Facility Name	Longhorn AAP
Project Number	501032
	LHAAP-50
Address	1203-B East Grand Avenue
	PMB 202
City	Marshall
State	TX
Postal Code	75670
Country	USA
Phone Number	713.243.7264
Project Manager	Praveen Srivastav

LABORATORY

Lab Name	ALS Laboratories
Lab Contact	RJ Modashia
Email	RJ.Modashia@alsglobal.com
Address	10450 Stanciff Rd , Suite 210
City	Houston
State	TX
Postal Code	77099
Country	USA
Phone Number	281.575.2279 or 281.530.5656

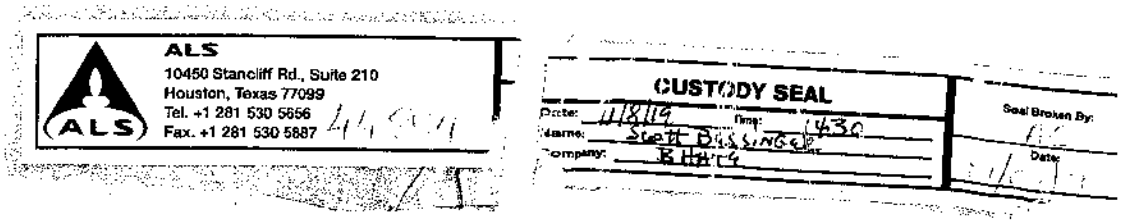
SAMPLE DETAILS

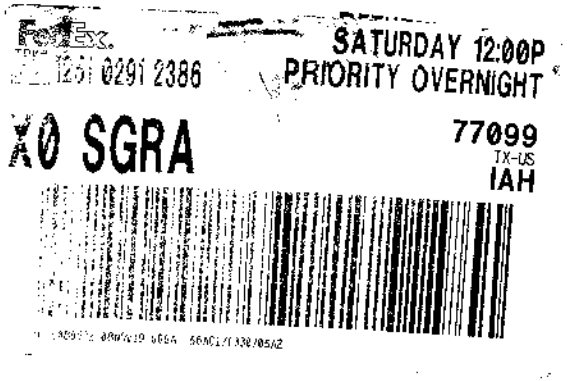
ANALYSIS REQUESTED

Sample ID	Location	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	# Of Cont.	ANALYSIS: Sample Container and Preservatives	3-40 ml VOA/HCL: Vocs by 8260B	3-40 ml VOA/HCL: MEE by RSK175	3-40 ml VOA/Cool to 6 deg C: CO2 by RSK175	2-40ml Amber/H2SO4: TOC by Sm5310C	1-250ml/Cool to 6 deg C: Anions (chlorite/sulfate/nitrate) by 9056	1-125ml/Cool to 6 deg C: Perchlorate by 6850
SDWW24-191108	LHAAP 50				WG	11/8/19	0825	4		X					X
SDWW24-191108	LHAAP 50				WG	11/8/19	0915	4		X					X
SDWW27-191108	LHAAP 50				WG	11/8/19	1005	4		X					X
SDWW15-191108	LHAAP 50				WG	11/8/19	1050	4		X					X
SDWW05-191108	LHAAP 50				WG	11/8/19	1145	4		X					X
SDWW18-191108	LHAAP 50				WG	11/8/19	1235	4		X					X
SDWW17-191108	LHAAP 50				WG	11/8/19	1325	4		X					X
TRIP BLANK	LHAAP 50				W	11/8/19		2		X					

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Sam Bruzga / BHATE	11/8/19 1430	J.M ALS-HOUSTON	11/09/19 03:50

4/C 2.1 IR#11 CF-0.5 44854


ALS
10450 Stancliff Rd., Suite 210
Houston, Texas 77099
Tel. +1 281 530 5656
Fax. +1 281 530 5887
CUSTODY SEAL
Date:
Time:
Name:
Company:
Seal Broken By:
Date:


FedEx
SATURDAY 12:00P
PRIORITY OVERNIGHT
X0 SGRA
77099
TX-US
IAH

Case Narrative

Method: 6850
Analysis: Perchlorate
Analysis SOP: LC-MS-CLO4
ALS WO ID(s): 1931753; 1932010

Client: ALS Laboratories (Houston, TX)
Matrix: Water
ELMS Batch (HBN): 2319 (252142)

General Set Information: There were twenty field samples in these Work Orders. The samples were analyzed for perchlorate.

Method Summary: Each sample was prepared as noted below and analyzed using an Agilent 1100 LC/MSD system in select ion monitoring (SIM) mode at m/z 83 and 85, which corresponds to the loss of one oxygen atom from the perchlorate molecule. ChemStation software was used for instrument control and data analysis. The ion ratio of m/z 83 to 85 was used to positively identify the response peak as perchlorate. Quantitation was performed using the m/z 83 peak area. An internal standard (ISTD) of ^{18}O labeled perchlorate was added to each sample to establish the perchlorate peak retention time and used in quantitation.

Sample Preparation: A 10.0mL aliquot of each sample was transferred into a 15-mL centrifuge tube. 50µL of an ^{18}O labeled perchlorate solution was added to each sample as an internal standard. The samples were then capped, vortexed, and filtered into autosampler vial using Phenex PES membrane 0.45µm Syringe filters.

Holding Times: Holding times were met for all analyses.

Dilutions: NA

Method QC data: The method blank (LMB 684808) was less than 1/2 the CRDL. The recovery for the LCS (684805) was within acceptable parameters.

MS/MSD Analysis: MS/MSD was performed on samples 1931753007/08 (Client ID: 04WW11-191106). 3.0µL of Working Standard Solution Horizon ID 49947 was added to 10.0mL of sample preparation. The spike target was 3.µg/L. The MS/MSD (684133/34) percent recoveries and relative percent difference (RPD) were within the performance limits.

Instrument QC: Instrument initial and continuing calibrations were performed in accordance with published procedures.

NC/CAR(s): NA

Sample Calculation: Samples were reported in µg/L. Results were calculated in µg/L by the equation (A)x(B),

where: A = Analyte concentration from the standard curve (µg/L)
B = Dilution performed at time of analysis

Miscellaneous Comments: These samples were analyzed in accordance with the requirements found in the DOD QSM Version 5.1.1. The Reporting Limit Verification Standard (RLVS – 684806) is reported from the analysis of the Laboratory Control Sample (LCS – 684805) at a level of 3.0µg/L. Due to limitations of the Chemstation Software, some of the chromatographic peaks may require manual integrations. A manual integration was performed for one of the Initial Calibration analyses (datafile: 20SEPI03) along with datafile 19OCT19D02.

Thomas Bosch November 20, 2019
Analyst Date

ANALYTICAL REPORT

Report Date: November 21, 2019

RJ Modashia
ALS Environmental (Houston)
10450 Stancliff Road
Suite 210
Houston, TX 77099

Phone: 281 530-5656

E-mail: RJ.Modashia@ALSGlobal.com

Workorder: **34-1932010**
Project ID: HS19110486
Purchase Order: HS19110486
Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
50WW21-191108	1932010001	11/08/19	11/12/19	
50WW24-191108	1932010002	11/08/19	11/12/19	
50WW27-191108	1932010003	11/08/19	11/12/19	
50WW15-191108	1932010004	11/08/19	11/12/19	
50WW05-191108	1932010005	11/08/19	11/12/19	
50WW18-191108	1932010006	11/08/19	11/12/19	
50WW17-191108	1932010007	11/08/19	11/12/19	

ANALYTICAL REPORT

Workorder: 34-1932010
Client: ALS Environmental (Houston)
Project Manager: Kevin W. Griffiths

Analytical Results

Sample ID: **50WW21-191108** | Sampling Site: NA | Collected: 11/08/2019
Lab ID: 1932010001 | Media: 125 mL Nalgene | Received: 11/12/2019
Matrix: Water | Sampling Parameter: NA

Analysis Method - EPA 6850, DoD QSM

Preparation: Not Applicable
Analysis: EPA 6850, DoD QSM Water | **Instrument ID:** LCMS04
Batch: ELMS/2319 (HBN: 252142) | **%Solids:** NA
Analyzed: 11/19/2019 12:58 | **Report Basis:** Wet

Analyte	Result (ug/L)	DL (ug/L)	LOD (ug/L)	LOQ (ug/L)	Dilution	Qual
Perchlorate	ND	1.0	2.0	4.0	1	U

Sample ID: **50WW24-191108** | Sampling Site: NA | Collected: 11/08/2019
Lab ID: 1932010002 | Media: 125 mL Nalgene | Received: 11/12/2019
Matrix: Water | Sampling Parameter: NA

Analysis Method - EPA 6850, DoD QSM

Preparation: Not Applicable
Analysis: EPA 6850, DoD QSM Water | **Instrument ID:** LCMS04
Batch: ELMS/2319 (HBN: 252142) | **%Solids:** NA
Analyzed: 11/19/2019 13:12 | **Report Basis:** Wet

Analyte	Result (ug/L)	DL (ug/L)	LOD (ug/L)	LOQ (ug/L)	Dilution	Qual
Perchlorate	ND	1.0	2.0	4.0	1	U

Sample ID: **50WW27-191108** | Sampling Site: NA | Collected: 11/08/2019
Lab ID: 1932010003 | Media: 125 mL Nalgene | Received: 11/12/2019
Matrix: Water | Sampling Parameter: NA

Analysis Method - EPA 6850, DoD QSM

Preparation: Not Applicable
Analysis: EPA 6850, DoD QSM Water | **Instrument ID:** LCMS04
Batch: ELMS/2319 (HBN: 252142) | **%Solids:** NA
Analyzed: 11/19/2019 13:26 | **Report Basis:** Wet

Analyte	Result (ug/L)	DL (ug/L)	LOD (ug/L)	LOQ (ug/L)	Dilution	Qual
Perchlorate	ND	1.0	2.0	4.0	1	U

Sample ID: **50WW15-191108** | Sampling Site: NA | Collected: 11/08/2019
Lab ID: 1932010004 | Media: 125 mL Nalgene | Received: 11/12/2019
Matrix: Water | Sampling Parameter: NA

Analysis Method - EPA 6850, DoD QSM

Preparation: Not Applicable
Analysis: EPA 6850, DoD QSM Water | **Instrument ID:** LCMS04
Batch: ELMS/2319 (HBN: 252142) | **%Solids:** NA
Analyzed: 11/19/2019 13:40 | **Report Basis:** Wet

Analyte	Result (ug/L)	DL (ug/L)	LOD (ug/L)	LOQ (ug/L)	Dilution	Qual
Perchlorate	ND	1.0	2.0	4.0	1	U

ANALYTICAL REPORT

Workorder: 34-1932010
Client: ALS Environmental (Houston)
Project Manager: Kevin W. Griffiths

Analytical Results

Sample ID: **50WW05-191108** | Sampling Site: NA | Collected: 11/08/2019
Lab ID: 1932010005 | Media: 125 mL Nalgene | Received: 11/12/2019
Matrix: Water | Sampling Parameter: NA

Analysis Method - EPA 6850, DoD QSM

Preparation: Not Applicable
Analysis: EPA 6850, DoD QSM Water | **Instrument ID:** LCMS04
Batch: ELMS/2319 (HBN: 252142) | **%Solids:** NA
Analyzed: 11/19/2019 13:54 | **Report Basis:** Wet

Analyte	Result (ug/L)	DL (ug/L)	LOD (ug/L)	LOQ (ug/L)	Dilution	Qual
Perchlorate	ND	1.0	2.0	4.0	1	U

Sample ID: **50WW18-191108** | Sampling Site: NA | Collected: 11/08/2019
Lab ID: 1932010006 | Media: 125 mL Nalgene | Received: 11/12/2019
Matrix: Water | Sampling Parameter: NA

Analysis Method - EPA 6850, DoD QSM

Preparation: Not Applicable
Analysis: EPA 6850, DoD QSM Water | **Instrument ID:** LCMS04
Batch: ELMS/2319 (HBN: 252142) | **%Solids:** NA
Analyzed: 11/19/2019 14:07 | **Report Basis:** Wet

Analyte	Result (ug/L)	DL (ug/L)	LOD (ug/L)	LOQ (ug/L)	Dilution	Qual
Perchlorate	ND	1.0	2.0	4.0	1	U

Sample ID: **50WW17-191108** | Sampling Site: NA | Collected: 11/08/2019
Lab ID: 1932010007 | Media: 125 mL Nalgene | Received: 11/12/2019
Matrix: Water | Sampling Parameter: NA

Analysis Method - EPA 6850, DoD QSM

Preparation: Not Applicable
Analysis: EPA 6850, DoD QSM Water | **Instrument ID:** LCMS04
Batch: ELMS/2319 (HBN: 252142) | **%Solids:** NA
Analyzed: 11/19/2019 14:21 | **Report Basis:** Wet

Analyte	Result (ug/L)	DL (ug/L)	LOD (ug/L)	LOQ (ug/L)	Dilution	Qual
Perchlorate	ND	1.0	2.0	4.0	1	U

Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

Method	Analyst	Peer Review
EPA 6850, DoD QSM	/S/ Thomas Bosch 11/19/2019 17:26	/S/ Stephen Brose 11/21/2019 07:07

Laboratory Contact Information

ALS Environmental
960 W Levoy Drive
Salt Lake City, Utah 84123

Phone: (801) 266-7700
Email: alslt.lab@ALSGlobal.com
Web: www.alsslc.com

ANALYTICAL REPORT

Workorder: 34-1932010
Client: ALS Environmental (Houston)
Project Manager: Kevin W. Griffiths

General Lab Comments

The results provided in this report relate only to the items tested.
Samples were received in acceptable condition unless otherwise noted.
Samples have not been blank corrected unless otherwise noted.
This test report shall not be reproduced, except in full, without written approval of ALS.

ALS provides professional analytical services for all samples submitted. ALS is not in a position to interpret the data and assumes no responsibility for the quality of the samples submitted.

All quality control samples processed with the samples in this report yielded acceptable results unless otherwise noted.

ALS is accredited for specific fields of testing (scopes) in the following testing sectors. The quality system implemented at ALS conforms to accreditation requirements and is applied to all analytical testing performed by ALS. The following table lists testing sector, accreditation body, accreditation number and website. Please contact these accrediting bodies or your ALS project manager for the current scope of accreditation that applies to your analytical testing.

Testing Sector	Accreditation Body (Standard)	Certificate Number	Website
Environmental	PJLA (DoD ELAP)	L17-506	http://www.pjlabs.com
	PJLA (ISO 17025)	L17-507-R1	http://www.pjlabs.com
	Utah (TNI)	UT00953	http://lams.nelac-institute.org/search
	Iowa (TNI)	IA# 376	http://www.shl.uiowa.edu/labcert/idnr/
	Kansas	E-10416	http://www.kdheks.gov/envlab/disclaimer.html
Industrial Hygiene	AIHA (ISO 17025 & AIHA IHLAP)	101574	http://www.aihaaccreditedlabs.org
	DOECAP-AP	L18-606	http://www.pjlabs.com
	Washington	C596	https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation
Dietary Supplements	PJLA (ISO 17025)	L17-507-R1	http://www.pjlabs.com

Result Symbol Definitions

MDL = Method Detection Limit, a statistical estimate of method/media/instrument sensitivity.
RL = Reporting Limit, a verified value of method/media/instrument sensitivity.
CRDL = Contract Required Detection Limit
Reg. Limit = Regulatory Limit.
ND = Not Detected, testing result not detected above the MDL or RL.
< Means this testing result is less than the numerical value.
** No result could be reported, see sample comments for details.

Qualifier Symbol Definitions

U = Qualifier indicates that the analyte was not detected above the MDL.
J = Qualifier Indicates that the analyte value is between the MDL and the RL. It is also used to indicate an estimated value for tentatively identified compounds in mass spectrometry where a 1:1 response is assumed.
B = Qualifier indicates that the analyte was detected in the blank.
E = Qualifier indicates that the analyte result exceeds calibration range.
P = Qualifier indicates that the RPD between the two columns is greater than 40%.

Quality Control Sample Batch Report

Analysis Information

Workorder: 1932010

Limits:	Client SOW/Contract Specified	**Preparation:**	NA	**Analysis:**	EPA 6850, DoD QSM
Basis:	DoD QSM	**Batch:**	NA	**Batch:**	ELMS/2319 (HBN: 252142)
		Prepared By:	NA	**Analyzed By:**	Thomas Bosch

Blank

LMB: 684808
Analyzed: 11/19/2019 09:32
Units: ug/L

Analyte	Result	MDL	RL
Perchlorate	ND	1	2.00

Laboratory Control Sample

LCS: 684805
Analyzed: 11/19/2019 09:04
Dilution: 1
Units: ug/L

Analyte	Result	Target	% Rec	QC Limits	
Perchlorate	2.81	3.00	93.7	78.8	123.8

Matrix Spike - Matrix Spike Duplicate

Sample:	1931753006	**MS:**	1931753007	**MSD:**	1931753008
Analyzed:	11/19/2019 10:55	**Analyzed:**	11/19/2019 11:08	**Analyzed:**	11/19/2019 11:22
Dilution:	1	**Dilution:**	1	**Dilution:**	1
Units:	ug/L	**Units:**	ug/L	**Units:**	ug/L

Analyte	Result	Result	Target	% Rec	QC Limits		Result	% Rec	RPD	QC Limits	
Perchlorate	ND	2.72	3	90.7	78.8	123.8	2.94	98.1	7.82	0.0	20.0

QC Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

Analyst	Peer Review
/S/ Thomas Bosch	/S/ Stephen Brose
11/20/2019 12:46	11/21/2019 07:07

Symbols and Definitions

- * - Analyte above reporting limit or outside of control limits
- ▲ - Sample result is greater than 4 times the spike added
- ◆ - Sample and Matrix Duplicate less than 5 times the reporting limit
- ● - Result is above the calibration range
- # - The Matrix Spike, Matrix Spike duplicate or Matrix Duplicate is reported for your information only. The sample matrix may be inappropriate for the method selected.

RPD - Relative % Difference (Spike / Spike Duplicate)
ND - Not Detected (U - Qualifier also flags analyte as not detected)
NA - Not Applicable
QC results are not adjusted for moisture correction, where applicable

W 1932010

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

18698 / #2

SAMPLING STATE: **Texas** **COC ID:** **12598**

SUBCONTRACT TO:

1932010

ALS Laboratory Group
960 LeVoy Dr
Salt Lake City, UT 84123

Phone: +1 801 266 7700

CUSTOMER INFORMATION:

Company:	ALS Houston
Contact:	RJ Modashia
Address:	10450 Stancliff Rd, Ste 210
Phone:	+1 281 530 5656
Email:	RJ.Modashia@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:	HS19110486
TSR:	Sonia West

	LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
	ANALYSIS REQUESTED			DUE DATE
1.	**HS19110486-01**	**50WW21-191108**	**Groundwater**	**08 Nov 2019 08:25**
	SUB_Perch-6850			25 Nov 2019
2.	**HS19110486-02**	**50WW24-191108**	**Groundwater**	**08 Nov 2019 09:15**
	SUB_Perch-6850			25 Nov 2019
3.	**HS19110486-03**	**50WW27-191108**	**Groundwater**	**08 Nov 2019 10:05**
	SUB_Perch-6850			25 Nov 2019
4.	**HS19110486-04**	**50WW15-191108**	**Groundwater**	**08 Nov 2019 10:50**
	SUB_Perch-6850			25 Nov 2019
5.	**HS19110486-05**	**50WW05-191108**	**Groundwater**	**08 Nov 2019 11:45**
	SUB_Perch-6850			25 Nov 2019
6.	**HS19110486-06**	**50WW18-191108**	**Groundwater**	**08 Nov 2019 12:35**
	SUB_Perch-6850			25 Nov 2019
7.	**HS19110486-07**	**50WW17-191108**	**Groundwater**	**08 Nov 2019 13:25**
	SUB_Perch-6850			25 Nov 2019

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

Subcontract Chain of Custody

SAMPLING STATE: **Texas** **COC ID:** **12598**

QC Level: DOD IV (DoD Data Package)

Relinquished By:		Date/Time:	11/11/19 1800
Received By:		Date/Time:	11/12/19 10:14
Cooler ID(s):		Temperature(s):	

09 Nov 2015 Page 2 of 2

ALS-SALT LAKE CITY-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: ALS Houston — Project/Task/Site: 1932010

Date/Time of Receipt: 11/12/19 10:14 — Number of Coolers Received: 1

Condition of Coolers:	Acceptable/Unacceptable	Temperature Control:	Present/Not Included
Cooler Custody Seals:	Present/Absent/NA		
	Intact/Broken/NA	Location Temp Taken:	Control/Between Samples
Container Custody Seals:	Present/Absent/NA		
	Intact/Broken/NA	Are all temperatures within project specific guidelines?	Yes/No/NA
Ice Present:	Yes/No/NA	VOA Headspace Present?	Yes/No/NA
	Frozen/Melted/NA		

pH Check Performed:							
	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA

Cooler Received	Cooler Condition	Temp.	Cooler Received	Cooler Condition	Temp.	Cooler Received	Cooler Condition	Temp.
1	Great	3 °C	4		°C	7		°C
2		°C	5		°C	8		°C
3		°C	6		°C	9		°C

Taken By: [signature] (Signature) — Jaylynn Johnson (Printed Name) — 11/12/19 (Date)

CLIENT-RELATED INFORMATION

☐ Missing Cooler	☐ Missing Samples/Bottles	☐ Incorrect Preservation	☐ Insufficient Sample Volume
☐ Cooler Conditions	☐ Broken/Leaking Samples	☐ pH Criteria Not Met	☐ Chain of Custody Problems
☐ Missing Paperwork	☐ Incorrect Bottle Type	☐ Residual Chlorine Present	☐ Other:
☐ Missing/Incorrect Bottle Labels	☐ Cooler Temperatures Out of Range	☐ Head Space in Bottles	

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

Client Notified? YES ☐ NO ☐

Response Required Within 24 Hours

PROJECT MANAGEMENT

PROJECT MANAGER COMMENTS:

ALS Project Manager: _____ (Printed Name) Returned to Sample Receipt by: _____ (Signature) Date: _____



ORIGIN ID:SGRA (281) 530-5656
SHIPPING DEPT
ALS LABORATORY GROUP
10450 STANCLIFF RD
SUITE 210
HOUSTON, TX 77099
UNITED STATES US

SHIP DATE: 1NOV19
ACTWGT: 11.0 LB
CAD: 3001[illegible]/CAFE3211
DIMS: 14x1[illegible]10 IN
BILL THIRD PARTY

TO **SAMPLE RECEIVING**
ALS ENVIRONMENTAL
960 W. LEVOY DRIVE

SALT LAKE CITY UT 84123
(801) 266-7700
REF: HS19110486 - RJ

FedEx Express

TRK# 0201 **1251 0291 5960**

TUE - 2 NOV 3:00P
STANDAR OVERNIGHT

AX BTFA

84123
UT-US **SLC**

RT 907 5
ST 15.2 15:00 A
5960
11.12

ALS
10450 Stancliff R
Houston, Texas 7
Tel. +1 281 530 5
Fax. +1 281 530 5

00988038

ALS Environmental

CHAIN-OF-CUSTODY

Project / Job / Task: HS19110486	***Split:***	**Workorder ID:** 1932010	**Level:** ENV_LVL4
Client: ALS Environmental (Houston)		**Account:** 8101	**Type:** 125Poly
Comments:			**Preservatives**

Item	Collect Date/Time	Sample ID	Lab ID	QC	Matrix	Containers ID(s)	Containers Count	Requested Analysis: EPA 6850, DoD QSM
1	11/08/2019 08:25	50WW21-191108	1932010001		Water	A	1	A
2	11/08/2019 09:15	50WW24-191108	1932010002		Water	A	1	A
3	11/08/2019 10:05	50WW27-191108	1932010003		Water	A	1	A
4	11/08/2019 10:50	50WW15-191108	1932010004		Water	A	1	A
5	11/08/2019 11:45	50WW05-191108	1932010005		Water	A	1	A
6	11/08/2019 12:35	50WW18-191108	1932010006		Water	A	1	A
7	11/08/2019 13:25	50WW17-191108	1932010007		Water	A	1	A
8								
9								
10								

50 of 151

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Reason for Transfer / Storage Location
Warath/Julie	11/12/2019 10:14	ALS Sample Receiving	Sample Login
Julie Warath	11/12/19 1400	4C	storage
R-33.1	11.19.19/08:15	T.Bursel	eLog analysis

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep / Analysis for: _____ Lab Notebook No.: _____

Prepared / Analyzed by: _____ Date / Time: _____

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Reason for Transfer / Storage Location

Batch Worklist

Batch: ELMS/ 2319 Created: 11/19/2019 07:58 Instrument: LCMS04 HBN: 252142
Rule: EPA 6850, DoD QSM Water Analyst: T. Bosch Status: WP

Workorder: 1931753 [ENV_LVL4]
Workorder: 1932010 [ENV_LVL4]

Pos	Lab ID	Sample ID	Prep Initial	Prep Final	Dust Weight	Type	Mx	Container	Procedure	Mgr	Expire Date	Due Date	Run Date
1	684804	CCV for HBN 252142 [ELMS/2319]				CCV	3		E685041C3Q	5311		11/21/2019	11/19/2019
2	684805	LCS for HBN 252142 [ELMS/2319]				LCS	3		E6850Q413Q	5311		11/21/2019	11/19/2019
3	684807	ICS for HBN 252142 [ELMS/2319]				ICS	3		E6850..D3Q	5311		11/21/2019	11/19/2019
4	684808	LMB for HBN 252142 [ELMS/2319]				LMB	3		E6850Q413Q	5311		11/21/2019	11/19/2019
5	1931753001	04WW02-191105				SAMPLE	3	1931753001-A	E6850Q41.3	5480	12/3/2019	11/21/2019	11/19/2019
6	1931753002	04WW02-191105-FD				FLDDUP	3	1931753002-A	E6850Q41.3	5480	12/3/2019	11/21/2019	11/19/2019
7	1931753003	LHSMW02-191105				SAMPLE	3	1931753003-A	E6850Q41.3	5480	12/3/2019	11/21/2019	11/19/2019
8	1931753004	04WW03-191106				SAMPLE	3	1931753004-A	E6850Q41.3	5480	12/4/2019	11/21/2019	11/19/2019
9	1931753005	04WW06-191106				SAMPLE	3	1931753005-A	E6850Q41.3	5480	12/4/2019	11/21/2019	11/19/2019
10	1931753006	04WW11-191106				SAMPLE	3	1931753006-A	E6850Q41.3	5480	12/4/2019	11/21/2019	11/19/2019
11	1931753007	04WW11-191106MS				MS	3	1931753007-A	E6850Q413Q	5480		11/21/2019	11/19/2019
12	1931753008	04WW1I-191106MSD				MSD	3	1931753008-A	E6850Q413Q	5480		11/21/2019	11/19/2019
13	1931753009	04WW05-191106				SAMPLE	3	1931753009-A	E6850Q41.3	5480	12/4/2019	11/21/2019	11/19/2019
14	1931753010	04WW08-191106				SAMPLE	3	1931753010-A	E6850Q41.3	5480	12/4/2019	11/21/2019	11/19/2019
15	684809	CCV for HBN 252142 [ELMS/2319]				CCV	3		E685041C3Q	5311		11/21/2019	11/19/2019
16	1931753011	04WW04-191106				SAMPLE	3	1931753011-A	E6850Q41.3	5480	12/4/2019	11/21/2019	11/19/2019
17	1931753012	LHSMW01-191106				SAMPLE	3	1931753012-A	E6850Q41.3	5480	12/4/2019	11/21/2019	11/19/2019
18	1931753013	Fire Station Well-191106				SAMPLE	3	1931753013-A	E6850Q41.3	5480	12/4/2019	11/21/2019	11/19/2019
19	1932010001	50WW21-191108				SAMPLE	3	1932010001-A	E6850Q41.3	5480	12/6/2019	11/25/2019	11/19/2019
20	1932010002	50WW24-191108				SAMPLE	3	1932010002-A	E6850Q41.3	5480	12/6/2019	11/25/2019	11/19/2019
21	1932010003	50WW27-191108				SAMPLE	3	1932010003-A	E6850Q41.3	5480	12/6/2019	11/25/2019	11/19/2019
22	1932010004	50WW15-191108				SAMPLE	3	1932010004-A	E6850Q41.3	5480	12/6/2019	11/25/2019	11/19/2019
23	1932010005	50WW05-191108				SAMPLE	3	1932010005-A	E6850Q41.3	5480	12/6/2019	11/25/2019	11/19/2019
24	1932010006	50WW18-191108				SAMPLE	3	1932010006-A	E6850Q41.3	5480	12/6/2019	11/25/2019	11/19/2019
25	1932010007	50WW17-191108				SAMPLE	3	1932010007-A	E6850Q41.3	5480	12/6/2019	11/25/2019	11/19/2019
26	684806	RLVS for HBN 252142 [ELMS/2319				RLVS	3		E685041C3Q	5311		11/21/2019	
27	684810	CCV for HBN 252142 [ELMS/2319]				CCV	3		E685041C3Q	5311		11/21/2019	11/19/2019



ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Analytical Documentation

Analyst Write-up

ALS Work Order #'s & Sample #( )'s: 1931753 (001-13); 1932010 (001-07)
ELMS Batch/HBN ID: 2319 (252142)
Prep Date: 11/14,19/2019 Analysis Date: 11/19/2019 Analyst: Tom Bosch
Analyte: **Perchlorate** Matrix: **Water** Method: **6850**
Sequence: \\HPCHEM\1\SEQUENCE\CLO4\2019\NOV\19NOV19D.s
Reported DL: **1.0µg/L** Reported LOD: **2.0µg/L** Reported LOQ: **4.0µg/L**

SAMPLE PREPARATION/ANALYSIS:

Water: Samples were prepared by Tom Bosch. 10.0mL of each sample was pipetted into a 15-mL centrifuge tube, and 50µL of an oxygen-18 labeled perchlorate solution was added as an internal standard. The samples were capped, vortexed, and filtered with Phenex PES membrane 0.45µm Syringe filters prior to analysis.

REAGENTS: Eluent A1: 95% ASTM Type II water (ALS)/5%ACN (B&J Lot DU461-US)/0.1% glacial acetic acid (JT-Baker Lot 122550).
Eluent B1: 95% ACN (B&J Lot DU461-US)/5% ASTM Type II water (ALS)/0.1% glacial acetic acid (JT-Baker Lot 122550).

STANDARDS: Internal Standard Spiking Solution Horizon# 47863. Dilutions of Working Standards (Horizon: 49947/48) used for ICAL, CCV's, RLVS and ICS.

CALIBRATION CURVE: Used curve from 09/20/2019, sequence 20SEP19D.s Offline Quantitation Method: CLO4-DP3.M

INSTRUMENT CONDITIONS: Samples were analyzed with an Agilent 1100 LC/MSD system, in negative SIM mode, monitoring m/z 83, 85, and 89.
Instrument ID: LCMS04 Online Acquisition Method: CLO4-AQN.M Fragmentor: 160 Output Gain: 7 Injection Volume: 30µL
Column: KP-RPPX C8 separator, 250mm Mobile Phase: 70% Eluent A1; 30% Eluent B1 Run time: 12.0min.

FLOW GRADIENT:

Time (min.)	Flow (mL/min)
0	0.65
5.8	0.65
5.9	0.25
10.3	0.25
10.5	0.65
12.0	0.65

QC DATA: 3.0µL of QC Solution Horizon ID 47516 was used for LCS 684805; Target = 3.0µg/L. ASTM type II water was used for LMB 684808.

MS/MSD: The Matrix Spike and duplicate (MS/MSD) was performed on samples 1931753007/08 (Client ID's: 04WW01-191106. 3.0µl of Working Standard Solution Horizon ID 49947 was added to 10.0mL of sample preparation. Spike target = 3.0µg/L.

COMMENTS:

1) Results reported in µg/L.
2) All QC, Blank, CCV, and MS/MSD results were within method parameters.
3) Sample data can be viewed at two directories within the ALS system: \\ALSLTWS013\LCMS\LCMS04\2019\NOV\HBN# or through NuGenesis\Tree\PrintData\LCMS\DefaultView.
4) Notebook: \\alsltws013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\252142-DoD-ALS-Hstn LCMS4 or through \\ALSLTWS013\DATAREVIEW\HBN#
5) The Reporting Limit Verification Standard (RLVS – 684806) is reported from the analysis of the Laboratory Control Sample (LCS – 684805) at a level of 3.0µg/L.
6) Due to limitations of the Chemstation Software, some of the chromatographic peaks require manual integration. Manual Integrations were performed for one of the Initial Calibration analyses (datafile: 20SEPI03) along with datafile 19OCT19D02.

5.5 Chromatography (GC, HPLC and LC/MS) Technical Review

Note: It is the peer reviewer's responsibility to ensure that appropriate criteria are used as defined in the HORIZON PROFILE. The evaluation criteria are prioritized as per Section 2.2 of this SOP. These items must be checked for all projects. The following checklist will be completed by both the analyst and the peer reviewer and scanned into the HBN folder with the raw data.

Chromatography (GC, HPLC, LC/MS) Technical Review Criteria **Batch(es)/SDG:** ELMS: 2319 HBN: 252142 **Sample Set IDs if Applicable:** 1931753 / 1932010	**Analyst Initials**	**Reviewer Initials**
Sample positions on autosampler verified against instrument sequence	TB	NA
Calibration standards analyzed and meets criteria	TB	SR
Standards traceability checked and meets criteria	TB	SR
Standard curve coefficients evaluated and meet criteria	TB	SR
ICVs analyzed and meet acceptance criteria	TB	SR
CCVs analyzed and meet acceptance criteria	TB	SR
Retention Time Windows checked	TB	SR
For method 8081A, Endrin/DDT Breakdown is checked for compliance	—	—
Surrogate recoveries checked and appropriately addressed	—	—
Method Preparation Blanks analyzed and meet acceptance criteria	TB	SR
MSs, MSDs, and/or MDs analyzed and calculations checked; applicable	TB	SR
RLVS analyzed	TB	SR
Preparation and analysis hold times met	TB	SR
Preparation deviations and re-preparations noted when performed	TB	SR
Analysis deviations and re-analyses noted when performed	TB	SR
Sample dilution factors noted on reports	TB	SR
Electronic records in HBN transcription accuracy and completeness	TB	SR
Preparation and analysis calculations checked	TB	SR
NCRs are completed as necessary NC/CAR#_____	TB	SR
Report forms are complete and accurate	TB	SR
Manual integrations checked	TB	SR

STANDARD REPORT

Working Standard - CLO4ISTDWRK

CLO4ISTDWRK		Description - Perchlorate ISTD Wrk 1,000ug/L
Standard: 49946	**Created By:** Thomas Bosch	**Amount:** 25 mL
MFG: ALS/SLC	**Create Date:** 09/23/2019 03:09PM	**Expires:** 09/19/2020
MFG Lot: TNB: 09/20/2019	**Verified By:** Thomas Bosch	**Usable:** Yes
Pipette ID: Not Provided	**Verify Date:**	**Lab Lot:** CLO4ISTDWRK

Pos.	Analyte	Name	Concentration
1	14797-73-0-8385	Perchlorate 83:85 Ratio	1000 ug/L
2	14797-73-0-89	Perchlorate 89	1000 ug/L

Composition

Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
47863	CLO4ISTDSTK	Perchlorate ISTD Stock	CLO4ISTDSTK	0.25 mL	12/05/2028

STANDARD REPORT

Constituent

Stock Standard - CLO4ISTDSTK

CLO4ISTDSTK		Description - Perchlorate ISTD Stock
Standard: 47863	**Created By:** Thomas Bosch	**Amount:** 1 mL
MFG: Cambridge Isotope	**Create Date:** 05/23/2019 10:05AM	**Expires:** 12/05/2028
MFG Lot: SDIH-016	**Verified By:** Thomas Bosch	**Usable:** Yes
Part ID: OLM-7310-S	**Verify Date:**	**Lab Lot:** CLO4ISTDSTK

Pos.	Analyte	Name	Concentration
1	14797-73-0-8385	Perchlorate 83:85 Ratio	100 ug/mL
2	14797-73-0-89	Perchlorate 89	100 ug/mL

STANDARD REPORT

Working Standard - CLO4 WRK

CLO4 WRK		Description - 6850 WKG Std 100.ug/L
Standard: 49948	**Created By:** Thomas Bosch	**Amount:** 10 mL
MFG: ALS/SLC	**Create Date:** 09/20/2019 03:09PM	**Expires:** 07/25/2020
MFG Lot: TNB: 09/20/2019		**Usable:** Yes
Pipette ID: Not Provided		**Lab Lot:** CLO4 WRK

Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	0.1 ug/mL
2	14797-73-0-8385	Perchlorate 83:85 Ratio	0.1 ug/mL

Composition

Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
49947	CLO4 INT	6850 Intermdt AccStd 10.ug/mL	CLO4 INT	0.1 mL	07/25/2020

STANDARD REPORT

Constituent

Stock Standard - CLO4 STOCK

CLO4 STOCK		Description - 6850 Stock AccStd 1,000ug/mL
Standard: 43659	**Created By:** Thomas Bosch	**Amount:** 100 mL
MFG: AccuStandard	**Create Date:** 09/17/2018 09:09AM	**Expires:** 07/25/2020
MFG Lot: 218065075		**Usable:** Yes
Part ID: IC-PER-10X-1		**Lab Lot:** CLO4 STOCK

Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	1000 ug/mL
2	14797-73-0-8385	Perchlorate 83:85 Ratio	1000 ug/mL

STANDARD REPORT

Constituent

Solvent Standard - ASTM H2O

ASTM H2O			Description - ASTM Type II Water
Standard: 109	**Created By:** ALS Support (Lims)	**Amount:** 1000 L	
MFG: DCL In House	**Create Date:** 10/06/2005 09:10AM	**Expires:** 11/07/2025	
MFG Lot: Not Provided		**Usable:** Yes	
Part ID: Not Provided		**Lab Lot:** LAB 109	

Pos.	Analyte	Name	Concentration
Solvent - Analyte(s) not applicable			

STANDARD REPORT

Constituent

Working Standard - CLO4 INT

CLO4 INT	Description - 6850 Intermdt AccStd 10.ug/mL

Standard: 49947
MFG: ALS/SLC
MFG Lot: TNB: 09/20/2019
Pipette ID: Not Provided

Created By: Thomas Bosch
Create Date: 09/23/2019 03:09PM

Amount: 10 mL
Expires: 07/25/2020
Usable: Yes
Lab Lot: CLO4 INT

Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	10 ug/mL
2	14797-73-0-8385	Perchlorate 83:85 Ratio	10 ug/mL

Composition

Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
43659	CLO4 STOCK	6850 Stock AccStd 1,000ug/mL	CLO4 STOCK	0.1 mL	07/25/2020

STANDARD REPORT

Working Standard - CLO4 QC WRK

CLO4 QC WRK — **Description - 6850 QC WKG STD 100ug/L**

Standard: 47516
MFG: ALS/SLC
MFG Lot: TNB: 05/06/2019
Pipette ID: Not Provided

Created By: Thomas Bosch
Create Date: 05/06/2019 03:05PM

Amount: 10 mL
Expires: 03/31/2020
Usable: Yes
Lab Lot: CLO4 QC WRK 100.ug/L

Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	100 ug/L

Composition

Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
47515	CLO4 QC INT	6850 QC Intrmdt Std-QC 10ug/mL	CLO4 QC INT 10.ug/mL	0.1 mL	03/31/2020

STANDARD REPORT

Constituent

Solvent Standard - ASTM H2O

ASTM H2O			**Description - ASTM Type II Water**
Standard: 109	**Created By:** ALS Support (Lims)	**Amount:** 1000 L	
MFG: DCL In House	**Create Date:** 10/06/2005 09:10AM	**Expires:** 11/07/2025	
MFG Lot: Not Provided		**Usable:** Yes	
Part ID: Not Provided		**Lab Lot:** LAB 109	

Pos.	Analyte	Name	Concentration
Solvent - Analyte(s) not applicable			

STANDARD REPORT

Constituent

Stock Standard - CLO4 QCSTOCK

CLO4 QCSTOCK		Description - 6850 QC Stock STD 1,000ug/mL
Standard: 36748	**Created By:** Thomas Bosch	**Amount:** 100 mL
MFG: Ultra Scientific	**Create Date:** 05/11/2017 01:05PM	**Expires:** 03/31/2020
MFG Lot: CP-0860		**Usable:** Yes
Part ID: ICC-013		**Lab Lot:** CLO4 QC STOCK

Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	1000 ug/mL

STANDARD REPORT

Constituent

Working Standard - CLO4 QC INT

CLO4 QC INT — **Description - 6850 QC Intrmdt Std-QC 10ug/mL**

Standard: 47515
MFG: ALS/SLC
MFG Lot: TNB: 05/06/2019
Pipette ID: Not Provided

Created By: Thomas Bosch
Create Date: 05/06/2019 03:05PM

Amount: 10 mL
Expires: 03/31/2020
Usable: Yes
Lab Lot: CLO4 QC INT 10.ug/mL

Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	10 ug/mL

Composition

Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
36748	CLO4 QCSTOCK	6850 QC Stock STD 1,000ug/mL	CLO4 QC STOCK	0.1 mL	03/31/2020

125 Market Street
New Haven, CT 06513
USA

AccuStandard®

Tel (203)786-5290
Fax (203)786-5287
www.AccuStandard.com

CERTIFICATE OF ANALYSIS

S 43659

AccuTrace™ Reference Standard

Catalog No: IC-PER-10X-1
Description: Perchlorate Standard
Element: Perchlorate (ClO_4)
SRM: Ind. Std.
Lot: 218065075
Matrix: Water
Hazards: *Refer to SDS for complete safety information*

Signal Word: None

Date Certified: Jun 25, 2018
Expiration: Jul 25, 2020
Sample Size: 100 mL
Components: 1
Storage Condition: Ambient (>5 °C)
Included on ISO/IEC 17025 Scope of Accreditation: Yes
Included on ISO 17034 Scope of Accreditation: Yes

Component		SRM #	Prepared Concentration (µg/mL)
ClO_4	Perchlorate	Ind. Std.	1000

AccuStandard

The gravimetric uncertainty for this product is ±0.24%.
The final solution was checked against an independent standard to verify its concentration.
We use the highest purity raw materials available to minimize impurity levels in the final solution. Typically 99.999%+ pure starting materials are used as well as ASTM Type I 18 megohm deionized water.
All solutions are filtered through a 0.2 µm filter prior to being bottled.
All glassware used in preparation is Class A and calibrated regularly.
All weights are traceable through NIST, Test No. 822-275872-11
All bottles are triple rinsed with deionized water prior to use.
Shake bottle prior to use and do not pipette directly out of the bottle. Use only cleaned Class A volumetric glassware.
We certify the accuracy of this standard to be ±0.5% of the stated value until its expiration date provided it is kept tightly capped and stored under the conditions stated above.

Certified By: Meigan O'Leary
Meigan O'Leary, Inorganic QC Manager

Page 1 of 1

For use in routine laboratory analysis.

AccuStandard is accredited to ISO 17034, ISO/IEC 17025 and certified to ISO 9001:2015

QR-ORG/INO-001
Rev. 5/18

ULTRA SCIENTIFIC
Analytical Solutions

Certificate of Analysis

ISO Guide 34 Reference Material

Product Number: ICC-013
Lot Number: CP-0860

S 36748

Lot Issue Date: 29-Feb 2016
Expiration Date: 31-Mar 2020

Product Name: Perchlorate IC Standard

Description:
This Reference Material (RM) was gravimetrically prepared in accordance with ISO Guide 34 and under ULTRA Scientific's ISO 9001 registered quality system. The neat materials used for this product have been verified by ULTRA's ISO 17025 laboratory and under ULTRA's ISO Guide 34 accreditation. The analyte concentrations were verified by ULTRA's ISO 17025 accredited laboratory. For each analyte, the true value, with its uncertainty value calculated at the 95% confidence level, is reported below.

Analyte	Starting Material	Lot Number	Purity (%)	Calculated Value	True Value	Traceability & Method
perchlorate	potassium perchlorate	RM07987	100	1001 ± 5 µg/mL	976 ± 6 µg/mL	NIST SRM 3141A; ICP-OES

Solvent: water (low TOC, < 50 ppb)

Storage: Store at Room Temperature (15° to 30°C).

Traceability:
Traceability has been established through an unbroken chain of comparisons, each having stated uncertainties. Comparisons are based on appropriate physical or chemical measurements, including gravimetric or volumetric dilution, where the mass or volume of a solution before and after dilution is measured. The balances used for these measurements are calibrated with weights traceable to NIST in compliance with ANSI/NCSL Z-540-1, ISO 9001, ISO 17025, and ISO Guide 34. Calibrated Class A glassware is used for volumetric measurements. Thermometers are calibrated against a NIST traceable thermometer in accordance with NIST Special Publication 819.

Estimation of Uncertainties:
The true value is reported, with its uncertainty value calculated at the 95% confidence level.

Homogeneity:
This RM was formulated and unitized according to an in-house procedure and is guaranteed to be homogeneous. There is no minimum sub-sample size required.

Intended Use:
This RM is intended for the preparation of working reference samples for use in routine laboratory analyses, calibration of instruments, validation of analytical methods, assessments of measurement methods and continuing calibration verification.

Instructions for Use:
Sample aliquots for analysis should be withdrawn at 20°C to 25°C immediately after opening and should be processed without delay for the true value to be valid within the stated uncertainties. Do not pipet from the bottle. Do not return any material removed for pipetting to the bottle. Tightly cap the bottle after removing any material and store according to the instructions noted above.

Hazards:
Refer to the Safety Data Sheet for information regarding this RM.

Expiration of Certification:
The certification of this RM is valid, within the measurement uncertainty specified, until the expiration date specified above, provided the RM is handled and stored in accordance with the instructions given in this certificate. This certification is nullified if the RM is damaged, contaminated, or otherwise modified.

ANAB ACCREDITED PRODUCER REFERENCE MATERIAL PRODUCER

ANAB ACCREDITED TESTING LABORATORY

ISO 9001 Registered Quality System – TUV USA

ULTRA SCIENTIFIC
Analytical Solutions

Certificate of Analysis

TRIPLE ISO CERTIFICATION ULTRA ISO 9001 ISO GUIDE 34 ISO 17025

ISO Guide 34 Reference Material

Product Number: ICC-013
Lot Number: CP-0860

Lot Issue Date: 29-Feb 2016
Expiration Date: 31-Mar 2020

Maintenance of Certification:
The real-time, long term stability of the RM may be monitored over the lifetime of the certification. If substantive changes occur that affect the certification before the expiration of this certificate, ULTRA Scientific will notify the purchaser.

Peter A. King, Ph.D.
VP, Technical Operations

Daniel J. Lamendola
Director of QA/RA

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

ANAB ACCREDITED CALIBRATION TESTING LABORATORY

Cambridge Isotope Laboratories, Inc.

Certificate of Analysis

S 47863

Product Name: PERCHLORIC ACID, SODIUM SALT
(Isotopic Label & Enrichment Specification) (18O4, 90%+) 100 UG/ML IN WATER

Lot Number: SDIH-016

Catalog Number: OLM-7310-S

Product Information

Chemical Purity Specification:	≥ 98%
MW*: ** For isotopically labeled compounds, MW listed is for the fully enriched product.*	130.44
Labeled CAS Number:	NA
Unlabeled CAS Number:	7601-89-0
Chemical Formula:	NaCl*O4
Storage:	Store at room temperature away from light and moisture.
Stability:	See storage and expiration date.

$NaCl^{18}O_4$

Certification

Cambridge Isotope Laboratories, Inc. guarantees that this material meets or exceeds the specifications stated. Absolute identity as well as chemical and isotopic purities are assured by the use of unambiguous synthetic routes and multiple chemical analyses whenever possible. Results are representative of QC testing at time of release from Quality Control unless otherwise stated. CIL Certificates of Analysis are occasionally updated with new data following recertification. We recommend checking the website for the latest version.

Volumetric measurements were made with Class A glassware. Gravimetry is traceable to the NIST through calibrated balances and certified, calibrated, standard weights. The calibrations are traceable to the NIST under Test No. 822/270236-04. The calibrations also meet specifications outlined in ISO 9001, ISO/IEC 17025, ANSI/NSCL Z540-1-1994, NCR Document 10CFR50 Appendix B, and applicable subdocuments.

This COA references the bulk catalog number before packaging. The COA also applies to the CIL finished good catalog number . Some possible packaging sizes and their corresponding suffix are -1.2, -1, -0.5, -10, or -0.1.

Approved by: Sashi Sivendran-Basak

Sashi Sivendran-Basak, Ph.D., Quality Review

Quality Control Tests and Results

QC Release Date	12/05/2018
Expiration Date	12/05/2028
Concentration Based on Gravimetry	100.0 ± 1.0 µg/mL (k=2)
Chemical Purity of Neat Material(s)	98%
LC/MS for Concentration	105.4 ± 1.1 µg/mL (k=2)

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Raw Data

Batch Report: C:\HPCHEM\1\DATA\19NOV19D\19NOV19S.B

Batch Review Method:
C:\HPCHEM\1\METHODS\CLO4-DP3.M

['#' ==> Run has not been reprocessed with Batch Review Method
'*' ==> Run has been saved with batch file]

#*	Sample	Location	Inj	SampleType	Run	Perchlorate Area	Perchlorat RT	Perchlorate Amount
*	684804 CCV@25	Vial 71	1	Control	1	1.11549e6	7.375	25.70542
*	684805 QC@3.0	Vial 72	1	Control	2	1.57343e5	7.389	2.81132
*	684807 ICS@3.0	Vial 73	1	Control	3	9.81343e4	7.227	2.70044
*	684808 LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1931753001	Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	1931753002	Vial 76	1	Sample	6	0.00000	0.000	0.00000
*	1931753003	Vial 77	1	Sample	7	0.00000	0.000	0.00000
*	1931753004	Vial 78	1	Sample	8	0.00000	0.000	0.00000
*	1931753005	Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	1931753006	Vial 80	1	Sample	10	0.00000	0.000	0.00000
*	1931753007 MS	Vial 81	1	Sample	11	1.30769e5	7.199	2.72098
*	1931753008 MSD	Vial 82	1	Sample	12	1.27060e5	7.171	2.94244
*	1931753009	Vial 83	1	Sample	13	0.00000	0.000	0.00000
*	1931753010	Vial 84	1	Sample	14	4.91726e5	7.095	13.36216
*	684809 CCV@25	Vial 71	1	Control	15	9.31289e5	7.389	24.67348
*	1931753011	Vial 85	1	Sample	16	0.00000	0.000	0.00000
*	1931753012	Vial 86	1	Sample	17	0.00000	0.000	0.00000
*	1931753013	Vial 87	1	Sample	18	0.00000	0.000	0.00000
*	1932010001	Vial 88	1	Sample	19	0.00000	0.000	0.00000
*	1932010002	Vial 89	1	Sample	20	0.00000	0.000	0.00000
*	1932010003	Vial 90	1	Sample	21	0.00000	0.000	0.00000
*	1932010004	Vial 91	1	Sample	22	0.00000	0.000	0.00000
*	1932010005	Vial 92	1	Sample	23	0.00000	0.000	0.00000
*	1932010006	Vial 93	1	Sample	24	0.00000	0.000	0.00000
*	1932010007	Vial 94	1	Sample	25	0.00000	0.000	0.00000
*	684810 CCV@25	Vial 71	1	Control	26	9.08551e5	7.429	24.23157

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount
*	684804 CCV@25	Vial 71	1	Control	1	1.47847e5	7.396	5.00000
*	684805 QC@3.0	Vial 72	1	Control	2	2.05736e5	7.412	5.00000
*	684807 ICS@3.0	Vial 73	1	Control	3	1.33496e5	7.255	5.00000
*	684808 LMB	Vial 74	1	Control	4	1.53147e5	7.417	5.00000
*	1931753001	Vial 75	1	Sample	5	1.89772e5	7.293	5.00000
*	1931753002	Vial 76	1	Sample	6	1.71402e5	7.294	5.00000
*	1931753003	Vial 77	1	Sample	7	1.69955e5	7.124	5.00000
*	1931753004	Vial 78	1	Sample	8	1.72551e5	7.195	5.00000
*	1931753005	Vial 79	1	Sample	9	1.42815e5	7.006	5.00000
*	1931753006	Vial 80	1	Sample	10	1.77283e5	7.209	5.00000
*	1931753007 MS	Vial 81	1	Sample	11	1.76570e5	7.222	5.00000
*	1931753008 MSD	Vial 82	1	Sample	12	1.58843e5	7.200	5.00000
*	1931753009	Vial 83	1	Sample	13	1.48965e5	7.198	5.00000
*	1931753010	Vial 84	1	Sample	14	1.31911e5	7.114	5.00000
*	684809 CCV@25	Vial 71	1	Control	15	1.29143e5	7.405	5.00000
*	1931753011	Vial 85	1	Sample	16	1.57073e5	7.174	5.00000
*	1931753012	Vial 86	1	Sample	17	1.56727e5	7.325	5.00000
*	1931753013	Vial 87	1	Sample	18	1.16312e5	7.227	5.00000
*	1932010001	Vial 88	1	Sample	19	1.18044e5	6.887	5.00000
*	1932010002	Vial 89	1	Sample	20	1.30569e5	7.171	5.00000
*	1932010003	Vial 90	1	Sample	21	1.33641e5	7.163	5.00000
*	1932010004	Vial 91	1	Sample	22	1.24695e5	7.109	5.00000
*	1932010005	Vial 92	1	Sample	23	1.43110e5	7.154	5.00000
*	1932010006	Vial 93	1	Sample	24	1.12592e5	7.082	5.00000
*	1932010007	Vial 94	1	Sample	25	1.22348e5	7.114	5.00000
*	684810 CCV@25	Vial 71	1	Control	26	1.28522e5	7.458	5.00000

Batch Report: C:\HPCHEM\1\DATA\19NOV19D\19NOV19S.B

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
*	684804 CCV@25	Vial 71	1	Control	1	3.31757e5	7.394	25.13176
*	684805 QC@3.0	Vial 72	1	Control	2	5.33816e4	7.396	3.04097
*	684807 ICS@3.0	Vial 73	1	Control	3	3.51191e4	7.259	3.08495
*	684808 LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1931753001	Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	1931753002	Vial 76	1	Sample	6	0.00000	0.000	0.00000
*	1931753003	Vial 77	1	Sample	7	0.00000	0.000	0.00000
*	1931753004	Vial 78	1	Sample	8	0.00000	0.000	0.00000
*	1931753005	Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	1931753006	Vial 80	1	Sample	10	0.00000	0.000	0.00000
*	1931753007 MS	Vial 81	1	Sample	11	4.43687e4	7.202	2.94112
*	1931753008 MSD	Vial 82	1	Sample	12	4.43897e4	7.197	3.28446
*	1931753009	Vial 83	1	Sample	13	0.00000	0.000	0.00000
*	1931753010	Vial 84	1	Sample	14	1.59614e5	7.112	14.10318
*	684809 CCV@25	Vial 71	1	Control	15	2.87274e5	7.401	24.93224
*	1931753011	Vial 85	1	Sample	16	0.00000	0.000	0.00000
*	1931753012	Vial 86	1	Sample	17	0.00000	0.000	0.00000
*	1931753013	Vial 87	1	Sample	18	0.00000	0.000	0.00000
*	1932010001	Vial 88	1	Sample	19	0.00000	0.000	0.00000
*	1932010002	Vial 89	1	Sample	20	0.00000	0.000	0.00000
*	1932010003	Vial 90	1	Sample	21	0.00000	0.000	0.00000
*	1932010004	Vial 91	1	Sample	22	0.00000	0.000	0.00000
*	1932010005	Vial 92	1	Sample	23	0.00000	0.000	0.00000
*	1932010006	Vial 93	1	Sample	24	0.00000	0.000	0.00000
*	1932010007	Vial 94	1	Sample	25	0.00000	0.000	0.00000
*	684810 CCV@25	Vial 71	1	Control	26	2.85245e5	7.448	24.88059

*** End of Report ***

Sequence: C:\HPCHEM\1\SEQUENCE\CLO4\2019\NOV\19NOV19D.S

Sequence Table:

Method and Injection Info Part:

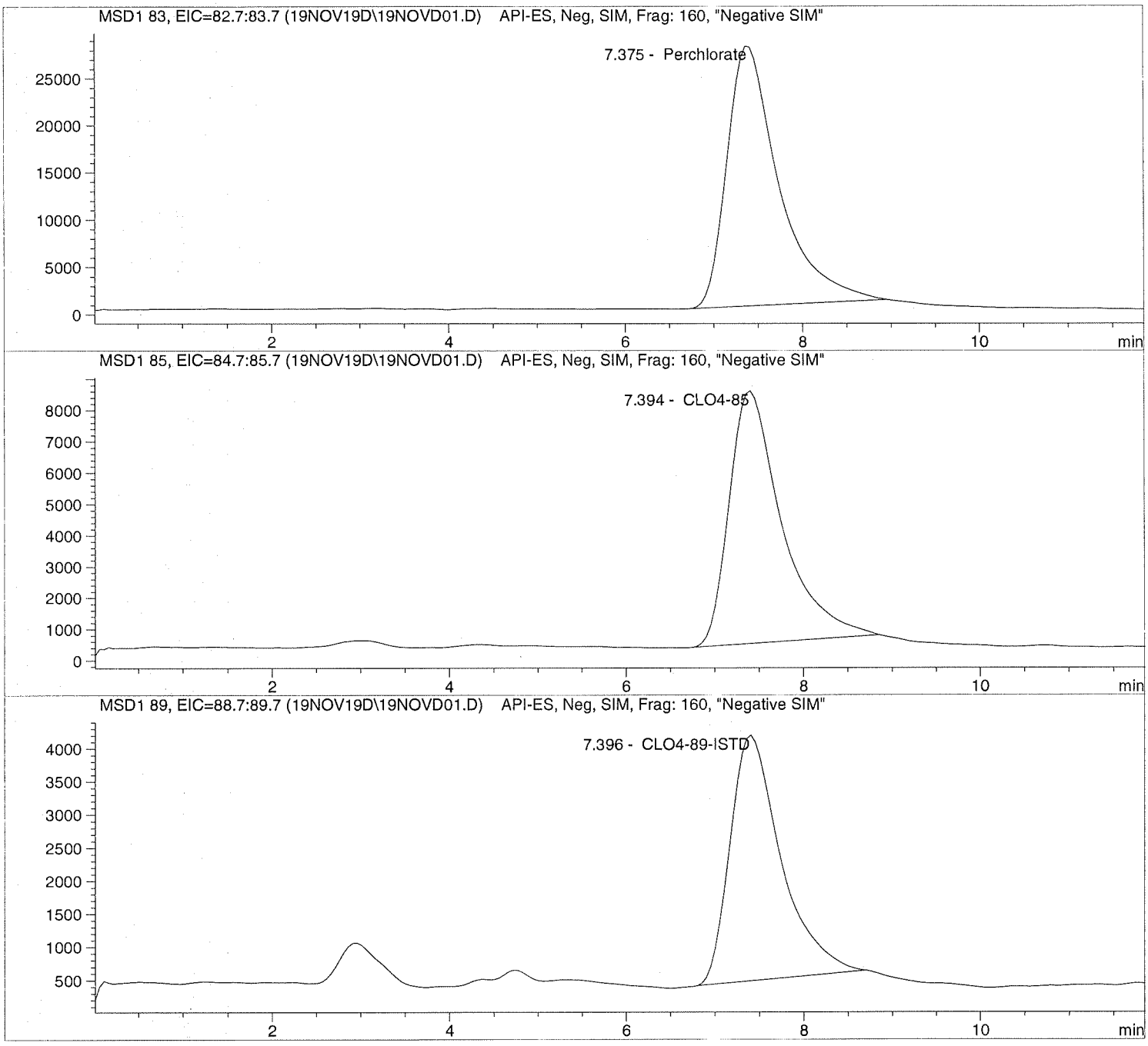
Line	Location	SampleName		Method	Inj	SampleType	InjVolume	DataFile
1	Vial 71	684804	CCV@25	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	684805	QC@3.0	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	684807	ICS@3.0	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	684808	LMB	CLO4-AQN	1	Ctrl Samp		
5	Vial 75	1931753001		CLO4-AQN	1	Sample		
6	Vial 76	1931753002		CLO4-AQN	1	Sample		
7	Vial 77	1931753003		CLO4-AQN	1	Sample		
8	Vial 78	1931753004		CLO4-AQN	1	Sample		
9	Vial 79	1931753005		CLO4-AQN	1	Sample		
10	Vial 80	1931753006		CLO4-AQN	1	Sample		
11	Vial 81	1931753007	MS	CLO4-AQN	1	Sample		
12	Vial 82	1931753008	MSD	CLO4-AQN	1	Sample		
13	Vial 83	1931753009		CLO4-AQN	1	Sample		
14	Vial 84	1931753010		CLO4-AQN	1	Sample		
15	Vial 71	684809	CCV@25	CLO4-AQN	1	Ctrl Samp		
16	Vial 85	1931753011		CLO4-AQN	1	Sample		
17	Vial 86	1931753012		CLO4-AQN	1	Sample		
18	Vial 87	1931753013		CLO4-AQN	1	Sample		
19	Vial 88	1932010001		CLO4-AQN	1	Sample		
20	Vial 89	1932010002		CLO4-AQN	1	Sample		
21	Vial 90	1932010003		CLO4-AQN	1	Sample		
22	Vial 91	1932010004		CLO4-AQN	1	Sample		
23	Vial 92	1932010005		CLO4-AQN	1	Sample		
24	Vial 93	1932010006		CLO4-AQN	1	Sample		
25	Vial 94	1932010007		CLO4-AQN	1	Sample		
26	Vial 71	684810	CCV@25	CLO4-AQN	1	Ctrl Samp		

Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD01.D Sample Name: 684804 CCV@25

Injection Date:	11/19/2019 08:46:14	Seq Line:	1
Sample Name:	684804 CCV@25	Location:	Vial 71
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD01.D Sample Name: 684804 CCV@25

Injection Date:	11/19/2019 08:46:14	Seq Line:	1
Sample Name:	684804 CCV@25	Location:	Vial 71
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method:	CLO4-AQN.M
Analysis Method:	C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed:	11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	25.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.375	PBA	1115487.1	25.7054	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.394	PBA	331756.7	25.1318	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.396	PBA	147846.5	5.0000	CLO4-89-ISTD

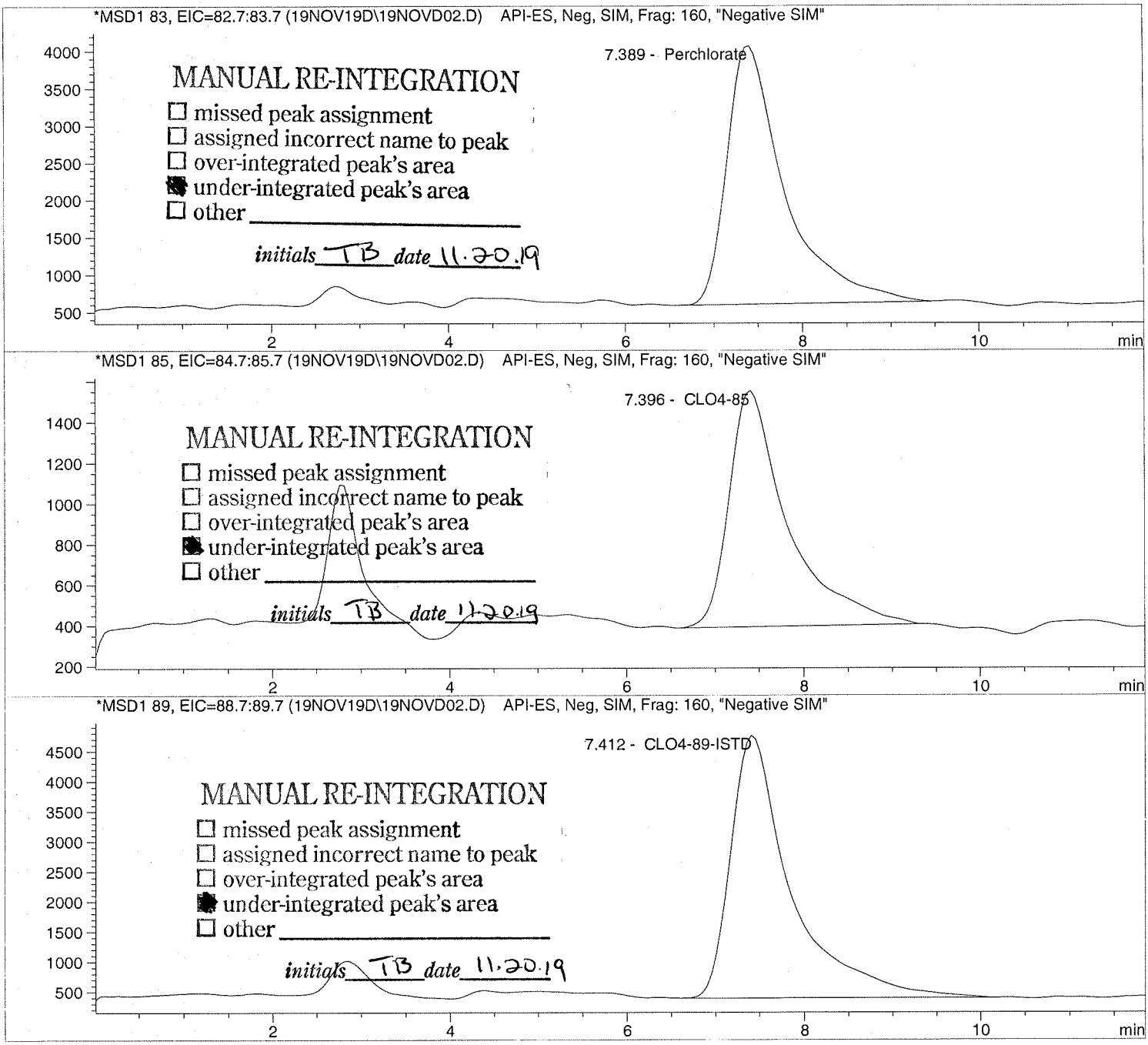
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD02.D Sample Name: 684805 QC@3.0

Injection Date:	11/19/2019 09:04:34	Seq Line:	2
Sample Name:	684805 QC@3.0	Location:	Vial 72
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD02.D Sample Name: 684805 QC@3.0

Injection Date:	11/19/2019 09:04:34	Seq Line:	2
Sample Name:	684805 QC@3.0	Location:	Vial 72
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	3.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.389	MM	157343.1	2.8113	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.396	MM	53381.6	3.0410	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.412	MM	205736.2	5.0000	CLO4-89-ISTD

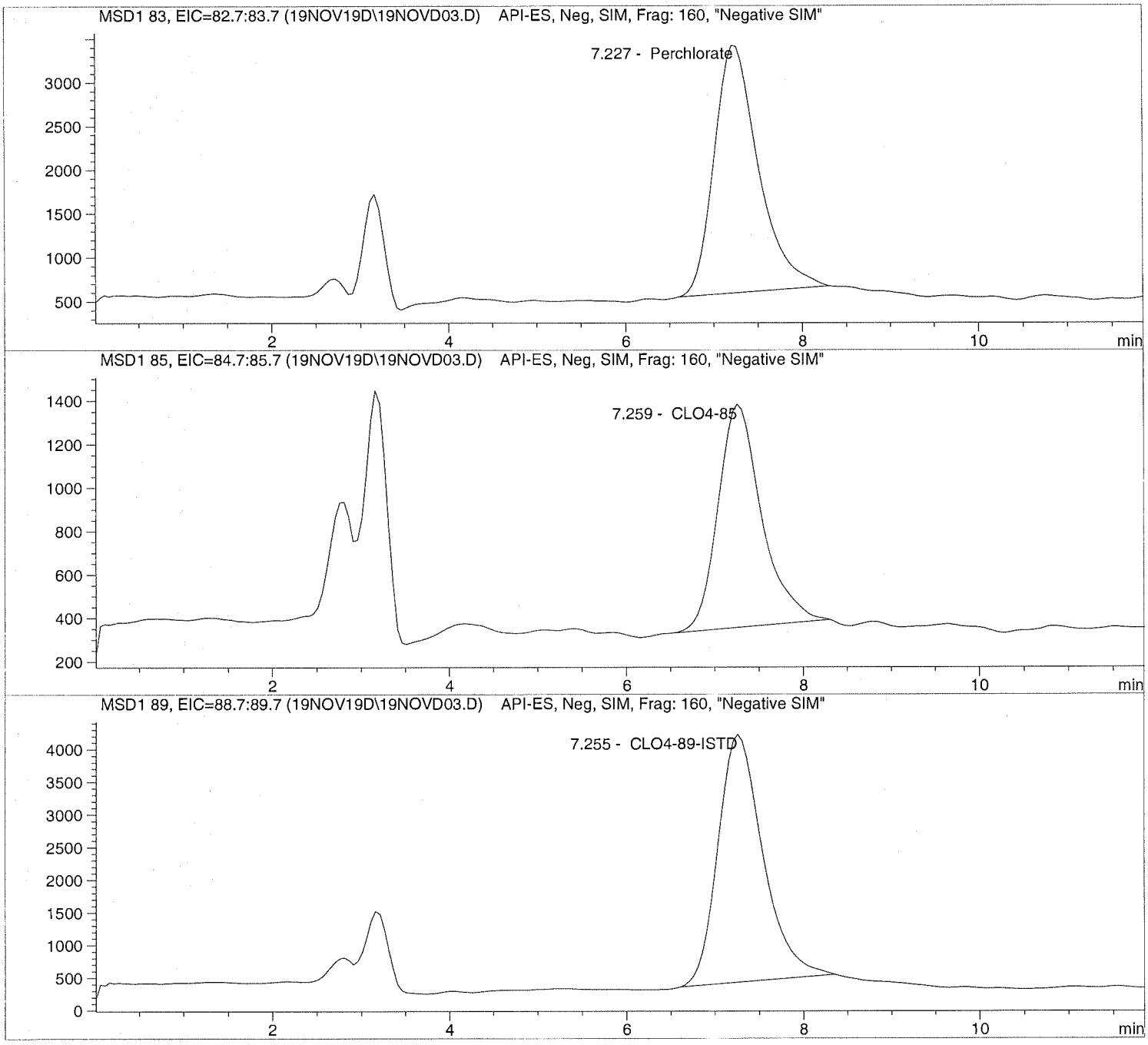
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD03.D Sample Name: 684807 ICS@3.0

Injection Date:	11/19/2019 09:18:20	Seq Line:	3
Sample Name:	684807 ICS@3.0	Location:	Vial 73
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD03.D Sample Name: 684807 ICS@3.0

Injection Date:	11/19/2019 09:18:20	Seq Line:	3
Sample Name:	684807 ICS@3.0	Location:	Vial 73
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	3.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.227	BBA	98134.3	2.7004	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.259	PBA	35119.1	3.0849	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.255	PBA	133495.5	5.0000	CLO4-89-ISTD

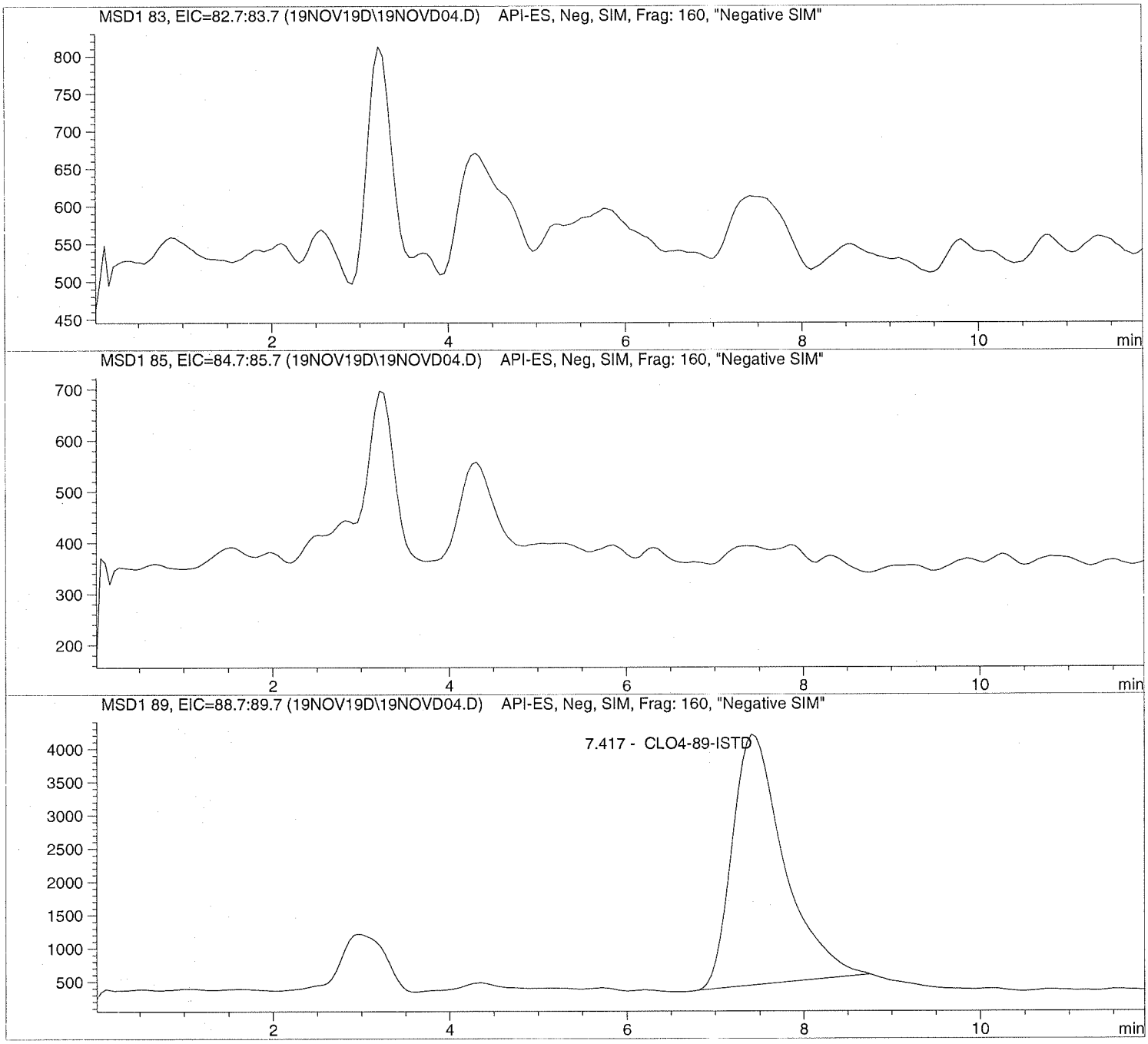
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD04.D Sample Name: 684808 LMB

Injection Date:	11/19/2019 09:32:09	Seq Line:	4
Sample Name:	684808 LMB	Location:	Vial 74
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD04.D Sample Name: 684808 LMB

Injection Date:	11/19/2019 09:32:09	Seq Line:	4
Sample Name:	684808 LMB	Location:	Vial 74
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method:	CLO4-AQN.M
Analysis Method:	C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed:	11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.417	PBA	153146.8	5.0000	CLO4-89-ISTD

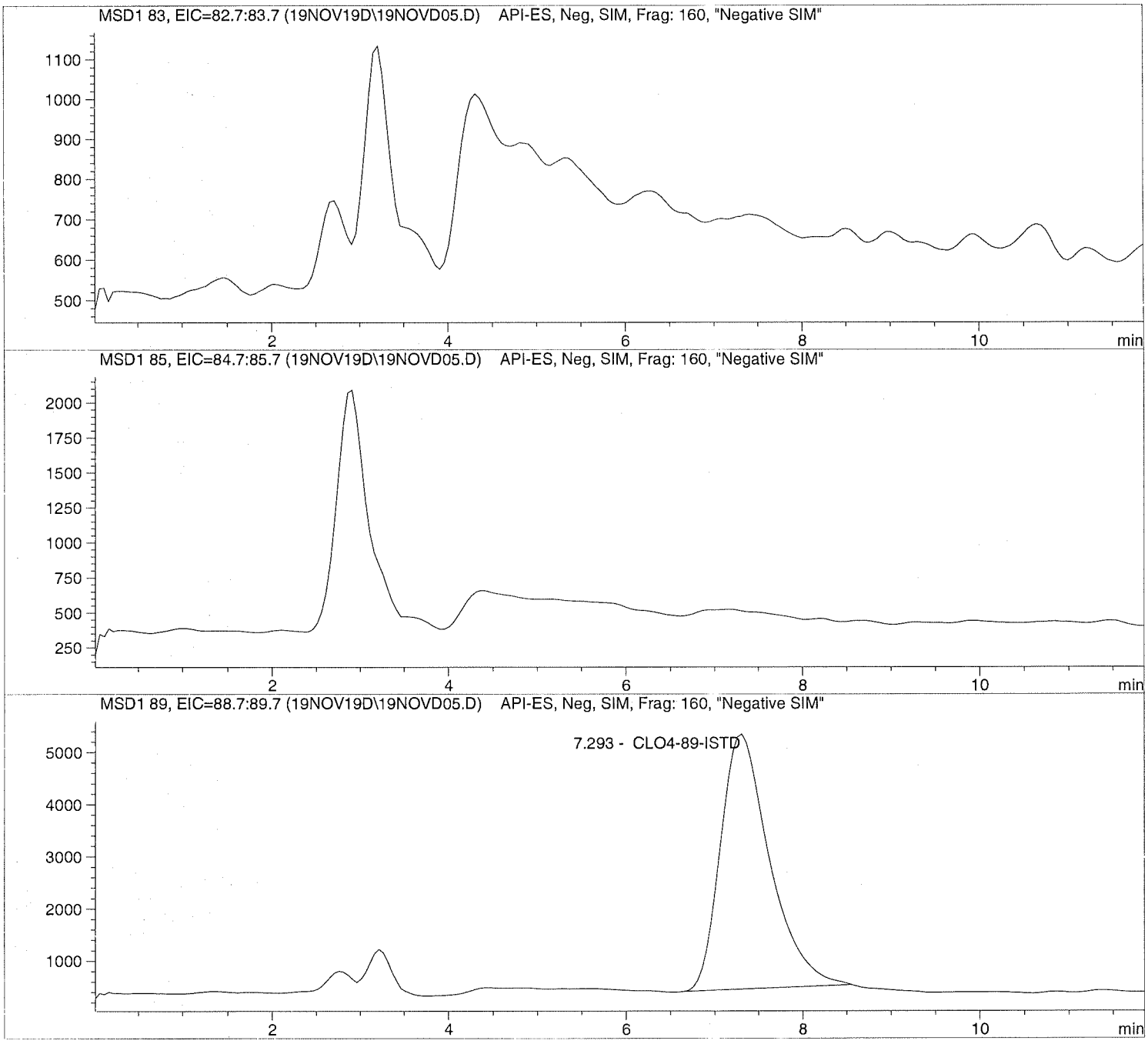
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD05.D Sample Name: 1931753001

Injection Date:	11/19/2019 09:45:57	Seq Line:	5
Sample Name:	1931753001	Location:	Vial 75
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD05.D Sample Name: 1931753001

Injection Date:	11/19/2019 09:45:57	Seq Line:	5
Sample Name:	1931753001	Location:	Vial 75
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.293	PBA	189772.2	5.0000	CLO4-89-ISTD

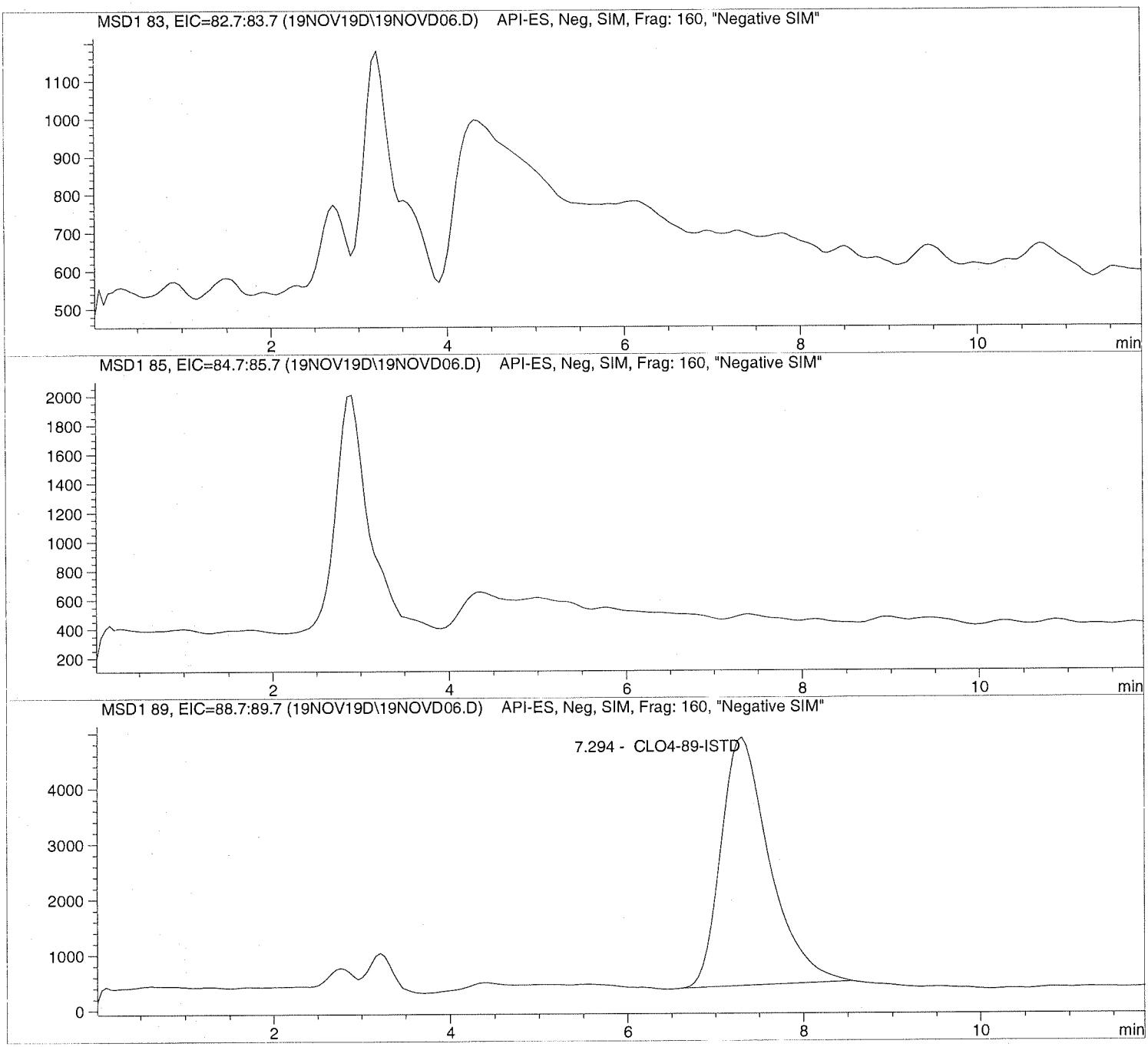
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD06.D Sample Name: 1931753002

Injection Date:	11/19/2019 09:59:43	Seq Line:	6
Sample Name:	1931753002	Location:	Vial 76
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD06.D Sample Name: 1931753002

Injection Date:	11/19/2019 09:59:43	Seq Line:	6
Sample Name:	1931753002	Location:	Vial 76
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.294	PBA	171402.0	5.0000	CLO4-89-ISTD

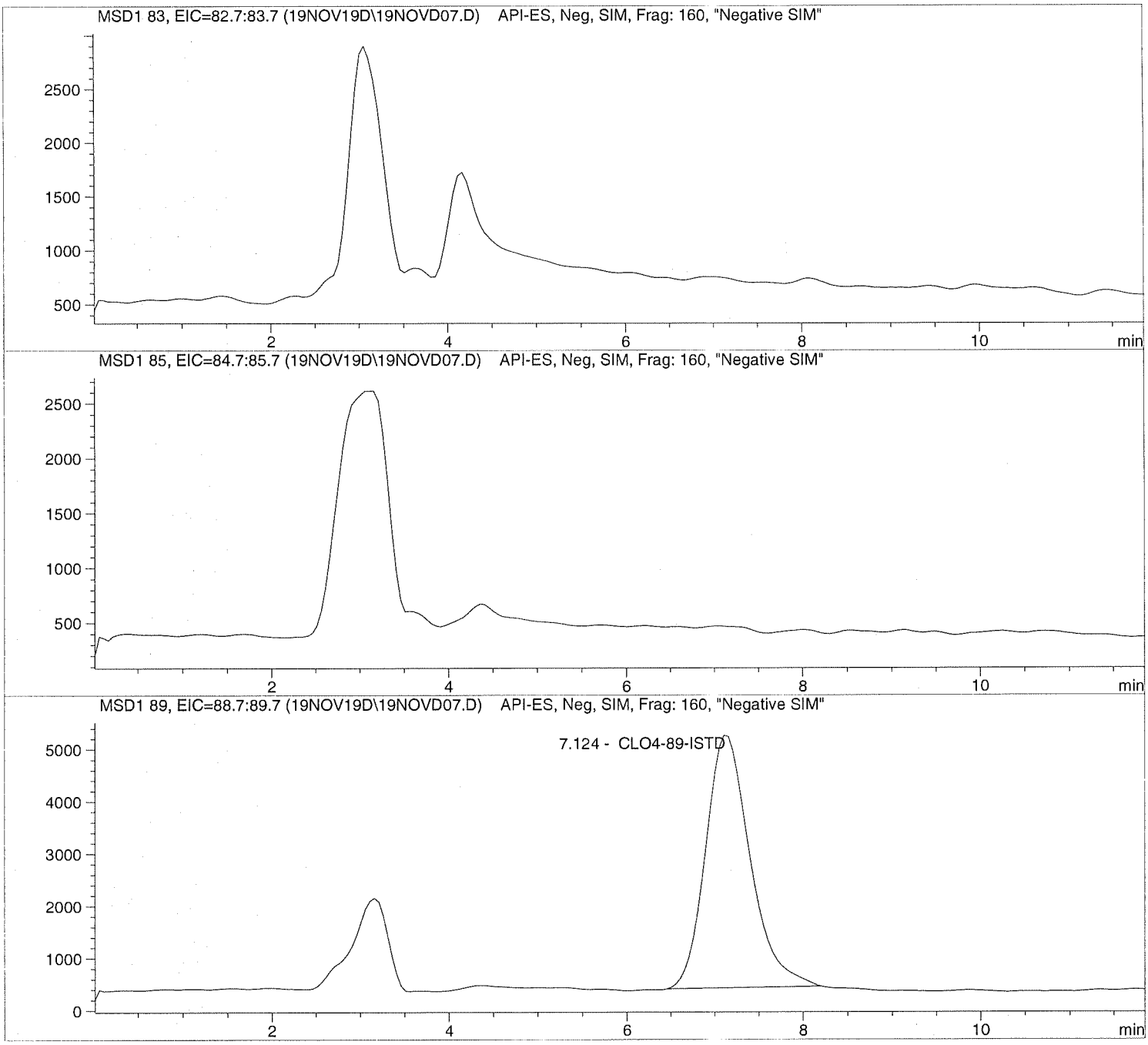
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Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD07.D Sample Name: 1931753003

Injection Date:	11/19/2019 10:13:33	Seq Line:	7
Sample Name:	1931753003	Location:	Vial 77
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD07.D Sample Name: 1931753003

Injection Date:	11/19/2019 10:13:33	Seq Line:	7
Sample Name:	1931753003	Location:	Vial 77
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.124	PBA	169954.7	5.0000	CLO4-89-ISTD

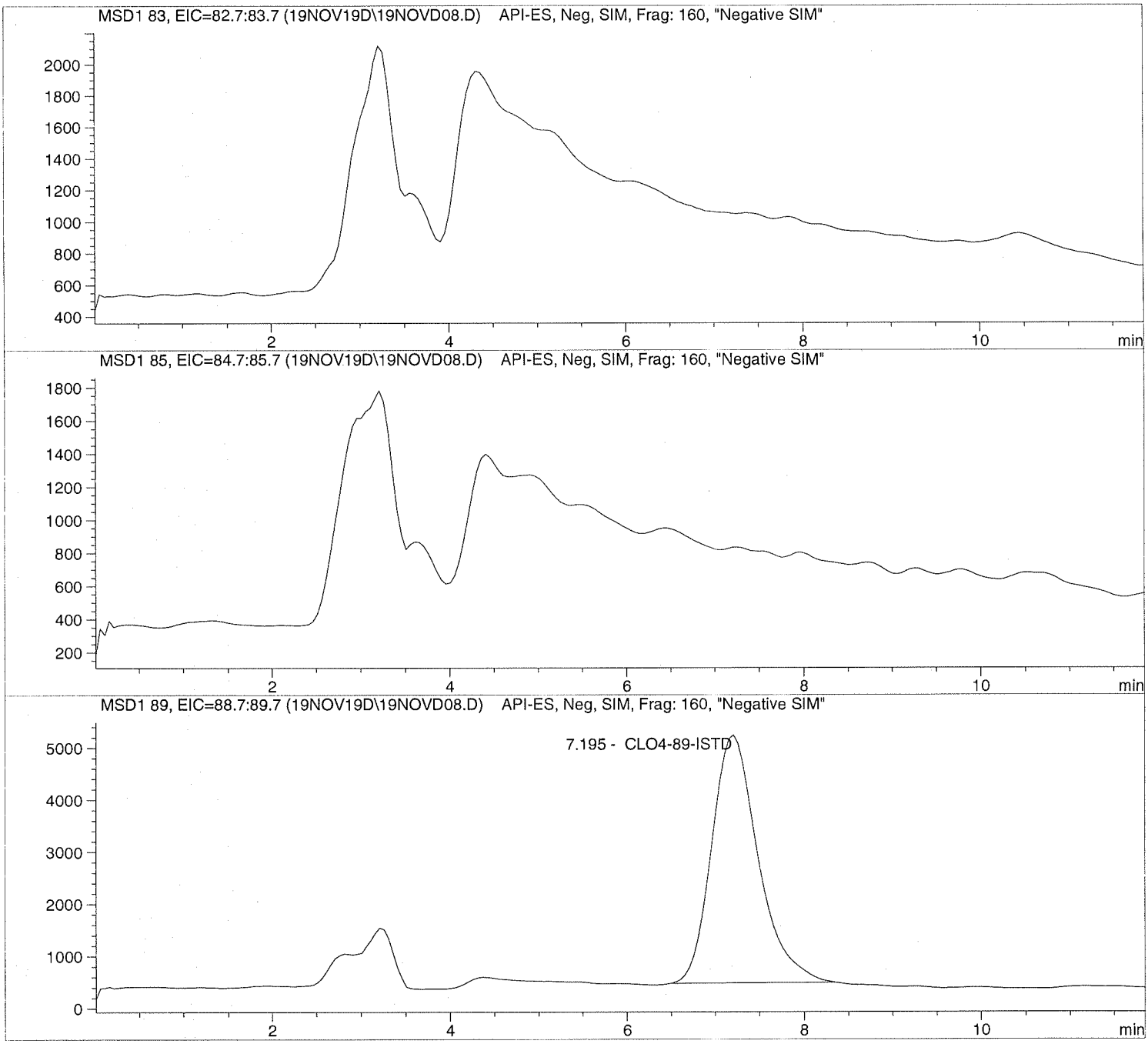
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD08.D Sample Name: 1931753004

Injection Date:	11/19/2019 10:27:21	Seq Line:	8
Sample Name:	1931753004	Location:	Vial 78
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD08.D Sample Name: 1931753004

Injection Date:	11/19/2019 10:27:21	Seq Line:	8
Sample Name:	1931753004	Location:	Vial 78
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.195	BBA	172551.3	5.0000	CLO4-89-ISTD

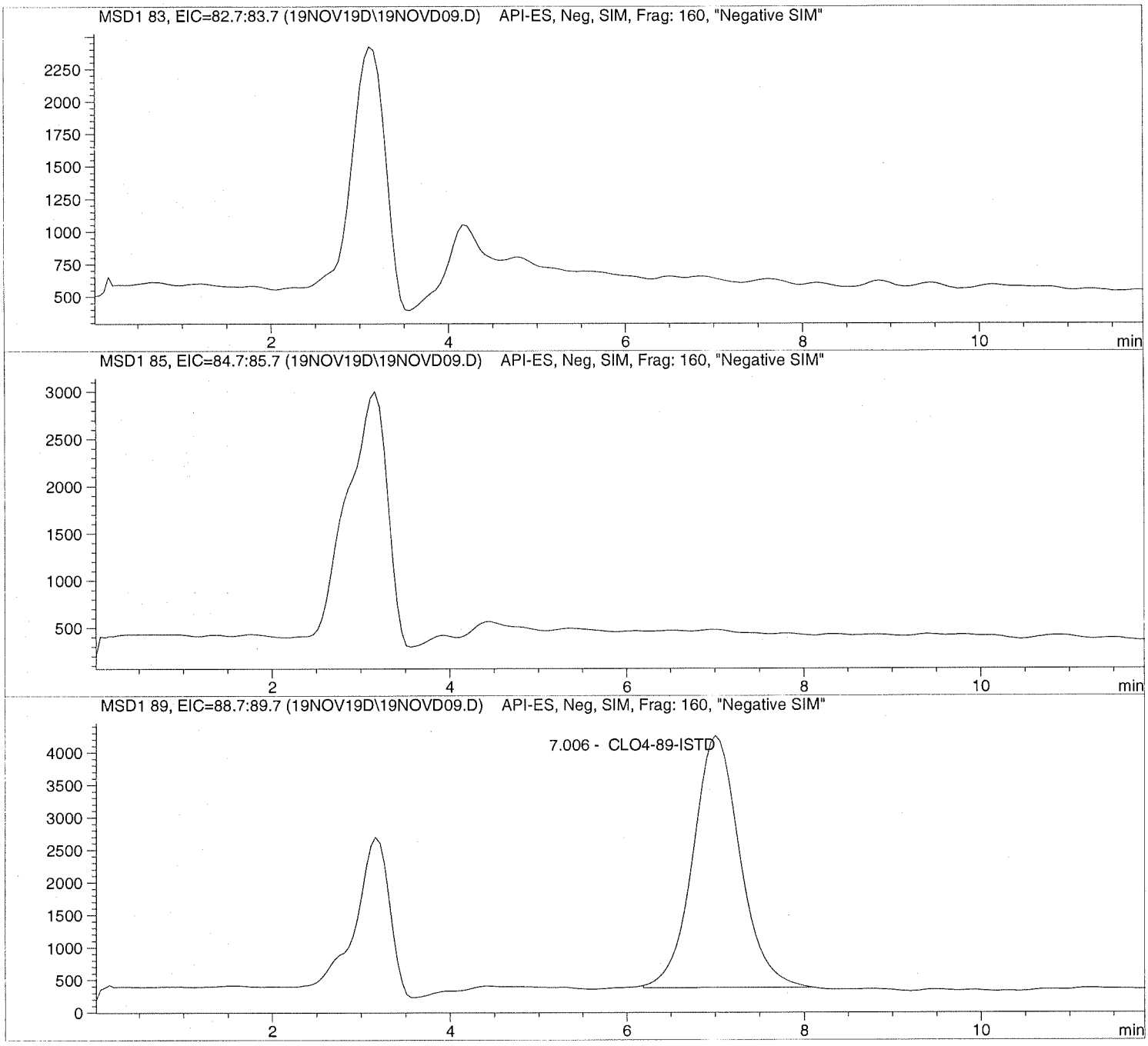
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD09.D Sample Name: 1931753005

Injection Date:	11/19/2019 10:41:09	Seq Line:	9
Sample Name:	1931753005	Location:	Vial 79
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD09.D Sample Name: 1931753005

Injection Date:	11/19/2019 10:41:09	Seq Line:	9
Sample Name:	1931753005	Location:	Vial 79
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.006	BBA	142814.7	5.0000	CLO4-89-ISTD

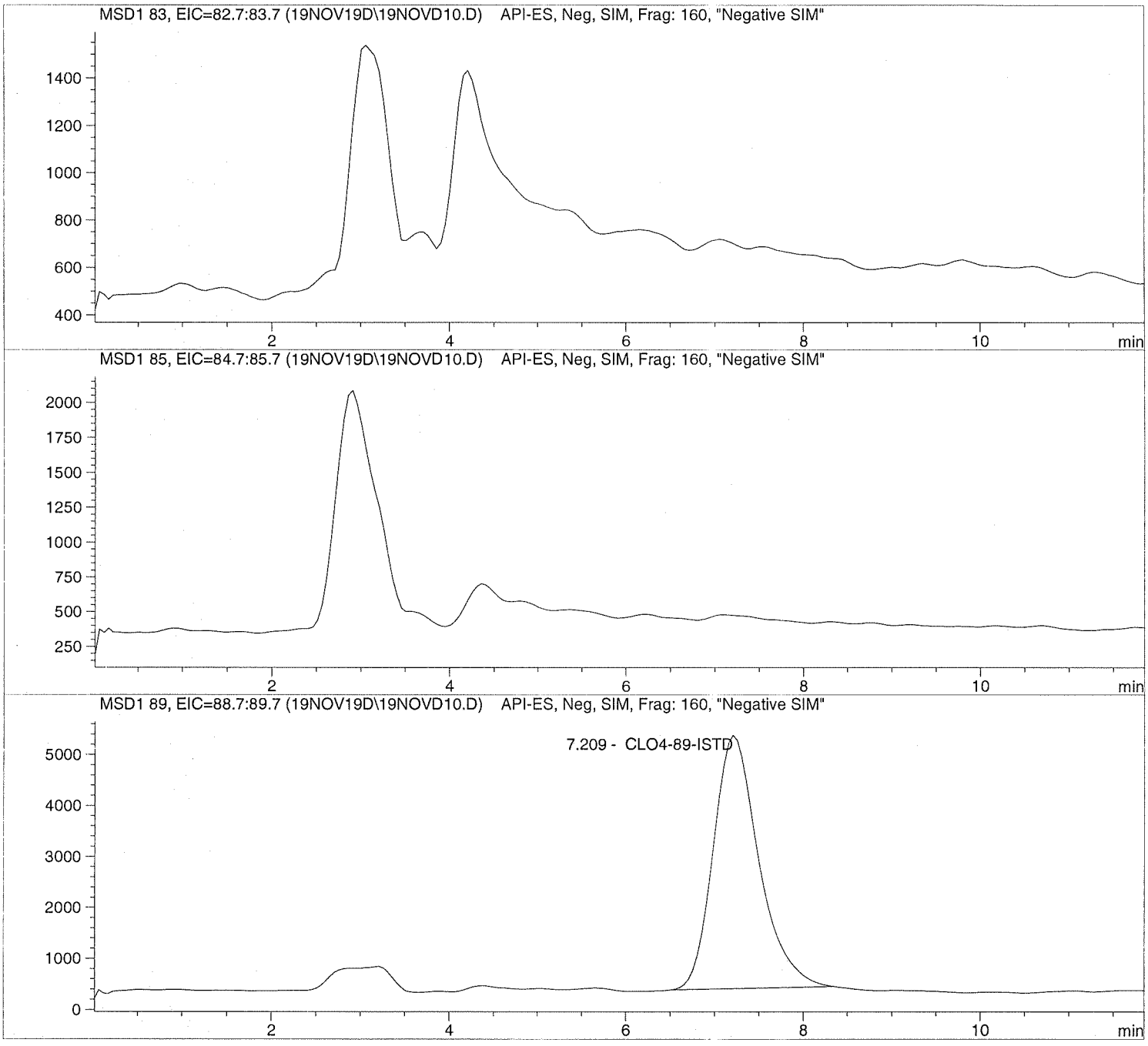
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD10.D Sample Name: 1931753006

Injection Date:	11/19/2019 10:55:02	Seq Line:	10
Sample Name:	1931753006	Location:	Vial 80
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD10.D Sample Name: 1931753006

Injection Date:	11/19/2019 10:55:02	Seq Line:	10
Sample Name:	1931753006	Location:	Vial 80
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.209	PBA	177283.0	5.0000	CLO4-89-ISTD

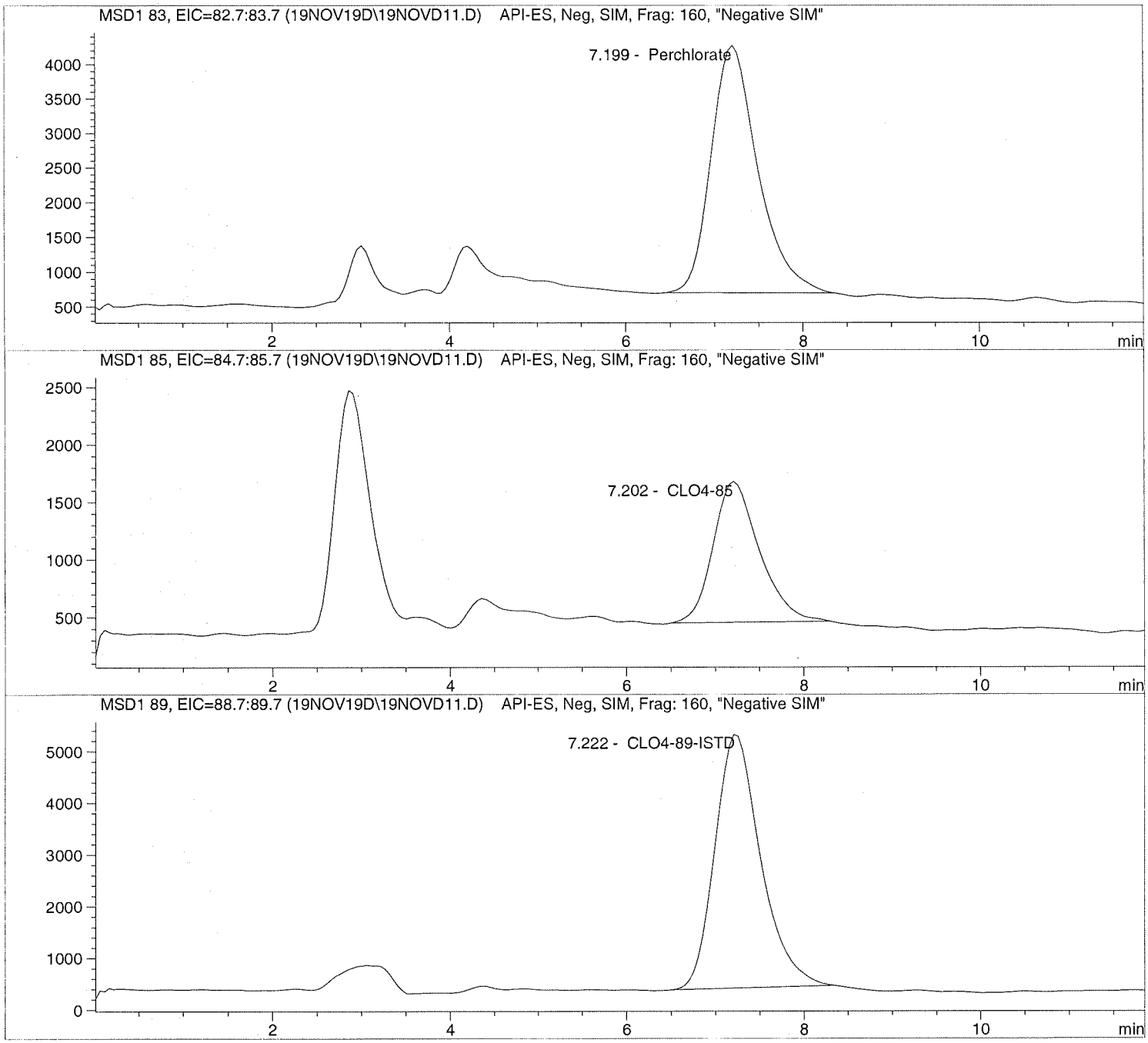
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD11.D Sample Name: 1931753007 MS

Injection Date:	11/19/2019 11:08:49	Seq Line:	11
Sample Name:	1931753007 MS	Location:	Vial 81
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD11.D Sample Name: 1931753007 MS

Injection Date:	11/19/2019 11:08:49	Seq Line:	11
Sample Name:	1931753007 MS	Location:	Vial 81
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.199	PBA	130769.1	2.7210	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.202	PBA	44368.7	2.9411	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.222	PBA	176570.0	5.0000	CLO4-89-ISTD

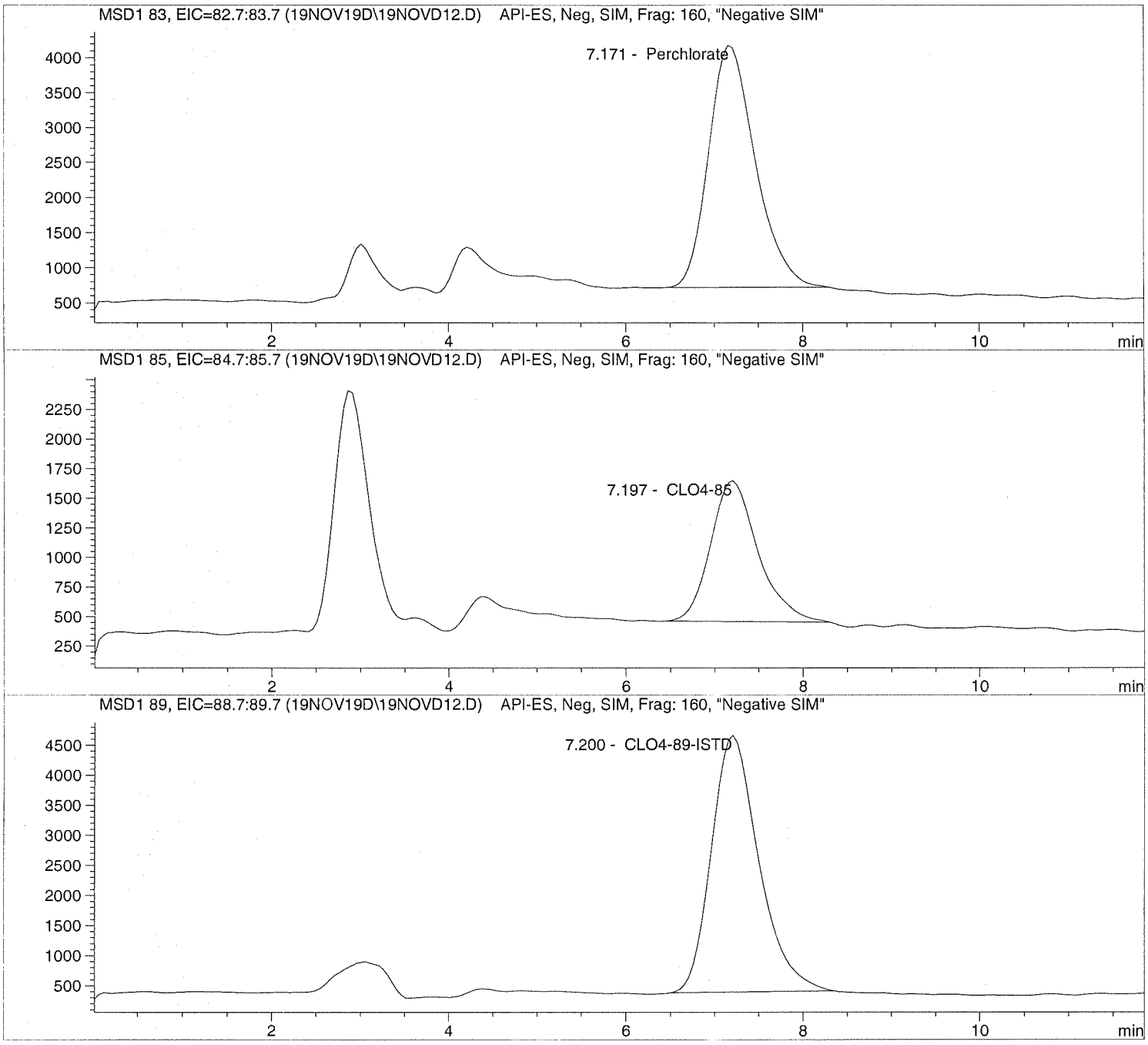
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD12.D Sample Name: 1931753008 MSD

Injection Date:	11/19/2019 11:22:36	Seq Line:	12
Sample Name:	1931753008 MSD	Location:	Vial 82
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD12.D Sample Name: 1931753008 MSD

Injection Date:	11/19/2019 11:22:36	Seq Line:	12
Sample Name:	1931753008 MSD	Location:	Vial 82
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.171	BBA	127059.9	2.9424	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.197	PBA	44389.7	3.2845	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.200	BBA	158843.2	5.0000	CLO4-89-ISTD

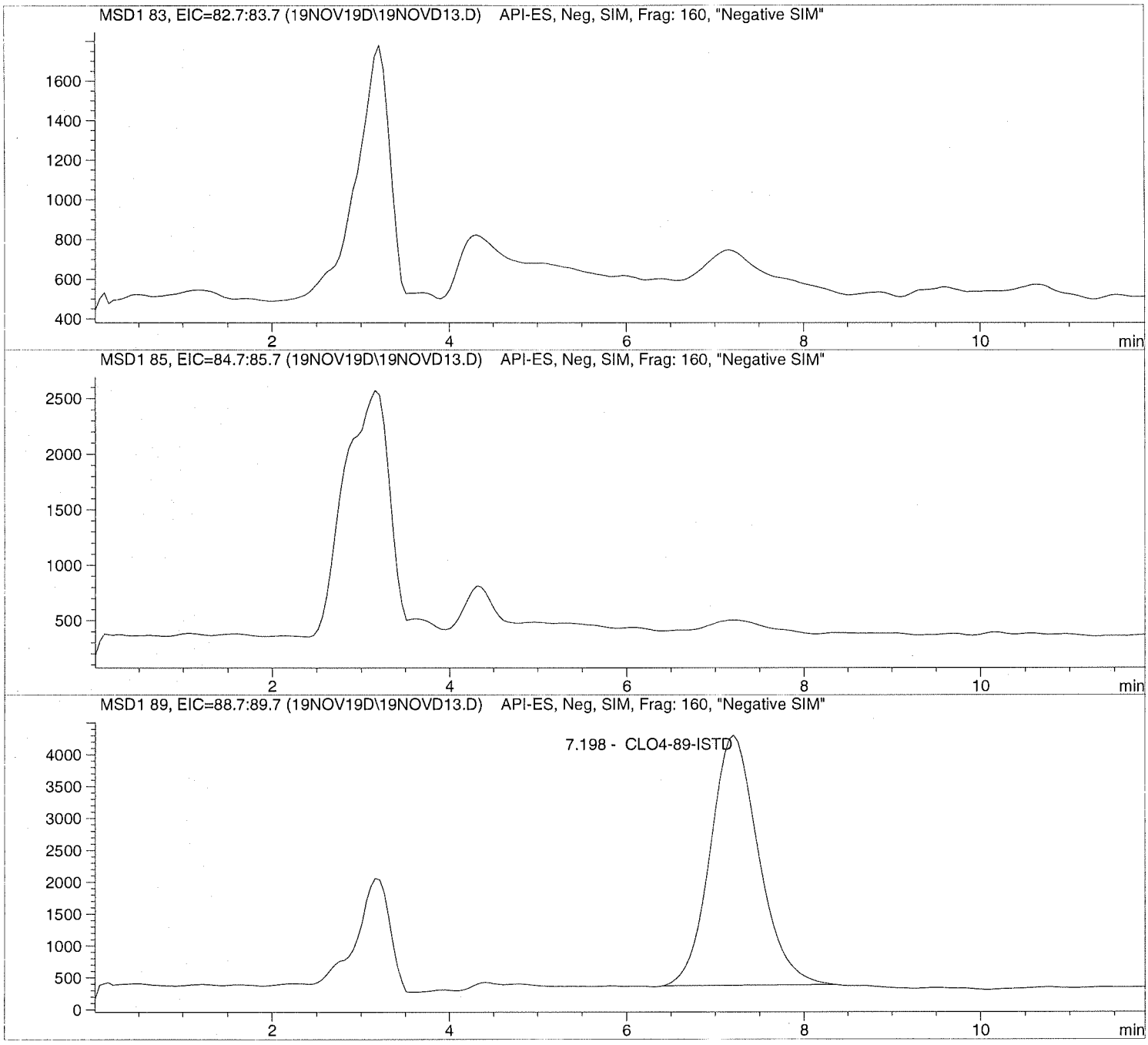
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD13.D Sample Name: 1931753009

Injection Date:	11/19/2019 11:36:21	Seq Line:	13
Sample Name:	1931753009	Location:	Vial 83
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD13.D Sample Name: 1931753009

Injection Date:	11/19/2019 11:36:21	Seq Line:	13
Sample Name:	1931753009	Location:	Vial 83
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method:	CLO4-AQN.M
Analysis Method:	C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed:	11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.198	PBA	148964.8	5.0000	CLO4-89-ISTD

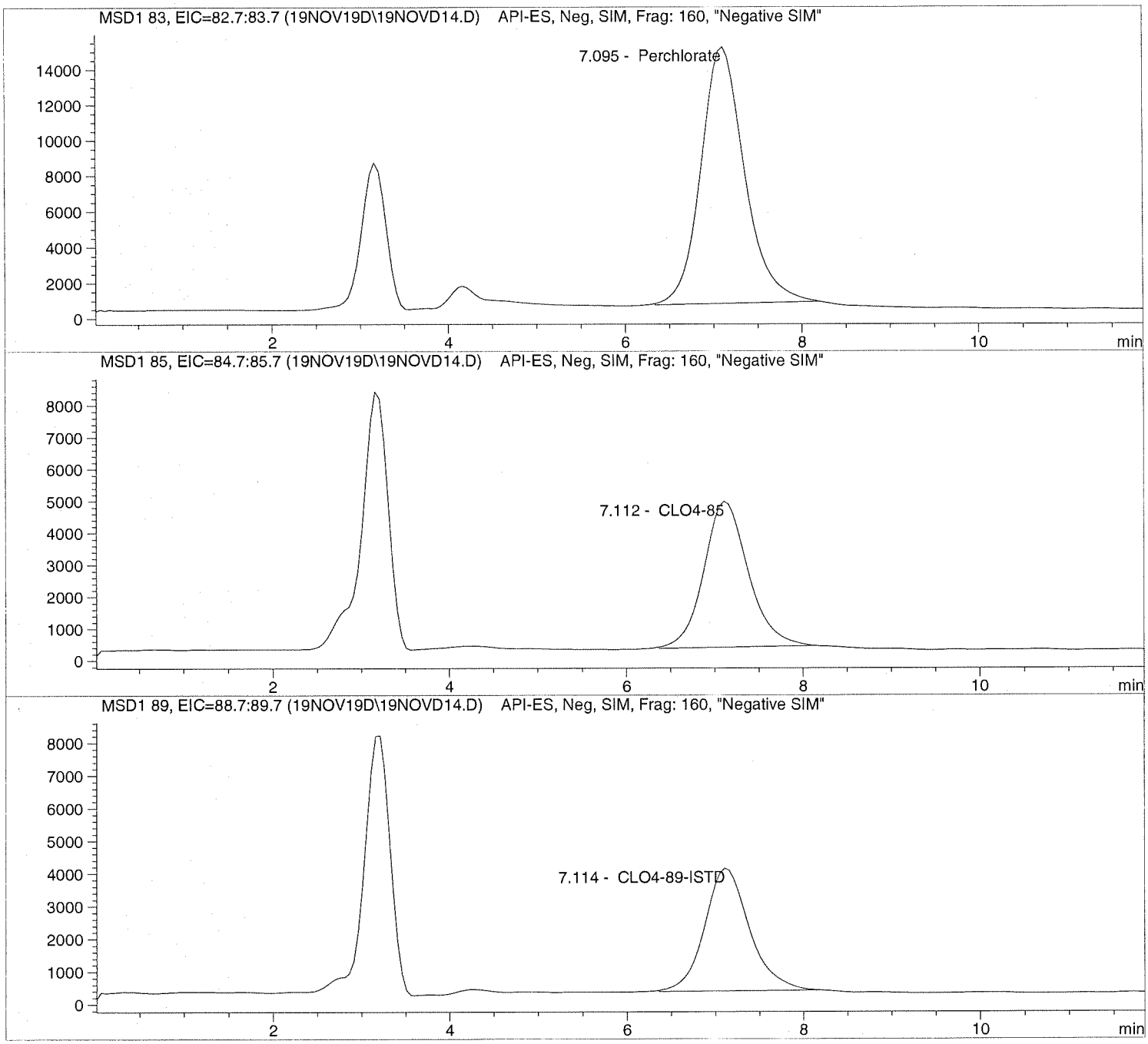
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD14.D Sample Name: 1931753010

Injection Date:	11/19/2019 11:50:06	Seq Line:	14
Sample Name:	1931753010	Location:	Vial 84
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD14.D Sample Name: 1931753010

Injection Date:	11/19/2019 11:50:06	Seq Line:	14
Sample Name:	1931753010	Location:	Vial 84
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.095	BBA	491725.6	13.3622	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.112	BBA	159613.7	14.1032	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.114	BBA	131911.3	5.0000	CLO4-89-ISTD

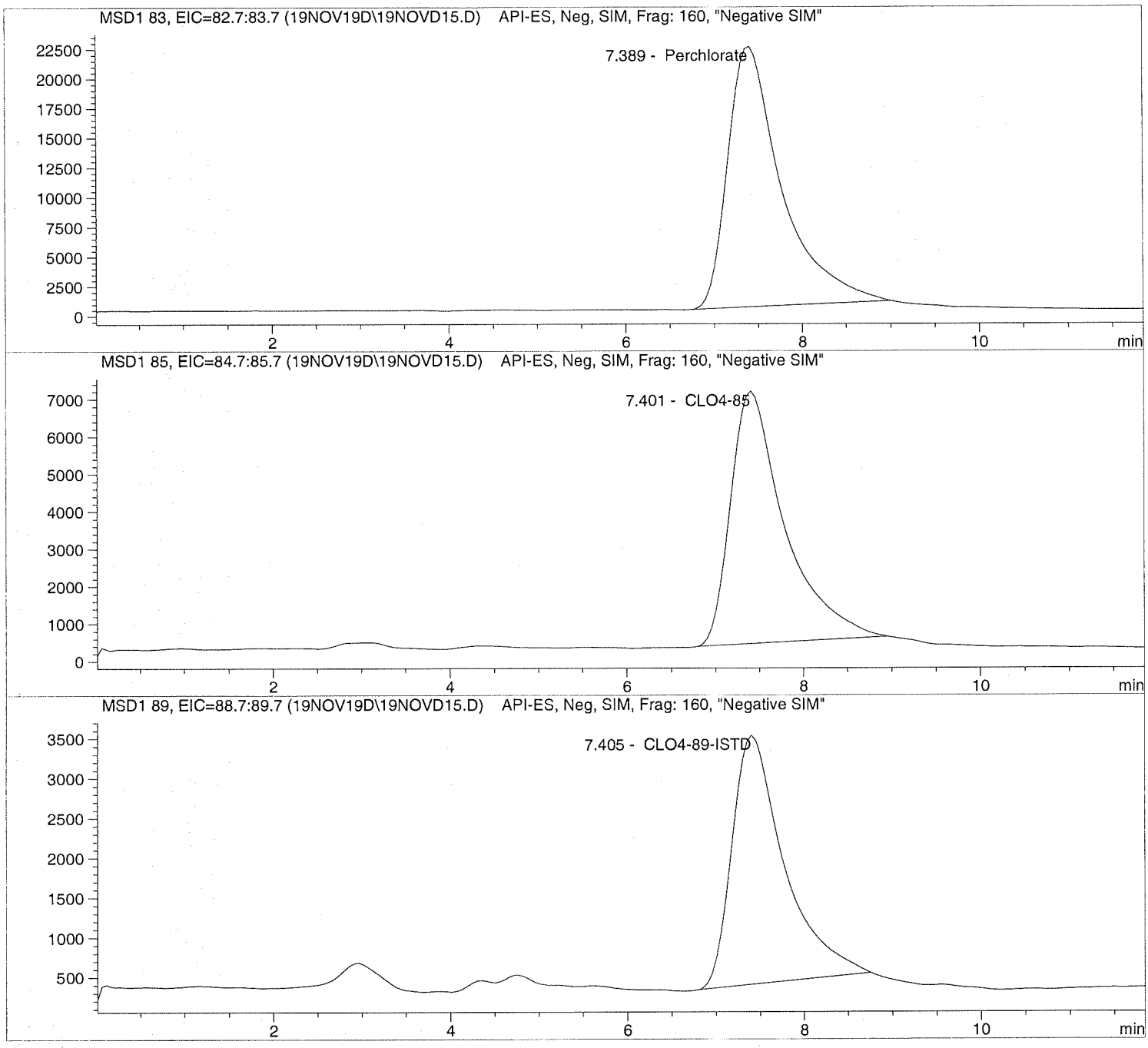
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD15.D Sample Name: 684809 CCV@25

Injection Date:	11/19/2019 12:03:53	Seq Line:	15
Sample Name:	684809 CCV@25	Location:	Vial 71
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD15.D Sample Name: 684809 CCV@25

Injection Date:	11/19/2019 12:03:53	Seq Line:	15
Sample Name:	684809 CCV@25	Location:	Vial 71
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	25.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.389	PBA	931288.6	24.6735	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.401	PBA	287273.8	24.9322	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.405	PBA	129143.4	5.0000	CLO4-89-ISTD

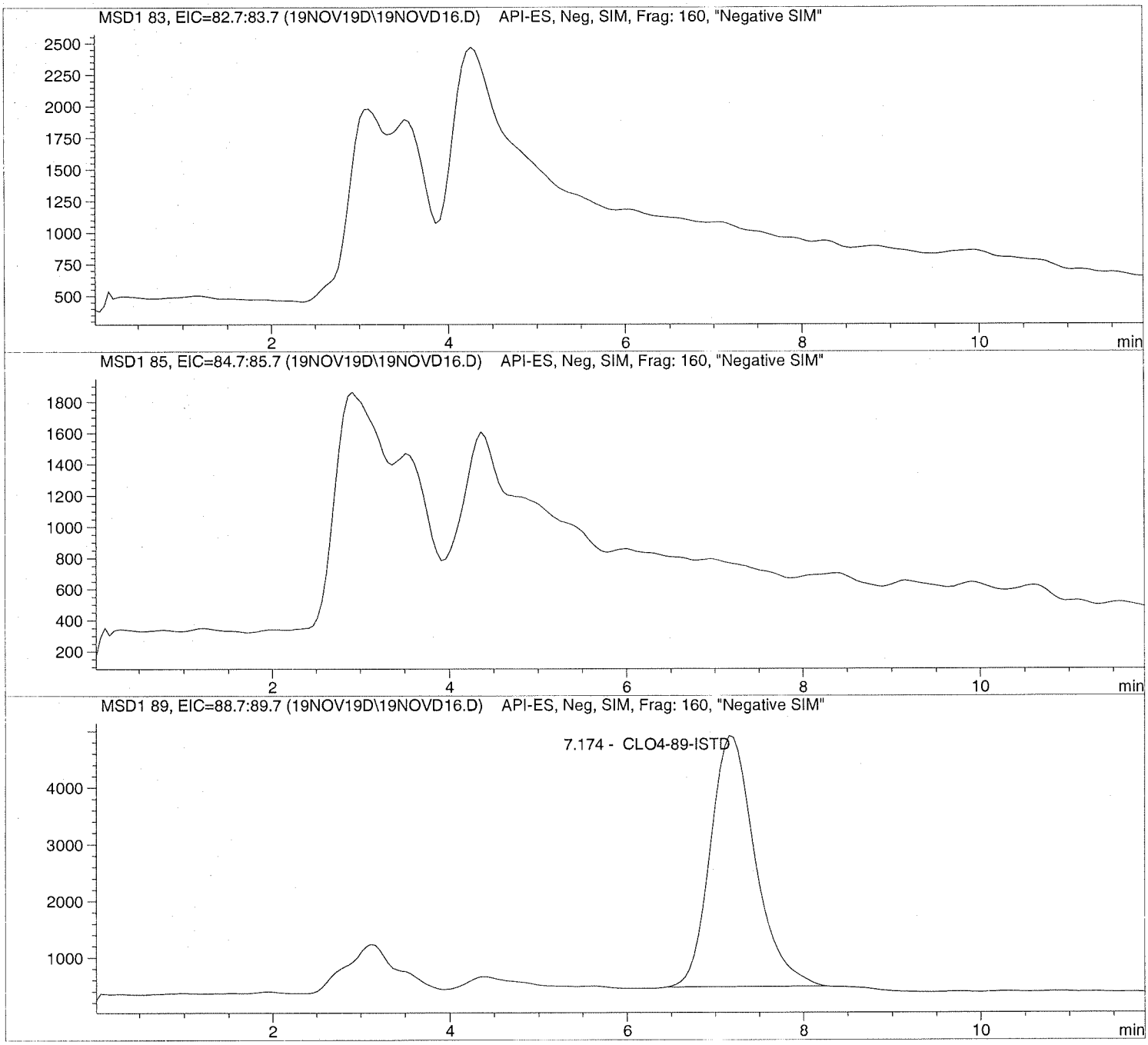
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD16.D Sample Name: 1931753011

Injection Date:	11/19/2019 12:17:41	Seq Line:	16
Sample Name:	1931753011	Location:	Vial 85
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD16.D Sample Name: 1931753011

Injection Date:	11/19/2019 12:17:41	Seq Line:	16
Sample Name:	1931753011	Location:	Vial 85
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.174	BBA	157072.7	5.0000	CLO4-89-ISTD

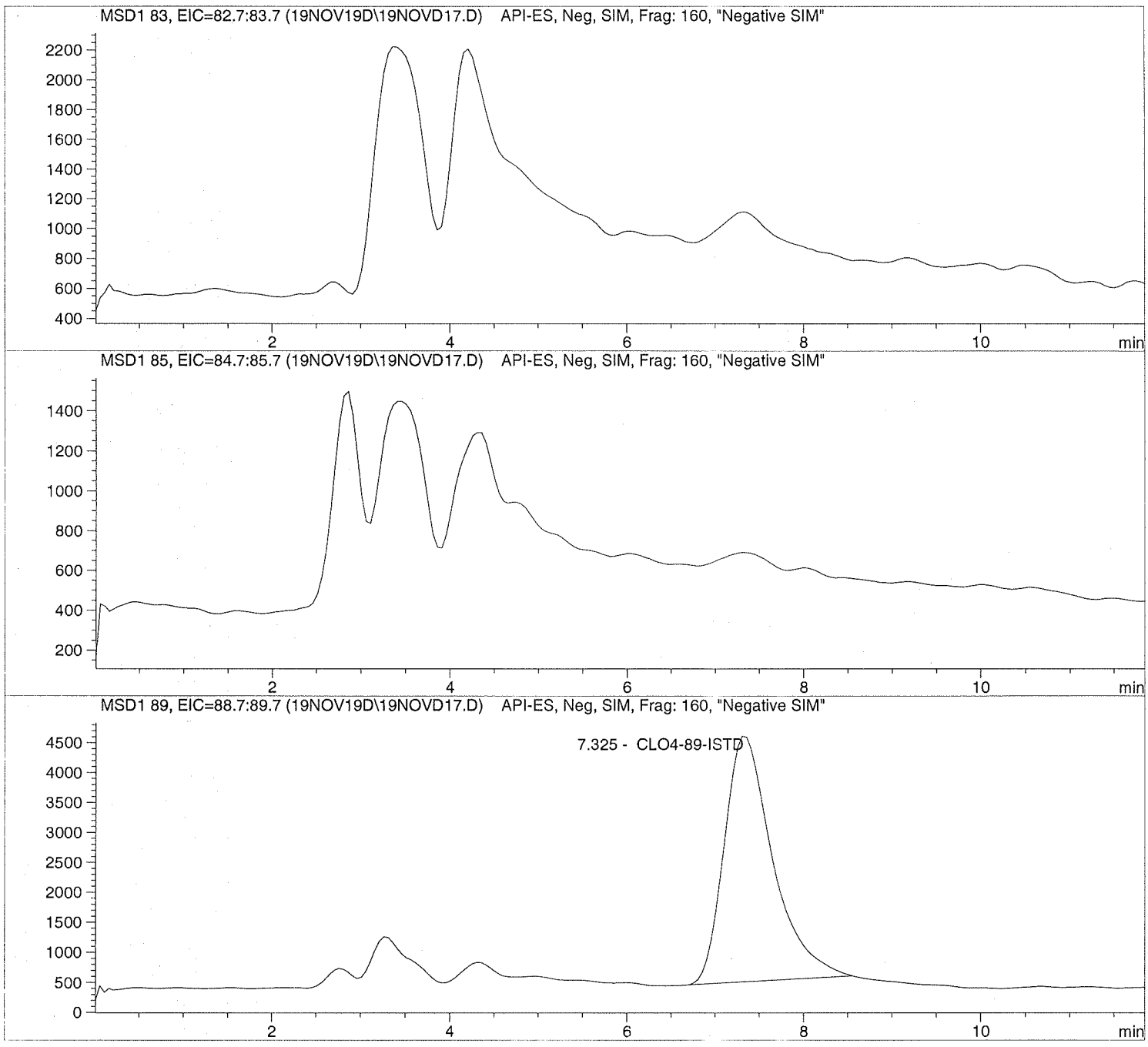
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD17.D Sample Name: 1931753012

Injection Date:	11/19/2019 12:31:25	Seq Line:	17
Sample Name:	1931753012	Location:	Vial 86
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD17.D Sample Name: 1931753012

Injection Date:	11/19/2019 12:31:25	Seq Line:	17
Sample Name:	1931753012	Location:	Vial 86
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.325	PBA	156727.4	5.0000	CLO4-89-ISTD

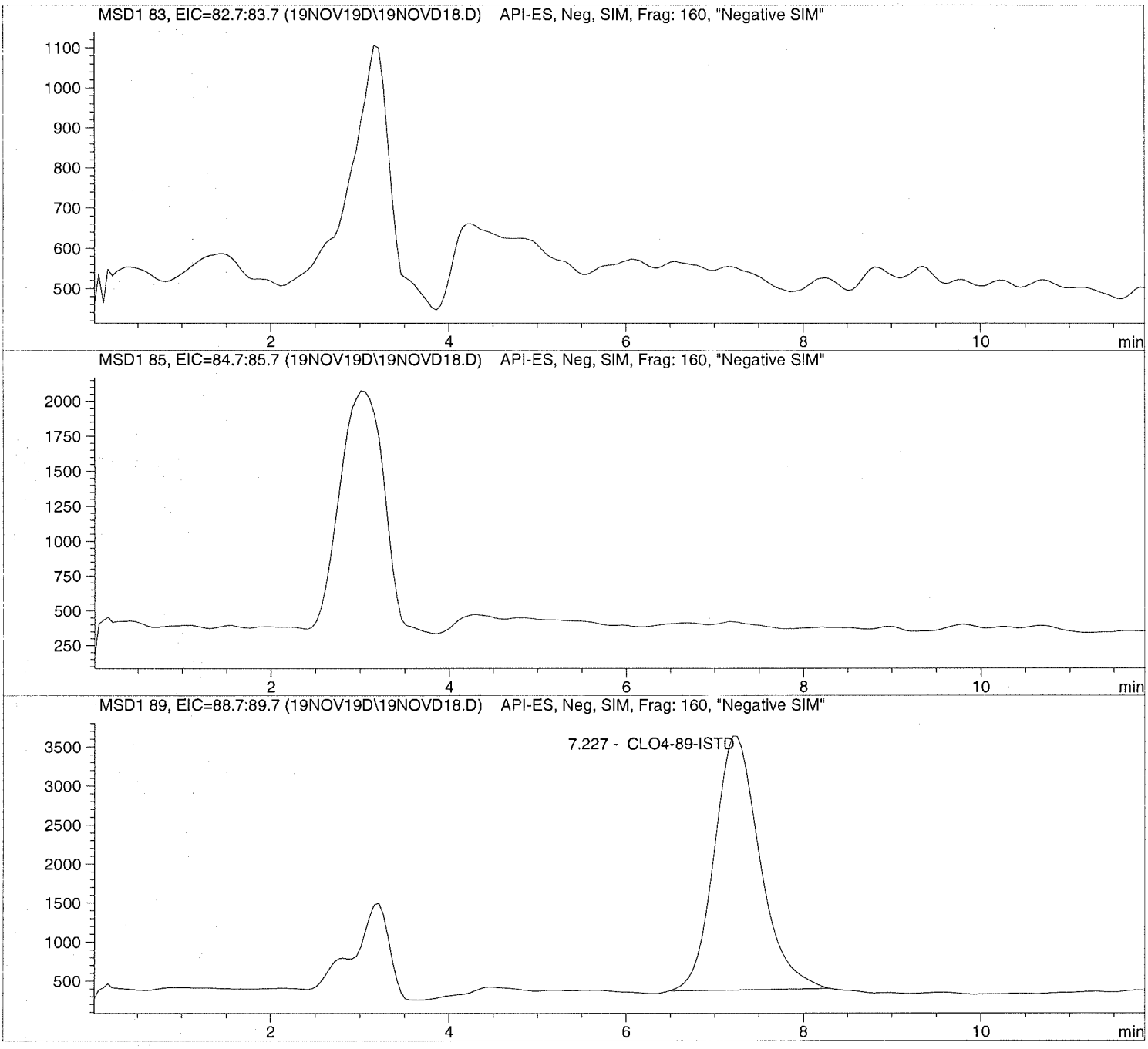
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD18.D Sample Name: 1931753013

Injection Date:	11/19/2019 12:45:09	Seq Line:	18
Sample Name:	1931753013	Location:	Vial 87
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD18.D Sample Name: 1931753013

Injection Date:	11/19/2019 12:45:09	Seq Line:	18
Sample Name:	1931753013	Location:	Vial 87
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.227	BBA	116311.5	5.0000	CLO4-89-ISTD

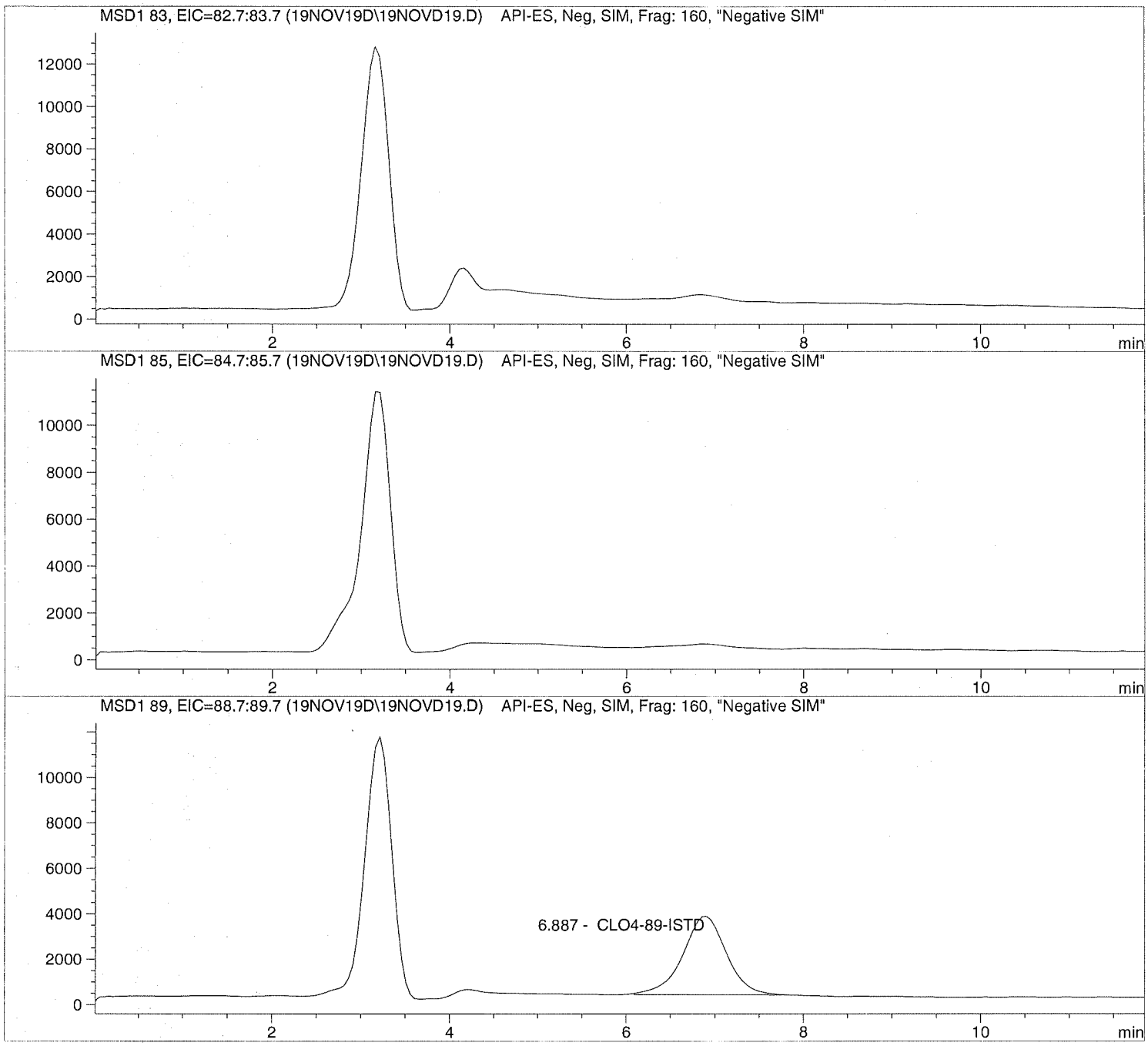
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD19.D Sample Name: 1932010001

Injection Date:	11/19/2019 12:58:54	Seq Line:	19
Sample Name:	1932010001	Location:	Vial 88
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD19.D Sample Name: 1932010001

Injection Date:	11/19/2019 12:58:54	Seq Line:	19
Sample Name:	1932010001	Location:	Vial 88
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.887	BBA	118043.7	5.0000	CLO4-89-ISTD

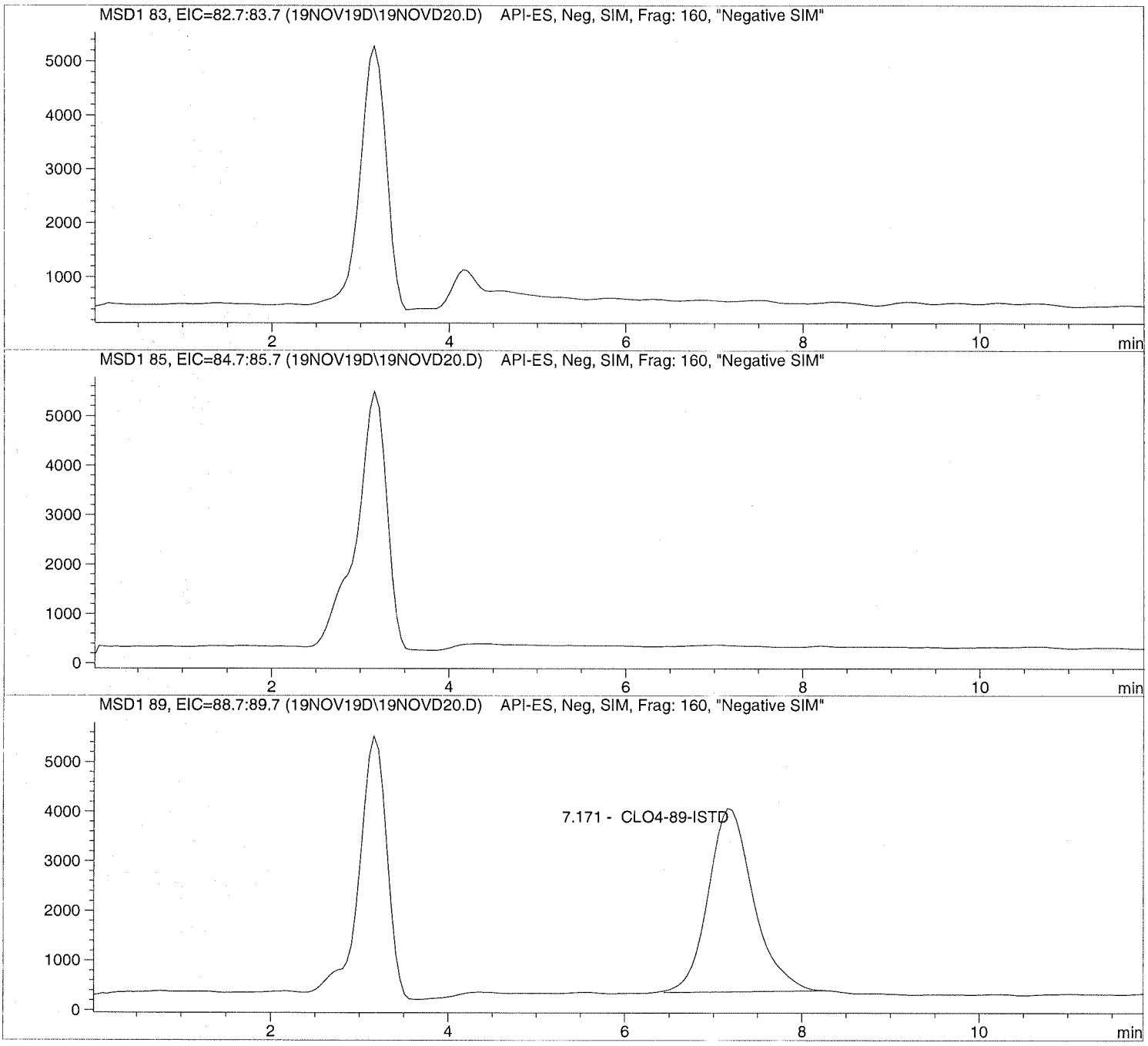
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD20.D Sample Name: 1932010002

Injection Date:	11/19/2019 13:12:42	Seq Line:	20
Sample Name:	1932010002	Location:	Vial 89
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD20.D Sample Name: 1932010002

Injection Date:	11/19/2019 13:12:42	Seq Line:	20
Sample Name:	1932010002	Location:	Vial 89
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.171	BBA	130569.2	5.0000	CLO4-89-ISTD

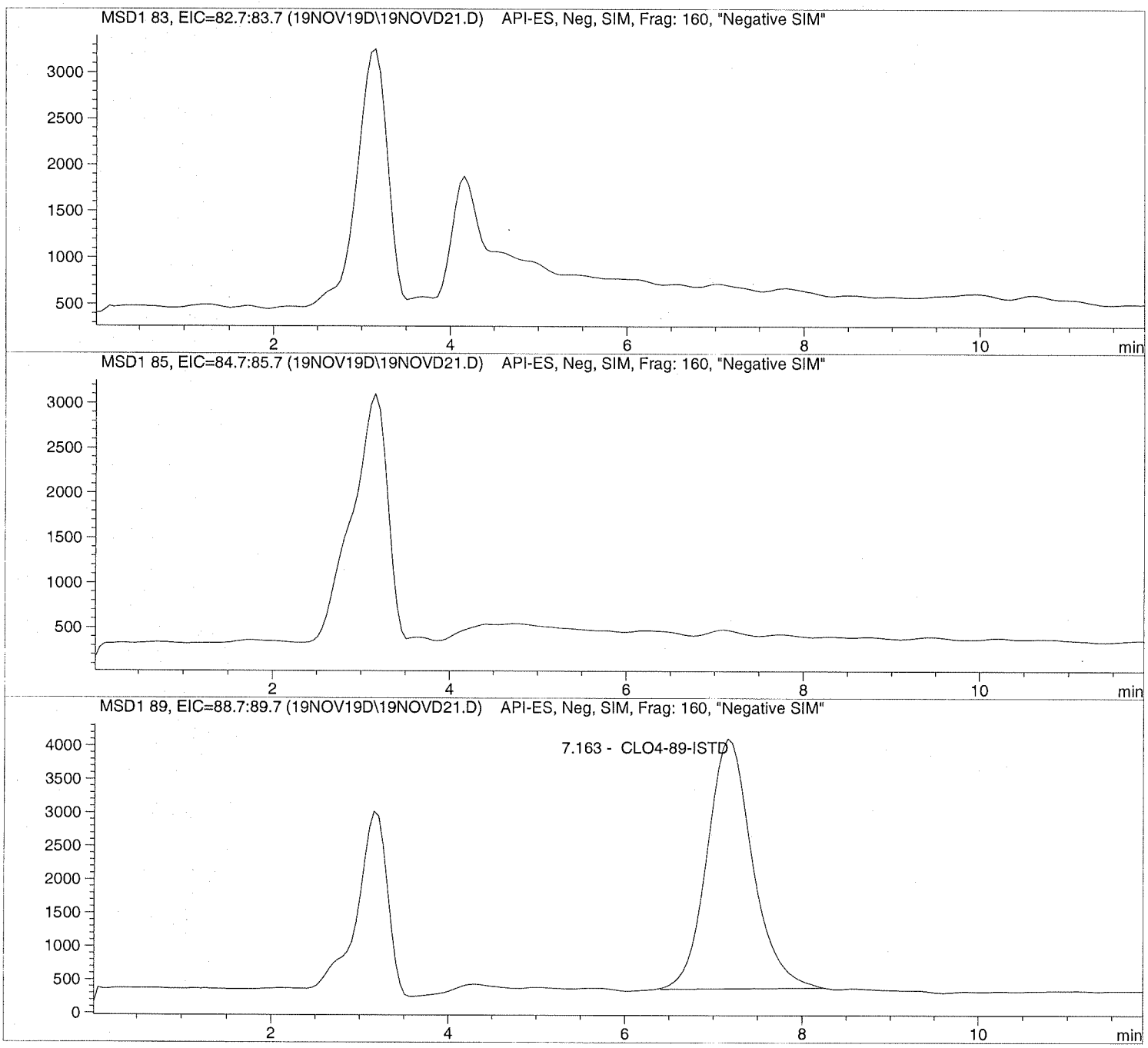
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD21.D Sample Name: 1932010003

Injection Date:	11/19/2019 13:26:30	Seq Line:	21
Sample Name:	1932010003	Location:	Vial 90
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD21.D Sample Name: 1932010003

Injection Date:	11/19/2019 13:26:30	Seq Line:	21
Sample Name:	1932010003	Location:	Vial 90
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.163	PBA	133641.2	5.0000	CLO4-89-ISTD

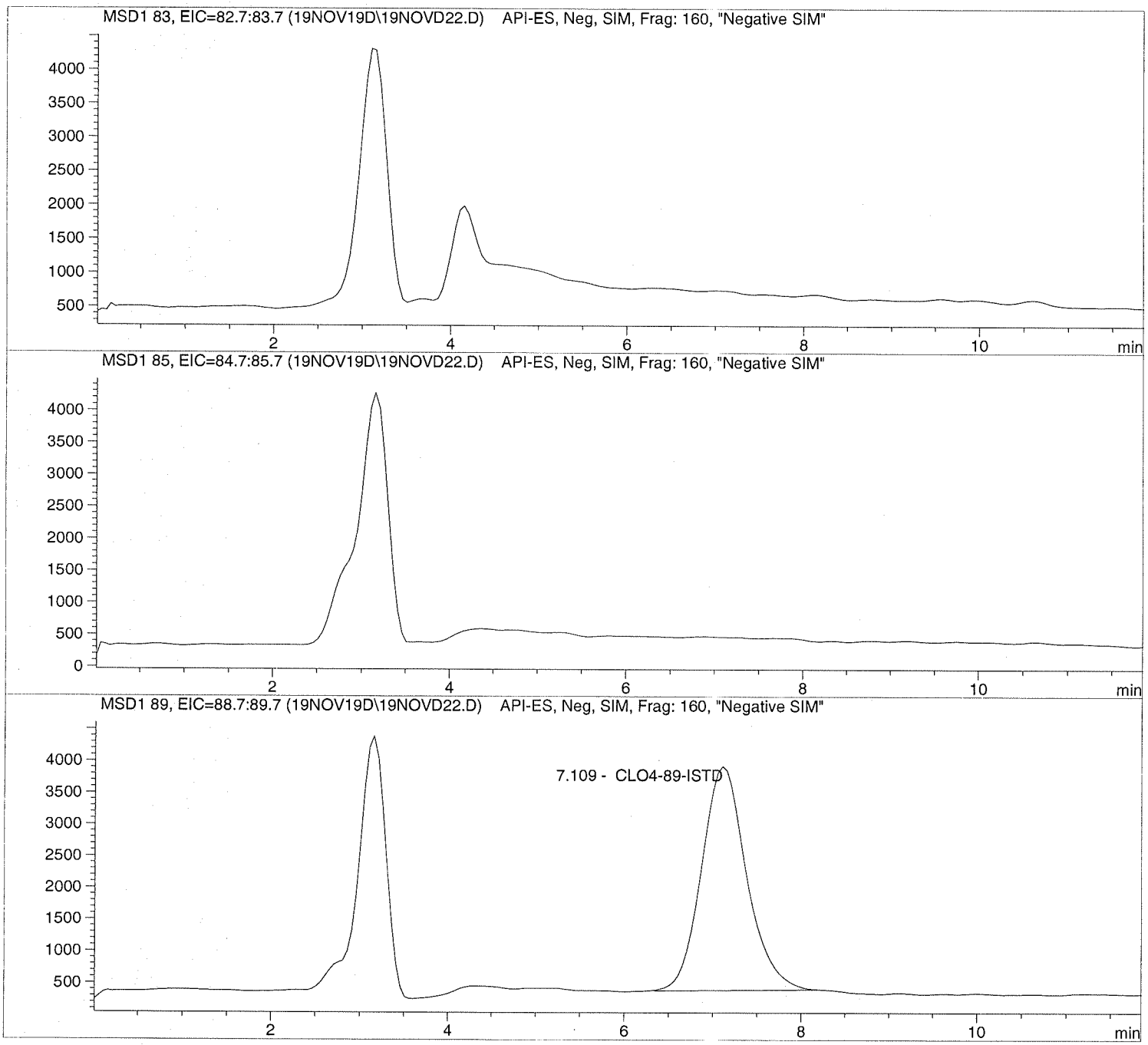
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD22.D Sample Name: 1932010004

Injection Date:	11/19/2019 13:40:18	Seq Line:	22
Sample Name:	1932010004	Location:	Vial 91
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD22.D Sample Name: 1932010004

Injection Date:	11/19/2019 13:40:18	Seq Line:	22
Sample Name:	1932010004	Location:	Vial 91
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.109	BBA	124695.0	5.0000	CLO4-89-ISTD

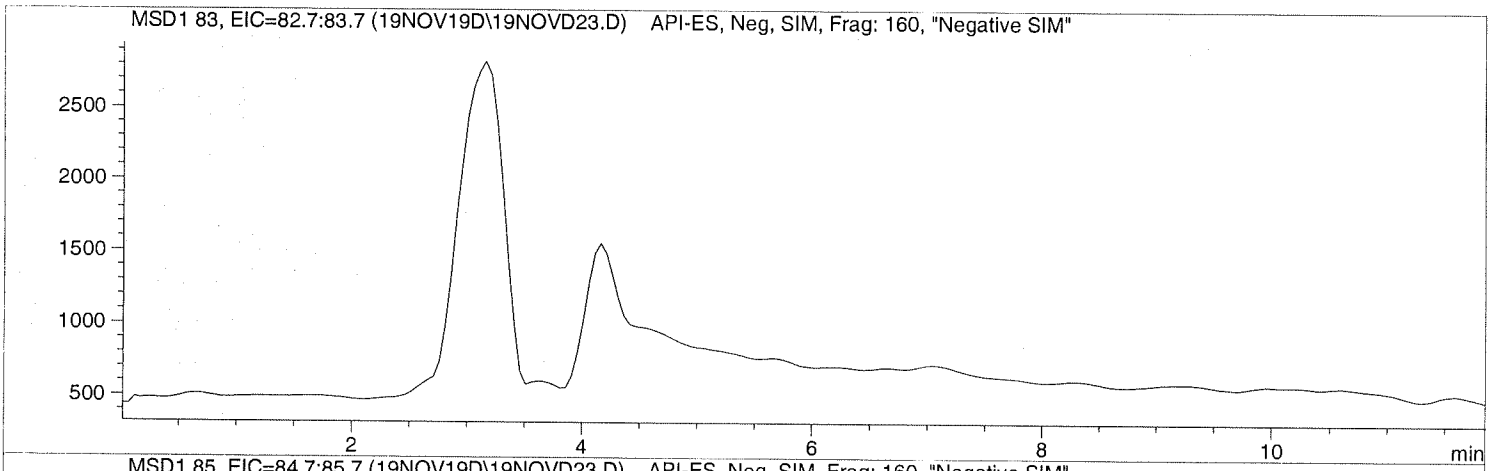
*** End of Report ***

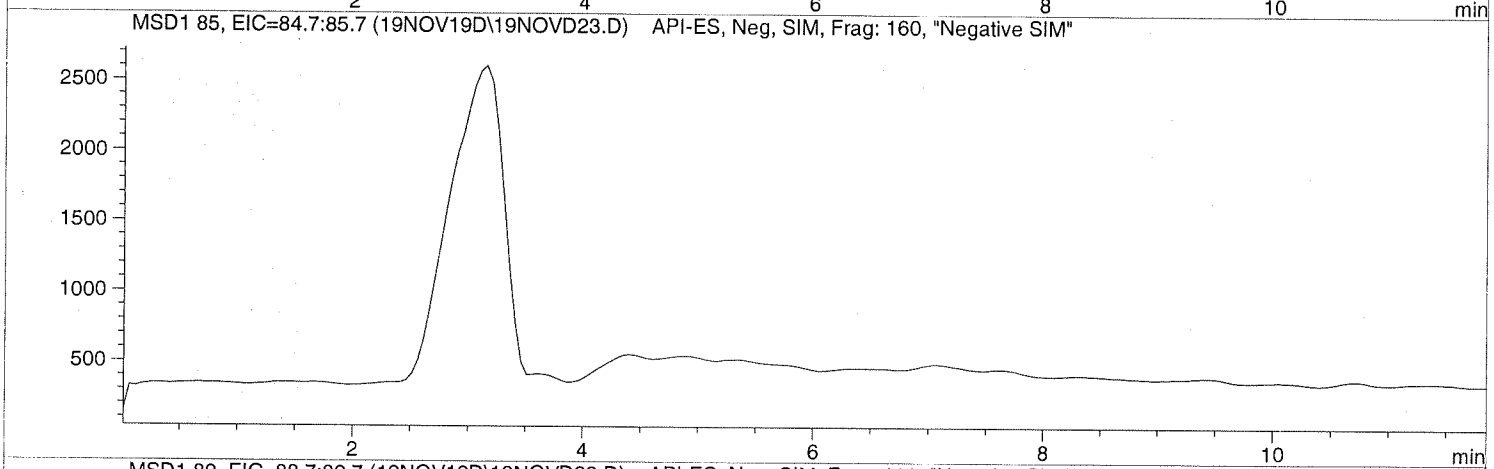
Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD23.D Sample Name: 1932010005

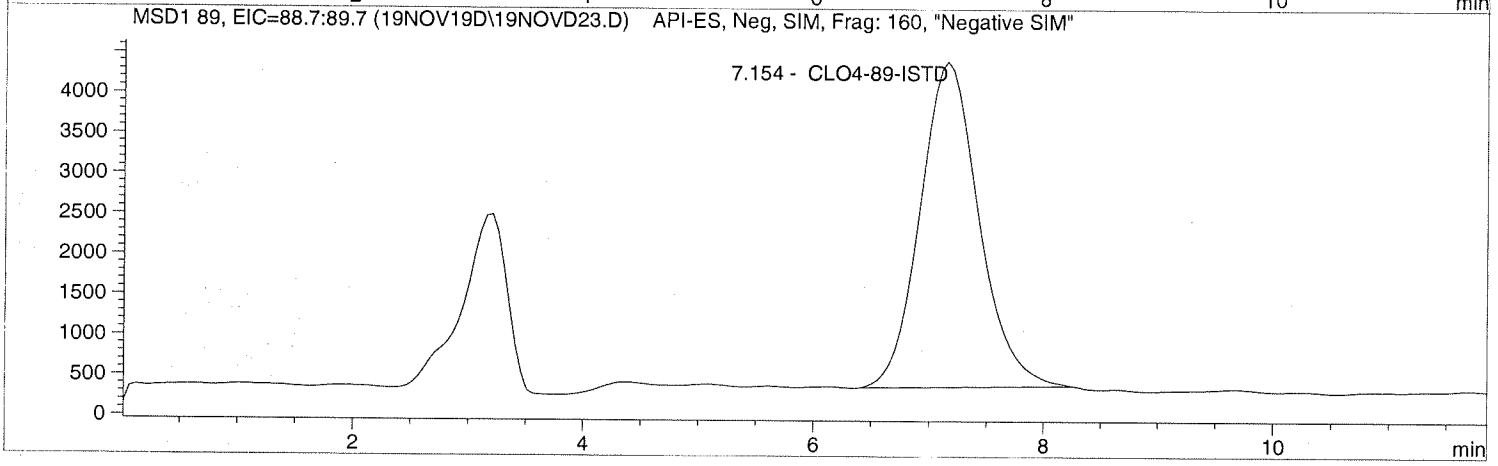
Injection Date:	11/19/2019 13:54:05	Seq Line:	23
Sample Name:	1932010005	Location:	Vial 92
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis







Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD23.D Sample Name: 1932010005

Injection Date:	11/19/2019 13:54:05	Seq Line:	23
Sample Name:	1932010005	Location:	Vial 92
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method:	CLO4-AQN.M
Analysis Method:	C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed:	11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.154	PBA	143110.0	5.0000	CLO4-89-ISTD

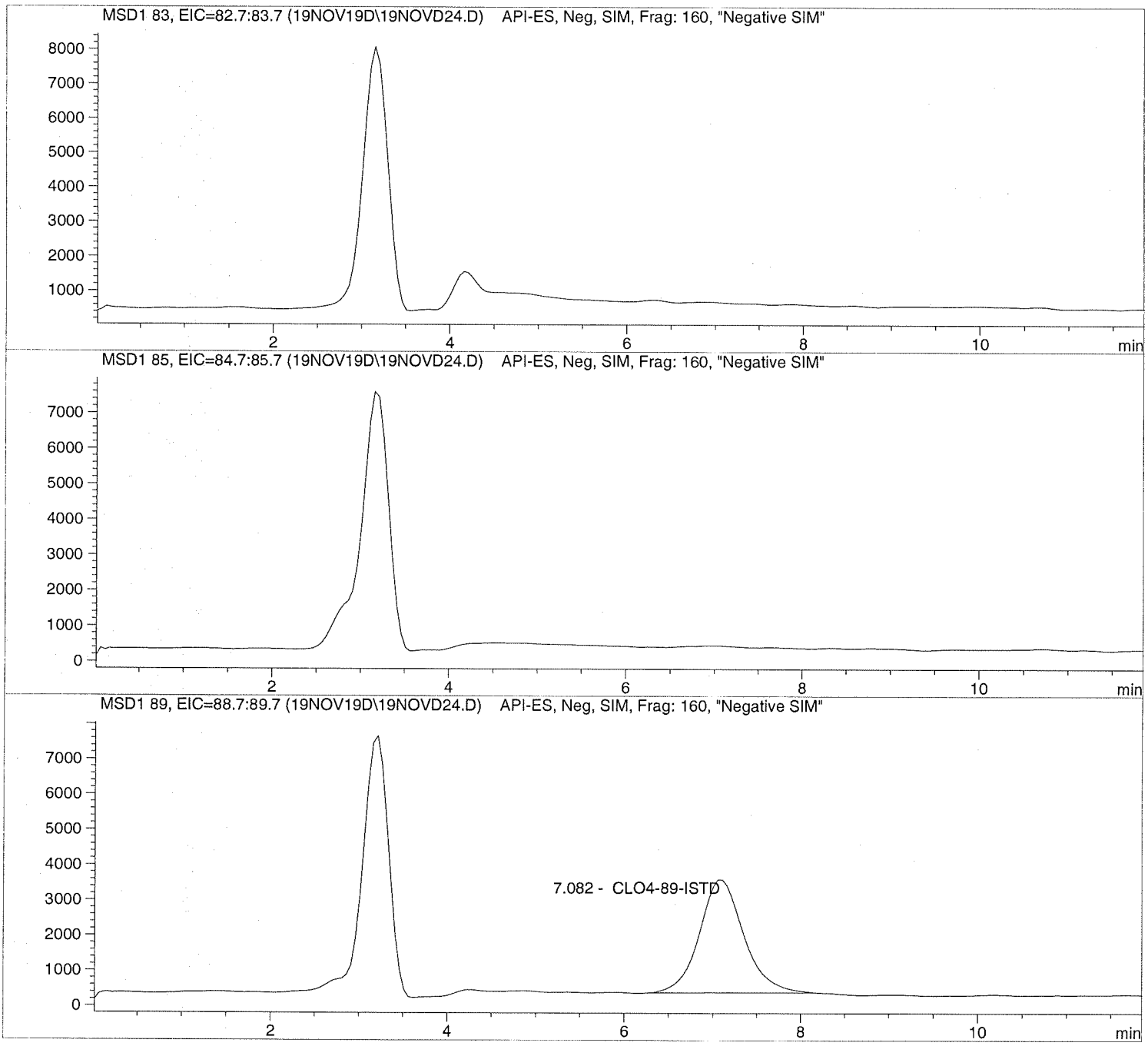
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD24.D Sample Name: 1932010006

Injection Date:	11/19/2019 14:07:50	Seq Line:	24
Sample Name:	1932010006	Location:	Vial 93
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD24.D Sample Name: 1932010006

Injection Date:	11/19/2019 14:07:50	Seq Line:	24
Sample Name:	1932010006	Location:	Vial 93
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method:	CLO4-AQN.M
Analysis Method:	C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed:	11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.082	BBA	112592.4	5.0000	CLO4-89-ISTD

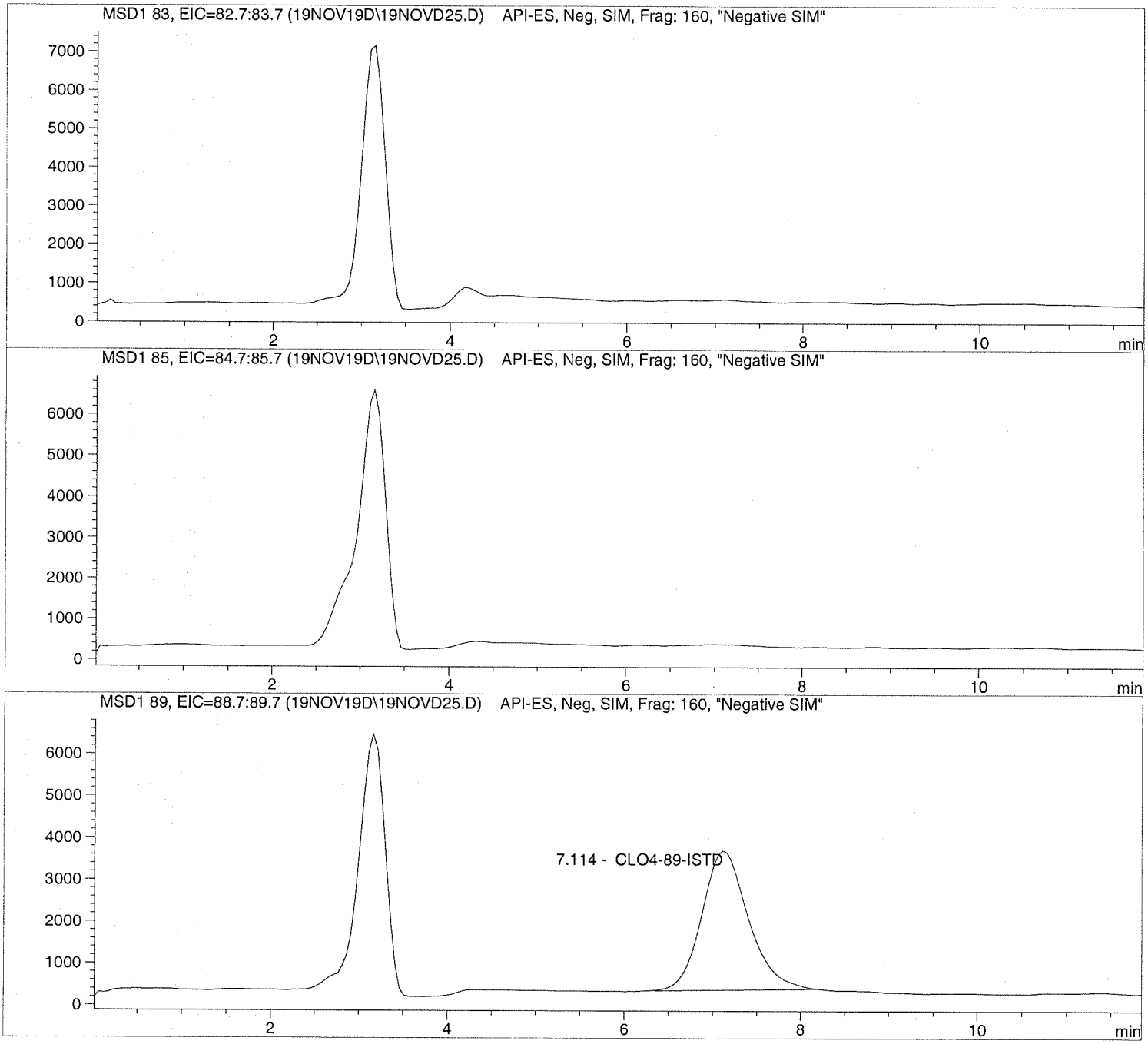
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD25.D Sample Name: 1932010007

Injection Date:	11/19/2019 14:21:39	Seq Line:	25
Sample Name:	1932010007	Location:	Vial 94
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD25.D Sample Name: 1932010007

Injection Date:	11/19/2019 14:21:39	Seq Line:	25
Sample Name:	1932010007	Location:	Vial 94
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.114	BBA	122347.6	5.0000	CLO4-89-ISTD

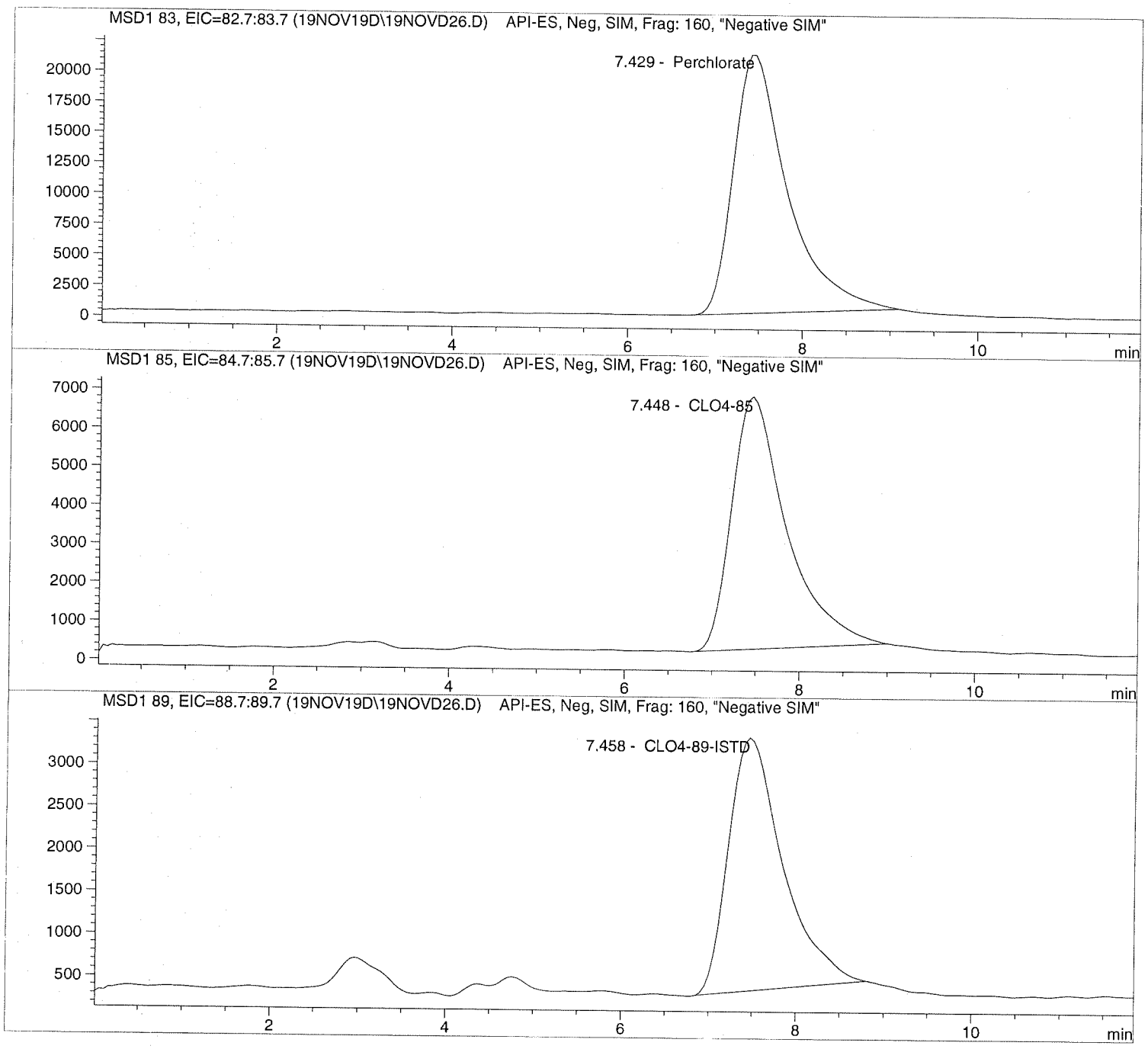
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD26.D Sample Name: 684810 CCV@25

Injection Date:	11/19/2019 14:35:25	Seq Line:	26
Sample Name:	684810 CCV@25	Location:	Vial 71
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD26.D Sample Name: 684810 CCV@25

Injection Date:	11/19/2019 14:35:25	Seq Line:	26
Sample Name:	684810 CCV@25	Location:	Vial 71
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	25.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.429	PBA	908551.0	24.2316	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.448	PBA	285244.9	24.8806	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.458	PBA	128522.3	5.0000	CLO4-89-ISTD

*** End of Report ***

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Raw Data

Initial Calibration

Calibration Table

Perchlorate

Calib. Data Modified : 9/23/2019 12:20:59 PM

Calculate : Internal Standard
Based on : Peak Area

Rel. Reference Window : 20.000 %
Abs. Reference Window : 0.000 min
Rel. Non-ref. Window : 20.000 %
Abs. Non-ref. Window : 0.000 min
Use Multiplier & Dilution Factor with ISTDs
Uncalibrated Peaks : not reported
Partial Calibration : No recalibration if peaks missing

Curve Type : Quadratic (some peaks differ, see below)
Origin : Ignored (some peaks differ, see below)
Weight : Linear (Amnt) (some peaks differ, see below)

Recalibration Settings:
Average Response : Average all calibrations
Average Retention Time: Floating Average New 75%

Calibration Report Options :
Printout of recalibrations within a sequence:
Calibration Table after Recalibration
Normal Report after Recalibration
If the sequence is done with bracketing:
Results of first cycle (ending previous bracket)

Default Sample ISTD Information (if not set in sample table):

ISTD #	ISTD Amount	Name
1	5.00000	CLO4-89-ISTD

Signal 1: MSD1 83, EIC=82.7:83.7
Signal 2: MSD1 85, EIC=84.7:85.7
Signal 3: MSD1 89, EIC=88.7:89.7

RetTime [min]	Lvl Sig		Amount	Area	Amt/Area	Ref	Grp	Name
7.750	1	3	1.00000	5.39218e4	1.85454e-5		1	Perchlorate
		4	2.00000	1.32825e5	1.50574e-5			
		5	5.00000	2.76271e5	1.80982e-5			
		6	10.00000	5.61298e5	1.78159e-5			
		7	25.00000	1.51820e6	1.64669e-5			
		8	50.00000	3.31156e6	1.50986e-5			
		9	75.00000	5.23914e6	1.43153e-5			
7.767	3	3	5.00000	2.14568e5	2.33026e-5	+I1		CLO4-89-ISTD
		4	5.00000	2.04758e5	2.44190e-5			
		5	5.00000	2.13407e5	2.34294e-5			
		6	5.00000	2.09246e5	2.38953e-5			
		7	5.00000	2.07403e5	2.41077e-5			
		8	5.00000	2.02929e5	2.46391e-5			
		9	5.00000	1.97933e5	2.52611e-5			
7.778	2	3	1.00000	1.70436e4	5.86732e-5		1	CLO4-85
		4	2.00000	4.20754e4	4.75337e-5			
		5	5.00000	9.24707e4	5.40712e-5			
		6	10.00000	1.68622e5	5.93041e-5			
		7	25.00000	4.63724e5	5.39114e-5			
		8	50.00000	9.95933e5	5.02042e-5			

RetTime [min]	Sig	Lvl	Amount	Area	Amt/Area	Ref	Grp	Name
		9	75.00000	1.58066e6	4.74484e-5			

More compound-specific settings:

Compound: Perchlorate
- Time Window : From 3.581 min To 11.899 min
- Curve Type : Quadratic
- Origin : Ignored
- Calibration Level Weights:/
  - Level 3 : 1
  - Level 4 : 0.5
  - Level 5 : 0.2
  - Level 6 : 0.1
  - Level 7 : 0.04
  - Level 8 : 0.02
  - Level 9 : 0.013333

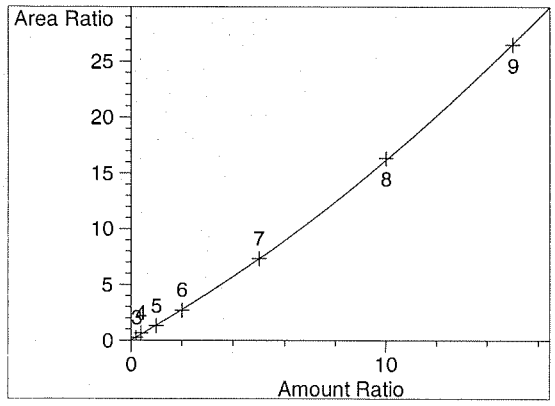
Compound: CLO4-89-ISTD
- Time Window : From 3.581 min To 11.896 min
- Curve Type : Linear
- Origin : Included
- Calibration Level Weights:/
  - Level 3 : 1
  - Level 4 : 1
  - Level 5 : 1
  - Level 6 : 1
  - Level 7 : 1
  - Level 8 : 1
  - Level 9 : 1

Compound: CLO4-85
- Time Window : From 3.601 min To 11.913 min
- Curve Type : Quadratic
- Origin : Ignored
- Calibration Level Weights:/
  - Level 3 : 1
  - Level 4 : 0.5
  - Level 5 : 0.2
  - Level 6 : 0.1
  - Level 7 : 0.04
  - Level 8 : 0.02
  - Level 9 : 0.013333

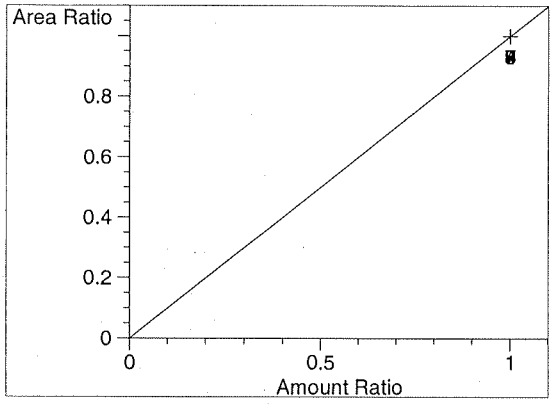
Peak Sum Table

No Entries in table

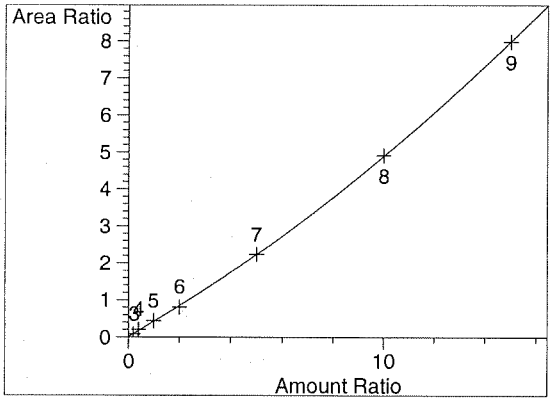
Calibration Curves



Perchlorate at exp. RT: 7.750
MSD1 83, EIC=82.7:83.7
Correlation: 0.99975
Residual Std. Dev.: 0.10284
Formula: $y = ax^2 + bx + c$
a: 3.10463e-2
b: 1.30369
c: 2.19496e-2
x: Amount Ratio
y: Area Ratio
Calibration Level Weights:
Level 3 : 1
Level 4 : 0.5
Level 5 : 0.2
Level 6 : 0.1
Level 7 : 0.04
Level 8 : 0.02
Level 9 : 0.013333



CLO4-89-ISTD at exp. RT: 7.767
MSD1 89, EIC=88.7:89.7
Correlation: 1.00000
Residual Std. Dev.: 0.00000
Formula: $y = mx + b$
m: 1.00000
b: 0.00000
x: Amount Ratio
y: Area Ratio
Calibration Level Weights:
Level 3 : 1
Level 4 : 1
Level 5 : 1
Level 6 : 1
Level 7 : 1
Level 8 : 1
Level 9 : 1



CLO4-85 at exp. RT: 7.778
MSD1 85, EIC=84.7:85.7
Correlation: 0.99969
Residual Std. Dev.: 0.02601
Formula: $y = ax^2 + bx + c$
a: 8.85207e-3
b: 3.99283e-1
c: 1.33505e-2
x: Amount Ratio
y: Area Ratio
Calibration Level Weights:
Level 3 : 1
Level 4 : 0.5
Level 5 : 0.2
Level 6 : 0.1
Level 7 : 0.04
Level 8 : 0.02
Level 9 : 0.013333

Batch Review Method:
C:\HPCHEM\1\METHODS\CLO4-DP3.M

['#' ==> Run has not been reprocessed with Batch Review Method
'*' ==> Run has been saved with batch file]

#	Sample	Location	Inj	SampleType	Run	Perchlorate Area	Perchlorat RT	Perchlorate Amount
#*	CLO4@ 1.0ug/L	Vial 73	1	Control	3	5.39218e4	7.750	8.75982e-1
#*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	1.32825e5	7.797	2.37682
#*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	2.76271e5	7.770	4.77237
#*	CLO4@ 10.ug/L	Vial 76	1	Control	6	5.61298e5	7.785	9.75097
#*	CLO4@ 25.ug/L	Vial 77	1	Control	7	1.51820e6	7.741	25.01082
#*	CLO4@ 50.ug/L	Vial 78	1	Control	8	3.31156e6	7.775	50.40300
#*	CLO4@ 75.ug/L	Vial 79	1	Control	9	5.23914e6	7.736	74.79107
#*	ICAL Verf@10ug/L	Vial 80	1	Control	11	5.74879e5	7.756	10.11855

#	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount
#*	CLO4@ 1.0ug/L	Vial 73	1	Control	3	2.14568e5	7.767	5.00000
#*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	2.04758e5	7.816	5.00000
#*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	2.13407e5	7.793	5.00000
#*	CLO4@ 10.ug/L	Vial 76	1	Control	6	2.09246e5	7.798	5.00000
#*	CLO4@ 25.ug/L	Vial 77	1	Control	7	2.07403e5	7.763	5.00000
#*	CLO4@ 50.ug/L	Vial 78	1	Control	8	2.02929e5	7.800	5.00000
#*	CLO4@ 75.ug/L	Vial 79	1	Control	9	1.97933e5	7.765	5.00000
#*	ICAL Verf@10ug/L	Vial 80	1	Control	11	2.06243e5	7.776	5.00000

#	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
#*	CLO4@ 1.0ug/L	Vial 73	1	Control	3	1.70436e4	7.778	8.24488e-1
#*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	4.20754e4	7.805	2.38090
#*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	9.24707e4	7.787	5.14166
#*	CLO4@ 10.ug/L	Vial 76	1	Control	6	1.68622e5	7.781	9.52209
#*	CLO4@ 25.ug/L	Vial 77	1	Control	7	4.63724e5	7.760	25.04916
#*	CLO4@ 50.ug/L	Vial 78	1	Control	8	9.95933e5	7.793	50.14223
#*	CLO4@ 75.ug/L	Vial 79	1	Control	9	1.58066e6	7.758	74.93659
#*	ICAL Verf@10ug/L	Vial 80	1	Control	11	1.71000e5	7.760	9.79043

*** End of Report ***

Sequence Table:

Method and Injection Info Part:

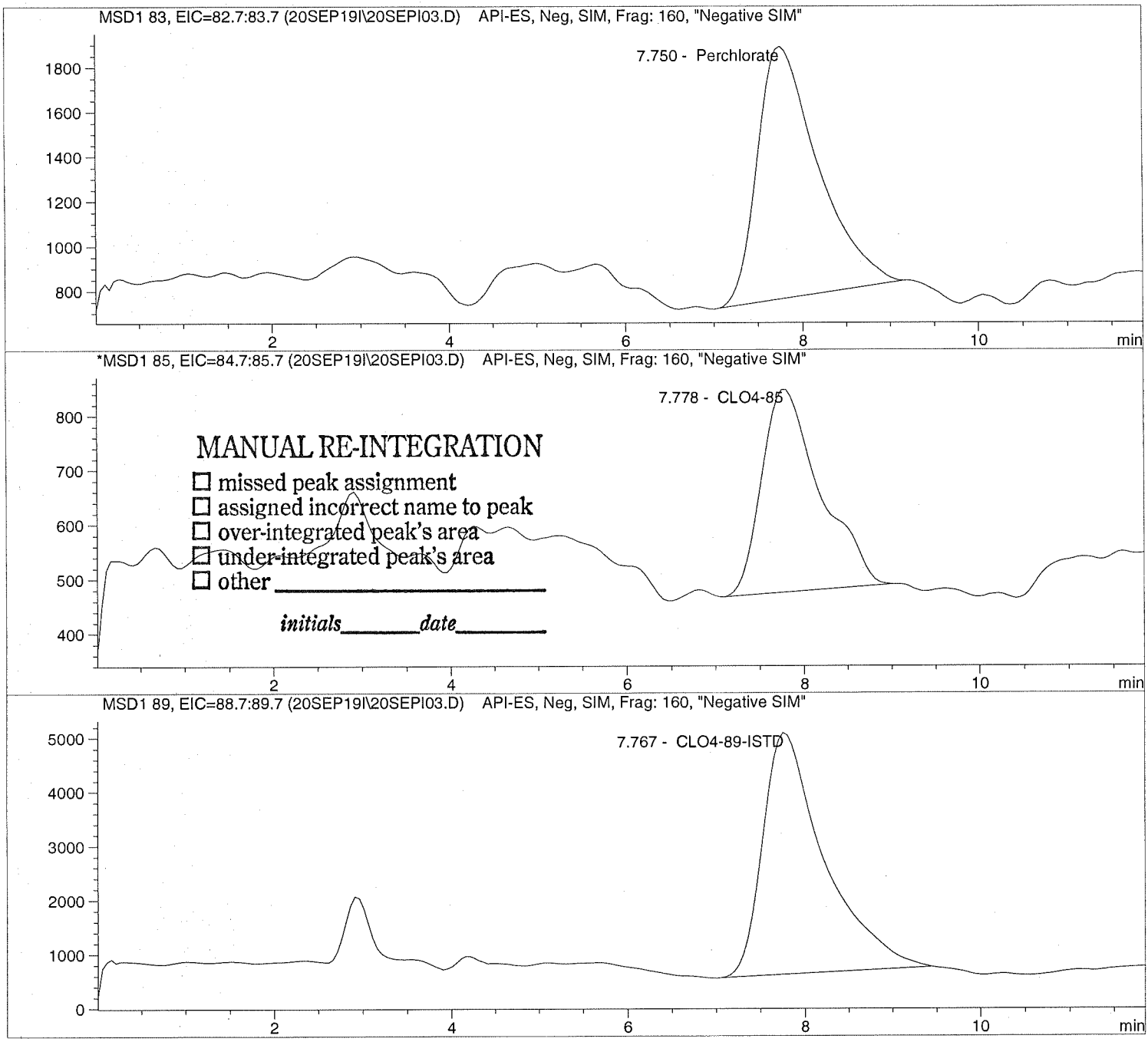
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
1	Vial 71	CLO4@ 0.2ug/L	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	CLO4@ 0.5ug/L	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	CLO4@ 1.0ug/L	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	CLO4@ 2.0ug/L	CLO4-AQN	1	Ctrl Samp		
5	Vial 75	CLO4@ 5.0ug/L	CLO4-AQN	1	Ctrl Samp		
6	Vial 76	CLO4@ 10.ug/L	CLO4-AQN	1	Ctrl Samp		
7	Vial 77	CLO4@ 25.ug/L	CLO4-AQN	1	Ctrl Samp		
8	Vial 78	CLO4@ 50.ug/L	CLO4-AQN	1	Ctrl Samp		
9	Vial 79	CLO4@ 75.ug/L	CLO4-AQN	1	Ctrl Samp		
10	Vial 71	CLO4@ 0.2ug/L	CLO4-AQN	1	Ctrl Samp		
11	Vial 80	ICAL Verf@10ug/L	CLO4-AQN	1	Ctrl Samp		

Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI03.D Sample Name: CLO4@ 1.0ug/L

Injection Date:	9/20/2019 09:24:05	Seq Line:	3
Sample Name:	CLO4@ 1.0ug/L	Location:	Vial 73
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI03.D Sample Name: CLO4@ 1.0ug/L

Injection Date:	9/20/2019 09:24:05	Seq Line:	3
Sample Name:	CLO4@ 1.0ug/L	Location:	Vial 73
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	1.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.750	PBA	53921.8	0.8760	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.778	MM	17043.6	0.8245	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.767	PBA	214568.1	5.0000	CLO4-89-ISTD

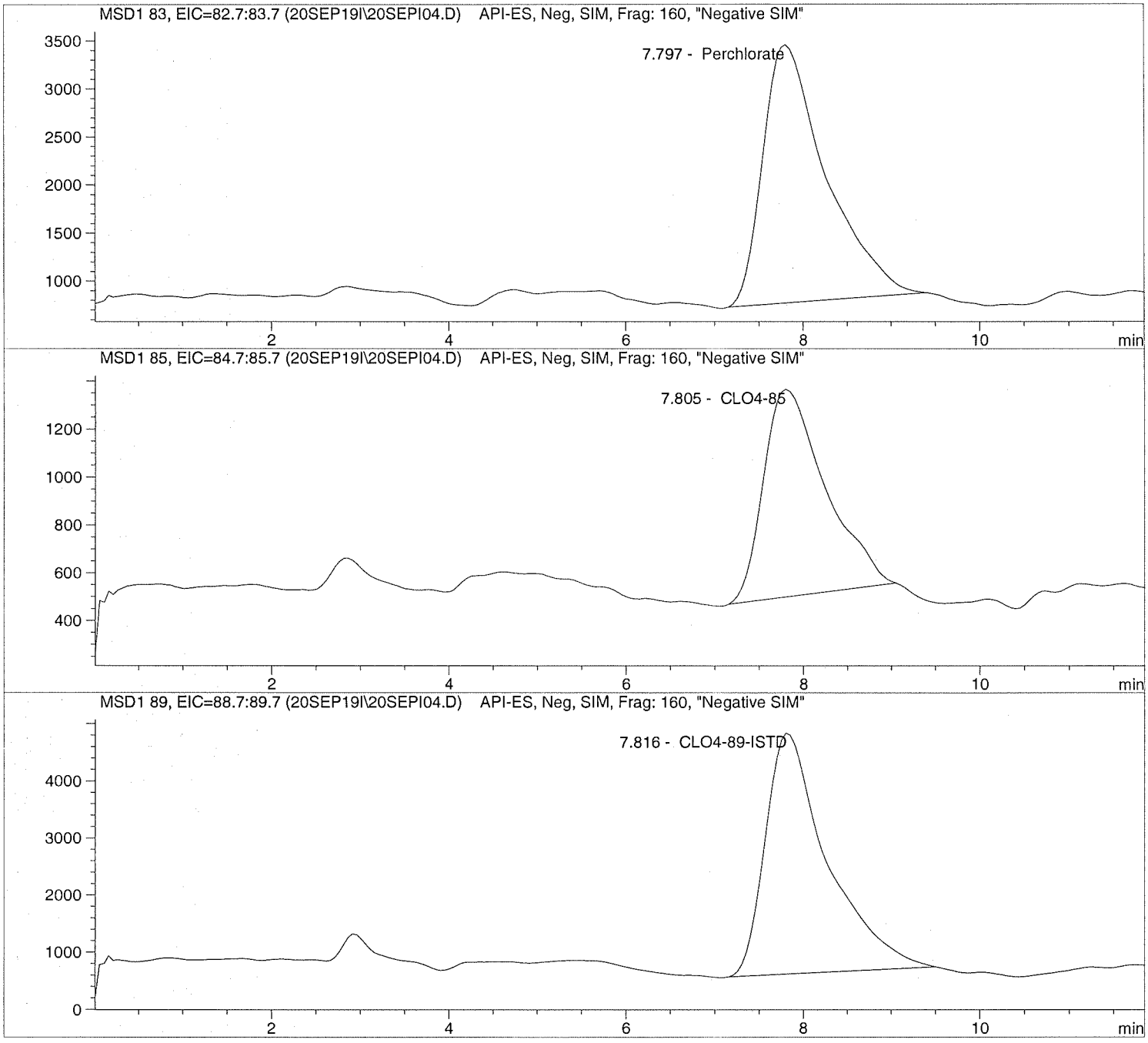
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI04.D Sample Name: CLO4@ 2.0ug/L

Injection Date:	9/20/2019 09:37:58	Seq Line:	4
Sample Name:	CLO4@ 2.0ug/L	Location:	Vial 74
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI04.D Sample Name: CLO4@ 2.0ug/L

Injection Date:	9/20/2019 09:37:58	Seq Line:	4
Sample Name:	CLO4@ 2.0ug/L	Location:	Vial 74
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method:	CLO4-AQN.M
Analysis Method:	C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed:	9/23/2019 12:21:47

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	2.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.797	PBA	132825.2	2.3768	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.805	PBA	42075.4	2.3809	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.816	PBA	204758.3	5.0000	CLO4-89-ISTD

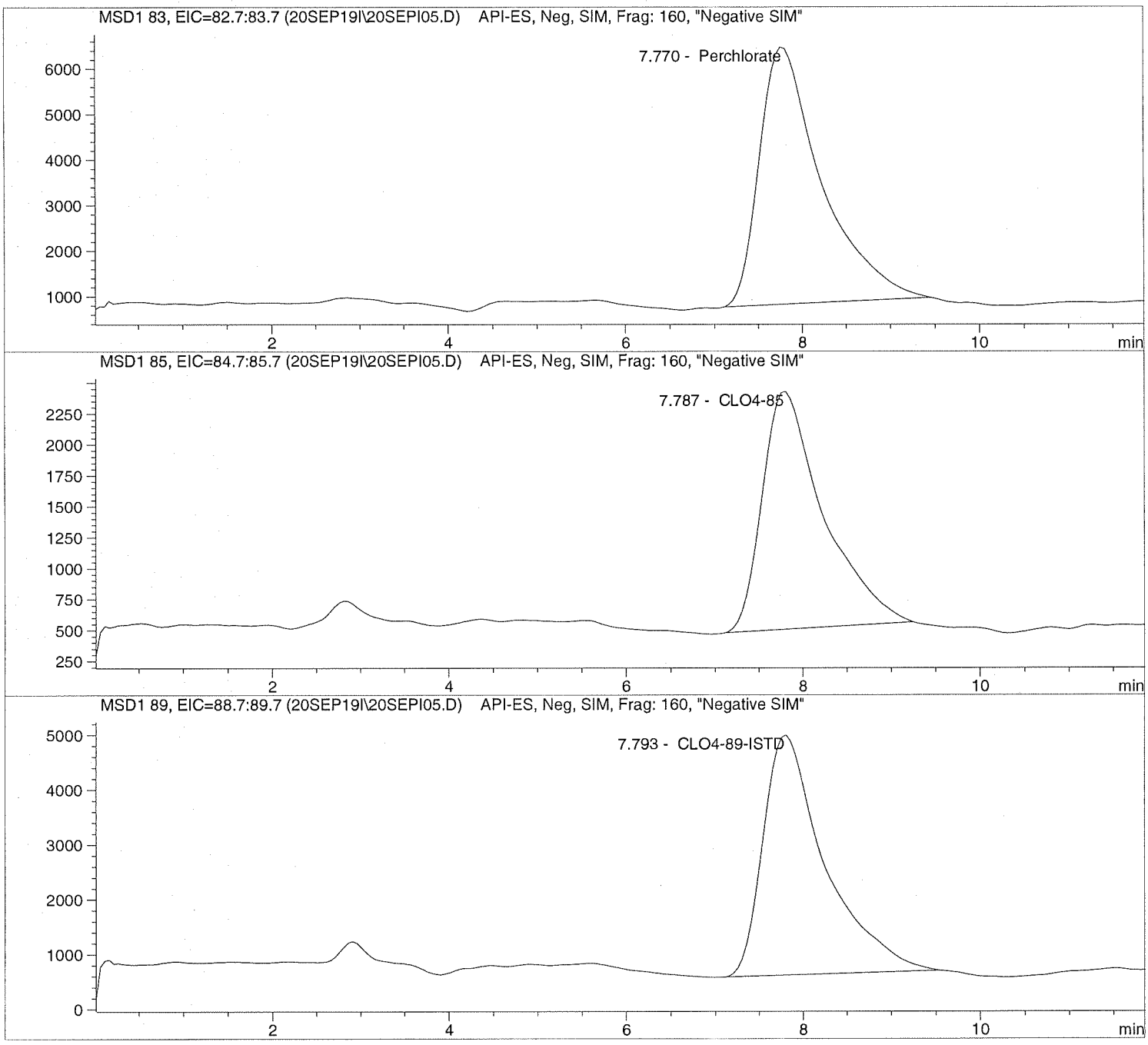
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI05.D Sample Name: CLO4@ 5.0ug/L

Injection Date:	9/20/2019 09:51:49	Seq Line:	5
Sample Name:	CLO4@ 5.0ug/L	Location:	Vial 75
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI05.D Sample Name: CLO4@ 5.0ug/L

Injection Date:	9/20/2019 09:51:49	Seq Line:	5
Sample Name:	CLO4@ 5.0ug/L	Location:	Vial 75
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	5.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.770	PBA	276270.7	4.7724	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.787	PBA	92470.7	5.1417	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.793	PBA	213407.0	5.0000	CLO4-89-ISTD

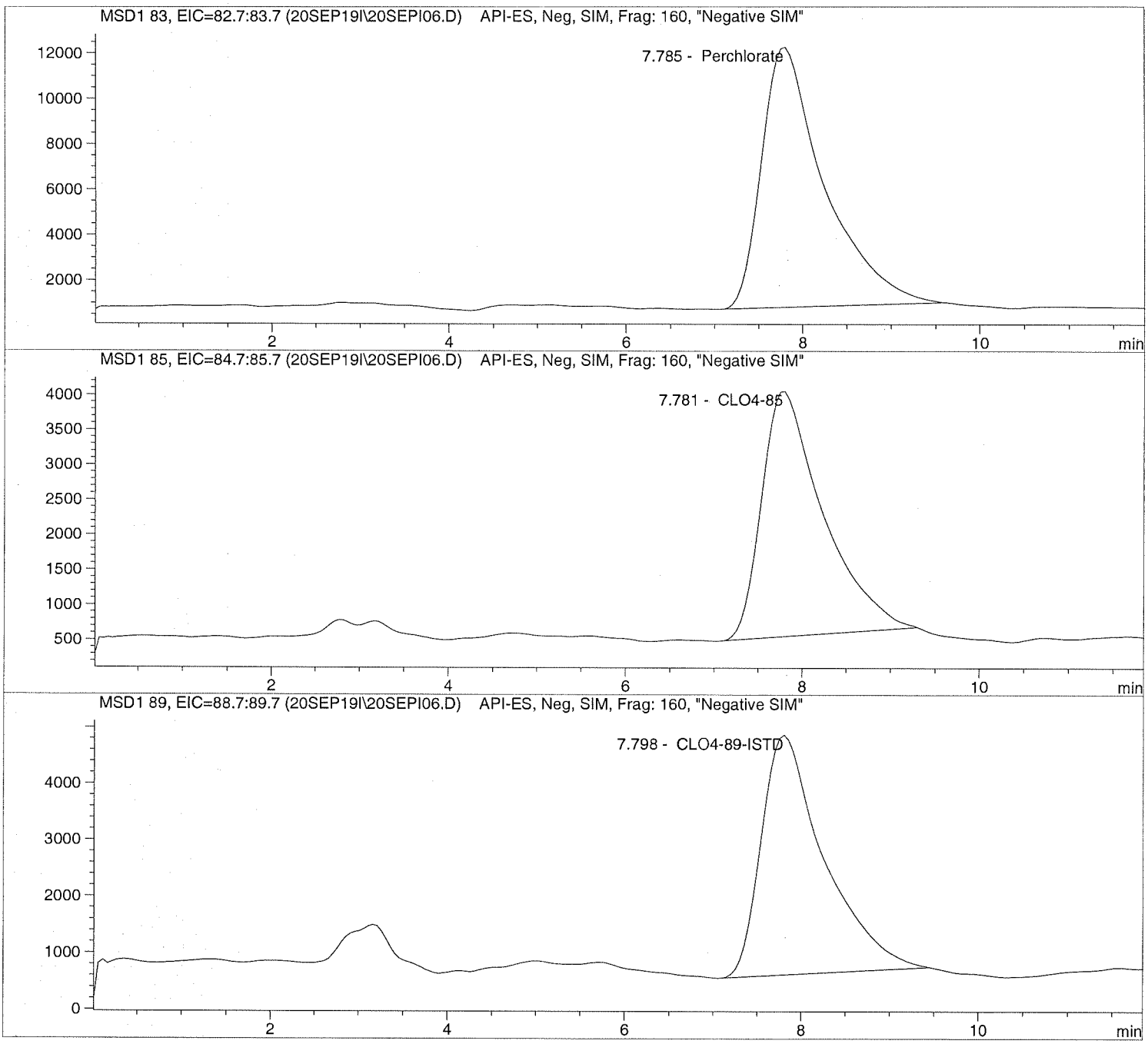
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI06.D Sample Name: CLO4@ 10.ug/L

Injection Date:	9/20/2019 10:05:36	Seq Line:	6
Sample Name:	CLO4@ 10.ug/L	Location:	Vial 76
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI06.D Sample Name: CLO4@ 10.ug/L

Injection Date:	9/20/2019 10:05:36	Seq Line:	6
Sample Name:	CLO4@ 10.ug/L	Location:	Vial 76
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	10.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.785	PBA	561297.7	9.7510	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.781	PBA	168622.4	9.5221	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.798	PBA	209246.3	5.0000	CLO4-89-ISTD

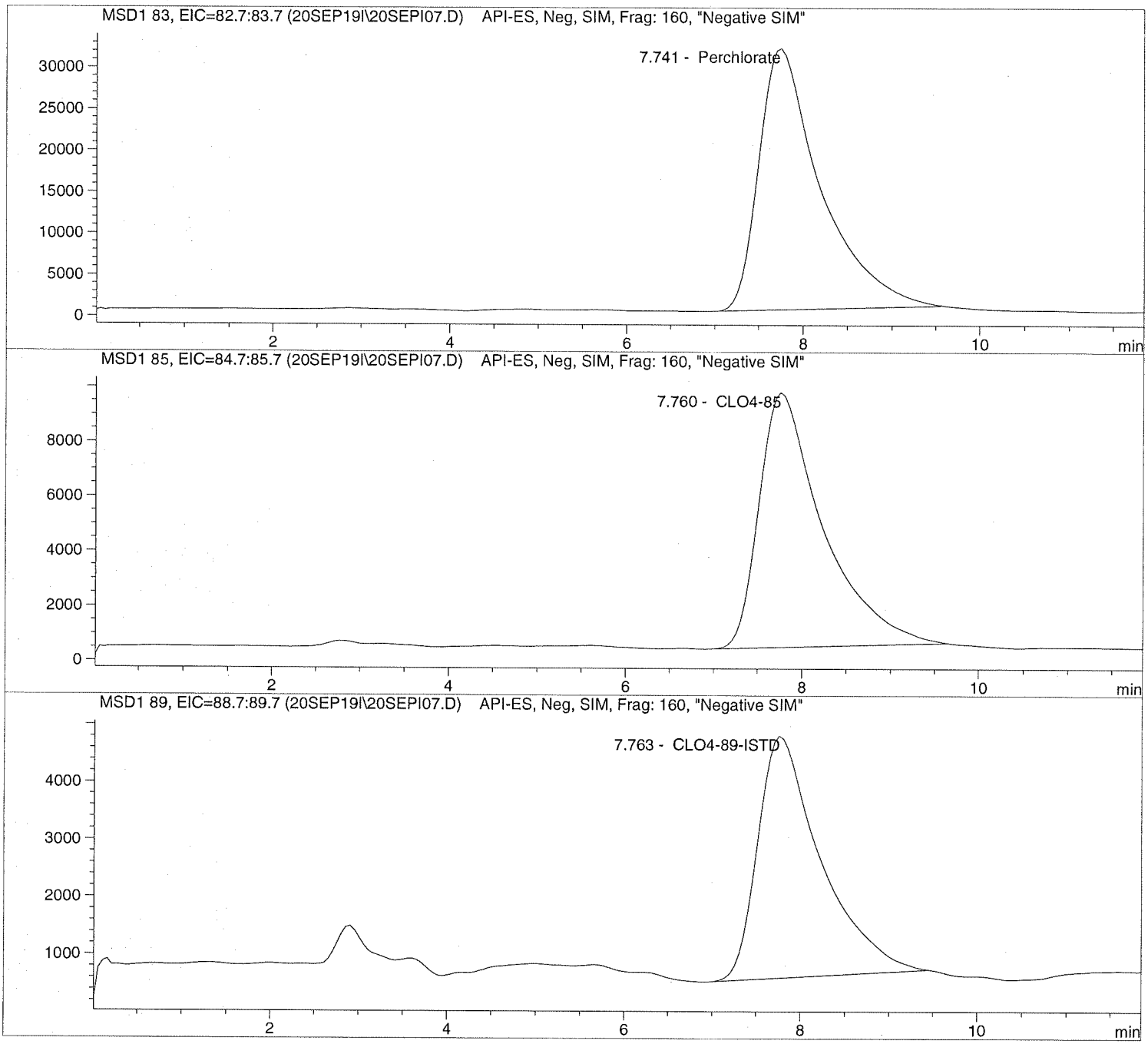
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI07.D Sample Name: CLO4@ 25.ug/L

Injection Date:	9/20/2019 10:19:23	Seq Line:	7
Sample Name:	CLO4@ 25.ug/L	Location:	Vial 77
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI07.D Sample Name: CLO4@ 25.ug/L

Injection Date:	9/20/2019 10:19:23	Seq Line:	7
Sample Name:	CLO4@ 25.ug/L	Location:	Vial 77
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	25.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.741	PBA	1518197.9	25.0108	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.760	PBA	463724.0	25.0492	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.763	PBA	207402.8	5.0000	CLO4-89-ISTD

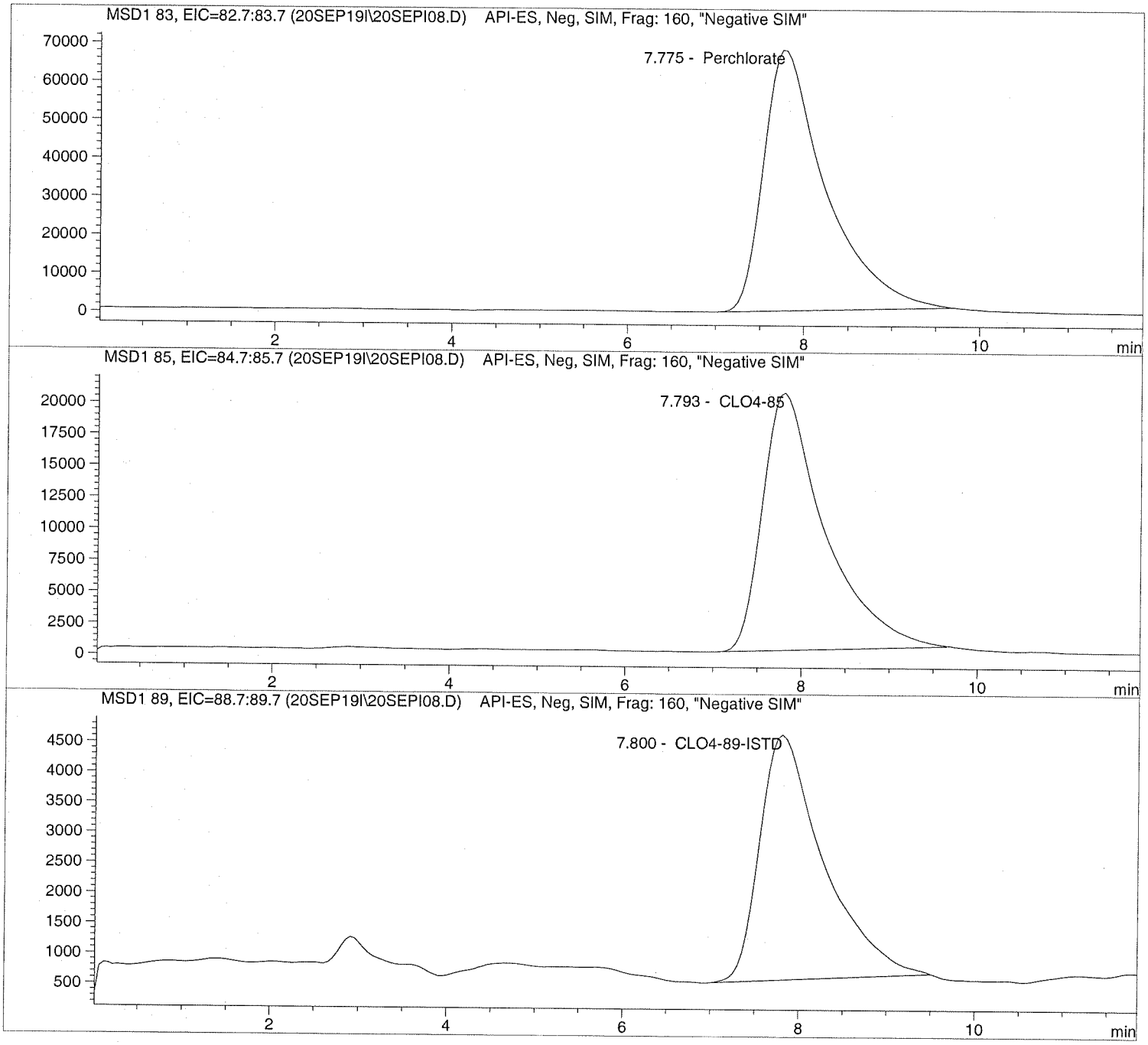
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI08.D Sample Name: CLO4@ 50.ug/L

Injection Date:	9/20/2019 10:33:18	Seq Line:	8
Sample Name:	CLO4@ 50.ug/L	Location:	Vial 78
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI08.D Sample Name: CLO4@ 50.ug/L

Injection Date:	9/20/2019 10:33:18	Seq Line:	8
Sample Name:	CLO4@ 50.ug/L	Location:	Vial 78
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method:	CLO4-AQN.M
Analysis Method:	C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed:	9/23/2019 12:21:47

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	50.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.775	PBA	3311559.2	50.4030	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.793	PBA	995933.0	50.1422	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.800	PBA	202929.2	5.0000	CLO4-89-ISTD

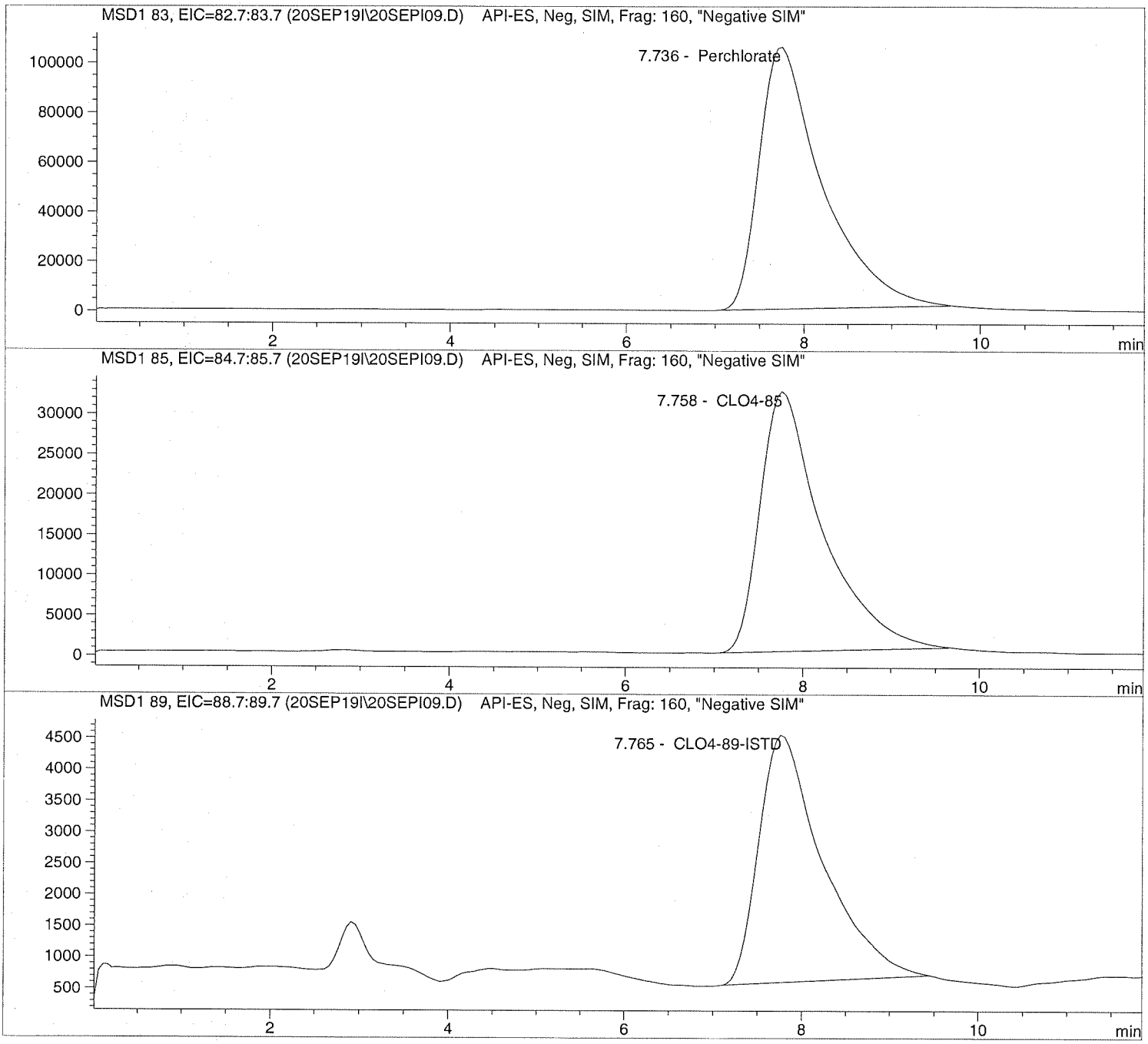
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI09.D Sample Name: CLO4@ 75.ug/L

Injection Date:	9/20/2019 10:47:05	Seq Line:	9
Sample Name:	CLO4@ 75.ug/L	Location:	Vial 79
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI09.D Sample Name: CLO4@ 75.ug/L

Injection Date:	9/20/2019 10:47:05	Seq Line:	9
Sample Name:	CLO4@ 75.ug/L	Location:	Vial 79
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	75.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.736	PBA	5239145.0	74.7911	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.758	PBA	1580664.2	74.9366	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.765	PBA	197932.5	5.0000	CLO4-89-ISTD

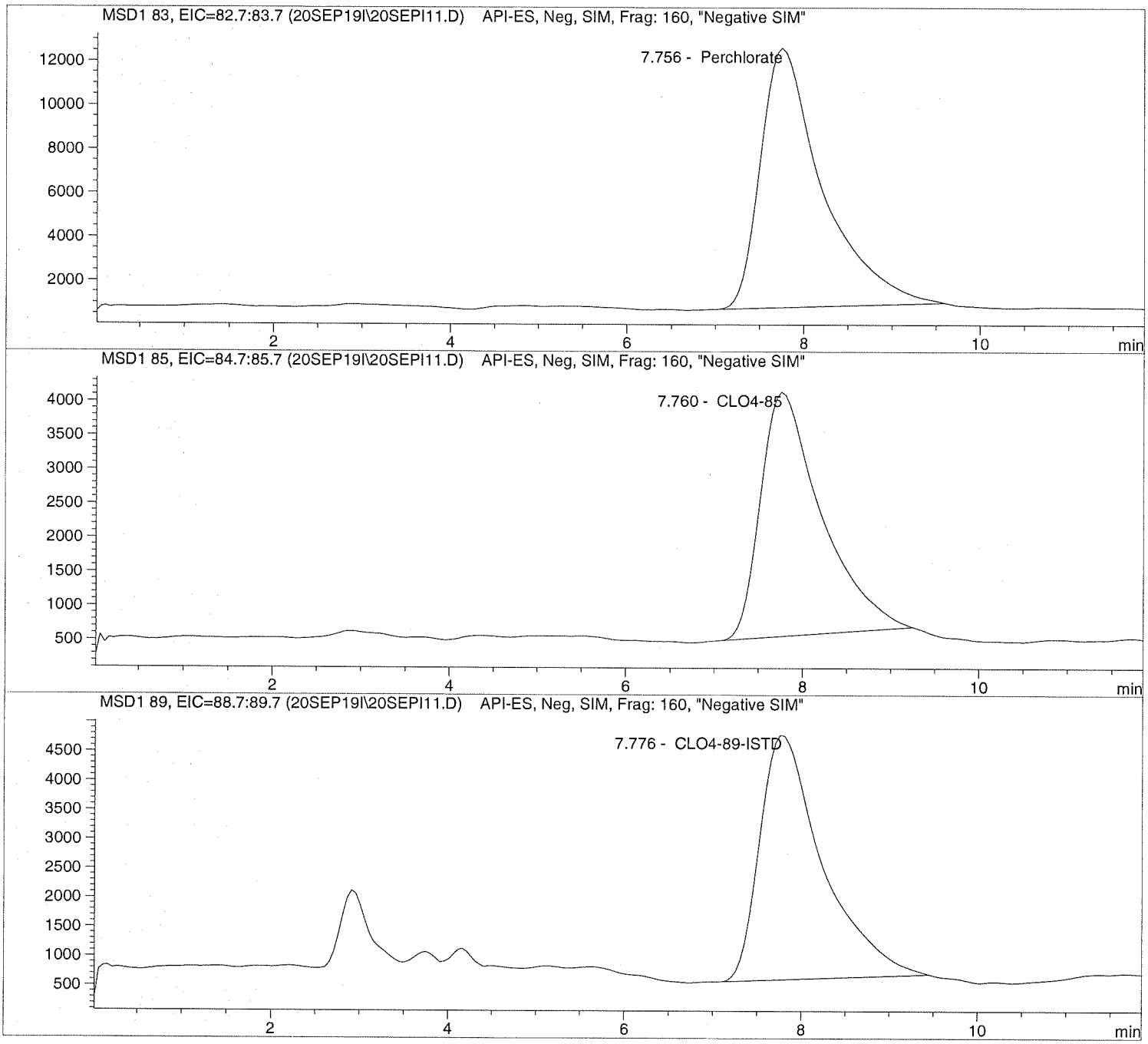
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI11.D Sample Name: ICAL Verf@10ug/L

Injection Date:	9/20/2019 11:14:45	Seq Line:	11
Sample Name:	ICAL Verf@10ug/L	Location:	Vial 80
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI11.D Sample Name: ICAL Verf@10ug/L

Injection Date:	9/20/2019 11:14:45	Seq Line:	11
Sample Name:	ICAL Verf@10ug/L	Location:	Vial 80
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method:	CLO4-AQN.M
Analysis Method:	C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed:	9/23/2019 12:21:47

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	10.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.756	PBA	574879.4	10.1185	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.760	PBA	171000.4	9.7904	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.776	PBA	206243.3	5.0000	CLO4-89-ISTD

*** End of Report ***



ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Raw Data

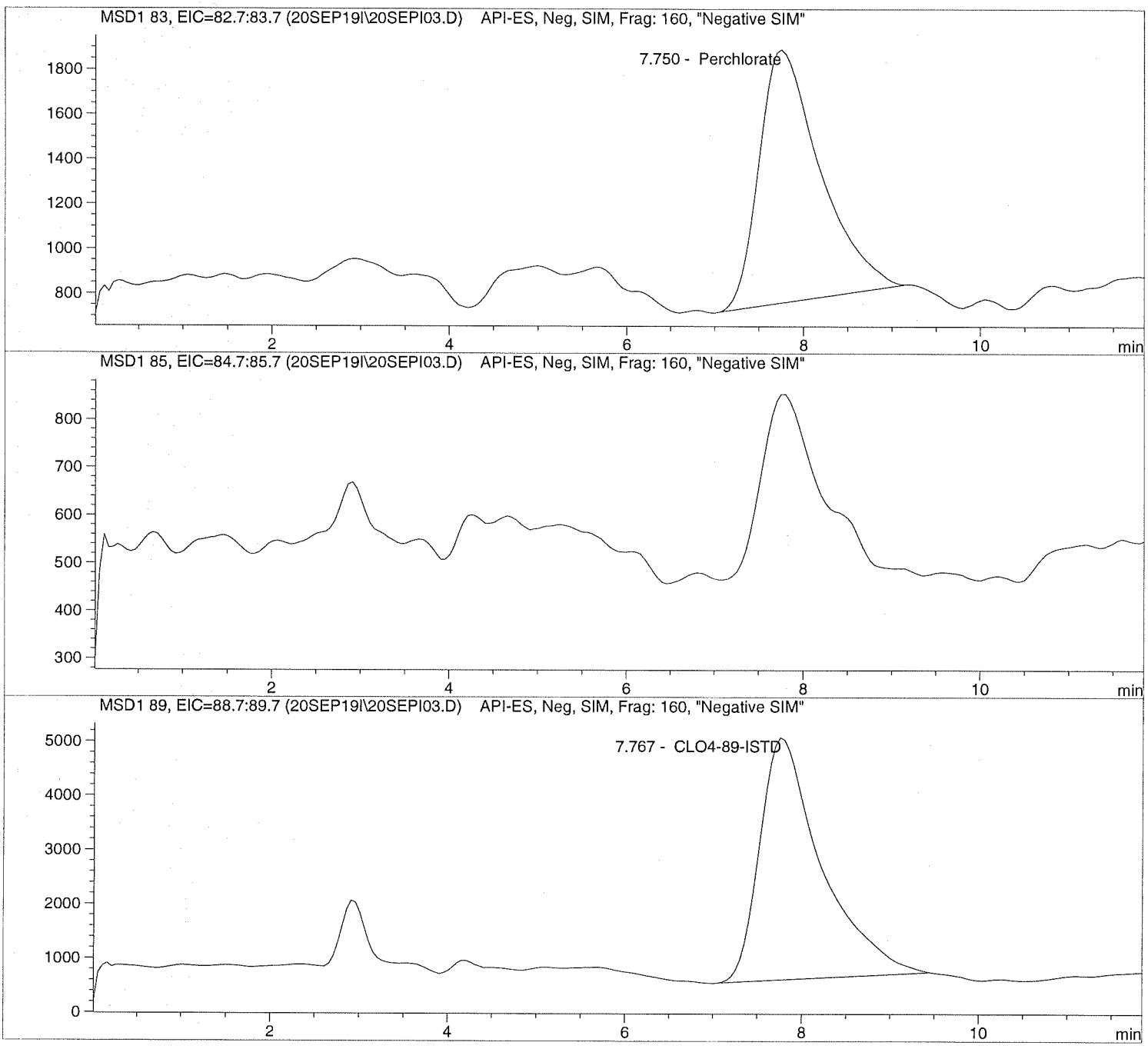
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Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI03.D Sample Name: CLO4@ 1.0ug/L

Injection Date:	9/20/2019 09:24:05	Seq Line:	3
Sample Name:	CLO4@ 1.0ug/L	Location:	Vial 73
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:27:11

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI03.D Sample Name: CLO4@ 1.0ug/L

Injection Date:	9/20/2019 09:24:05	Seq Line:	3
Sample Name:	CLO4@ 1.0ug/L	Location:	Vial 73
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:27:11

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	1.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.750	PBA	53921.8	0.8760	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.767	PBA	214568.1	5.0000	CLO4-89-ISTD

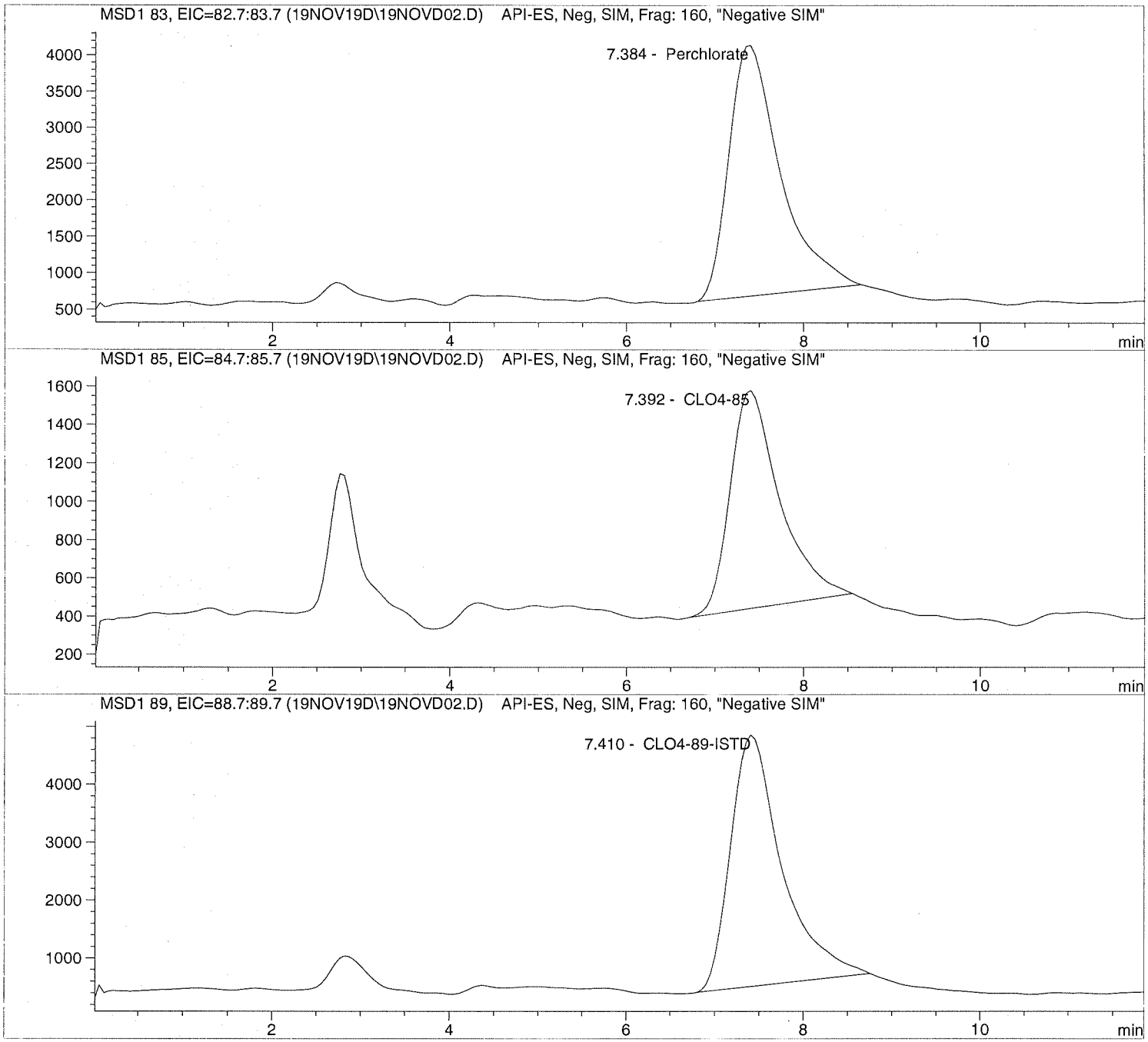
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD02.D Sample Name: 684805 QC@3.0

Injection Date:	11/19/2019 09:04:34	Seq Line:	2
Sample Name:	684805 QC@3.0	Location:	Vial 72
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD02.D Sample Name: 684805 QC@3.0

Injection Date:	11/19/2019 09:04:34	Seq Line:	2
Sample Name:	684805 QC@3.0	Location:	Vial 72
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	3.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.384	PBA	139068.9	2.9298	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.392	PBA	44210.1	2.9647	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.410	PBA	174596.2	5.0000	CLO4-89-ISTD

*** End of Report ***

10450 Stancliff Rd. Suite 210
Houston, TX 77099
T: +1 281 530 5656
F: +1 281 530 5887

November 27, 2019

Susan Huang
Aptim Environmental & Infrastucture, Inc.
2500 City West Blvd., Suite 1700
Houston, TX 77042

Work Order: **HS19110644**

Laboratory Results for: **LHAAP-50 501032**

Dear Susan,

ALS Environmental received 11 sample(s) on Nov 13, 2019 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
RJ Modashia
Project Manager

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Work Order: HS19110644

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19110644-01	50WW29-191111	Groundwater		11-Nov-2019 09:20	13-Nov-2019 09:39	☐
HS19110644-02	50WW10-191111	Groundwater		11-Nov-2019 10:15	13-Nov-2019 09:39	☐
HS19110644-03	50WW09-191111	Groundwater		11-Nov-2019 11:05	13-Nov-2019 09:39	☐
HS19110644-04	50WW09-191111-FD	Groundwater		11-Nov-2019 11:05	13-Nov-2019 09:39	☐
HS19110644-05	50WW22-191112	Groundwater		12-Nov-2019 08:30	13-Nov-2019 09:39	☐
HS19110644-06	50WW08-191112	Groundwater		12-Nov-2019 09:30	13-Nov-2019 09:39	☐
HS19110644-07	50WW06-191112	Groundwater		12-Nov-2019 10:30	13-Nov-2019 09:39	☐
HS19110644-08	50WW11-191112	Groundwater		12-Nov-2019 11:30	13-Nov-2019 09:39	☐
HS19110644-09	50WW12-191112	Groundwater		12-Nov-2019 12:30	13-Nov-2019 09:39	☐
HS19110644-10	50WW12-191112-FD	Groundwater		12-Nov-2019 12:30	13-Nov-2019 09:39	☐
HS19110644-11	Trip Blank	Water	CG 101419 -06	11-Nov-2019 00:00	13-Nov-2019 09:39	☐

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc. **CASE NARRATIVE**
Project: LHAAP-50 501032
Work Order: HS19110644

Work Order Comments

- The analysis for Methane, Methene, Ethane and CO2 by RSK175 was subcontracted to ALS Simi Valley, CA. Final report attached.
- The analysis for Perchlorate was subcontracted to ALS Salt Lake City, UT. Final report attached.

Work Order Comments

- The analysis for TOC was subcontracted to ALS Environmental in Kelso, WA. Final Report attached.

GCMS Volatiles by Method SW8260

Batch ID: R350624

Sample ID: 50WW29-191111 (HS19110644-01MS)

- MS/MSD failed QC limits for several compounds.

Sample ID: VLCSW-191115

- 1,2_Dichloropropane exceeded QC limits for LCS. CCV is OK. Samples are ND for this compound.

Sample ID: VSTD050

- Acetone exceeded %D limits for CCV. Samples are ND for this compound.

WetChemistry by Method SW9056

Batch ID: R350457

Sample ID: HS19110621-01MS

- MS and MSD are for an unrelated sample (Chloride,Sulfate)

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc. **ANALYTICAL REPORT**
Project: LHAAP-50 501032 WorkOrder:HS19110644
Sample ID: 50WW29-191111 Lab ID:HS19110644-01
Collection Date: 11-Nov-2019 09:20 Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C	**Method:SW8260**							Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:56
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:56
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 13:56
1,1,2-Trichlor-1,2,2-trifluoroethane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 13:56
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:56
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:56
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:56
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:56
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 13:56
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 13:56
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 13:56
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:56
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:56
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:56
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 13:56
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:56
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 13:56
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:56
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 13:56
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:56
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 13:56
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:56
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	15-Nov-2019 13:56
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:56
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	15-Nov-2019 13:56
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 13:56
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:56
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	15-Nov-2019 13:56
Acetone	2.0	U	0.40	2.0	2.0	UG/L	1	15-Nov-2019 13:56
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:56
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 13:56
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:56
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:56
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 13:56
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 13:56
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	15-Nov-2019 13:56
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 13:56
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:56
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:56

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

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Sample ID: 50WW29-191111
Collection Date: 11-Nov-2019 09:20

ANALYTICAL REPORT
WorkOrder:HS19110644
Lab ID:HS19110644-01
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:56
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:56
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:56
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	15-Nov-2019 13:56
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:56
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:56
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:56
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:56
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	15-Nov-2019 13:56
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:56
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	15-Nov-2019 13:56
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	15-Nov-2019 13:56
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 13:56
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:56
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:56
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:56
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:56
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:56
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:56
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:56
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:56
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:56
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:56
Trichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:56
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:56
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:56
Surr: 1,2-Dichloroethane-d4	*95.9*			**0**	*81-118*	*%REC*	*1*	*15-Nov-2019 13:56*
Surr: 4-Bromofluorobenzene	*96.6*			**0**	*85-114*	*%REC*	*1*	*15-Nov-2019 13:56*
Surr: Dibromofluoromethane	*87.2*			**0**	*80-119*	*%REC*	*1*	*15-Nov-2019 13:56*
Surr: Toluene-d8	*108*			**0**	*89-112*	*%REC*	*1*	*15-Nov-2019 13:56*
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		**Method:NA**						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	27-Nov-2019 17:54

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

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Sample ID: 50WW10-191111
Collection Date: 11-Nov-2019 10:15

ANALYTICAL REPORT
WorkOrder:HS19110644
Lab ID:HS19110644-02
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C	**Method:SW8260**							Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:23
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:23
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 18:23
1,1,2-Trichlor-1,2,2-trifluoroethane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 18:23
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:23
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:23
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:23
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:23
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 18:23
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 18:23
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 18:23
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:23
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:23
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:23
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 18:23
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:23
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 18:23
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:23
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 18:23
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:23
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 18:23
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:23
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	15-Nov-2019 18:23
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:23
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	15-Nov-2019 18:23
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 18:23
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:23
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	15-Nov-2019 18:23
Acetone	2.0	U	0.40	2.0	2.0	UG/L	1	15-Nov-2019 18:23
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:23
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 18:23
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:23
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:23
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 18:23
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 18:23
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	15-Nov-2019 18:23
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 18:23
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:23
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:23

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

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Sample ID: 50WW10-191111
Collection Date: 11-Nov-2019 10:15

ANALYTICAL REPORT
WorkOrder:HS19110644
Lab ID:HS19110644-02
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:23
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:23
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:23
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	15-Nov-2019 18:23
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:23
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:23
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:23
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:23
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	15-Nov-2019 18:23
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:23
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	15-Nov-2019 18:23
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	15-Nov-2019 18:23
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 18:23
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:23
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:23
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:23
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:23
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:23
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:23
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:23
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:23
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:23
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:23
Trichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:23
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:23
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:23
Surr: 1,2-Dichloroethane-d4	*96.2*			**0**	*81-118*	*%REC*	*1*	*15-Nov-2019 18:23*
Surr: 4-Bromofluorobenzene	*95.6*			**0**	*85-114*	*%REC*	*1*	*15-Nov-2019 18:23*
Surr: Dibromofluoromethane	*89.5*			**0**	*80-119*	*%REC*	*1*	*15-Nov-2019 18:23*
Surr: Toluene-d8	*106*			**0**	*89-112*	*%REC*	*1*	*15-Nov-2019 18:23*
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		**Method:NA**						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	27-Nov-2019 17:54

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

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Sample ID: 50WW09-191111
Collection Date: 11-Nov-2019 11:05

ANALYTICAL REPORT
WorkOrder:HS19110644
Lab ID:HS19110644-03
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C	**Method:SW8260**							Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:48
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:48
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 18:48
1,1,2-Trichlor-1,2,2-trifluoroethane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 18:48
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:48
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:48
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:48
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:48
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 18:48
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 18:48
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 18:48
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:48
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:48
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:48
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 18:48
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:48
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 18:48
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:48
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 18:48
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:48
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 18:48
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:48
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	15-Nov-2019 18:48
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:48
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	15-Nov-2019 18:48
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 18:48
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:48
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	15-Nov-2019 18:48
Acetone	2.0	U	0.40	2.0	2.0	UG/L	1	15-Nov-2019 18:48
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:48
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 18:48
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:48
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:48
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 18:48
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 18:48
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	15-Nov-2019 18:48
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 18:48
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:48
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:48

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

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc. **ANALYTICAL REPORT**
Project: LHAAP-50 501032 WorkOrder:HS19110644
Sample ID: 50WW09-191111 Lab ID:HS19110644-03
Collection Date: 11-Nov-2019 11:05 Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:48
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:48
cis-1,2-Dichloroethene	**4.1**		**0.20**	**0.50**	**1.0**	**UG/L**	1	15-Nov-2019 18:48
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	15-Nov-2019 18:48
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:48
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:48
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:48
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:48
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	15-Nov-2019 18:48
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:48
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	15-Nov-2019 18:48
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	15-Nov-2019 18:48
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 18:48
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:48
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:48
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:48
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:48
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:48
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:48
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:48
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:48
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:48
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:48
Trichloroethene	**30**		**0.20**	**0.50**	**1.0**	**UG/L**	1	15-Nov-2019 18:48
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 18:48
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 18:48
Surr: 1,2-Dichloroethane-d4	*101*			**0**	*81-118*	*%REC*	*1*	*15-Nov-2019 18:48*
Surr: 4-Bromofluorobenzene	*90.0*			**0**	*85-114*	*%REC*	*1*	*15-Nov-2019 18:48*
Surr: Dibromofluoromethane	*88.0*			**0**	*80-119*	*%REC*	*1*	*15-Nov-2019 18:48*
Surr: Toluene-d8	*107*			**0**	*89-112*	*%REC*	*1*	*15-Nov-2019 18:48*
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		**Method:NA**						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	27-Nov-2019 17:54

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

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Sample ID: 50WW09-191111-FD
Collection Date: 11-Nov-2019 11:05

ANALYTICAL REPORT
WorkOrder:HS19110644
Lab ID:HS19110644-04
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C	**Method:SW8260**							Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:12
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:12
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 19:12
1,1,2-Trichlor-1,2,2-trifluoroethane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 19:12
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:12
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:12
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:12
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:12
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 19:12
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 19:12
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 19:12
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:12
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:12
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:12
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 19:12
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:12
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 19:12
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:12
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 19:12
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:12
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 19:12
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:12
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	15-Nov-2019 19:12
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:12
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	15-Nov-2019 19:12
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 19:12
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:12
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	15-Nov-2019 19:12
Acetone	2.0	U	0.40	2.0	2.0	UG/L	1	15-Nov-2019 19:12
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:12
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 19:12
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:12
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:12
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 19:12
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 19:12
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	15-Nov-2019 19:12
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 19:12
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:12
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:12

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

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Sample ID: 50WW09-191111-FD
Collection Date: 11-Nov-2019 11:05

ANALYTICAL REPORT
WorkOrder:HS19110644
Lab ID:HS19110644-04
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:12
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:12
cis-1,2-Dichloroethene	**4.0**		**0.20**	**0.50**	**1.0**	**UG/L**	1	15-Nov-2019 19:12
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	15-Nov-2019 19:12
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:12
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:12
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:12
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:12
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	15-Nov-2019 19:12
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:12
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	15-Nov-2019 19:12
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	15-Nov-2019 19:12
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 19:12
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:12
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:12
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:12
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:12
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:12
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:12
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:12
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:12
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:12
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:12
Trichloroethene	**30**		**0.20**	**0.50**	**1.0**	**UG/L**	1	15-Nov-2019 19:12
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:12
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:12
Surr: 1,2-Dichloroethane-d4	*98.6*			**0**	*81-118*	*%REC*	*1*	*15-Nov-2019 19:12*
Surr: 4-Bromofluorobenzene	*94.2*			**0**	*85-114*	*%REC*	*1*	*15-Nov-2019 19:12*
Surr: Dibromofluoromethane	*90.9*			**0**	*80-119*	*%REC*	*1*	*15-Nov-2019 19:12*
Surr: Toluene-d8	*108*			**0**	*89-112*	*%REC*	*1*	*15-Nov-2019 19:12*
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		**Method:NA**						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	27-Nov-2019 17:54

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

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc. **ANALYTICAL REPORT**
Project: LHAAP-50 501032 WorkOrder:HS19110644
Sample ID: 50WW22-191112 Lab ID:HS19110644-05
Collection Date: 12-Nov-2019 08:30 Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C	**Method:SW8260**							Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:36
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:36
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 19:36
1,1,2-Trichlor-1,2,2-trifluoroethane	**1.0**		**0.50**	**0.50**	**1.0**	**UG/L**	1	15-Nov-2019 19:36
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:36
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:36
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:36
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:36
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 19:36
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 19:36
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 19:36
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:36
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:36
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:36
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 19:36
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:36
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 19:36
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:36
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 19:36
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:36
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 19:36
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:36
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	15-Nov-2019 19:36
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:36
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	15-Nov-2019 19:36
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 19:36
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:36
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	15-Nov-2019 19:36
Acetone	2.0	U	0.40	2.0	2.0	UG/L	1	15-Nov-2019 19:36
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:36
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 19:36
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:36
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:36
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 19:36
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 19:36
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	15-Nov-2019 19:36
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 19:36
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:36

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

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Sample ID: 50WW22-191112
Collection Date: 12-Nov-2019 08:30

ANALYTICAL REPORT
WorkOrder:HS19110644
Lab ID:HS19110644-05
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:36
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:36
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:36
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:36
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	15-Nov-2019 19:36
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:36
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:36
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:36
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:36
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	15-Nov-2019 19:36
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:36
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	15-Nov-2019 19:36
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	15-Nov-2019 19:36
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 19:36
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:36
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:36
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:36
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:36
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:36
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:36
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:36
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:36
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:36
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:36
Trichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:36
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 19:36
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 19:36
Surr: 1,2-Dichloroethane-d4	*103*			**0**	*81-118*	*%REC*	*1*	*15-Nov-2019 19:36*
Surr: 4-Bromofluorobenzene	*97.2*			**0**	*85-114*	*%REC*	*1*	*15-Nov-2019 19:36*
Surr: Dibromofluoromethane	*86.8*			**0**	*80-119*	*%REC*	*1*	*15-Nov-2019 19:36*
Surr: Toluene-d8	*106*			**0**	*89-112*	*%REC*	*1*	*15-Nov-2019 19:36*
ANIONS BY SW9056A		**Method:SW9056**						Analyst: KMU
Chloride	**773**		**4.00**	**10.0**	**10.0**	**mg/L**	20	13-Nov-2019 19:01
Nitrogen, Nitrate (As N)	0.100	U	0.0300	0.100	0.100	mg/L	1	13-Nov-2019 18:44
Sulfate	**587**		**4.00**	**10.0**	**10.0**	**mg/L**	20	13-Nov-2019 19:01
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		**Method:NA**						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	27-Nov-2019 17:54

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

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Sample ID: 50WW22-191112
Collection Date: 12-Nov-2019 08:30

ANALYTICAL REPORT
WorkOrder:HS19110644
Lab ID:HS19110644-05
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
SUBCONTRACT ANALYSIS - RSK		**Method:NA**						Analyst: SUBCA
Subcontract Analysis	See Attached		0	0		NA	1	26-Nov-2019 17:07
SUBCONTRACT ANALYSIS - TOC ANALYSIS		**Method:NA**						Analyst: SUBK
Subcontract Analysis	See Attached		0	0		NA	1	25-Nov-2019 09:52

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

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc. **ANALYTICAL REPORT**
Project: LHAAP-50 501032 WorkOrder:HS19110644
Sample ID: 50WW08-191112 Lab ID:HS19110644-06
Collection Date: 12-Nov-2019 09:30 Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C	**Method:SW8260**							Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 15:09
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 15:09
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 15:09
1,1,2-Trichlor-1,2,2-trifluoroethane	**1.6**		**0.50**	**0.50**	**1.0**	**UG/L**	1	15-Nov-2019 15:09
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 15:09
1,1-Dichloroethane	**1.0**		**0.20**	**0.50**	**1.0**	**UG/L**	1	15-Nov-2019 15:09
1,1-Dichloroethene	**1.2**		**0.20**	**0.50**	**1.0**	**UG/L**	1	15-Nov-2019 15:09
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 15:09
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 15:09
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 15:09
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 15:09
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 15:09
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 15:09
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 15:09
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 15:09
1,2-Dichloroethane	**2.2**		**0.20**	**0.50**	**1.0**	**UG/L**	1	15-Nov-2019 15:09
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 15:09
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 15:09
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 15:09
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 15:09
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 15:09
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 15:09
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	15-Nov-2019 15:09
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 15:09
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	15-Nov-2019 15:09
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 15:09
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 15:09
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	15-Nov-2019 15:09
Acetone	2.0	U	0.40	2.0	2.0	UG/L	1	15-Nov-2019 15:09
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 15:09
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 15:09
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 15:09
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 15:09
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 15:09
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 15:09
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	15-Nov-2019 15:09
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 15:09
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 15:09

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

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Sample ID: 50WW08-191112
Collection Date: 12-Nov-2019 09:30

ANALYTICAL REPORT
WorkOrder:HS19110644
Lab ID:HS19110644-06
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 15:09
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 15:09
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 15:09
cis-1,2-Dichloroethene	**39**		**0.20**	**0.50**	**1.0**	**UG/L**	1	15-Nov-2019 15:09
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	15-Nov-2019 15:09
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 15:09
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 15:09
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 15:09
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 15:09
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	15-Nov-2019 15:09
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 15:09
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	15-Nov-2019 15:09
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	15-Nov-2019 15:09
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 15:09
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 15:09
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 15:09
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 15:09
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 15:09
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 15:09
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 15:09
Tetrachloroethene	**1.3**		**0.30**	**0.50**	**1.0**	**UG/L**	1	15-Nov-2019 15:09
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 15:09
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 15:09
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 15:09
Trichloroethene	**420**		**2.0**	**5.0**	**10**	**UG/L**	10	15-Nov-2019 17:10
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 15:09
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 15:09
Surr: 1,2-Dichloroethane-d4	*101*			**0**	*81-118*	*%REC*	*10*	*15-Nov-2019 17:10*
Surr: 1,2-Dichloroethane-d4	*101*			**0**	*81-118*	*%REC*	*1*	*15-Nov-2019 15:09*
Surr: 4-Bromofluorobenzene	*92.4*			**0**	*85-114*	*%REC*	*1*	*15-Nov-2019 15:09*
Surr: 4-Bromofluorobenzene	*98.5*			**0**	*85-114*	*%REC*	*10*	*15-Nov-2019 17:10*
Surr: Dibromofluoromethane	*92.3*			**0**	*80-119*	*%REC*	*10*	*15-Nov-2019 17:10*
Surr: Dibromofluoromethane	*91.2*			**0**	*80-119*	*%REC*	*1*	*15-Nov-2019 15:09*
Surr: Toluene-d8	*105*			**0**	*89-112*	*%REC*	*10*	*15-Nov-2019 17:10*
Surr: Toluene-d8	*105*			**0**	*89-112*	*%REC*	*1*	*15-Nov-2019 15:09*
ANIONS BY SW9056A		**Method:SW9056**						Analyst: KMU
Chloride	**361**		**2.00**	**5.00**	**5.00**	**mg/L**	10	13-Nov-2019 19:34
Nitrogen, Nitrate (As N)	**0.118**		**0.0300**	**0.100**	**0.100**	**mg/L**	1	13-Nov-2019 19:17
Sulfate	**304**		**2.00**	**5.00**	**5.00**	**mg/L**	10	13-Nov-2019 19:34

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

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Sample ID: 50WW08-191112
Collection Date: 12-Nov-2019 09:30

ANALYTICAL REPORT
WorkOrder:HS19110644
Lab ID:HS19110644-06
Matrix:Groundwater

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	27-Nov-2019 17:54
SUBCONTRACT ANALYSIS - RSK		**Method:NA**						Analyst: SUBCA
Subcontract Analysis	See Attached		0	0		NA	1	26-Nov-2019 17:07
SUBCONTRACT ANALYSIS - TOC ANALYSIS		**Method:NA**						Analyst: SUBK
Subcontract Analysis	See Attached		0	0		NA	1	25-Nov-2019 09:52

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

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Sample ID: 50WW06-191112
Collection Date: 12-Nov-2019 10:30

ANALYTICAL REPORT
WorkOrder:HS19110644
Lab ID:HS19110644-07
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C	**Method:SW8260**							Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 20:01
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 20:01
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 20:01
1,1,2-Trichlor-1,2,2-trifluoroethane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 20:01
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 20:01
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 20:01
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 20:01
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 20:01
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 20:01
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 20:01
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 20:01
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 20:01
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 20:01
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 20:01
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 20:01
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 20:01
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 20:01
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 20:01
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 20:01
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 20:01
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 20:01
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 20:01
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	15-Nov-2019 20:01
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 20:01
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	15-Nov-2019 20:01
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 20:01
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 20:01
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	15-Nov-2019 20:01
Acetone	2.0	U	0.40	2.0	2.0	UG/L	1	15-Nov-2019 20:01
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 20:01
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 20:01
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 20:01
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 20:01
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 20:01
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 20:01
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	15-Nov-2019 20:01
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 20:01
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 20:01
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 20:01

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

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc. **ANALYTICAL REPORT**
Project: LHAAP-50 501032 WorkOrder:HS19110644
Sample ID: 50WW06-191112 Lab ID:HS19110644-07
Collection Date: 12-Nov-2019 10:30 Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 20:01
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 20:01
cis-1,2-Dichloroethene	**1.2**		**0.20**	**0.50**	**1.0**	**UG/L**	1	15-Nov-2019 20:01
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	15-Nov-2019 20:01
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 20:01
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 20:01
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 20:01
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 20:01
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	15-Nov-2019 20:01
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 20:01
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	15-Nov-2019 20:01
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	15-Nov-2019 20:01
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 20:01
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 20:01
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 20:01
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 20:01
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 20:01
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 20:01
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 20:01
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 20:01
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 20:01
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 20:01
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 20:01
Trichloroethene	**41**		**0.20**	**0.50**	**1.0**	**UG/L**	1	15-Nov-2019 20:01
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 20:01
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 20:01
Surr: 1,2-Dichloroethane-d4	*101*			**0**	*81-118*	*%REC*	*1*	*15-Nov-2019 20:01*
Surr: 4-Bromofluorobenzene	*94.7*			**0**	*85-114*	*%REC*	*1*	*15-Nov-2019 20:01*
Surr: Dibromofluoromethane	*91.9*			**0**	*80-119*	*%REC*	*1*	*15-Nov-2019 20:01*
Surr: Toluene-d8	*106*			**0**	*89-112*	*%REC*	*1*	*15-Nov-2019 20:01*
ANIONS BY SW9056A		**Method:SW9056**						Analyst: KMU
Chloride	**84.1**		**0.200**	**0.500**	**0.500**	**mg/L**	1	13-Nov-2019 20:40
Nitrogen, Nitrate (As N)	0.100	U	0.0300	0.100	0.100	mg/L	1	13-Nov-2019 20:40
Sulfate	**20.8**		**0.200**	**0.500**	**0.500**	**mg/L**	1	13-Nov-2019 20:40
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		**Method:NA**						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	27-Nov-2019 17:54
SUBCONTRACT ANALYSIS - RSK		**Method:NA**						Analyst: SUBCA
Subcontract Analysis	See Attached		0	0		NA	1	26-Nov-2019 17:07

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

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Sample ID: 50WW06-191112
Collection Date: 12-Nov-2019 10:30

ANALYTICAL REPORT
WorkOrder:HS19110644
Lab ID:HS19110644-07
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
SUBCONTRACT ANALYSIS - TOC ANALYSIS		**Method:NA**						Analyst: SUBK
Subcontract Analysis	See Attached		0	0		NA	1	25-Nov-2019 09:52

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

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Sample ID: 50WW11-191112
Collection Date: 12-Nov-2019 11:30

ANALYTICAL REPORT
WorkOrder:HS19110644
Lab ID:HS19110644-08
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C	**Method:SW8260**							Analyst: PC
1,1,1,2-Tetrachloroethane	5.0	U	3.0	5.0	10	UG/L	10	15-Nov-2019 15:33
1,1,1-Trichloroethane	5.0	U	2.0	5.0	10	UG/L	10	15-Nov-2019 15:33
1,1,2,2-Tetrachloroethane	5.0	U	5.0	5.0	10	UG/L	10	15-Nov-2019 15:33
1,1,2-Trichlor-1,2,2-trifluoroethane	5.0	U	5.0	5.0	10	UG/L	10	15-Nov-2019 15:33
1,1,2-Trichloroethane	5.0	U	3.0	5.0	10	UG/L	10	15-Nov-2019 15:33
1,1-Dichloroethane	5.0	U	2.0	5.0	10	UG/L	10	15-Nov-2019 15:33
1,1-Dichloroethene	**26**		**2.0**	**5.0**	**10**	**UG/L**	10	15-Nov-2019 15:33
1,1-Dichloropropene	5.0	U	3.0	5.0	10	UG/L	10	15-Nov-2019 15:33
1,2,3-Trichlorobenzene	5.0	U	4.0	5.0	10	UG/L	10	15-Nov-2019 15:33
1,2,3-Trichloropropane	5.0	U	5.0	5.0	10	UG/L	10	15-Nov-2019 15:33
1,2,4-Trichlorobenzene	5.0	U	5.0	5.0	10	UG/L	10	15-Nov-2019 15:33
1,2,4-Trimethylbenzene	5.0	U	3.0	5.0	10	UG/L	10	15-Nov-2019 15:33
1,2-Dibromo-3-chloropropane	5.0	U	2.0	5.0	10	UG/L	10	15-Nov-2019 15:33
1,2-Dibromoethane	5.0	U	2.0	5.0	10	UG/L	10	15-Nov-2019 15:33
1,2-Dichlorobenzene	5.0	U	5.0	5.0	10	UG/L	10	15-Nov-2019 15:33
1,2-Dichloroethane	**28**		**2.0**	**5.0**	**10**	**UG/L**	10	15-Nov-2019 15:33
1,2-Dichloropropane	5.0	U	5.0	5.0	10	UG/L	10	15-Nov-2019 15:33
1,3,5-Trimethylbenzene	5.0	U	3.0	5.0	10	UG/L	10	15-Nov-2019 15:33
1,3-Dichlorobenzene	5.0	U	4.0	5.0	10	UG/L	10	15-Nov-2019 15:33
1,3-Dichloropropane	5.0	U	3.0	5.0	10	UG/L	10	15-Nov-2019 15:33
1,4-Dichlorobenzene	5.0	U	4.0	5.0	10	UG/L	10	15-Nov-2019 15:33
2,2-Dichloropropane	5.0	U	2.0	5.0	10	UG/L	10	15-Nov-2019 15:33
2-Butanone	10	U	5.0	10	20	UG/L	10	15-Nov-2019 15:33
2-Chlorotoluene	5.0	U	3.0	5.0	10	UG/L	10	15-Nov-2019 15:33
2-Hexanone	10	U	10	10	20	UG/L	10	15-Nov-2019 15:33
4-Chlorotoluene	5.0	U	4.0	5.0	10	UG/L	10	15-Nov-2019 15:33
4-Isopropyltoluene	5.0	U	3.0	5.0	10	UG/L	10	15-Nov-2019 15:33
4-Methyl-2-pentanone	10	U	7.0	10	20	UG/L	10	15-Nov-2019 15:33
Acetone	20	U	4.0	20	20	UG/L	10	15-Nov-2019 15:33
Benzene	5.0	U	2.0	5.0	10	UG/L	10	15-Nov-2019 15:33
Bromobenzene	5.0	U	4.0	5.0	10	UG/L	10	15-Nov-2019 15:33
Bromochloromethane	5.0	U	2.0	5.0	10	UG/L	10	15-Nov-2019 15:33
Bromodichloromethane	5.0	U	2.0	5.0	10	UG/L	10	15-Nov-2019 15:33
Bromoform	5.0	U	4.0	5.0	10	UG/L	10	15-Nov-2019 15:33
Bromomethane	5.0	U	4.0	5.0	10	UG/L	10	15-Nov-2019 15:33
Carbon disulfide	10	U	6.0	10	20	UG/L	10	15-Nov-2019 15:33
Carbon tetrachloride	5.0	U	5.0	5.0	10	UG/L	10	15-Nov-2019 15:33
Chlorobenzene	5.0	U	3.0	5.0	10	UG/L	10	15-Nov-2019 15:33
Chloroethane	5.0	U	3.0	5.0	10	UG/L	10	15-Nov-2019 15:33

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

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Sample ID: 50WW11-191112
Collection Date: 12-Nov-2019 11:30

ANALYTICAL REPORT
WorkOrder:HS19110644
Lab ID:HS19110644-08
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
Chloroform	5.0	U	2.0	5.0	10	UG/L	10	15-Nov-2019 15:33
Chloromethane	5.0	U	2.0	5.0	10	UG/L	10	15-Nov-2019 15:33
cis-1,2-Dichloroethene	**58**		**2.0**	**5.0**	**10**	**UG/L**	10	15-Nov-2019 15:33
cis-1,3-Dichloropropene	5.0	U	1.0	5.0	10	UG/L	10	15-Nov-2019 15:33
Dibromochloromethane	5.0	U	3.0	5.0	10	UG/L	10	15-Nov-2019 15:33
Dibromomethane	5.0	U	2.0	5.0	10	UG/L	10	15-Nov-2019 15:33
Dichlorodifluoromethane	5.0	U	3.0	5.0	10	UG/L	10	15-Nov-2019 15:33
Ethylbenzene	5.0	U	3.0	5.0	10	UG/L	10	15-Nov-2019 15:33
Hexachlorobutadiene	10	U	10	10	10	UG/L	10	15-Nov-2019 15:33
Isopropylbenzene	5.0	U	3.0	5.0	10	UG/L	10	15-Nov-2019 15:33
m,p-Xylene	10	U	5.0	10	20	UG/L	10	15-Nov-2019 15:33
Methylene chloride	10	U	4.0	10	20	UG/L	10	15-Nov-2019 15:33
n-Butylbenzene	5.0	U	4.0	5.0	10	UG/L	10	15-Nov-2019 15:33
n-Propylbenzene	5.0	U	3.0	5.0	10	UG/L	10	15-Nov-2019 15:33
Naphthalene	5.0	U	3.0	5.0	10	UG/L	10	15-Nov-2019 15:33
o-Xylene	5.0	U	3.0	5.0	10	UG/L	10	15-Nov-2019 15:33
sec-Butylbenzene	5.0	U	3.0	5.0	10	UG/L	10	15-Nov-2019 15:33
Styrene	5.0	U	3.0	5.0	10	UG/L	10	15-Nov-2019 15:33
tert-Butylbenzene	5.0	U	3.0	5.0	10	UG/L	10	15-Nov-2019 15:33
Tetrachloroethene	5.0	U	3.0	5.0	10	UG/L	10	15-Nov-2019 15:33
Toluene	5.0	U	2.0	5.0	10	UG/L	10	15-Nov-2019 15:33
trans-1,2-Dichloroethene	5.0	U	2.0	5.0	10	UG/L	10	15-Nov-2019 15:33
trans-1,3-Dichloropropene	5.0	U	2.0	5.0	10	UG/L	10	15-Nov-2019 15:33
Trichloroethene	**3,300**		**20**	**50**	**100**	**UG/L**	100	15-Nov-2019 16:46
Trichlorofluoromethane	5.0	U	3.0	5.0	10	UG/L	10	15-Nov-2019 15:33
Vinyl chloride	5.0	U	2.0	5.0	10	UG/L	10	15-Nov-2019 15:33
Surr: 1,2-Dichloroethane-d4	*100*			**0**	*81-118*	*%REC*	*10*	*15-Nov-2019 15:33*
Surr: 1,2-Dichloroethane-d4	*99.6*			**0**	*81-118*	*%REC*	*100*	*15-Nov-2019 16:46*
Surr: 4-Bromofluorobenzene	*94.1*			**0**	*85-114*	*%REC*	*10*	*15-Nov-2019 15:33*
Surr: 4-Bromofluorobenzene	*95.3*			**0**	*85-114*	*%REC*	*100*	*15-Nov-2019 16:46*
Surr: Dibromofluoromethane	*92.2*			**0**	*80-119*	*%REC*	*10*	*15-Nov-2019 15:33*
Surr: Dibromofluoromethane	*88.8*			**0**	*80-119*	*%REC*	*100*	*15-Nov-2019 16:46*
Surr: Toluene-d8	*106*			**0**	*89-112*	*%REC*	*10*	*15-Nov-2019 15:33*
Surr: Toluene-d8	*106*			**0**	*89-112*	*%REC*	*100*	*15-Nov-2019 16:46*
ANIONS BY SW9056A		**Method:SW9056**						Analyst: KMU
Chloride	**294**		**2.00**	**5.00**	**5.00**	**mg/L**	10	13-Nov-2019 21:47
Nitrogen, Nitrate (As N)	0.100	U	0.0300	0.100	0.100	mg/L	1	13-Nov-2019 21:30
Sulfate	**351**		**2.00**	**5.00**	**5.00**	**mg/L**	10	13-Nov-2019 21:47

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

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Sample ID: 50WW11-191112
Collection Date: 12-Nov-2019 11:30

ANALYTICAL REPORT
WorkOrder:HS19110644
Lab ID:HS19110644-08
Matrix:Groundwater

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	27-Nov-2019 17:54
SUBCONTRACT ANALYSIS - RSK		**Method:NA**						Analyst: SUBCA
Subcontract Analysis	See Attached		0	0		NA	1	26-Nov-2019 17:07
SUBCONTRACT ANALYSIS - TOC ANALYSIS		**Method:NA**						Analyst: SUBK
Subcontract Analysis	See Attached		0	0		NA	1	25-Nov-2019 09:52

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

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Sample ID: 50WW12-191112
Collection Date: 12-Nov-2019 12:30

ANALYTICAL REPORT
WorkOrder:HS19110644
Lab ID:HS19110644-09
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C	**Method:SW8260**							Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:20
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 14:20
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 14:20
1,1,2-Trichlor-1,2,2-trifluoroethane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 14:20
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:20
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 14:20
1,1-Dichloroethene	**4.6**		**0.20**	**0.50**	**1.0**	**UG/L**	1	15-Nov-2019 14:20
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:20
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 14:20
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 14:20
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 14:20
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:20
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 14:20
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 14:20
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 14:20
1,2-Dichloroethane	**2.7**		**0.20**	**0.50**	**1.0**	**UG/L**	1	15-Nov-2019 14:20
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 14:20
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:20
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 14:20
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:20
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 14:20
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 14:20
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	15-Nov-2019 14:20
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:20
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	15-Nov-2019 14:20
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 14:20
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:20
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	15-Nov-2019 14:20
Acetone	2.0	U	0.40	2.0	2.0	UG/L	1	15-Nov-2019 14:20
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 14:20
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 14:20
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 14:20
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 14:20
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 14:20
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 14:20
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	15-Nov-2019 14:20
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 14:20
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:20
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:20

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

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Sample ID: 50WW12-191112
Collection Date: 12-Nov-2019 12:30

ANALYTICAL REPORT
WorkOrder:HS19110644
Lab ID:HS19110644-09
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 14:20
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 14:20
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 14:20
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	15-Nov-2019 14:20
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:20
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 14:20
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:20
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:20
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	15-Nov-2019 14:20
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:20
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	15-Nov-2019 14:20
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	15-Nov-2019 14:20
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 14:20
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:20
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:20
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:20
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:20
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:20
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:20
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:20
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 14:20
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 14:20
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 14:20
Trichloroethene	**280**		**1.0**	**2.5**	**5.0**	**UG/L**	5	15-Nov-2019 17:35
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:20
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 14:20
Surr: 1,2-Dichloroethane-d4	*98.3*			**0**	*81-118*	*%REC*	*1*	*15-Nov-2019 14:20*
Surr: 1,2-Dichloroethane-d4	*109*			**0**	*81-118*	*%REC*	*5*	*15-Nov-2019 17:35*
Surr: 4-Bromofluorobenzene	*93.6*			**0**	*85-114*	*%REC*	*5*	*15-Nov-2019 17:35*
Surr: 4-Bromofluorobenzene	*90.2*			**0**	*85-114*	*%REC*	*1*	*15-Nov-2019 14:20*
Surr: Dibromofluoromethane	*86.6*			**0**	*80-119*	*%REC*	*1*	*15-Nov-2019 14:20*
Surr: Dibromofluoromethane	*94.9*			**0**	*80-119*	*%REC*	*5*	*15-Nov-2019 17:35*
Surr: Toluene-d8	*105*			**0**	*89-112*	*%REC*	*5*	*15-Nov-2019 17:35*
Surr: Toluene-d8	*106*			**0**	*89-112*	*%REC*	*1*	*15-Nov-2019 14:20*
ANIONS BY SW9056A		**Method:SW9056**						Analyst: KMU
Chloride	**1,070**		**4.00**	**10.0**	**10.0**	**mg/L**	20	13-Nov-2019 22:20
Nitrogen, Nitrate (As N)	0.100	U	0.0300	0.100	0.100	mg/L	1	13-Nov-2019 22:03
Sulfate	**531**		**4.00**	**10.0**	**10.0**	**mg/L**	20	13-Nov-2019 22:20

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

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Sample ID: 50WW12-191112
Collection Date: 12-Nov-2019 12:30

ANALYTICAL REPORT
WorkOrder:HS19110644
Lab ID:HS19110644-09
Matrix:Groundwater

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	27-Nov-2019 17:54
SUBCONTRACT ANALYSIS - RSK		**Method:NA**						Analyst: SUBCA
Subcontract Analysis	See Attached		0	0		NA	1	26-Nov-2019 17:07
SUBCONTRACT ANALYSIS - TOC ANALYSIS		**Method:NA**						Analyst: SUBK
Subcontract Analysis	See Attached		0	0		NA	1	25-Nov-2019 09:52

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

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc. **ANALYTICAL REPORT**
Project: LHAAP-50 501032 WorkOrder:HS19110644
Sample ID: 50WW12-191112-FD Lab ID:HS19110644-10
Collection Date: 12-Nov-2019 12:30 Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C	**Method:SW8260**							Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:45
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 14:45
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 14:45
1,1,2-Trichlor-1,2,2-trifluoroethane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 14:45
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:45
1,1-Dichloroethane	**1.5**		**0.20**	**0.50**	**1.0**	**UG/L**	1	15-Nov-2019 14:45
1,1-Dichloroethene	**4.1**		**0.20**	**0.50**	**1.0**	**UG/L**	1	15-Nov-2019 14:45
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:45
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 14:45
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 14:45
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 14:45
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:45
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 14:45
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 14:45
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 14:45
1,2-Dichloroethane	**2.7**		**0.20**	**0.50**	**1.0**	**UG/L**	1	15-Nov-2019 14:45
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 14:45
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:45
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 14:45
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:45
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 14:45
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 14:45
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	15-Nov-2019 14:45
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:45
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	15-Nov-2019 14:45
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 14:45
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:45
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	15-Nov-2019 14:45
Acetone	2.0	U	0.40	2.0	2.0	UG/L	1	15-Nov-2019 14:45
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 14:45
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 14:45
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 14:45
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 14:45
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 14:45
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 14:45
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	15-Nov-2019 14:45
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 14:45
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:45
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:45

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

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Sample ID: 50WW12-191112-FD
Collection Date: 12-Nov-2019 12:30

ANALYTICAL REPORT
WorkOrder:HS19110644
Lab ID:HS19110644-10
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 14:45
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 14:45
cis-1,2-Dichloroethene	**0.76**	J	**0.20**	**0.50**	**1.0**	**UG/L**	1	15-Nov-2019 14:45
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	15-Nov-2019 14:45
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:45
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 14:45
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:45
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:45
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	15-Nov-2019 14:45
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:45
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	15-Nov-2019 14:45
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	15-Nov-2019 14:45
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 14:45
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:45
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:45
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:45
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:45
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:45
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:45
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:45
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 14:45
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 14:45
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 14:45
Trichloroethene	**260**		**1.0**	**2.5**	**5.0**	**UG/L**	5	15-Nov-2019 17:59
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 14:45
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 14:45
Surr: 1,2-Dichloroethane-d4	*101*			**0**	*81-118*	*%REC*	*1*	*15-Nov-2019 14:45*
Surr: 1,2-Dichloroethane-d4	*100.0*			**0**	*81-118*	*%REC*	*5*	*15-Nov-2019 17:59*
Surr: 4-Bromofluorobenzene	*102*			**0**	*85-114*	*%REC*	*5*	*15-Nov-2019 17:59*
Surr: 4-Bromofluorobenzene	*96.0*			**0**	*85-114*	*%REC*	*1*	*15-Nov-2019 14:45*
Surr: Dibromofluoromethane	*89.3*			**0**	*80-119*	*%REC*	*1*	*15-Nov-2019 14:45*
Surr: Dibromofluoromethane	*84.0*			**0**	*80-119*	*%REC*	*5*	*15-Nov-2019 17:59*
Surr: Toluene-d8	*109*			**0**	*89-112*	*%REC*	*5*	*15-Nov-2019 17:59*
Surr: Toluene-d8	*106*			**0**	*89-112*	*%REC*	*1*	*15-Nov-2019 14:45*
ANIONS BY SW9056A		**Method:SW9056**						Analyst: KMU
Chloride	**1,060**		**4.00**	**10.0**	**10.0**	**mg/L**	20	13-Nov-2019 22:53
Nitrogen, Nitrate (As N)	0.100	U	0.0300	0.100	0.100	mg/L	1	13-Nov-2019 22:37
Sulfate	**533**		**4.00**	**10.0**	**10.0**	**mg/L**	20	13-Nov-2019 22:53

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

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Sample ID: 50WW12-191112-FD
Collection Date: 12-Nov-2019 12:30

ANALYTICAL REPORT
WorkOrder:HS19110644
Lab ID:HS19110644-10
Matrix:Groundwater

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	27-Nov-2019 17:54
SUBCONTRACT ANALYSIS - RSK		**Method:NA**						Analyst: SUBCA
Subcontract Analysis	See Attached		0	0		NA	1	26-Nov-2019 17:07
SUBCONTRACT ANALYSIS - TOC ANALYSIS		**Method:NA**						Analyst: SUBK
Subcontract Analysis	See Attached		0	0		NA	1	25-Nov-2019 09:52

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

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Sample ID: Trip Blank
Collection Date: 11-Nov-2019 00:00

ANALYTICAL REPORT
WorkOrder:HS19110644
Lab ID:HS19110644-11
Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C	**Method:SW8260**							Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:32
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:32
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 13:32
1,1,2-Trichlor-1,2,2-trifluoroethane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 13:32
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:32
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:32
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:32
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:32
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 13:32
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 13:32
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 13:32
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:32
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:32
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:32
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 13:32
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:32
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 13:32
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:32
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 13:32
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:32
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 13:32
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:32
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	15-Nov-2019 13:32
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:32
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	15-Nov-2019 13:32
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 13:32
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:32
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	15-Nov-2019 13:32
Acetone	2.0	U	0.40	2.0	2.0	UG/L	1	15-Nov-2019 13:32
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:32
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 13:32
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:32
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:32
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 13:32
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 13:32
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	15-Nov-2019 13:32
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	15-Nov-2019 13:32
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:32
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:32

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

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Sample ID: Trip Blank
Collection Date: 11-Nov-2019 00:00

ANALYTICAL REPORT
WorkOrder:HS19110644
Lab ID:HS19110644-11
Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C	**Method:SW8260**							Analyst: PC
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:32
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:32
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:32
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	15-Nov-2019 13:32
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:32
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:32
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:32
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:32
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	15-Nov-2019 13:32
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:32
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	15-Nov-2019 13:32
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	15-Nov-2019 13:32
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Nov-2019 13:32
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:32
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:32
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:32
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:32
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:32
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:32
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:32
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:32
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:32
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:32
Trichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:32
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Nov-2019 13:32
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	15-Nov-2019 13:32
Surr: 1,2-Dichloroethane-d4	*96.4*			**0**	*81-118*	*%REC*	*1*	*15-Nov-2019 13:32*
Surr: 4-Bromofluorobenzene	*97.0*			**0**	*85-114*	*%REC*	*1*	*15-Nov-2019 13:32*
Surr: Dibromofluoromethane	*89.0*			**0**	*80-119*	*%REC*	*1*	*15-Nov-2019 13:32*
Surr: Toluene-d8	*110*			**0**	*89-112*	*%REC*	*1*	*15-Nov-2019 13:32*

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

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
WorkOrder: HS19110644

DATES REPORT

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
Batch ID: R350457 (0)	**Test Name :** ANIONS BY SW9056A				**Matrix:** Groundwater	
HS19110644-05	50WW22-191112	12 Nov 2019 08:30			13 Nov 2019 19:01	20
HS19110644-05	50WW22-191112	12 Nov 2019 08:30			13 Nov 2019 18:44	1
HS19110644-06	50WW08-191112	12 Nov 2019 09:30			13 Nov 2019 19:34	10
HS19110644-06	50WW08-191112	12 Nov 2019 09:30			13 Nov 2019 19:17	1
HS19110644-07	50WW06-191112	12 Nov 2019 10:30			13 Nov 2019 20:40	1
HS19110644-08	50WW11-191112	12 Nov 2019 11:30			13 Nov 2019 21:47	10
HS19110644-08	50WW11-191112	12 Nov 2019 11:30			13 Nov 2019 21:30	1
HS19110644-09	50WW12-191112	12 Nov 2019 12:30			13 Nov 2019 22:20	20
HS19110644-09	50WW12-191112	12 Nov 2019 12:30			13 Nov 2019 22:03	1
HS19110644-10	50WW12-191112-FD	12 Nov 2019 12:30			13 Nov 2019 22:53	20
HS19110644-10	50WW12-191112-FD	12 Nov 2019 12:30			13 Nov 2019 22:37	1
Batch ID: R350624 (0)	**Test Name :** VOLATILES ORGANICS BY METHOD 8260C				**Matrix:** Water	
HS19110644-11	Trip Blank	11 Nov 2019 00:00			15 Nov 2019 13:32	1
Batch ID: R350624 (0)	**Test Name :** VOLATILES ORGANICS BY METHOD 8260C				**Matrix:** Groundwater	
HS19110644-01	50WW29-191111	11 Nov 2019 09:20			15 Nov 2019 13:56	1
HS19110644-02	50WW10-191111	11 Nov 2019 10:15			15 Nov 2019 18:23	1
HS19110644-03	50WW09-191111	11 Nov 2019 11:05			15 Nov 2019 18:48	1
HS19110644-04	50WW09-191111-FD	11 Nov 2019 11:05			15 Nov 2019 19:12	1
HS19110644-05	50WW22-191112	12 Nov 2019 08:30			15 Nov 2019 19:36	1
HS19110644-06	50WW08-191112	12 Nov 2019 09:30			15 Nov 2019 17:10	10
HS19110644-06	50WW08-191112	12 Nov 2019 09:30			15 Nov 2019 15:09	1
HS19110644-07	50WW06-191112	12 Nov 2019 10:30			15 Nov 2019 20:01	1
HS19110644-08	50WW11-191112	12 Nov 2019 11:30			15 Nov 2019 16:46	100
HS19110644-08	50WW11-191112	12 Nov 2019 11:30			15 Nov 2019 15:33	10
HS19110644-09	50WW12-191112	12 Nov 2019 12:30			15 Nov 2019 17:35	5
HS19110644-09	50WW12-191112	12 Nov 2019 12:30			15 Nov 2019 14:20	1
HS19110644-10	50WW12-191112-FD	12 Nov 2019 12:30			15 Nov 2019 17:59	5
HS19110644-10	50WW12-191112-FD	12 Nov 2019 12:30			15 Nov 2019 14:45	1
Batch ID: R351196 (0)	**Test Name :** SUBCONTRACT ANALYSIS - TOC ANALYSIS				**Matrix:** Groundwater	
HS19110644-05	50WW22-191112	12 Nov 2019 08:30			25 Nov 2019 09:52	1
HS19110644-06	50WW08-191112	12 Nov 2019 09:30			25 Nov 2019 09:52	1
HS19110644-07	50WW06-191112	12 Nov 2019 10:30			25 Nov 2019 09:52	1
HS19110644-08	50WW11-191112	12 Nov 2019 11:30			25 Nov 2019 09:52	1
HS19110644-09	50WW12-191112	12 Nov 2019 12:30			25 Nov 2019 09:52	1
HS19110644-10	50WW12-191112-FD	12 Nov 2019 12:30			25 Nov 2019 09:52	1

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032 **DATES REPORT**
WorkOrder: HS19110644

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
Batch ID: R351372 (0)	**Test Name :** SUBCONTRACT ANALYSIS - RSK				**Matrix:** Groundwater	
HS19110644-05	50WW22-191112	12 Nov 2019 08:30			26 Nov 2019 17:07	1
HS19110644-06	50WW08-191112	12 Nov 2019 09:30			26 Nov 2019 17:07	1
HS19110644-07	50WW06-191112	12 Nov 2019 10:30			26 Nov 2019 17:07	1
HS19110644-08	50WW11-191112	12 Nov 2019 11:30			26 Nov 2019 17:07	1
HS19110644-09	50WW12-191112	12 Nov 2019 12:30			26 Nov 2019 17:07	1
HS19110644-10	50WW12-191112-FD	12 Nov 2019 12:30			26 Nov 2019 17:07	1
Batch ID: R351504 (0)	**Test Name :** SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)				**Matrix:** Groundwater	
HS19110644-01	50WW29-191111	11 Nov 2019 09:20			27 Nov 2019 17:54	1
HS19110644-02	50WW10-191111	11 Nov 2019 10:15			27 Nov 2019 17:54	1
HS19110644-03	50WW09-191111	11 Nov 2019 11:05			27 Nov 2019 17:54	1
HS19110644-04	50WW09-191111-FD	11 Nov 2019 11:05			27 Nov 2019 17:54	1
HS19110644-05	50WW22-191112	12 Nov 2019 08:30			27 Nov 2019 17:54	1
HS19110644-06	50WW08-191112	12 Nov 2019 09:30			27 Nov 2019 17:54	1
HS19110644-07	50WW06-191112	12 Nov 2019 10:30			27 Nov 2019 17:54	1
HS19110644-08	50WW11-191112	12 Nov 2019 11:30			27 Nov 2019 17:54	1
HS19110644-09	50WW12-191112	12 Nov 2019 12:30			27 Nov 2019 17:54	1
HS19110644-10	50WW12-191112-FD	12 Nov 2019 12:30			27 Nov 2019 17:54	1

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
WorkOrder: HS19110644

QC BATCH REPORT

Batch ID: R350624 (0) **Instrument: VOA9** **Method: VOLATILES ORGANICS BY METHOD 8260C**

MBLK Sample ID: **VBLKW-191115** Units: **UG/L** Analysis Date: **15-Nov-2019 13:07**
Client ID: Run ID: **VOA9_350624** SeqNo: **5346675** 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-Trichlor-1,2,2-trifluoroethane	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	0.50	1.0								U
1,2,3-Trichloropropane	0.50	1.0								U
1,2,4-Trichlorobenzene	0.50	1.0								U
1,2,4-Trimethylbenzene	0.50	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	0.50	1.0								U
1,3-Dichlorobenzene	0.50	1.0								U
1,3-Dichloropropane	0.50	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	0.50	1.0								U
2-Hexanone	1.0	2.0								U
4-Chlorotoluene	0.50	1.0								U
4-Isopropyltoluene	0.50	1.0								U
4-Methyl-2-pentanone	1.0	2.0								U
Acetone	2.0	2.0								U
Benzene	0.50	1.0								U
Bromobenzene	0.50	1.0								U
Bromochloromethane	0.50	1.0								U
Bromodichloromethane	0.50	1.0								U
Bromoform	0.50	1.0								U

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
WorkOrder: HS19110644

QC BATCH REPORT

Batch ID: R350624 (0) **Instrument: VOA9** **Method: VOLATILES ORGANICS BY METHOD 8260C**

MBLK Sample ID: **VBLKW-191115** Units: **UG/L** Analysis Date: **15-Nov-2019 13:07**
Client ID: Run ID: **VOA9_350624** SeqNo: **5346675** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Bromomethane	0.50	1.0								U
Carbon disulfide	1.0	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	1.0	2.0								U
Naphthalene	0.50	1.0								U
n-Butylbenzene	0.50	1.0								U
n-Propylbenzene	0.50	1.0								U
o-Xylene	0.50	1.0								U
sec-Butylbenzene	0.50	1.0								U
Styrene	0.50	1.0								U
tert-Butylbenzene	0.50	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*	*1.0*	*50*	*0*	*98.0*	*81 - 118*				
Surr: 4-Bromofluorobenzene	*47.09*	*1.0*	*50*	*0*	*94.2*	*85 - 114*				
Surr: Dibromofluoromethane	*44.5*	*1.0*	*50*	*0*	*89.0*	*80 - 119*				

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
WorkOrder: HS19110644

QC BATCH REPORT

Batch ID: R350624 (0) **Instrument:** VOA9 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MBLK Sample ID: **VBLKW-191115** Units: **UG/L** Analysis Date: **15-Nov-2019 13:07**
Client ID: Run ID: **VOA9_350624** SeqNo: **5346675** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Surr: Toluene-d8	*52.12*	*1.0*	*50*	*0*	*104*	*89 - 112*				

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
WorkOrder: HS19110644

QC BATCH REPORT

Batch ID: R350624 (0) **Instrument: VOA9** **Method: VOLATILES ORGANICS BY METHOD 8260C**

LCS Sample ID: **VLCSW-191115** Units: **UG/L** Analysis Date: **15-Nov-2019 12:19**
Client ID: Run ID: **VOA9_350624** SeqNo: **5346674** 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	18.38	1.0	20	0	91.9	78 - 124				
1,1,1-Trichloroethane	18.42	1.0	20	0	92.1	74 - 131				
1,1,2,2-Tetrachloroethane	21.73	1.0	20	0	109	71 - 121				
1,1,2-Trichlor-1,2,2-trifluoroethane	19.98	1.0	20	0	99.9	70 - 136				
1,1,2-Trichloroethane	21.08	1.0	20	0	105	80 - 119				
1,1-Dichloroethane	23.15	1.0	20	0	116	77 - 125				
1,1-Dichloroethene	22.18	1.0	20	0	111	71 - 131				
1,1-Dichloropropene	20.1	1.0	20	0	101	78 - 125				
1,2,3-Trichlorobenzene	18.57	1.0	20	0	92.8	69 - 129				
1,2,3-Trichloropropane	20.03	1.0	20	0	100	73 - 122				
1,2,4-Trichlorobenzene	16.44	1.0	20	0	82.2	69 - 130				
1,2,4-Trimethylbenzene	19.09	1.0	20	0	95.4	76 - 124				
1,2-Dibromo-3-chloropropane	15.93	1.0	20	0	79.6	62 - 128				
1,2-Dibromoethane	19.15	1.0	20	0	95.8	77 - 121				
1,2-Dichlorobenzene	19.25	1.0	20	0	96.3	80 - 119				
1,2-Dichloroethane	19.49	1.0	20	0	97.5	73 - 128				
1,2-Dichloropropane	24.44	1.0	20	0	122	78 - 122				S
1,3,5-Trimethylbenzene	18.93	1.0	20	0	94.7	75 - 124				
1,3-Dichlorobenzene	17.36	1.0	20	0	86.8	80 - 119				
1,3-Dichloropropane	22.24	1.0	20	0	111	80 - 119				
1,4-Dichlorobenzene	17.42	1.0	20	0	87.1	79 - 118				
2,2-Dichloropropane	18.33	1.0	20	0	91.7	60 - 139				
2-Butanone	45.48	2.0	40	0	114	56 - 143				
2-Chlorotoluene	20.93	1.0	20	0	105	79 - 122				
2-Hexanone	42.68	2.0	40	0	107	57 - 139				
4-Chlorotoluene	19.29	1.0	20	0	96.4	78 - 122				
4-Isopropyltoluene	17.88	1.0	20	0	89.4	77 - 127				
4-Methyl-2-pentanone	44.57	2.0	40	0	111	67 - 130				
Acetone	50.37	2.0	40	0	126	39 - 160				
Benzene	21.94	1.0	20	0	110	79 - 120				
Bromobenzene	18.07	1.0	20	0	90.4	80 - 120				
Bromochloromethane	20.73	1.0	20	0	104	78 - 123				
Bromodichloromethane	21.16	1.0	20	0	106	79 - 125				
Bromoform	15.87	1.0	20	0	79.3	66 - 130				

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
WorkOrder: HS19110644

QC BATCH REPORT

Batch ID: R350624 (0) **Instrument: VOA9** **Method: VOLATILES ORGANICS BY METHOD 8260C**

LCS Sample ID: **VLCSW-191115** Units: **UG/L** Analysis Date: **15-Nov-2019 12:19**
Client ID: Run ID: **VOA9_350624** SeqNo: **5346674** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Bromomethane	25.62	1.0	20	0	128	53 - 141				
Carbon disulfide	45.84	2.0	40	0	115	64 - 133				
Carbon tetrachloride	17.73	1.0	20	0	88.6	72 - 136				
Chlorobenzene	19.39	1.0	20	0	96.9	82 - 118				
Chloroethane	26.49	1.0	20	0	132	60 - 138				
Chloroform	21.33	1.0	20	0	107	79 - 124				
Chloromethane	26.49	1.0	20	0	132	50 - 139				
cis-1,2-Dichloroethene	20.98	1.0	20	0	105	78 - 123				
cis-1,3-Dichloropropene	22.73	1.0	20	0	114	75 - 124				
Dibromochloromethane	16.93	1.0	20	0	84.7	74 - 126				
Dibromomethane	22.64	1.0	20	0	113	79 - 123				
Dichlorodifluoromethane	20.36	1.0	20	0	102	32 - 152				
Ethylbenzene	17.83	1.0	20	0	89.2	79 - 121				
Hexachlorobutadiene	17.34	1.0	20	0	86.7	66 - 134				
Isopropylbenzene	18.14	1.0	20	0	90.7	72 - 131				
m,p-Xylene	38.39	2.0	40	0	96.0	80 - 121				
Methylene chloride	23.01	2.0	20	0	115	74 - 124				
Naphthalene	20.07	1.0	20	0	100	61 - 128				
n-Butylbenzene	18.35	1.0	20	0	91.7	75 - 128				
n-Propylbenzene	19.54	1.0	20	0	97.7	76 - 126				
o-Xylene	18.84	1.0	20	0	94.2	78 - 122				
sec-Butylbenzene	18.59	1.0	20	0	93.0	77 - 126				
Styrene	19.45	1.0	20	0	97.3	78 - 123				
tert-Butylbenzene	18.39	1.0	20	0	91.9	78 - 124				
Tetrachloroethene	17.17	1.0	20	0	85.8	74 - 129				
Toluene	19.42	1.0	20	0	97.1	80 - 121				
trans-1,2-Dichloroethene	20.68	1.0	20	0	103	75 - 124				
trans-1,3-Dichloropropene	17.97	1.0	20	0	89.9	73 - 127				
Trichloroethene	18.71	1.0	20	0	93.6	79 - 123				
Trichlorofluoromethane	21.47	1.0	20	0	107	65 - 141				
Vinyl chloride	24.2	1.0	20	0	121	58 - 137				
Surr: 1,2-Dichloroethane-d4	*57.79*	*1.0*	*50*	*0*	*116*	*81 - 118*				
Surr: 4-Bromofluorobenzene	*47.4*	*1.0*	*50*	*0*	*94.8*	*85 - 114*				
Surr: Dibromofluoromethane	*53.56*	*1.0*	*50*	*0*	*107*	*80 - 119*				

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
WorkOrder: HS19110644

QC BATCH REPORT

Batch ID: R350624 (0) **Instrument:** VOA9 **Method:** VOLATILES ORGANICS BY METHOD 8260C

LCS Sample ID: **VLCSW-191115** Units: **UG/L** Analysis Date: **15-Nov-2019 12:19**
Client ID: Run ID: **VOA9_350624** SeqNo: **5346674** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Surr: Toluene-d8	*50.48*	*1.0*	*50*	*0*	*101*	*89 - 112*				

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
WorkOrder: HS19110644

QC BATCH REPORT

Batch ID: R350624 (0) **Instrument:** VOA9 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MS Sample ID: **HS19110644-01MS** Units: **UG/L** Analysis Date: **15-Nov-2019 15:58**
Client ID: **50WW29-191111** Run ID: **VOA9_350624** SeqNo: **5346682** 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	22.07	1.0	20	0	110	78 - 124				
1,1,1-Trichloroethane	24.4	1.0	20	0	122	74 - 131				
1,1,2,2-Tetrachloroethane	24.09	1.0	20	0	120	71 - 121				
1,1,2-Trichlor-1,2,2-trifluoroethane	28.04	1.0	20	0	140	70 - 136				S
1,1,2-Trichloroethane	27.89	1.0	20	0	139	80 - 119				S
1,1-Dichloroethane	26.81	1.0	20	0	134	77 - 125				S
1,1-Dichloroethene	28.31	1.0	20	0	142	71 - 131				S
1,1-Dichloropropene	28.52	1.0	20	0	143	78 - 125				S
1,2,3-Trichlorobenzene	21.55	1.0	20	0	108	69 - 129				
1,2,3-Trichloropropane	23.36	1.0	20	0	117	73 - 122				
1,2,4-Trichlorobenzene	20.9	1.0	20	0	105	69 - 130				
1,2,4-Trimethylbenzene	23.87	1.0	20	0	119	76 - 124				
1,2-Dibromo-3-chloropropane	20.82	1.0	20	0	104	62 - 128				
1,2-Dibromoethane	23.75	1.0	20	0	119	77 - 121				
1,2-Dichlorobenzene	23	1.0	20	0	115	80 - 119				
1,2-Dichloroethane	27.38	1.0	20	0	137	73 - 128				S
1,2-Dichloropropane	30.12	1.0	20	0	151	78 - 122				S
1,3,5-Trimethylbenzene	24.87	1.0	20	0	124	75 - 124				S
1,3-Dichlorobenzene	22.18	1.0	20	0	111	80 - 119				
1,3-Dichloropropane	27.21	1.0	20	0	136	80 - 119				S
1,4-Dichlorobenzene	21.15	1.0	20	0	106	79 - 118				
2,2-Dichloropropane	18.1	1.0	20	0	90.5	60 - 139				
2-Butanone	49.58	2.0	40	0	124	56 - 143				
2-Chlorotoluene	25.31	1.0	20	0	127	79 - 122				S
2-Hexanone	49.24	2.0	40	0	123	57 - 139				
4-Chlorotoluene	23.92	1.0	20	0	120	78 - 122				
4-Isopropyltoluene	23.77	1.0	20	0	119	77 - 127				
4-Methyl-2-pentanone	51.87	2.0	40	0	130	67 - 130				
Acetone	53.41	2.0	40	0	134	39 - 160				
Benzene	27.96	1.0	20	0	140	79 - 120				S
Bromobenzene	20.86	1.0	20	0	104	80 - 120				
Bromochloromethane	22.36	1.0	20	0	112	78 - 123				
Bromodichloromethane	26.35	1.0	20	0	132	79 - 125				S
Bromoform	18.33	1.0	20	0	91.6	66 - 130				

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
WorkOrder: HS19110644

QC BATCH REPORT

Batch ID: R350624 (0) **Instrument:** VOA9 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MS Sample ID: **HS19110644-01MS** Units: **UG/L** Analysis Date: **15-Nov-2019 15:58**
Client ID: **50WW29-191111** Run ID: **VOA9_350624** SeqNo: **5346682** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Bromomethane	30.26	1.0	20	0	151	53 - 141				S
Carbon disulfide	51.42	2.0	40	0	129	64 - 133				
Carbon tetrachloride	25.03	1.0	20	0	125	72 - 136				
Chlorobenzene	24.59	1.0	20	0	123	82 - 118				S
Chloroethane	33.6	1.0	20	0	168	60 - 138				S
Chloroform	25.42	1.0	20	0	127	79 - 124				S
Chloromethane	29.51	1.0	20	0	148	50 - 139				S
cis-1,2-Dichloroethene	24.5	1.0	20	0	123	78 - 123				
cis-1,3-Dichloropropene	25.95	1.0	20	0	130	75 - 124				S
Dibromochloromethane	20.93	1.0	20	0	105	74 - 126				
Dibromomethane	26.4	1.0	20	0	132	79 - 123				S
Dichlorodifluoromethane	23.29	1.0	20	0	116	32 - 152				
Ethylbenzene	25.77	1.0	20	0	129	79 - 121				S
Hexachlorobutadiene	19.15	1.0	20	0	95.7	66 - 134				
Isopropylbenzene	25.76	1.0	20	0	129	72 - 131				
m,p-Xylene	49.79	2.0	40	0	124	80 - 121				S
Methylene chloride	25.83	2.0	20	0	129	74 - 124				S
Naphthalene	24.07	1.0	20	0	120	61 - 128				
n-Butylbenzene	24.53	1.0	20	0	123	75 - 128				
n-Propylbenzene	25.65	1.0	20	0	128	76 - 126				S
o-Xylene	24.31	1.0	20	0	122	78 - 122				
sec-Butylbenzene	25.34	1.0	20	0	127	77 - 126				S
Styrene	24.01	1.0	20	0	120	78 - 123				
tert-Butylbenzene	24.69	1.0	20	0	123	78 - 124				
Tetrachloroethene	24.11	1.0	20	0	121	74 - 129				
Toluene	25.26	1.0	20	0	126	80 - 121				S
trans-1,2-Dichloroethene	23.67	1.0	20	0	118	75 - 124				
trans-1,3-Dichloropropene	20.28	1.0	20	0	101	73 - 127				
Trichloroethene	26.8	1.0	20	0	134	79 - 123				S
Trichlorofluoromethane	27.21	1.0	20	0	136	65 - 141				
Vinyl chloride	28.22	1.0	20	0	141	58 - 137				S
Surr: 1,2-Dichloroethane-d4	*49.65*	*1.0*	*50*	*0*	*99.3*	*81 - 118*				
Surr: 4-Bromofluorobenzene	*49.69*	*1.0*	*50*	*0*	*99.4*	*85 - 114*				
Surr: Dibromofluoromethane	*48.26*	*1.0*	*50*	*0*	*96.5*	*80 - 119*				

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
WorkOrder: HS19110644

QC BATCH REPORT

Batch ID: R350624 (0) **Instrument:** VOA9 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MS Sample ID: **HS19110644-01MS** Units: **UG/L** Analysis Date: **15-Nov-2019 15:58**
Client ID: **50WW29-191111** Run ID: **VOA9_350624** SeqNo: **5346682** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Surr: Toluene-d8	*51.91*	*1.0*	*50*	*0*	*104*	*89 - 112*				

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
WorkOrder: HS19110644

QC BATCH REPORT

Batch ID: R350624 (0) **Instrument:** VOA9 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MSD Sample ID: **HS19110644-01MSD** Units: **UG/L** Analysis Date: **15-Nov-2019 16:22**
Client ID: **50WW29-191111** Run ID: **VOA9_350624** SeqNo: **5346683** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	21.57	1.0	20	0	108	78 - 124	22.07	2.3	20	
1,1,1-Trichloroethane	22.02	1.0	20	0	110	74 - 131	24.4	10.2	20	
1,1,2,2-Tetrachloroethane	25.8	1.0	20	0	129	71 - 121	24.09	6.86	20	S
1,1,2-Trichlor-1,2,2-trifluoroethane	26.91	1.0	20	0	135	70 - 136	28.04	4.1	20	
1,1,2-Trichloroethane	26.94	1.0	20	0	135	80 - 119	27.89	3.44	20	S
1,1-Dichloroethane	24.76	1.0	20	0	124	77 - 125	26.81	7.98	20	
1,1-Dichloroethene	27.22	1.0	20	0	136	71 - 131	28.31	3.93	20	S
1,1-Dichloropropene	28.8	1.0	20	0	144	78 - 125	28.52	0.971	20	S
1,2,3-Trichlorobenzene	23.04	1.0	20	0	115	69 - 129	21.55	6.66	20	
1,2,3-Trichloropropane	23.5	1.0	20	0	118	73 - 122	23.36	0.614	20	
1,2,4-Trichlorobenzene	21.13	1.0	20	0	106	69 - 130	20.9	1.08	20	
1,2,4-Trimethylbenzene	23.9	1.0	20	0	120	76 - 124	23.87	0.127	20	
1,2-Dibromo-3-chloropropane	21.36	1.0	20	0	107	62 - 128	20.82	2.55	20	
1,2-Dibromoethane	22.34	1.0	20	0	112	77 - 121	23.75	6.15	20	
1,2-Dichlorobenzene	22.62	1.0	20	0	113	80 - 119	23	1.64	20	
1,2-Dichloroethane	27.67	1.0	20	0	138	73 - 128	27.38	1.07	20	S
1,2-Dichloropropane	30.28	1.0	20	0	151	78 - 122	30.12	0.517	20	S
1,3,5-Trimethylbenzene	24.18	1.0	20	0	121	75 - 124	24.87	2.82	20	
1,3-Dichlorobenzene	22.63	1.0	20	0	113	80 - 119	22.18	2.05	20	
1,3-Dichloropropane	27.68	1.0	20	0	138	80 - 119	27.21	1.71	20	S
1,4-Dichlorobenzene	21.72	1.0	20	0	109	79 - 118	21.15	2.64	20	
2,2-Dichloropropane	16.92	1.0	20	0	84.6	60 - 139	18.1	6.74	20	
2-Butanone	47.99	2.0	40	0	120	56 - 143	49.58	3.26	20	
2-Chlorotoluene	26.03	1.0	20	0	130	79 - 122	25.31	2.8	20	S
2-Hexanone	51.84	2.0	40	0	130	57 - 139	49.24	5.16	20	
4-Chlorotoluene	24.01	1.0	20	0	120	78 - 122	23.92	0.38	20	
4-Isopropyltoluene	23.96	1.0	20	0	120	77 - 127	23.77	0.774	20	
4-Methyl-2-pentanone	55.93	2.0	40	0	140	67 - 130	51.87	7.54	20	S
Acetone	55.55	2.0	40	0	139	39 - 160	53.41	3.93	20	
Benzene	28.33	1.0	20	0	142	79 - 120	27.96	1.31	20	S
Bromobenzene	21.8	1.0	20	0	109	80 - 120	20.86	4.43	20	
Bromochloromethane	22.8	1.0	20	0	114	78 - 123	22.36	1.94	20	
Bromodichloromethane	26.66	1.0	20	0	133	79 - 125	26.35	1.18	20	S
Bromoform	19.33	1.0	20	0	96.7	66 - 130	18.33	5.33	20	

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
WorkOrder: HS19110644

QC BATCH REPORT

Batch ID: R350624 (0) **Instrument:** VOA9 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MSD Sample ID: **HS19110644-01MSD** Units: **UG/L** Analysis Date: **15-Nov-2019 16:22**
Client ID: **50WW29-191111** Run ID: **VOA9_350624** SeqNo: **5346683** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual
Bromomethane	29.37	1.0	20	0	147	53 - 141	30.26	2.98	20	S
Carbon disulfide	51.04	2.0	40	0	128	64 - 133	51.42	0.738	20	
Carbon tetrachloride	25.45	1.0	20	0	127	72 - 136	25.03	1.68	20	
Chlorobenzene	23.53	1.0	20	0	118	82 - 118	24.59	4.39	20	
Chloroethane	32.01	1.0	20	0	160	60 - 138	33.6	4.85	20	S
Chloroform	25.03	1.0	20	0	125	79 - 124	25.42	1.57	20	S
Chloromethane	30.07	1.0	20	0	150	50 - 139	29.51	1.88	20	S
cis-1,2-Dichloroethene	21.53	1.0	20	0	108	78 - 123	24.5	12.9	20	
cis-1,3-Dichloropropene	25.66	1.0	20	0	128	75 - 124	25.95	1.12	20	S
Dibromochloromethane	21.8	1.0	20	0	109	74 - 126	20.93	4.08	20	
Dibromomethane	27.07	1.0	20	0	135	79 - 123	26.4	2.52	20	S
Dichlorodifluoromethane	20.9	1.0	20	0	105	32 - 152	23.29	10.8	20	
Ethylbenzene	24.65	1.0	20	0	123	79 - 121	25.77	4.47	20	S
Hexachlorobutadiene	22.17	1.0	20	0	111	66 - 134	19.15	14.6	20	
Isopropylbenzene	25.67	1.0	20	0	128	72 - 131	25.76	0.342	20	
m,p-Xylene	50.3	2.0	40	0	126	80 - 121	49.79	1.01	20	S
Methylene chloride	24.37	2.0	20	0	122	74 - 124	25.83	5.8	20	
Naphthalene	24.51	1.0	20	0	123	61 - 128	24.07	1.8	20	
n-Butylbenzene	25.91	1.0	20	0	130	75 - 128	24.53	5.48	20	S
n-Propylbenzene	25.54	1.0	20	0	128	76 - 126	25.65	0.405	20	S
o-Xylene	23.88	1.0	20	0	119	78 - 122	24.31	1.77	20	
sec-Butylbenzene	25.67	1.0	20	0	128	77 - 126	25.34	1.29	20	S
Styrene	24.26	1.0	20	0	121	78 - 123	24.01	1.07	20	
tert-Butylbenzene	25.59	1.0	20	0	128	78 - 124	24.69	3.56	20	S
Tetrachloroethene	23.86	1.0	20	0	119	74 - 129	24.11	1.01	20	
Toluene	25.06	1.0	20	0	125	80 - 121	25.26	0.813	20	S
trans-1,2-Dichloroethene	22.99	1.0	20	0	115	75 - 124	23.67	2.93	20	
trans-1,3-Dichloropropene	21.05	1.0	20	0	105	73 - 127	20.28	3.75	20	
Trichloroethene	26.03	1.0	20	0	130	79 - 123	26.8	2.92	20	S
Trichlorofluoromethane	26.97	1.0	20	0	135	65 - 141	27.21	0.899	20	
Vinyl chloride	28.16	1.0	20	0	141	58 - 137	28.22	0.239	20	S
Surr: 1,2-Dichloroethane-d4	*48.35*	*1.0*	*50*	*0*	*96.7*	*81 - 118*	*49.65*	*2.64*	*20*	
Surr: 4-Bromofluorobenzene	*49.79*	*1.0*	*50*	*0*	*99.6*	*85 - 114*	*49.69*	*0.203*	*20*	
Surr: Dibromofluoromethane	*46.3*	*1.0*	*50*	*0*	*92.6*	*80 - 119*	*48.26*	*4.13*	*20*	

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
WorkOrder: HS19110644

QC BATCH REPORT

Batch ID: R350624 (0) **Instrument:** VOA9 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MSD Sample ID: **HS19110644-01MSD** Units: **UG/L** Analysis Date: **15-Nov-2019 16:22**
Client ID: **50WW29-191111** Run ID: **VOA9_350624** SeqNo: **5346683** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Surr: Toluene-d8	*51.64*	*1.0*	*50*	*0*	*103*	*89 - 112*	*51.91*	*0.529*	*20*	

The following samples were analyzed in this batch:

HS19110644-01	HS19110644-02	HS19110644-03	HS19110644-04
HS19110644-05	HS19110644-06	HS19110644-07	HS19110644-08
HS19110644-09	HS19110644-10	HS19110644-11	

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
WorkOrder: HS19110644

QC BATCH REPORT

Batch ID: R350457 (0) **Instrument: ICS-Integrion** **Method: ANIONS BY SW9056A**

MBLK Sample ID: **WBLKW1-111319** Units: **mg/L** Analysis Date: **13-Nov-2019 14:02**
Client ID: Run ID: **ICS-Integrion_350457** SeqNo: **5343626** 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
Nitrogen, Nitrate (As N)	0.100	0.100								U
Sulfate	0.500	0.500								U

LCS Sample ID: **WLCSW1-111319** Units: **mg/L** Analysis Date: **13-Nov-2019 14:18**
Client ID: Run ID: **ICS-Integrion_350457** SeqNo: **5343627** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	19.9	0.500	20	0	99.5	80 - 120				
Nitrogen, Nitrate (As N)	4.021	0.100	4	0	101	80 - 120				
Sulfate	19.6	0.500	20	0	98.0	80 - 120				

LCSD Sample ID: **WLCSDW1-111319** Units: **mg/L** Analysis Date: **13-Nov-2019 14:35**
Client ID: Run ID: **ICS-Integrion_350457** SeqNo: **5343628** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	19.76	0.500	20	0	98.8	80 - 120	19.9	0.736	20	
Nitrogen, Nitrate (As N)	3.991	0.100	4	0	99.8	80 - 120	4.021	0.741	20	
Sulfate	19.39	0.500	20	0	96.9	80 - 120	19.6	1.07	20	

MS Sample ID: **HS19110644-07MS** Units: **mg/L** Analysis Date: **13-Nov-2019 20:57**
Client ID: **50WW06-191112** Run ID: **ICS-Integrion_350457** SeqNo: **5343645** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	92.15	0.500	10	84.1	80.5	80 - 120				O
Nitrogen, Nitrate (As N)	1.929	0.100	2	0	96.4	80 - 120				
Sulfate	29.85	0.500	10	20.76	90.9	80 - 120				

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
WorkOrder: HS19110644

QC BATCH REPORT

Batch ID: R350457 (0) **Instrument: ICS-Integrion** **Method: ANIONS BY SW9056A**

MS Sample ID: **HS19110621-01MS** Units: **mg/L** Analysis Date: **13-Nov-2019 16:14**
Client ID: Run ID: **ICS-Integrion_350457** SeqNo: **5343633** PrepDate: DF: **2**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	311.1	1.00	20	297	70.3	80 - 120				SEO
Nitrogen, Nitrate (As N)	24.53	0.200	4	21	88.0	80 - 120				O
Sulfate	322.5	1.00	20	310.5	60.1	80 - 120				SEO

MSD Sample ID: **HS19110644-07MSD** Units: **mg/L** Analysis Date: **13-Nov-2019 21:14**
Client ID: **50WW06-191112** Run ID: **ICS-Integrion_350457** SeqNo: **5343646** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	92.17	0.500	10	84.1	80.7	80 - 120	92.15	0.0174	20	O
Nitrogen, Nitrate (As N)	1.934	0.100	2	0	96.7	80 - 120	1.929	0.243	20	
Sulfate	29.88	0.500	10	20.76	91.2	80 - 120	29.85	0.1	20	

MSD Sample ID: **HS19110621-01MSD** Units: **mg/L** Analysis Date: **13-Nov-2019 16:31**
Client ID: Run ID: **ICS-Integrion_350457** SeqNo: **5343634** PrepDate: DF: **2**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	310.4	1.00	20	297	66.5	80 - 120	311.1	0.243	20	SEO
Nitrogen, Nitrate (As N)	24.44	0.200	4	21	85.9	80 - 120	24.53	0.359	20	O
Sulfate	322.3	1.00	20	310.5	59.2	80 - 120	322.5	0.0539	20	SEO

The following samples were analyzed in this batch: HS19110644-05 HS19110644-06 HS19110644-07 HS19110644-08 HS19110644-09 HS19110644-10

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
WorkOrder: **HS19110644**

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	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

Acronym	Description
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 Quantitaion Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Arkansas	19-028-0	27-Mar-2020
California	2919, 2019-2020	30-Apr-2020
Dept of Defense	ANAB L2231	20-Dec-2021
Florida	E87611-28	30-Jun-2020
Illinois	2000322019-2	09-May-2020
Kansas	E-10352 2019-2020	31-Jul-2020
Kentucky	123043, 2019-2020	30-Apr-2020
Louisiana	03087, 2019-2020	30-Jun-2020
Maryland	343, 2019-2020	30-Jun-2020
North Carolina	624-2019	31-Dec-2019
North Dakota	R-193 2019-2020	30-Apr-2020
Oklahoma	2019-067	31-Aug-2020
Texas	TX104704231-19-23	30-Apr-2020

ALS Houston, US Date: 27-Nov-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Work Order: HS19110644

SAMPLE TRACKING

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19110644-01	50WW29-191111	Login	11/13/2019 3:24:15 PM	JRM	Sub
HS19110644-01	50WW29-191111	Login	11/13/2019 3:24:15 PM	JRM	Disposed
HS19110644-02	50WW10-191111	Login	11/13/2019 3:24:15 PM	JRM	Sub
HS19110644-02	50WW10-191111	Login	11/13/2019 3:24:15 PM	JRM	Disposed
HS19110644-03	50WW09-191111	Login	11/13/2019 3:24:15 PM	JRM	Sub
HS19110644-03	50WW09-191111	Login	11/13/2019 3:24:15 PM	JRM	Disposed
HS19110644-05	50WW22-191112	Login	11/13/2019 3:24:15 PM	JRM	Sub
HS19110644-05	50WW22-191112	Login	11/13/2019 3:24:15 PM	JRM	Disposed
HS19110644-05	50WW22-191112	Login	11/13/2019 3:24:15 PM	JRM	Disposed
HS19110644-05	50WW22-191112	Login	11/13/2019 3:24:15 PM	JRM	Sub
HS19110644-05	50WW22-191112	Login	11/13/2019 3:24:15 PM	JRM	Sub
HS19110644-05	50WW22-191112	Login	11/13/2019 3:24:15 PM	JRM	Sub

ALS Houston, US Date: 27-Nov-19

Sample Receipt Checklist

Client Name: CBI-Houston
Work Order: HS19110644
Date/Time Received: **13-Nov-2019 09:39**
Received by: **JRM**

Checklist completed by: *Jared R. Makan* eSignature 13-Nov-2019 Date
Reviewed by: *RJ Modashia* eSignature 14-Nov-2019 Date

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:N/A
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):	1.0°C / 0.5°C UC/C	IR11	
Cooler(s)/Kit(s):	43786		
Date/Time sample(s) sent to storage:	11/13/2019 15:45		
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:

APTIM

Page 1 of

COC ID: 50NOV2019-1911_-ALS | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Longhorn AAP			Lab Name	ALS Laboratories			Email Invoice To	FedInvoices@aptim.com		
Project Number	501032			Lab Contact	RJ Modashia						
	LHAAP-50			Email	RJ.Modashia@alsglobal.com			Email Report To	Susan.Huang@aptim.com		
Address	1203-B East Grand Avenue			Address	10450 Stancliff Rd., Suite 210			Mail Reports To	Susan Huang		
	PMB 202							Address	4005 Port Chicago Highway, Suite 200		
City	Marshall	State	TX	City	Houston	State	TX	City	Concord	State	CA
Postal Code	75670	Country	USA	Postal Code	77099	Country	USA	Postal Code	94520	Country	USA
Phone Number	713.243.7264			Phone Number	281.575.2270 or 281 530.5656						
Project Manager	Praveen Srivastav							Shipping Company			

SAMPLE DETAILS

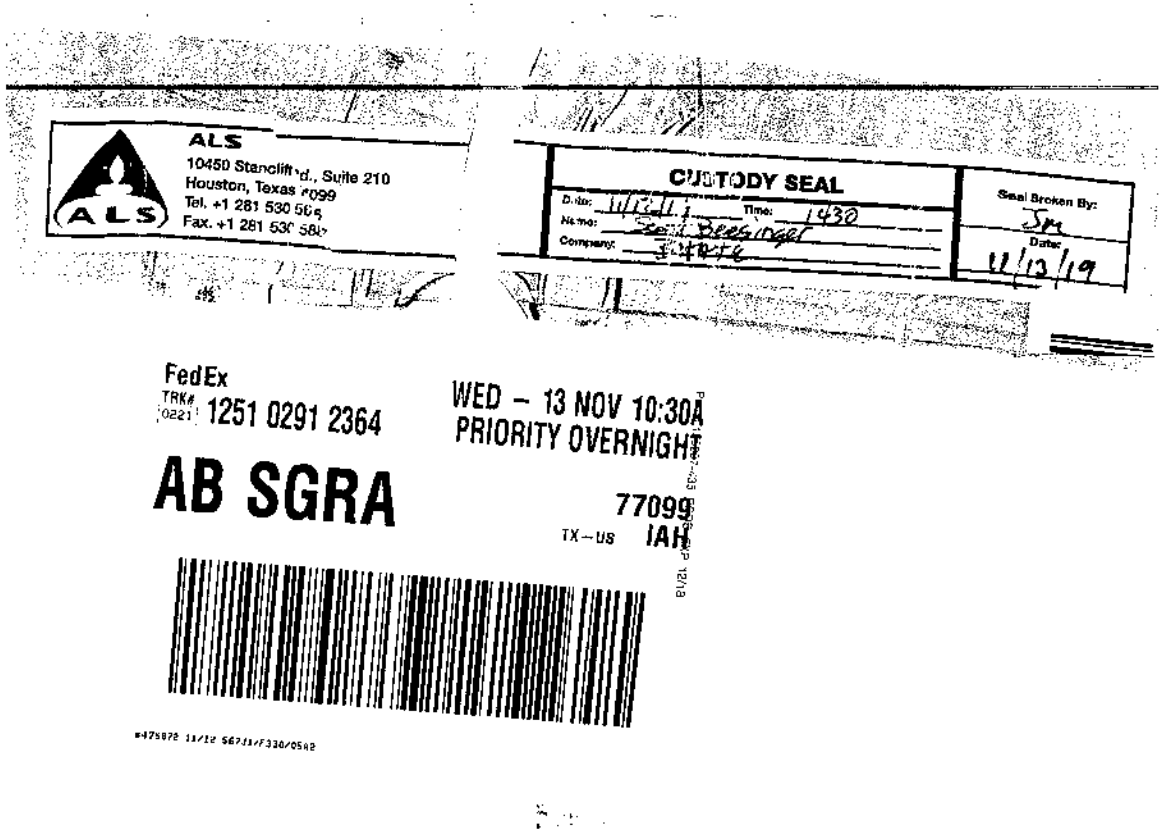
Sample ID	Location	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	# Of Cont.	ANALYSIS: Sample Container and Preservatives	3-40 ml VOA/HCL: Vocs by 8260B	3-40 ml VOA/HCL: MEE by RSK175	3-40 ml VOA/Cool to 6 deg C: CO2 by RSK175	2-40ml Amber/H2SO4: TOC by Sm5310C	1-250ml/Cool to 6 deg C: Anions (chloride/sulfate/nitrate) by 9056	1-125ml/Cool to 6 deg C: Perchlorate by 6850
SDWW29-191111	LHAAP 50				WG	11/11/19	0920	4		X					X
SDWW10-191111	LHAAP 50				WG	11/11/19	1015	4		X					X
SDWW09-191111	LHAAP 50				WG	11/11/19	1105	4		X					X
SDWW09-191111-FD	LHAAP 50				WG	11/11/19	1105	4		X					X
SDWW22-191112	LHAAP 50				WG	11/12/19	0830	13		X	X	X	X	X	X
SDWW08-191112	LHAAP 50				WG	11/12/19	0930	13		X	X	X	X	X	X
SDWW06-191112	LHAAP 50				WG	11/12/19	1030	13		X	X	X	X	X	X
SDWW11-191112	LHAAP 50				WG	11/12/19	1180	13		X	X	X	X	X	X
SDWW12-191112	LHAAP 50				WG	11/12/19	1230	13		X	X	X	X	X	X
SDWW12-191112-FD	LHAAP 50				WG	11/12/19	1230	13		X	X	X	X	X	X
TRIP Blank	LHAAP 50				W	11/12/19		2		X					

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Cooler 03736 IR 2.1	Sam Bessey/BHMTC	11/12/19 1450		11/13/19 09:30
Temp 1.0 2.5+0.5				

HS19110644

Aptim Environmental & Infrastructure, Inc.

LHAAP-50 501032



ALS
10450 Stanclift Rd., Suite 210
Houston, Texas 77099
Tel. +1 281 530 5656
Fax. +1 281 530 5810

CUSTODY SEAL
Date: 11/12/19 Time: 1430
Name: Scott Beegle
Company: ALS
Seal Broken By:
Date: 11/13/19

FedEx
TRK# 0221 1251 0291 2364

WED – 13 NOV 10:30A
PRIORITY OVERNIGHT

AB SGRA

77099
TX – US IAH

ALS Environmental
ALS Group USA, Corp
1317 South 13th Avenue
Kelso, WA 98626
T : +1 360 577 7222
F : +1 360 636 1068
www.alsglobal.com

November 22, 2019

Analytical Report for Service Request No: K1910759

RJ Modashia
ALS Laboratory Group
10450 Stancliff Road
Suite 210
Houston, TX 77099-4338

RE: HS19110644

Dear RJ,

Enclosed are the results of the sample(s) submitted to our laboratory November 14, 2019
For your reference, these analyses have been assigned our service request number **K1910759.**

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3350. You may also contact me via email at Kelley.Lovejoy@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Kelley Lovejoy

Kelley Lovejoy
Project Manager

RIGHT SOLUTIONS | RIGHT PARTNER

ALS Environmental
ALS Group USA, Corp
1317 South 13th Avenue
Kelso, WA 98626
T : +1 360 577 7222
F : +1 360 636 1068
www.alsglobal.com

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Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimated value.
J	The result is an estimated value.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
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.
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.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L16-58-R4
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjlabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water-	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

Case Narrative

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

1317 South 13th Ave, Kelso, WA 98626 | 1-360-577-7222 | www.alsglobal.com

Client: ALS Environmental - US
Project: HS19110644
Sample Matrix: Ground Water

Service Request: K1910759
Date Received: 11/14/2019

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier level IV requested by the client.

Sample Receipt:

Six ground water samples were received for analysis at ALS Environmental on 11/14/2019. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

General Chemistry:

No significant anomalies were noted with this analysis.

Approved by Kelley Lovejoy Date 11/22/2019

Chain of Custody

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

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

KH910759

Subcontract Chain of Custody

SAMPLING STATE: **Texas** **COC ID:** **12625**

SUBCONTRACT TO:

ALS Environmental Kelso
1317 S. 13th Avenue
Kelso, WA 98626

Phone: +1 360 501 3312

CUSTOMER INFORMATION:

Company:	ALS Houston
Contact:	RJ Modashia
Address:	10450 Stancliff Rd, Ste 210
Phone:	+1 281 530 5656
Email:	RJ.Modashia@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:	HS19110644
TSR:	Sonia West

	LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
	ANALYSIS REQUESTED			DUE DATE
1.	**HS19110644-05**	**50WW22-191112**	**Groundwater**	**12 Nov 2019 08:30**
	TOC Analysis with DOD Level IV/EQuIS APTIM EDD			27 Nov 2019
2.	**HS19110644-06**	**50WW08-191112**	**Groundwater**	**12 Nov 2019 09:30**
	TOC Analysis with DOD Level IV/EQuIS APTIM EDD			27 Nov 2019
3.	**HS19110644-07**	**50WW06-191112**	**Groundwater**	**12 Nov 2019 10:30**
	TOC Analysis with DOD Level IV/EQuIS APTIM EDD			27 Nov 2019
4.	**HS19110644-08**	**50WW11-191112**	**Groundwater**	**12 Nov 2019 11:30**
	TOC Analysis with DOD Level IV/EQuIS APTIM EDD			27 Nov 2019
5.	**HS19110644-09**	**50WW12-191112**	**Groundwater**	**12 Nov 2019 12:30**
	TOC Analysis with DOD Level IV/EQuIS APTIM EDD			27 Nov 2019
6.	**HS19110644-10**	**50WW12-191112-FD**	**Groundwater**	**12 Nov 2019 12:30**
	TOC Analysis with DOD Level IV/EQuIS APTIM EDD			27 Nov 2019

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

QC Level: DOD IV (DoD Data Package)

KL910759

Subcontract Chain of Custody

SAMPLING STATE: **Texas**

COC ID: **12625**

Relinquished By: _____ Date/Time: 11/13/19 1800

Received By: Monrow ALS Houston Date/Time: 11-14-19 0940

Cooler ID(s): _____ Temperature(s): _____

PC KL

Cooler Receipt and Preservation Form

Client ALS - Houston Service Request K19 10759

Received: 11-14-19 Opened: 11-14-19 By: [illegible] Unloaded: 11-14-19 By: [illegible]

1. Samples were received via? *USPS* (*Fed Ex*) *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) (*Cooler*) *Box* *Envelope* *Other*_____ *NA*
3. Were custody seals on coolers? NA (Y) N If yes, how many and where? 1F4/B
   If present, were custody seals intact? (Y) N If present, were they signed and dated? (Y) N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID (NA)	Tracking Number NA	Filed
0.5	-0.5	4.5	4.5	0	371		1251 0291 7686	

4. Packing material: *Inserts* (*Baggies*) *Bubble Wrap* *Gel Packs* (*Wet Ice*) *Dry Ice* *Sleeves* _____
5. Were custody papers properly filled out (ink, signed, etc.)? NA (Y) N
6. Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.* NA (Y) N
   If applicable, tissue samples were received: *Frozen* *Partially Thawed* *Thawed*
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA (Y) N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA (Y) N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA (Y) N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA (Y) N
11. Were VOA vials received without headspace? *Indicate in the table below.* (NA) Y N
12. Was C12/Res negative? (NA) Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

General Chemistry

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	ALS Environmental - US	**Service Request:**	K1910759
Project:	HS19110644	**Date Collected:**	11/12/19
Sample Matrix:	Ground Water	**Date Received:**	11/14/19
Analysis Method:	SM 5310 C	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA

Carbon, Total Organic

Sample Name	Lab Code	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
50WW22-191112	K1910759-001	**1.01**	0.50	0.20	0.07	1	11/21/19 01:36	
50WW08-191112	K1910759-002	**0.83**	0.50	0.20	0.07	1	11/21/19 02:41	
50WW06-191112	K1910759-003	**1.63**	0.50	0.20	0.07	1	11/21/19 03:13	
50WW11-191112	K1910759-004	**1.49**	0.50	0.20	0.07	1	11/21/19 04:18	
50WW12-191112	K1910759-005	**1.11**	0.50	0.20	0.07	1	11/21/19 04:51	
50WW12-191112-FD	K1910759-006	**1.19**	0.50	0.20	0.07	1	11/21/19 05:23	
Method Blank	K1910759-MB	ND U	0.50	0.20	0.07	1	11/20/19 23:26	

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	K1910759
Project	HS19110644	**Date Collected:**	11/12/19
Sample Matrix:	Ground Water	**Date Received:**	11/14/19
Analysis Method:	SM 5310 C	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA

Replicate Sample Summary
Carbon, Total Organic

Sample Name:	Lab Code:	LOQ	LOD	MDL	Sample Result	Duplicate Result	Average	RPD	RPD Limit	Date Analyzed
50WW22-191112	K1910759-001DUP	0.50	0.20	0.07	1.01	1.06	1.03	4	10	11/21/19
50WW08-191112	K1910759-002DUP	0.50	0.20	0.07	0.83	0.83	0.835	<1	10	11/21/19
50WW06-191112	K1910759-003DUP	0.50	0.20	0.07	1.63	1.59	1.61	3	10	11/21/19
50WW11-191112	K1910759-004DUP	0.50	0.20	0.07	1.49	1.53	1.51	3	10	11/21/19
50WW12-191112	K1910759-005DUP	0.50	0.20	0.07	1.11	1.05	1.08	6	10	11/21/19
50WW12-191112-FD	K1910759-006DUP	0.50	0.20	0.07	1.19	1.15	1.17	4	10	11/21/19

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

Results flagged with a pound (#) indicate the control criteria is not applicable.

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

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	K1910759
Project:	HS19110644	**Date Collected:**	11/12/19
Sample Matrix:	Ground Water	**Date Received:**	11/14/19
		Date Analyzed:	11/21/19
		Date Extracted:	NA

Matrix Spike Summary
Carbon, Total Organic

Sample Name:	50WW22-191112	**Units:**	mg/L
Lab Code:	K1910759-001	**Basis:**	NA
Analysis Method:	SM 5310 C		
Prep Method:	None		

Matrix Spike
K1910759-001MS

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Carbon, Total Organic	1.01	26.0	25.0	100	83-117

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

Results flagged with a pound (#) indicate the control criteria is not applicable.

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

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	K1910759
Project:	HS19110644	**Date Analyzed:**	11/20/19
Sample Matrix:	Ground Water	**Date Extracted:**	NA

Lab Control Sample Summary
Carbon, Total Organic

Analysis Method:	SM 5310 C	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	660506

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1910759-LCS	24.5	25.0	98	83-117

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US **Service Request:** K1910759
Project: HS19110644

Continuing Calibration Verification (CCV) Summary

Carbon, Total Organic

Analysis Method: SM 5310 C **Units:** mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance Limits
CCV1	660506	KQ1917163-01	11/20/19 16:58	25.0	23.6	94	90-110
CCV2	660506	KQ1917163-02	11/20/19 22:52	25.0	23.8	95	90-110
CCV3	660506	KQ1917163-03	11/21/19 03:45	25.0	23.6	94	90-110
CCV4	660506	KQ1917163-04	11/21/19 08:36	25.0	23.5	94	90-110

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US **Service Request:**K1910759
Project: HS19110644

Continuing Calibration Blank (CCB) Summary
Carbon, Total Organic

Analysis Method: SM 5310 C **Units:**mg/L

	Analysis Lot	Lab Code	Date Analyzed	LOQ	LOD	MDL	Result	Q
CCB1	660506	KQ1917163-05	11/20/19 17:15	0.50	0.20	0.07	ND	U
CCB2	660506	KQ1917163-06	11/20/19 23:09	0.50	0.20	0.07	ND	U
CCB3	660506	KQ1917163-07	11/21/19 04:02	0.50	0.20	0.07	ND	U
CCB4	660506	KQ1917163-08	11/21/19 08:52	0.50	0.20	0.07	ND	U

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	ALS Environmental - US	**Service Request:**	K1910759
Project:	HS19110644	**Date Collected:**	11/12/19
Sample Matrix:	Ground Water	**Date Received:**	11/14/19
Analysis Method:	SM 5310 C	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA

Carbon, Total Organic

Sample Name	Lab Code	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
50WW22-191112	K1910759-001	**1.01**	0.50	0.20	0.07	1	11/21/19 01:36	
50WW08-191112	K1910759-002	**0.83**	0.50	0.20	0.07	1	11/21/19 02:41	
50WW06-191112	K1910759-003	**1.63**	0.50	0.20	0.07	1	11/21/19 03:13	
50WW11-191112	K1910759-004	**1.49**	0.50	0.20	0.07	1	11/21/19 04:18	
50WW12-191112	K1910759-005	**1.11**	0.50	0.20	0.07	1	11/21/19 04:51	
50WW12-191112-FD	K1910759-006	**1.19**	0.50	0.20	0.07	1	11/21/19 05:23	
Method Blank	K1910759-MB	ND U	0.50	0.20	0.07	1	11/20/19 23:26	

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	K1910759
Project	HS19110644	**Date Collected:**	11/12/19
Sample Matrix:	Ground Water	**Date Received:**	11/14/19
Analysis Method:	SM 5310 C	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA

Replicate Sample Summary
Carbon, Total Organic

Sample Name:	Lab Code:	MRL	LOQ	MDL	Sample Result	Duplicate Result	Average	RPD	RPD Limit	Date Analyzed
50WW22-191112	K1910759-001DUP	0.50	0.20	0.07	1.01	1.06	1.03	4	10	11/21/19
50WW08-191112	K1910759-002DUP	0.50	0.20	0.07	0.83	0.83	0.835	<1	10	11/21/19
50WW06-191112	K1910759-003DUP	0.50	0.20	0.07	1.63	1.59	1.61	3	10	11/21/19
50WW11-191112	K1910759-004DUP	0.50	0.20	0.07	1.49	1.53	1.51	3	10	11/21/19
50WW12-191112	K1910759-005DUP	0.50	0.20	0.07	1.11	1.05	1.08	6	10	11/21/19
50WW12-191112-FD	K1910759-006DUP	0.50	0.20	0.07	1.19	1.15	1.17	4	10	11/21/19

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ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	K1910759
Project:	HS19110644	**Date Collected:**	11/12/19
Sample Matrix:	Ground Water	**Date Received:**	11/14/19
		Date Analyzed:	11/21/19
		Date Extracted:	NA

Matrix Spike Summary
Carbon, Total Organic

Sample Name:	50WW22-191112	**Units:**	mg/L
Lab Code:	K1910759-001	**Basis:**	NA
Analysis Method:	SM 5310 C		
Prep Method:	None		

Matrix Spike
K1910759-001MS

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Carbon, Total Organic	1.01	26.0	25.0	100	83-117

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

Results flagged with a pound (#) indicate the control criteria is not applicable.

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

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	K1910759
Project:	HS19110644	**Date Analyzed:**	11/20/19
Sample Matrix:	Ground Water	**Date Extracted:**	NA

Lab Control Sample Summary
Carbon, Total Organic

Analysis Method:	SM 5310 C	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	660506

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1910759-LCS	24.5	25.0	98	83-117

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US **Service Request:** K1910759
Project: HS19110644

Continuing Calibration Verification (CCV) Summary

Carbon, Total Organic

Analysis Method: SM 5310 C **Units:** mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance Limits
CCV1	660506	KQ1917163-01	11/20/19 16:58	25.0	23.6	94	90-110
CCV2	660506	KQ1917163-02	11/20/19 22:52	25.0	23.8	95	90-110
CCV3	660506	KQ1917163-03	11/21/19 03:45	25.0	23.6	94	90-110
CCV4	660506	KQ1917163-04	11/21/19 08:36	25.0	23.5	94	90-110

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US **Service Request:**K1910759
Project: HS19110644

Continuing Calibration Blank (CCB) Summary
Carbon, Total Organic

Analysis Method: SM 5310 C **Units:**mg/L

	Analysis Lot	Lab Code	Date Analyzed	LOQ	LOD	MDL	Result	Q
CCB1	660506	KQ1917163-05	11/20/19 17:15	0.50	0.20	0.07	ND	U
CCB2	660506	KQ1917163-06	11/20/19 23:09	0.50	0.20	0.07	ND	U
CCB3	660506	KQ1917163-07	11/21/19 04:02	0.50	0.20	0.07	ND	U
CCB4	660506	KQ1917163-08	11/21/19 08:52	0.50	0.20	0.07	ND	U

Raw Data

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

General Chemistry

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

Work Request # Original ( ) K9/0407, 425, 566, 461, 254, 378, 381, 401, 407, 415, 566, 617, 157, 432, 464, 759, 765, 837, 838

Tier: II II II II IV II II II II II II I II I II IV IV II II

Date Analyzed: 11/9/19

Analyst: BCP

Analysis: TOC/DOC

Run # DOC: 660502, 660507, TOC: 660505, 660506

DATA QUALITY REPORT
INORGANICS

Explain any "no" responses to questions below, and any corrective actions in the comments section below.

1.	Is the method name and number correct and appropriate?	(yes)/no/NA
2.	Holding times met for all analyses and for all samples?	(yes)/no/NA
3.	Are calculations correct?	(yes)/no/NA
4.	Is the reporting basis correct? (Dry Weight)	(yes)/no/NA
5.	All quality control criteria met?	(yes)/no
6.	Is the calibration curve correlation coefficient ≥ 0.995?	(yes)/no/NA
7.	MBs, CCVs, CCBs, LCSs, Dups, and Spikes, analyzed at proper frequency?	(yes)/no/NA
8.	Are ICVs, CCVs, and CCBs all within acceptance limits?	(yes)/no/NA
9.	Are results for methods blanks all ND?	(yes)/no/NA
10.	Are all QC samples within acceptance criteria? (LCS % rec, MS/DMS % rec, DUP or MS/DMS RPDs, etc.)	yes/(no)/NA
11.	Are all exceptions explained?	(yes)/no/NA
12.	Have all applicable service requests been reviewed?	(yes)/no/NA
13.	Are all samples labeled correctly?	(yes)/no/NA
14.	Have all instructions on the service request been followed? (e.g. Special MRLs, QC on a specific sample, Form V)	(yes)/no/NA
15.	Are detection limits and units reported correctly?	(yes)/no/NA
16.	Is the unused space on the benchsheet crossed out?	(yes)/no/NA
17.	Was analysis turned in by the due date? (n-2) (If not record SR#)	yes/(no)/NA

COMMENTS: K9/0407-9/9d, 407-11/11d, 407-15/15d, 407-2/2d, 407-3/3d, 381-1/1d and 407-13/13d report a high %RSD. However, these samples are less than 5x the MRL.

Final Approved by: [signature] Date: 11/21/19

DQREPORT

Analytical Results Summary

Instrument Name: K-TOC-03 **Analyst:** BDITZLER **Analysis Lot:** 660502 **Method/Testcode:** SM 5310 C/TOC D

Lab Code	Target Analytes	QC	Parent Sample	Matrix	Raw Result	Sample Amt.	Final Result	Dil	MDL	PQL	% Rec	% RSD	Date Analyzed	QC?	Tier
K1910407-001	Carbon, Dissolved Organic (DOC)	N/A		Water	1.04 mg/L	10 mL	1.04 mg/L	1	0.07	0.50			11/19/19 16:45:00	N	II
K1910407-002	Carbon, Dissolved Organic (DOC)	N/A		Water	0.34 mg/L	10 mL	0.34 mg/L J	1	0.07	0.50			11/19/19 17:17:00	N	II
K1910407-003	Carbon, Dissolved Organic (DOC)	N/A		Water	0.17 mg/L	10 mL	0.17 mg/L J	1	0.07	0.50			11/19/19 17:49:00	N	II
K1910407-004	Carbon, Dissolved Organic (DOC)	N/A		Water	0.05 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/19/19 18:21:00	N	II
K1910407-005	Carbon, Dissolved Organic (DOC)	N/A		Water	0.47 mg/L	10 mL	0.47 mg/L J	1	0.07	0.50			11/19/19 19:27:00	N	II
K1910407-006	Carbon, Dissolved Organic (DOC)	N/A		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/19/19 19:59:00	N	II
K1910407-007	Carbon, Dissolved Organic (DOC)	N/A		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/19/19 20:31:00	N	II
K1910407-008	Carbon, Dissolved Organic (DOC)	N/A		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/19/19 21:03:00	N	II
K1910407-009	Carbon, Dissolved Organic (DOC)	N/A		Water	0.25 mg/L	10 mL	0.25 mg/L J	1	0.07	0.50			11/19/19 21:35:00	N	II
K1910407-010	Carbon, Dissolved Organic (DOC)	N/A		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/19/19 22:07:00	N	II
K1910407-011	Carbon, Dissolved Organic (DOC)	N/A		Water	0.43 mg/L	10 mL	0.43 mg/L J	1	0.07	0.50			11/19/19 22:39:00	N	II
K1910407-012	Carbon, Dissolved Organic (DOC)	N/A		Water	1.03 mg/L	10 mL	1.03 mg/L	1	0.07	0.50			11/19/19 23:11:00	N	II
K1910407-013	Carbon, Dissolved Organic (DOC)	N/A		Water	0.27 mg/L	10 mL	0.27 mg/L J	1	0.07	0.50			11/19/19 23:44:00	N	II
K1910407-014	Carbon, Dissolved Organic (DOC)	N/A		Water	0.02 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/20/19 00:16:00	N	II
K1910407-015	Carbon, Dissolved Organic (DOC)	N/A		Water	0.25 mg/L	10 mL	0.25 mg/L J	1	0.07	0.50			11/20/19 01:54:00	N	II
K1910425-009	Carbon, Dissolved Organic (DOC)	N/A		Surface Water	0.95 mg/L	10 mL	0.95 mg/L	1	0.07	0.50			11/20/19 02:26:00	N	II
K1910425-010	Carbon, Dissolved Organic (DOC)	N/A		Surface Water	0.52 mg/L	10 mL	0.52 mg/L	1	0.07	0.50			11/20/19 02:58:00	N	II
K1910425-011	Carbon, Dissolved Organic (DOC)	N/A		Surface Water	0.96 mg/L	10 mL	0.96 mg/L	1	0.07	0.50			11/20/19 03:30:00	N	II
K1910425-012	Carbon, Dissolved Organic (DOC)	N/A		Surface Water	0.76 mg/L	10 mL	0.76 mg/L	1	0.07	0.50			11/20/19 04:03:00	N	II
K1910566-002	Carbon, Dissolved Organic	N/A		Water	3.32 mg/L	10 mL	3.32 mg/L	1	0.07	0.50			11/19/19 15:40:00	N	II
KQ1917160-01	Carbon, Dissolved Organic	CCV		Water	23.87 mg/L	10 mL	23.9 mg/L	1					11/19/19 14:16:00	N	II
KQ1917160-01	Carbon, Dissolved Organic (DOC)	CCV		Water	23.87 mg/L	10 mL	23.9 mg/L	1					11/19/19 14:16:00	N	II
KQ1917160-02	Carbon, Dissolved Organic	CCV		Water	23.81 mg/L	10 mL	23.8 mg/L	1					11/19/19 18:54:00	N	II
KQ1917160-02	Carbon, Dissolved Organic (DOC)	CCV		Water	23.81 mg/L	10 mL	23.8 mg/L	1					11/19/19 18:54:00	N	II
KQ1917160-03	Carbon, Dissolved Organic	CCV		Water	23.75 mg/L	10 mL	23.8 mg/L	1					11/20/19 00:48:00	N	II

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

Printed 11/21/19 13:24

Results Summary

11/21/19

Analytical Results Summary

Instrument Name: K-TOC-03 **Analyst:** BDITZLER **Analysis Lot:** 660502 **Method/Testcode:** SM 5310 C/TOC D

Lab Code	Target Analytes	QC	Parent Sample	Matrix	Raw Result	Sample Amt.	Final Result	Dil	MDL	PQL	% Rec	% RSD	Date Analyzed	QC?	Tier
KQ1917160-03	Carbon, Dissolved Organic (DOC)	CCV		Water	23.75 mg/L	10 mL	23.8 mg/L	1					11/20/19 00:48:00	N	II
KQ1917160-04	Carbon, Dissolved Organic	CCV		Water	23.93 mg/L	10 mL	23.9 mg/L	1					11/20/19 05:55:00	N	II
KQ1917160-04	Carbon, Dissolved Organic (DOC)	CCV		Water	23.93 mg/L	10 mL	23.9 mg/L	1					11/20/19 05:55:00	N	II
KQ1917160-05	Carbon, Dissolved Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/19/19 14:33:00	N	II
KQ1917160-05	Carbon, Dissolved Organic (DOC)	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/19/19 14:33:00	N	II
KQ1917160-06	Carbon, Dissolved Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/19/19 19:10:00	N	II
KQ1917160-06	Carbon, Dissolved Organic (DOC)	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/19/19 19:10:00	N	II
KQ1917160-07	Carbon, Dissolved Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/20/19 01:04:00	N	II
KQ1917160-07	Carbon, Dissolved Organic (DOC)	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/20/19 01:04:00	N	II
KQ1917160-08	Carbon, Dissolved Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/20/19 06:12:00	N	II
KQ1917160-08	Carbon, Dissolved Organic (DOC)	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/20/19 06:12:00	N	II
KQ1917160-09	Carbon, Dissolved Organic	MB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/19/19 14:50:00	N	II
KQ1917160-09	Carbon, Dissolved Organic (DOC)	MB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/19/19 14:50:00	N	II
KQ1917160-10	Carbon, Dissolved Organic	LCS		Water	24.74 mg/L	10 mL	24.7 mg/L	1	0.07	0.50	99		11/19/19 15:06:00	N	II
KQ1917160-10	Carbon, Dissolved Organic (DOC)	LCS		Water	24.74 mg/L	10 mL	24.7 mg/L	1	0.07	0.50	99		11/19/19 15:06:00	N	II
KQ1917160-11	Carbon, Dissolved Organic	MS	K1910566-002	Water	28.89 mg/L	10 mL	28.9 mg/L	1	0.07	0.50	102		11/19/19 16:12:00	N	II
KQ1917160-12	Carbon, Dissolved Organic (DOC)	N/A		Surface Water	3.32 mg/L	10 mL	3.32 mg/L	1	0.07	0.50			11/19/19 15:40:00	N	II
KQ1917160-13	Carbon, Dissolved Organic (DOC)	MS	KQ1917160-12	Surface Water	28.89 mg/L	10 mL	28.9 mg/L	1	0.07	0.50	102		11/19/19 16:12:00	N	II
KQ1917160-14	Carbon, Dissolved Organic	DUP	K1910566-002	Water	3.44 mg/L	10 mL	3.44 mg/L	1	0.07	0.50		4	11/19/19 15:40:00	N	II
KQ1917160-15	Carbon, Dissolved Organic (DOC)	DUP	K1910407-007	Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50		NC	11/19/19 20:31:00	N	II
KQ1917160-16	Carbon, Dissolved Organic (DOC)	DUP	K1910407-008	Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50		NC	11/19/19 21:03:00	N	II
KQ1917160-17	Carbon, Dissolved Organic (DOC)	DUP	K1910407-009	Water	0.20 mg/L	10 mL	0.20 mg/L J	1	0.07	0.50		19*	11/19/19 21:35:00	N	II
KQ1917160-18	Carbon, Dissolved Organic (DOC)	DUP	K1910407-010	Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50		NC	11/19/19 22:07:00	N	II
KQ1917160-19	Carbon, Dissolved Organic (DOC)	DUP	K1910407-011	Water	0.52 mg/L	10 mL	0.52 mg/L	1	0.07	0.50		19*	11/19/19 22:39:00	N	II
KQ1917160-20	Carbon, Dissolved Organic (DOC)	DUP	K1910407-012	Water	1.01 mg/L	10 mL	1.01 mg/L	1	0.07	0.50		2	11/19/19 23:11:00	N	II
KQ1917160-21	Carbon, Dissolved Organic (DOC)	DUP	K1910407-013	Water	0.26 mg/L	10 mL	0.26 mg/L J	1	0.07	0.50		6	11/19/19 23:44:00	N	II

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

Analytical Results Summary

Instrument Name: K-TOC-03 **Analyst:** BDITZLER **Analysis Lot:** 660502 **Method/Testcode:** SM 5310 C/TOC D

Lab Code	Target Analytes	QC	Parent Sample	Matrix	Raw Result	Sample Amt.	Final Result	Dil	MDL	PQL	% Rec	% RSD	Date Analyzed	QC?	Tier
KQ1917160-22	Carbon, Dissolved Organic (DOC)	DUP	K1910407-014	Water	0.03 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50		NC	11/20/19 00:16:00	N	II
KQ1917160-23	Carbon, Dissolved Organic (DOC)	DUP	K1910407-015	Water	0.12 mg/L	10 mL	0.12 mg/L J	1	0.07	0.50		67*	11/20/19 01:54:00	N	II
KQ1917160-24	Carbon, Dissolved Organic (DOC)	DUP	K1910425-009	Surface Water	0.95 mg/L	10 mL	0.95 mg/L	1	0.07	0.50		<1	11/20/19 02:26:00	N	II
KQ1917160-25	Carbon, Dissolved Organic (DOC)	DUP	K1910425-010	Surface Water	0.54 mg/L	10 mL	0.54 mg/L	1	0.07	0.50		3	11/20/19 02:58:00	N	II
KQ1917160-26	Carbon, Dissolved Organic (DOC)	DUP	K1910407-001	Water	1.08 mg/L	10 mL	1.08 mg/L	1	0.07	0.50		4	11/19/19 16:45:00	N	II
KQ1917160-27	Carbon, Dissolved Organic (DOC)	DUP	K1910425-011	Surface Water	1.01 mg/L	10 mL	1.01 mg/L	1	0.07	0.50		5	11/20/19 03:30:00	N	II
KQ1917160-28	Carbon, Dissolved Organic (DOC)	DUP	K1910425-012	Surface Water	0.74 mg/L	10 mL	0.74 mg/L	1	0.07	0.50		2	11/20/19 04:03:00	N	II
KQ1917160-29	Carbon, Dissolved Organic (DOC)	DUP	K1910407-002	Water	0.38 mg/L	10 mL	0.38 mg/L J	1	0.07	0.50		11*	11/19/19 17:17:00	N	II
KQ1917160-30	Carbon, Dissolved Organic (DOC)	DUP	K1910407-003	Water	0.12 mg/L	10 mL	0.12 mg/L J	1	0.07	0.50		39*	11/19/19 17:49:00	N	II
KQ1917160-31	Carbon, Dissolved Organic (DOC)	DUP	K1910407-004	Water	0.05 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50		NC	11/19/19 18:21:00	N	II
KQ1917160-32	Carbon, Dissolved Organic (DOC)	DUP	K1910407-005	Water	0.47 mg/L	10 mL	0.47 mg/L J	1	0.07	0.50		<1	11/19/19 19:27:00	N	II
KQ1917160-33	Carbon, Dissolved Organic (DOC)	DUP	K1910407-006	Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50		NC	11/19/19 19:59:00	N	II
KQ1917160-34	Carbon, Dissolved Organic (DOC)	DUP	KQ1917160-12	Surface Water	3.44 mg/L	10 mL	3.44 mg/L	1	0.07	0.50		4	11/19/19 15:40:00	N	II

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

Analytical Results Summary

Instrument Name: K-TOC-03 **Analyst:** BDITZLER **Analysis Lot:** 660507 **Method/Testcode:** SM 5310 C/TOC D

Lab Code	Target Analytes	QC	Parent Sample	Matrix	Raw Result	Sample Amt.	Final Result	Dil	MDL	PQL	% Rec	% RSD	Date Analyzed	QC?	Tier
K1910461-001	Carbon, Dissolved Organic (DOC)	N/A		Effluent	0.87 mg/L	10 mL	0.87 mg/L	1	0.07	0.50			11/20/19 05:07:00	N	II
K1910461-002	Carbon, Dissolved Organic (DOC)	N/A		Water	0.99 mg/L	10 mL	0.99 mg/L	1	0.07	0.50			11/20/19 04:35:00	N	II
KQ1917161-01	Carbon, Dissolved Organic (DOC)	CCV		Water	23.75 mg/L	10 mL	23.8 mg/L	1					11/20/19 00:48:00	N	II
KQ1917161-02	Carbon, Dissolved Organic (DOC)	CCV		Water	23.93 mg/L	10 mL	23.9 mg/L	1					11/20/19 05:55:00	N	II
KQ1917161-03	Carbon, Dissolved Organic (DOC)	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/20/19 01:04:00	N	II
KQ1917161-04	Carbon, Dissolved Organic (DOC)	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/20/19 06:12:00	N	II
KQ1917161-05	Carbon, Dissolved Organic (DOC)	MS	K1910461-001	Effluent	26.37 mg/L	10 mL	26.4 mg/L	1	0.07	0.50	102		11/20/19 05:39:00	N	II
KQ1917161-06	Carbon, Dissolved Organic (DOC)	DUP	K1910461-002	Water	1.02 mg/L	10 mL	1.02 mg/L	1	0.07	0.50		3	11/20/19 04:35:00	N	II
KQ1917161-07	Carbon, Dissolved Organic (DOC)	DUP	K1910461-001	Effluent	0.95 mg/L	10 mL	0.95 mg/L	1	0.07	0.50		8	11/20/19 05:07:00	N	II
KQ1917161-08	Carbon, Dissolved Organic (DOC)	MB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/20/19 01:21:00	N	II
KQ1917161-09	Carbon, Dissolved Organic (DOC)	LCS		Water	24.63 mg/L	10 mL	24.6 mg/L	1	0.07	0.50	99		11/20/19 01:38:00	N	II

11/21/19

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

Analytical Results Summary

Instrument Name: K-TOC-03 **Analyst:** BDITZLER **Analysis Lot:** 660505 **Method/Testcode:** SM 5310 C/TOC T

Lab Code	Target Analytes	QC	Parent Sample	Matrix	Raw Result	Sample Amt.	Final Result	Dil	MDL	PQL	% Rec	% RSD	Date Analyzed	QC?	Tier
K1910254-001	Carbon, Total Organic	N/A		Water	1.73 mg/L	10 mL	1.73 mg/L	1	0.07	0.50			11/20/19 10:46:00	N	IV
K1910378-001	Carbon, Total Organic	N/A		Ground Water	19.65 mg/L	10 mL	19.7 mg/L	1	0.07	0.50			11/20/19 08:05:00	N	II
K1910381-001	Carbon, Total Organic	N/A		Water	1.05 mg/L	10 mL	1.05 mg/L	1	0.07	0.50			11/20/19 08:37:00	N	II
K1910401-001	Carbon, Total Organic	N/A		Water	13.82 mg/L	10 mL	13.8 mg/L	1	0.07	0.50			11/20/19 09:10:00	N	II
K1910401-002	Carbon, Total Organic	N/A		Water	12.19 mg/L	10 mL	12.2 mg/L	1	0.07	0.50			11/20/19 09:42:00	N	II
K1910407-001	Carbon, Total Organic	N/A		Water	1.06 mg/L	10 mL	1.06 mg/L	1	0.07	0.50			11/20/19 12:41:00	N	II
K1910407-002	Carbon, Total Organic	N/A		Water	0.27 mg/L	10 mL	0.27 mg/L J	1	0.07	0.50			11/20/19 13:13:00	N	II
K1910407-003	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/20/19 13:45:00	N	II
K1910407-004	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/20/19 14:17:00	N	II
K1910407-005	Carbon, Total Organic	N/A		Water	0.31 mg/L	10 mL	0.31 mg/L J	1	0.07	0.50			11/20/19 14:49:00	N	II
K1910407-006	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/20/19 15:22:00	N	II
K1910407-007	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/20/19 15:54:00	N	II
K1910407-008	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/20/19 16:26:00	N	II
K1910407-009	Carbon, Total Organic	N/A		Water	0.12 mg/L	10 mL	0.12 mg/L J	1	0.07	0.50			11/20/19 17:31:00	N	II
K1910407-010	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/20/19 18:04:00	N	II
K1910407-011	Carbon, Total Organic	N/A		Water	0.36 mg/L	10 mL	0.36 mg/L J	1	0.07	0.50			11/20/19 18:36:00	N	II
K1910415-001	Carbon, Total Organic	N/A		Ocean Water	0.00 mg/L	10 mL	1.0 mg/L U	2	0.2	1.0			11/20/19 10:14:00	N	II
K1910566-001	Carbon, Total Organic	N/A		Water	2.86 mg/L	10 mL	2.86 mg/L	1	0.07	0.50			11/20/19 06:29:00	N	II
K1910617-001	Carbon, Total Organic	N/A		Reagent Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/20/19 07:01:00	N	I
K1910617-002	Carbon, Total Organic	N/A		Reagent Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/20/19 07:33:00	N	I
KQ1917162-01	Carbon, Total Organic	CCV		Water	23.93 mg/L	10 mL	23.9 mg/L	1					11/20/19 05:55:00	N	II
KQ1917162-01	Carbon, Total Organic	CCV		Water	23.93 mg/L	10 mL	23.9 mg/L	1					11/20/19 05:55:00	N	II
KQ1917162-02	Carbon, Total Organic	CCV		Water	23.73 mg/L	10 mL	23.7 mg/L	1					11/20/19 11:34:00	N	II
KQ1917162-02	Carbon, Total Organic	CCV		Water	23.73 mg/L	10 mL	23.7 mg/L	1					11/20/19 11:34:00	N	II
KQ1917162-03	Carbon, Total Organic	CCV		Water	23.60 mg/L	10 mL	23.6 mg/L	1					11/20/19 16:58:00	N	II
KQ1917162-03	Carbon, Total Organic	CCV		Water	23.60 mg/L	10 mL	23.6 mg/L	1					11/20/19 16:58:00	N	II
KQ1917162-04	Carbon, Total Organic	CCV		Water	23.85 mg/L	10 mL	23.8 mg/L	1					11/20/19 22:52:00	N	II
KQ1917162-04	Carbon, Total Organic	CCV		Water	23.85 mg/L	10 mL	23.8 mg/L	1					11/20/19 22:52:00	N	II
KQ1917162-05	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/20/19 06:12:00	N	II
KQ1917162-05	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/20/19 06:12:00	N	II
KQ1917162-06	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/20/19 11:51:00	N	II
KQ1917162-06	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/20/19 11:51:00	N	II
KQ1917162-07	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/20/19 17:15:00	N	II
KQ1917162-07	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/20/19 17:15:00	N	II

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

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Results Summary

11/21/19

Analytical Results Summary

Instrument Name: K-TOC-03 **Analyst:** BDITZLER **Analysis Lot:** 660505 **Method/Testcode:** 415.1/TOC T

Lab Code	Target Analytes	QC	Parent Sample	Matrix	Raw Result	Sample Amt.	Final Result	Dil	MDL	PQL	% Rec	% RSD	Date Analyzed	QC?	Tier
KQ1917162-08	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/20/19 23:09:00	N	II
KQ1917162-08	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/20/19 23:09:00	N	II
KQ1917162-09	Carbon, Total Organic	MB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/20/19 12:08:00	N	II
KQ1917162-09	Carbon, Total Organic	MB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/20/19 12:08:00	N	II
KQ1917162-10	Carbon, Total Organic	LCS		Water	24.45 mg/L	10 mL	24.4 mg/L	1	0.07	0.50	98		11/20/19 12:24:00	N	II
KQ1917162-10	Carbon, Total Organic	LCS		Water	24.45 mg/L	10 mL	24.4 mg/L	1	0.07	0.50	98		11/20/19 12:24:00	N	II
KQ1917162-11	Carbon, Total Organic	MS	K1910407-001	Water	26.58 mg/L	10 mL	26.6 mg/L	1	0.07	0.50	102		11/20/19 11:18:00	N	II
KQ1917162-12	Carbon, Total Organic	DUP	K1910401-002	Water	12.14 mg/L	10 mL	12.1 mg/L	1	0.07	0.50		<1	11/20/19 09:42:00	N	II
KQ1917162-13	Carbon, Total Organic	DUP	K1910415-001	Ocean Water	0.00 mg/L	10 mL	1.0 mg/L U	2	0.2	1.0		NC	11/20/19 10:14:00	N	II
KQ1917162-14	Carbon, Total Organic	DUP	K1910617-001	Reagent Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50		NC	11/20/19 07:01:00	N	I
KQ1917162-15	Carbon, Total Organic	DUP	K1910617-002	Reagent Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50		NC	11/20/19 07:33:00	N	I
KQ1917162-16	Carbon, Total Organic	DUP	K1910401-001	Water	13.86 mg/L	10 mL	13.9 mg/L	1	0.07	0.50		<1	11/20/19 09:10:00	N	II
KQ1917162-17	Carbon, Total Organic	DUP	K1910566-001	Water	3.03 mg/L	10 mL	3.03 mg/L	1	0.07	0.50		6	11/20/19 06:29:00	N	II
KQ1917162-18	Carbon, Total Organic	DUP	K1910407-008	Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50		NC	11/20/19 16:26:00	N	II
KQ1917162-19	Carbon, Total Organic	DUP	K1910407-009	Water	0.16 mg/L	10 mL	0.16 mg/L J	1	0.07	0.50		23*	11/20/19 17:31:00	N	II
KQ1917162-20	Carbon, Total Organic	DUP	K1910407-010	Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50		NC	11/20/19 18:04:00	N	II
KQ1917162-21	Carbon, Total Organic	DUP	K1910407-011	Water	0.41 mg/L	10 mL	0.41 mg/L J	1	0.07	0.50		13*	11/20/19 18:36:00	N	II
KQ1917162-22	Carbon, Total Organic	DUP	K1910254-001	Water	1.68 mg/L	10 mL	1.68 mg/L	1	0.07	0.50		3	11/20/19 10:46:00	N	IV
KQ1917162-23	Carbon, Total Organic	DUP	K1910407-001	Water	1.07 mg/L	10 mL	1.07 mg/L	1	0.07	0.50		1	11/20/19 12:41:00	N	II
KQ1917162-24	Carbon, Total Organic	DUP	K1910407-002	Water	0.28 mg/L	10 mL	0.28 mg/L J	1	0.07	0.50		3	11/20/19 13:13:00	N	II
KQ1917162-25	Carbon, Total Organic	DUP	K1910407-003	Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50		NC	11/20/19 13:45:00	N	II
KQ1917162-26	Carbon, Total Organic	DUP	K1910407-004	Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50		NC	11/20/19 14:17:00	N	II
KQ1917162-27	Carbon, Total Organic	DUP	K1910407-005	Water	0.30 mg/L	10 mL	0.30 mg/L J	1	0.07	0.50		3	11/20/19 14:49:00	N	II
KQ1917162-28	Carbon, Total Organic	DUP	K1910407-006	Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50		NC	11/20/19 15:22:00	N	II
KQ1917162-29	Carbon, Total Organic	DUP	K1910407-007	Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50		NC	11/20/19 15:54:00	N	II
KQ1917162-30	Carbon, Total Organic	DUP	K1910381-001	Water	0.91 mg/L	10 mL	0.91 mg/L	1	0.07	0.50		14*	11/20/19 08:37:00	N	II
KQ1917162-31	Carbon, Total Organic	DUP	K1910378-001	Ground Water	19.66 mg/L	10 mL	19.7 mg/L	1	0.07	0.50		<1	11/20/19 08:05:00	N	II
KQ1917162-32	Carbon, Total Organic	N/A		Water	1.06 mg/L	10 mL	1.06 mg/L	1	0.07	0.50			11/20/19 12:41:00	N	II
KQ1917162-33	Carbon, Total Organic	MS	KQ1917162-32	Water	26.58 mg/L	10 mL	26.6 mg/L	1	0.07	0.50	102		11/20/19 11:18:00	N	II
KQ1917162-34	Carbon, Total Organic	DUP	KQ1917162-32	Water	1.07 mg/L	10 mL	1.07 mg/L	1	0.07	0.50		1	11/20/19 12:41:00	N	II

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

Analytical Results Summary

Instrument Name: K-TOC-03 **Analyst:** BDITZLER **Analysis Lot:** 660506 **Method/Testcode:** SM 5310 C/TOC T

Lab Code	Target Analytes	QC	Parent Sample	Matrix	Raw Result	Sample Amt.	Final Result	Dil	MDL	PQL	% Rec	% RSD	Date Analyzed	QC?	Tier
K1910157-001	Carbon, Total Organic	N/A		Water	3.09 mg/L	10 mL	77 mg/L	25	2	13			11/21/19 06:59:00	N	II
K1910407-012	Carbon, Total Organic	N/A		Water	1.00 mg/L	10 mL	1.00 mg/L	1	0.07	0.50			11/20/19 19:08:00	N	II
K1910407-013	Carbon, Total Organic	N/A		Water	0.11 mg/L	10 mL	0.11 mg/L J	1	0.07	0.50			11/20/19 19:40:00	N	II
K1910407-014	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/20/19 20:12:00	N	II
K1910407-015	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/20/19 20:44:00	N	II
K1910432-001	Carbon, Total Organic	N/A		Ground Water	8.76 mg/L	10 mL	8.76 mg/L	1	0.07	0.50			11/20/19 21:16:00	N	I
K1910432-002	Carbon, Total Organic	N/A		Ground Water	15.03 mg/L	10 mL	15.0 mg/L	1	0.07	0.50			11/20/19 21:48:00	N	I
K1910432-003	Carbon, Total Organic	N/A		Ground Water	20.33 mg/L	10 mL	20.3 mg/L	1	0.07	0.50			11/20/19 22:20:00	N	I
K1910432-004	Carbon, Total Organic	N/A		Ground Water	23.61 mg/L	10 mL	23.6 mg/L	1	0.07	0.50			11/21/19 00:00:00	N	I
K1910432-005	Carbon, Total Organic	N/A		Ground Water	26.51 mg/L	10 mL	26.5 mg/L	1	0.07	0.50			11/21/19 00:32:00	N	I
K1910464-002	Carbon, Total Organic	N/A		Water	6.75 mg/L	10 mL	6.75 mg/L	1	0.07	0.50			11/21/19 01:04:00	N	II
K1910759-001	Carbon, Total Organic	N/A		Ground Water	1.01 mg/L	10 mL	1.01 mg/L	1	0.07	0.50			11/21/19 01:36:00	N	IV
K1910759-002	Carbon, Total Organic	N/A		Ground Water	0.83 mg/L	10 mL	0.83 mg/L	1	0.07	0.50			11/21/19 02:41:00	N	IV
K1910759-003	Carbon, Total Organic	N/A		Ground Water	1.63 mg/L	10 mL	1.63 mg/L	1	0.07	0.50			11/21/19 03:13:00	N	IV
K1910759-004	Carbon, Total Organic	N/A		Ground Water	1.49 mg/L	10 mL	1.49 mg/L	1	0.07	0.50			11/21/19 04:18:00	N	IV
K1910759-005	Carbon, Total Organic	N/A		Ground Water	1.11 mg/L	10 mL	1.11 mg/L	1	0.07	0.50			11/21/19 04:51:00	N	IV
K1910759-006	Carbon, Total Organic	N/A		Ground Water	1.19 mg/L	10 mL	1.19 mg/L	1	0.07	0.50			11/21/19 05:23:00	N	IV
K1910765-005	Carbon, Total Organic	N/A		Ground Water	15.32 mg/L	10 mL	15.3 mg/L	1	0.07	0.50			11/21/19 07:31:00	N	IV
K1910837-001	Carbon, Total Organic	N/A		Water	1.66 mg/L	10 mL	1.66 mg/L	1	0.07	0.50			11/21/19 05:55:00	N	II
K1910838-001	Carbon, Total Organic	N/A		Water	2.52 mg/L	10 mL	2.52 mg/L	1	0.07	0.50			11/21/19 06:27:00	N	II
KQ1917163-01	Carbon, Total Organic	CCV		Water	23.60 mg/L	10 mL	23.6 mg/L	1					11/20/19 16:58:00	N	II
KQ1917163-02	Carbon, Total Organic	CCV		Water	23.85 mg/L	10 mL	23.8 mg/L	1					11/20/19 22:52:00	N	II
KQ1917163-03	Carbon, Total Organic	CCV		Water	23.61 mg/L	10 mL	23.6 mg/L	1					11/21/19 03:45:00	N	II
KQ1917163-04	Carbon, Total Organic	CCV		Water	23.55 mg/L	10 mL	23.5 mg/L	1					11/21/19 08:36:00	N	II
KQ1917163-05	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/20/19 17:15:00	N	II
KQ1917163-06	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/20/19 23:09:00	N	II
KQ1917163-07	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/21/19 04:02:00	N	II
KQ1917163-08	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/21/19 08:52:00	N	II
KQ1917163-09	Carbon, Total Organic	MB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			11/20/19 23:26:00	N	II
KQ1917163-10	Carbon, Total Organic	LCS		Water	24.50 mg/L	10 mL	24.5 mg/L	1	0.07	0.50	98		11/20/19 23:43:00	N	II

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

Analytical Results Summary

Instrument Name: K-TOC-03 **Analyst:** BDITZLER **Analysis Lot:** 660506 **Method/Testcode:** SM 5310 C/TOC T

Lab Code	Target Analytes	QC	Parent Sample	Matrix	Raw Result	Sample Amt.	Final Result	Dil	MDL	PQL	% Rec	% RSD	Date Analyzed	QC?	Tier
KQ1917163-11	Carbon, Total Organic	MS	K1910759-001	Ground Water	26.00 mg/L	10 mL	26.0 mg/L	1	0.07	0.50	100		11/21/19 02:08:00	N	IV
KQ1917163-12	Carbon, Total Organic	DUP	K1910157-001	Water	3.18 mg/L	10 mL	80 mg/L	25	2	13		3	11/21/19 06:59:00	N	II
KQ1917163-13	Carbon, Total Organic	DUP	K1910407-012	Water	1.05 mg/L	10 mL	1.05 mg/L	1	0.07	0.50		5	11/20/19 19:08:00	N	II
KQ1917163-14	Carbon, Total Organic	DUP	K1910407-013	Water	0.19 mg/L	10 mL	0.19 mg/L J	1	0.07	0.50		53*	11/20/19 19:40:00	N	II
KQ1917163-15	Carbon, Total Organic	DUP	K1910407-014	Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50		NC	11/20/19 20:12:00	N	II
KQ1917163-16	Carbon, Total Organic	DUP	K1910407-015	Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50		NC	11/20/19 20:44:00	N	II
KQ1917163-17	Carbon, Total Organic	DUP	K1910432-001	Ground Water	8.62 mg/L	10 mL	8.62 mg/L	1	0.07	0.50		2	11/20/19 21:16:00	N	I
KQ1917163-18	Carbon, Total Organic	DUP	K1910432-002	Ground Water	15.11 mg/L	10 mL	15.1 mg/L	1	0.07	0.50		<1	11/20/19 21:48:00	N	I
KQ1917163-19	Carbon, Total Organic	DUP	K1910432-003	Ground Water	20.30 mg/L	10 mL	20.3 mg/L	1	0.07	0.50		<1	11/20/19 22:20:00	N	I
KQ1917163-20	Carbon, Total Organic	DUP	K1910432-004	Ground Water	23.33 mg/L	10 mL	23.3 mg/L	1	0.07	0.50		1	11/21/19 00:00:00	N	I
KQ1917163-21	Carbon, Total Organic	DUP	K1910432-005	Ground Water	26.73 mg/L	10 mL	26.7 mg/L	1	0.07	0.50		<1	11/21/19 00:32:00	N	I
KQ1917163-22	Carbon, Total Organic	DUP	K1910464-002	Water	6.63 mg/L	10 mL	6.63 mg/L	1	0.07	0.50		2	11/21/19 01:04:00	N	II
KQ1917163-23	Carbon, Total Organic	DUP	K1910759-002	Ground Water	0.83 mg/L	10 mL	0.83 mg/L	1	0.07	0.50		<1	11/21/19 02:41:00	N	IV
KQ1917163-24	Carbon, Total Organic	DUP	K1910759-001	Ground Water	1.06 mg/L	10 mL	1.06 mg/L	1	0.07	0.50		4	11/21/19 01:36:00	N	IV
KQ1917163-25	Carbon, Total Organic	DUP	K1910759-003	Ground Water	1.59 mg/L	10 mL	1.59 mg/L	1	0.07	0.50		3	11/21/19 03:13:00	N	IV
KQ1917163-26	Carbon, Total Organic	DUP	K1910759-004	Ground Water	1.53 mg/L	10 mL	1.53 mg/L	1	0.07	0.50		3	11/21/19 04:18:00	N	IV
KQ1917163-27	Carbon, Total Organic	DUP	K1910759-005	Ground Water	1.05 mg/L	10 mL	1.05 mg/L	1	0.07	0.50		6	11/21/19 04:51:00	N	IV
KQ1917163-28	Carbon, Total Organic	DUP	K1910759-006	Ground Water	1.15 mg/L	10 mL	1.15 mg/L	1	0.07	0.50		4	11/21/19 05:23:00	N	IV
KQ1917163-29	Carbon, Total Organic	DUP	K1910765-005	Ground Water	15.18 mg/L	10 mL	15.2 mg/L	1	0.07	0.50		<1	11/21/19 07:31:00	N	IV
KQ1917163-30	Carbon, Total Organic	DUP	K1910837-001	Water	1.64 mg/L	10 mL	1.64 mg/L	1	0.07	0.50		1	11/21/19 05:55:00	N	II
KQ1917163-31	Carbon, Total Organic	DUP	K1910838-001	Water	2.51 mg/L	10 mL	2.51 mg/L	1	0.07	0.50		<1	11/21/19 06:27:00	N	II

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

DOC: 660502, 660507
TOC: 660505, 660506

Schedule: 11192019

Version: 7
Instrument: Fusion1
Last Saved by: Fusion1 (Fusion1)
Last Saved on: 2019/11/19 15:46 - Tuesday

Position	Sample Type	Sample ID	Method ID (Calibration ID)	Reps
(Clean)	Clean	Clean		1
(Clean)	Clean	Clean		1
(Clean)	Clean	Clean		1
(Blank)	Blank	Reagent/Acid Blank		1
D	Sample	RB	Extended Reaction 021711 (Extended Reaction 021711)	1
B	Check Standard	[TOC] CCV 021711 [25 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
D	Check Standard	[TOC] CCB 021711 [0.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
1	Sample	MB1	Extended Reaction 021711 (Extended Reaction 021711)	1
C	Check Standard	[TOC] LCS ER [25.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
2	Sample	ICS	Extended Reaction 021711 (Extended Reaction 021711)	1
3	Sample	K1910566-002.10 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
4	Sample	K1910566-002.10 ms doc	Extended Reaction 021711 (Extended Reaction 021711)	1
5	Sample	RB	Extended Reaction 021711 (Extended Reaction 021711)	1
6	Sample	K1910407-001.01 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
7	Sample	K1910407-002.01 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
8	Sample	K1910407-003.01 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
9	Sample	K1910407-004.01 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
B	Check Standard	[TOC] CCV 021711 [25 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
D	Check Standard	[TOC] CCB 021711 [0.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
10	Sample	K1910407-005.01 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
11	Sample	K1910407-006.01 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
12	Sample	K1910407-007.01 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
13	Sample	K1910407-008.01 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
14	Sample	K1910407-009.01 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
15	Sample	K1910407-010.01 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
16	Sample	K1910407-011.01 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
17	Sample	K1910407-012.01 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
18	Sample	K1910407-013.01 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
19	Sample	K1910407-014.01 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
B	Check Standard	[TOC] CCV 021711 [25 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
D	Check Standard	[TOC] CCB 021711 [0.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
20	Sample	MB2	Extended Reaction 021711 (Extended Reaction 021711)	1
C	Check Standard	[TOC] LCS ER [25.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
21	Sample	K1910407-015.01 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
22	Sample	K1910425-009.01 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
23	Sample	K1910425-010.01 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
24	Sample	K1910425-011.01 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
25	Sample	K1910425-012.01 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
26	Sample	K1910461-002.04 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
27	Sample	K1910461-001.03 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
28	Sample	K1910461-001.03 ms doc	Extended Reaction 021711 (Extended Reaction 021711)	1
B	Check Standard	[TOC] CCV 021711 [25 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
D	Check Standard	[TOC] CCB 021711 [0.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
29	Sample	K1910566-001.08	Extended Reaction 021711 (Extended Reaction 021711)	2
30	Sample	K1910617-001.01	Extended Reaction 021711 (Extended Reaction 021711)	2
31	Sample	K1910617-002.01	Extended Reaction 021711 (Extended Reaction 021711)	2
32	Sample	K1910378-001.08	Extended Reaction 021711 (Extended Reaction 021711)	2
33	Sample	K1910381-001.01	Extended Reaction 021711 (Extended Reaction 021711)	2
34	Sample	K1910401-001.01	Extended Reaction 021711 (Extended Reaction 021711)	2
35	Sample	K1910401-002.01	Extended Reaction 021711 (Extended Reaction 021711)	2
36	Sample	K1910415-001.01 2x	Extended Reaction 021711 (Extended Reaction 021711)	2
37	Sample	K1910254-001.05	Extended Reaction 021711 (Extended Reaction 021711)	2
38	Sample	K1910407-001.02 ms	Extended Reaction 021711 (Extended Reaction 021711)	1
B	Check Standard	[TOC] CCV 021711 [25 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1

11/21/19

Schedule: 11192019

Position	Sample Type	Sample ID	Method ID (Calibration ID)	Reps
D	Check Standard	[TOC] CCB 021711 [0.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
39	Sample	MB3	Extended Reaction 021711 (Extended Reaction 021711)	1
C	Check Standard	[TOC] LCS ER [25.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
40	Sample	K1910407-001.02	Extended Reaction 021711 (Extended Reaction 021711)	2
41	Sample	K1910407-002.02	Extended Reaction 021711 (Extended Reaction 021711)	2
42	Sample	K1910407-003.02	Extended Reaction 021711 (Extended Reaction 021711)	2
43	Sample	K1910407-004.02	Extended Reaction 021711 (Extended Reaction 021711)	2
44	Sample	K1910407-005.02	Extended Reaction 021711 (Extended Reaction 021711)	2
45	Sample	K1910407-006.02	Extended Reaction 021711 (Extended Reaction 021711)	2
46	Sample	K1910407-007.02	Extended Reaction 021711 (Extended Reaction 021711)	2
47	Sample	K1910407-008.02	Extended Reaction 021711 (Extended Reaction 021711)	2
B	Check Standard	[TOC] CCV 021711 [25 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
D	Check Standard	[TOC] CCB 021711 [0.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
48	Sample	K1910407-009.02	Extended Reaction 021711 (Extended Reaction 021711)	2
49	Sample	K1910407-010.02	Extended Reaction 021711 (Extended Reaction 021711)	2
50	Sample	K1910407-011.02	Extended Reaction 021711 (Extended Reaction 021711)	2
51	Sample	K1910407-012.02	Extended Reaction 021711 (Extended Reaction 021711)	2
52	Sample	K1910407-013.02	Extended Reaction 021711 (Extended Reaction 021711)	2
53	Sample	K1910407-014.02	Extended Reaction 021711 (Extended Reaction 021711)	2
54	Sample	K1910407-015.02	Extended Reaction 021711 (Extended Reaction 021711)	2
55	Sample	K1910432-001.03	Extended Reaction 021711 (Extended Reaction 021711)	2
56	Sample	K1910432-002.03	Extended Reaction 021711 (Extended Reaction 021711)	2
57	Sample	K1910432-003.03	Extended Reaction 021711 (Extended Reaction 021711)	2
B	Check Standard	[TOC] CCV 021711 [25 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
D	Check Standard	[TOC] CCB 021711 [0.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
58	Sample	MB4	Extended Reaction 021711 (Extended Reaction 021711)	1
C	Check Standard	[TOC] LCS ER [25.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
59	Sample	K1910432-004.03	Extended Reaction 021711 (Extended Reaction 021711)	2
60	Sample	K1910432-005.03	Extended Reaction 021711 (Extended Reaction 021711)	2
61	Sample	K1910464-002.01	Extended Reaction 021711 (Extended Reaction 021711)	2
62	Sample	K1910759-001.01	Extended Reaction 021711 (Extended Reaction 021711)	2
63	Sample	K1910759-001.01 ms	Extended Reaction 021711 (Extended Reaction 021711)	1
64	Sample	RB	Extended Reaction 021711 (Extended Reaction 021711)	1
65	Sample	K1910759-002.01	Extended Reaction 021711 (Extended Reaction 021711)	2
66	Sample	K1910759-003.01	Extended Reaction 021711 (Extended Reaction 021711)	2
B	Check Standard	[TOC] CCV 021711 [25 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
D	Check Standard	[TOC] CCB 021711 [0.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
67	Sample	K1910759-004.01	Extended Reaction 021711 (Extended Reaction 021711)	2
68	Sample	K1910759-005.01	Extended Reaction 021711 (Extended Reaction 021711)	2
69	Sample	K1910759-006.01	Extended Reaction 021711 (Extended Reaction 021711)	2
70	Sample	K1910837-001.01	Extended Reaction 021711 (Extended Reaction 021711)	2
71	Sample	K1910838-001.01	Extended Reaction 021711 (Extended Reaction 021711)	2
72	Sample	K1910157-001.02 25x	Extended Reaction 021711 (Extended Reaction 021711)	2
73	Sample	K1910765-005.01	Extended Reaction 021711 (Extended Reaction 021711)	2
74	Sample	RB	Extended Reaction 021711 (Extended Reaction 021711)	2
B	Check Standard	[TOC] CCV 021711 [25 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
D	Check Standard	[TOC] CCB 021711 [0.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1

Fusion Report - 11192019
Tuesday, November 19, 2019 12:16 PM

(View - Reps, Unused Reps, Meta-Data, Signature, History)
Printed on 2019/11/21 09:12 - Thursday

Report Summary Information

Company Location:	Gen Chem Lab		
Schedule Name:	11192019	Engine Version:	1.1.5.1
Instrument Name:	Fusion1	Firmware Version:	1.2.0696
Report Version:	1 of 1	Connection:	RS232 COM1
Report Creation by Operators (schedule version):	Fusion1 (Fusion1) (v2) Fusion1 (Fusion1) (v3) Fusion1 (Fusion1) (v4) Fusion1 (Fusion1) (v5) Fusion1 (Fusion1) (v6) Fusion1 (Fusion1) (v7)		
Comment:			

Report Results

11/21/19

Sample Type: Clean — From Schedule Version 2

	Pos	Analysis Type	Sample ID	Start Time
◆	(clean)		Clean	2019/11/19 12:16

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	13.35	19.58	6.23	49.65	05:24
2	TC Clean	15.07	18.91	3.83	50.08	04:04
3	TC Clean	3.36	7.06	3.69	50.09	03:49
4	TC Clean	2.42	6.19	3.77	50.10	03:56

Sample Type: Clean — From Schedule Version 3

	Pos	Analysis Type	Sample ID	Start Time
◆	(clean)		Clean	2019/11/19 12:38

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	12.15	16.05	3.91	49.53	05:23
2	TC Clean	5.62	9.39	3.77	50.09	04:06

3	TC Clean	2.90	6.43	3.53	50.12	03:59
4	TC Clean	2.13	5.68	3.55	50.12	03:55

Sample Type: Clean — From Schedule Version 4

	Pos	Analysis Type	Sample ID	Start Time
◆	(clean)		Clean	2019/11/19 13:04

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	12.14	15.79	3.65	49.66	05:24
2	TC Clean	6.47	10.27	3.80	50.11	04:06
3	TC Clean	2.92	6.53	3.60	50.08	03:47
4	TC Clean	1.89	5.57	3.68	50.12	03:48

Sample Type: Blank (Creating v1321) — From Schedule Version 5

	Pos	Analysis Type	Sample ID	Start Time
◆	(blank)		Reagent/Acid Blank	2019/11/19 13:26

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	1.20	4.89	3.69	49.52	05:21
2	TC Clean	5.17	8.92	3.75	50.09	04:06
3	TC Clean	2.42	6.06	3.64	50.12	03:48
4	TC Clean	1.68	5.44	3.76	50.05	03:46
5	Reagent Blank	4.91	8.53	3.62	50.10	05:06
6	Acid Blank	1.51	5.17	3.66	49.70	05:28

Sample Type: Sample — From Schedule Version 5

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	D	TOC	RB	0.4462 ppm	0.0000 ppm	0.0000%	2019/11/19 13:59

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.4462	4.4616	13.57	17.37	3.80	50.26	12:34

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

Sample Type: Check Standard --> CCV 021711 From Schedule Version 5

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◈	B	TOC	25.0000	1:2	[TOC] CCV 021711 [25 ppm]	0 / infinity (NA / NA)	23.8685 ppm (PASS)	0.0000 ppm	0%	2019/11/19 14:16

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.8685	238.6848	182.31	185.93	3.62	50.28	12:30

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	50 ppmC

Sample Type: Check Standard --> CCB 021711 From Schedule Version 5

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◈	D	TOC	0.0000	1:2	[TOC] CCB 021711 [0.0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/11/19 14:33

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0.0 ppm	1	0.0000	0.0000	9.51	13.09	3.58	50.32	12:31

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	0 ppmC

Sample Type: Sample From Schedule Version 5

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	1	TOC	MB1	0.0000 ppm	0.0000 ppm	0.0000%	2019/11/19 14:50

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.19	11.78	3.59	50.28	12:32

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

Sample Type: Check Standard --> LCS ER From Schedule Version 6

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◈	C	TOC	25.0000	1:1	[TOC] LCS ER [25.0 ppm]	0 / infinity (NA / NA)	24.7443 ppm (PASS)	0.0000 ppm	0%	2019/11/19 15:06

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	24.7443	247.4432	188.59	192.17	3.59	50.27	12:33

Completion State	Success Action	Method	Calibration	STD Conc - Pos C
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	25 ppmC

Sample Type: Sample From Schedule Version 6

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	2	TOC	ICS	0.0850 ppm	0.0000 ppm	0.0000%	2019/11/19 15:23

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0850	0.8495	10.98	14.63	3.65	50.29	12:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	3	TOC	K1910566-002.10 doc	3.3789 ppm	0.0902 ppm	2.6700%	2019/11/19 15:40

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.3151	33.1509	34.14	37.82	3.67	50.32	12:31
2	TOC	3.4427	34.4270	35.06	38.69	3.63	50.29	12:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

Sample Type: Sample From Schedule Version 7

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	4	TOC	K1910566-002.10 ms doc	28.8933 ppm	0.0000 ppm	0.0000%	2019/11/19 16:12

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	28.8933	288.9328	217.55	221.30	3.75	50.32	12:32

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	5	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/11/19 16:29

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time

1	TOC	0.0000	0.0000	8.94	12.67	3.74	50.33	12:29

Dilution 1:10 | **Blank Contribution** (TC) 10.3749 (IC) (v1321) | **Method** Extended Reaction 021711 (v4) | **Calibration** Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	6	TOC	K1910407-001.01 doc	1.0567 ppm	0.0297 ppm	2.8100%	2019/11/19 16:45

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.0357	10.3568	17.80	21.42	3.62	50.35	12:30
2	TOC	1.0777	10.7766	18.10	21.73	3.63	50.33	12:27

Dilution 1:10 | **Blank Contribution** (TC) 10.3749 (IC) (v1321) | **Method** Extended Reaction 021711 (v4) | **Calibration** Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	7	TOC	K1910407-002.01 doc	0.3628 ppm	0.0293 ppm	8.0700%	2019/11/19 17:17

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.3421	3.4212	12.83	16.56	3.73	50.35	12:25
2	TOC	0.3835	3.8354	13.12	16.85	3.72	50.33	12:30

Dilution 1:10 | **Blank Contribution** (TC) 10.3749 (IC) (v1321) | **Method** Extended Reaction 021711 (v4) | **Calibration** Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	8	TOC	K1910407-003.01 doc	0.1462 ppm	0.0398 ppm	27.2600%	2019/11/19 17:49

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1743	1.7435	11.62	15.17	3.54	50.37	12:30
2	TOC	0.1180	1.1800	11.22	14.92	3.70	50.35	12:26

Dilution 1:10 | **Blank Contribution** (TC) 10.3749 (IC) (v1321) | **Method** Extended Reaction 021711 (v4) | **Calibration** Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	9	TOC	K1910407-004.01 doc	0.0523 ppm	0.0022 ppm	4.1500%	2019/11/19 18:21

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0539	0.5385	10.76	14.34	3.58	50.40	12:27
2	TOC	0.0508	0.5078	10.74	14.41	3.67	50.39	12:29

Dilution 1:10 | **Blank Contribution** (TC) 10.3749 (IC) (v1321) | **Method** Extended Reaction 021711 (v4) | **Calibration** Extended Reaction 021711 (v27)

Sample Type: Check Standard --> CCV 021711

From Schedule Version 7

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◈	B	TOC	25.0000	1:2	[TOC] CCV 021711 [25 ppm]	0 / infinity (NA / NA)	23.8078 ppm (PASS)	0.0000 ppm	0%	2019/11/19 18:54

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.8078	238.0782	181.87	185.48	3.61	50.39	12:32

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	50 ppmC

Sample Type: Check Standard --> CCB 021711

From Schedule Version 7

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◈	D	TOC	0.0000	1:2	[TOC] CCB 021711 [0.0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/11/19 19:10

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0.0 ppm	1	0.0000	0.0000	8.08	11.77	3.68	50.40	12:35

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	0 ppmC

Sample Type: Sample

From Schedule Version 7

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	10	TOC	K1910407-005.01 doc	0.4734 ppm	0.0010 ppm	0.2100%	2019/11/19 19:27

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.4741	4.7406	13.77	17.46	3.69	50.41	12:25
2	TOC	0.4727	4.7266	13.76	17.54	3.78	50.40	12:24

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	11	TOC	K1910407-006.01 doc	0.0000 ppm	0.0000 ppm	0.0000%	2019/11/19 19:59

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	10.23	14.02	3.79	50.38	12:30
2	TOC	0.0000	0.0000	10.20	13.97	3.77	50.45	12:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	12	TOC	K1910407-007.01 doc	0.0000 ppm	0.0000 ppm	0.0000%	2019/11/19 20:31

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	9.09	12.87	3.78	50.40	12:27
2	TOC	0.0000	0.0000	8.75	12.49	3.74	50.40	12:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	13	TOC	K1910407-008.01 doc	0.0000 ppm	0.0000 ppm	0.0000%	2019/11/19 21:03

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	9.11	12.90	3.80	50.39	12:29
2	TOC	0.0000	0.0000	9.39	13.13	3.74	50.39	12:24

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	14	TOC	K1910407-009.01 doc	0.2241 ppm	0.0300 ppm	13.3800%	2019/11/19 21:35

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.2453	2.4533	12.13	15.68	3.55	50.33	12:27
2	TOC	0.2029	2.0294	11.83	15.49	3.66	50.35	12:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	15	TOC	K1910407-010.01 doc	0.0000 ppm	0.0000 ppm	0.0000%	2019/11/19 22:07

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.96	11.43	3.46	50.32	12:28
2	TOC	0.0000	0.0000	8.22	11.93	3.71	50.29	12:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	16	TOC	K1910407-011.01 doc	0.4763 ppm	0.0623 ppm	13.0900%	2019/11/19 22:39

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.4322	4.3222	13.47	17.04	3.56	50.27	12:29
2	TOC	0.5204	5.2036	14.11	17.69	3.58	50.28	12:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	17	TOC	K1910407-012.01 doc	1.0186 ppm	0.0153 ppm	1.5000%	2019/11/19 23:11

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.0294	10.2940	17.76	21.19	3.43	50.26	12:30
2	TOC	1.0078	10.0779	17.60	21.03	3.42	50.24	12:31

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	18	TOC	K1910407-013.01 doc	0.2658 ppm	0.0110 ppm	4.1500%	2019/11/19 23:44

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.2736	2.7365	12.34	15.87	3.53	50.23	12:27
2	TOC	0.2580	2.5803	12.23	15.77	3.54	50.22	12:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	19	TOC	K1910407-014.01 doc	0.0256 ppm	0.0023 ppm	8.8600%	2019/11/20 00:16

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0240	0.2400	10.55	14.11	3.56	50.21	12:27
2	TOC	0.0272	0.2721	10.57	14.23	3.66	50.22	12:32

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

Sample Type: Check Standard --> CCV 021711 From Schedule Version 7

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◈	B	TOC	25.0000	1:2	[TOC] CCV 021711 [25 ppm]	0 / infinity (NA / NA)	23.7504 ppm (PASS)	0.0000 ppm	0%	2019/11/20 00:48

Pos	Base Analysis	ID	Rep	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run

	Type		#							Time
B	TOC	25 ppm	1	23.7504	237.5036	181.46	185.01	3.55	50.20	12:30

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	50 ppmC

Sample Type: Check Standard --> CCB 021711 — From Schedule Version 7

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆	D	TOC	0.0000	1:2	[TOC] CCB 021711 [0.0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/11/20 01:04

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0.0 ppm	1	0.0000	0.0000	7.35	10.98	3.63	50.17	12:33

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	0 ppmC

Sample Type: Sample — From Schedule Version 7

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	20	TOC	MB2	0.0000 ppm	0.0000 ppm	0.0000%	2019/11/20 01:21

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.15	10.65	3.50	50.20	12:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

Sample Type: Check Standard --> LCS ER — From Schedule Version 7

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆	C	TOC	25.0000	1:1	[TOC] LCS ER [25.0 ppm]	0 / infinity (NA / NA)	24.6336 ppm (PASS)	0.0000 ppm	0%	2019/11/20 01:38

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	24.6336	246.3359	187.79	191.19	3.39	50.19	12:31

Completion State	Success Action	Method	Calibration	STD Conc - Pos C
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	25 ppmC

Sample Type: Sample From Schedule Version 7

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	21	TOC	K1910407-015.01 doc	0.1853 ppm	0.0879 ppm	47.4200%	2019/11/20 01:54

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.2474	2.4743	12.15	15.74	3.60	50.15	12:27
2	TOC	0.1232	1.2316	11.26	14.77	3.51	50.15	12:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	22	TOC	K1910425-009.01 doc	0.9495 ppm	0.0034 ppm	0.3500%	2019/11/20 02:26

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.9519	9.5186	17.20	20.61	3.41	50.15	12:27
2	TOC	0.9471	9.4712	17.17	20.72	3.55	50.14	12:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	23	TOC	K1910425-010.01 doc	0.5284 ppm	0.0119 ppm	2.2600%	2019/11/20 02:58

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.5199	5.1994	14.10	17.70	3.60	50.14	12:31
2	TOC	0.5368	5.3682	14.22	17.74	3.51	50.16	12:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	24	TOC	K1910425-011.01 doc	0.9867 ppm	0.0340 ppm	3.4500%	2019/11/20 03:30

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.9626	9.6260	17.28	20.91	3.63	50.15	12:27
2	TOC	1.0107	10.1072	17.62	21.25	3.63	50.17	12:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	25	TOC	K1910425-012.01 doc	0.7528 ppm	0.0119 ppm	1.5900%	2019/11/20 04:03

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time

1	TOC	0.7612	7.6121	15.83	19.46	3.62	50.15	12:30
2	TOC	0.7443	7.4434	15.71	19.30	3.59	50.12	12:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	26	TOC	K1910461-002.04 doc	1.0037 ppm	0.0183 ppm	1.8300%	2019/11/20 04:35

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.9908	9.9077	17.48	20.99	3.51	50.10	12:28
2	TOC	1.0167	10.1671	17.66	21.10	3.44	50.10	12:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	27	TOC	K1910461-001.03 doc	0.9093 ppm	0.0518 ppm	5.6900%	2019/11/20 05:07

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.8726	8.7265	16.63	20.21	3.58	50.09	12:30
2	TOC	0.9459	9.4586	17.16	20.58	3.43	50.15	12:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	28	TOC	K1910461-001.03 ms doc	26.3715 ppm	0.0000 ppm	0.0000%	2019/11/20 05:39

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	26.3715	263.7148	199.47	202.99	3.53	50.11	12:31

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

Sample Type: Check Standard --> CCV 021711

From Schedule Version 7

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◈	B	TOC	25.0000	1:2	[TOC] CCV 021711 [25 ppm]	0 / infinity (NA / NA)	23.9275 ppm (PASS)	0.0000 ppm	0%	2019/11/20 05:55

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.9275	239.2748	182.73	186.31	3.58	50.10	12:32

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	50 ppmC

Sample Type: Check Standard --> CCB 021711 From Schedule Version 7

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆	D	TOC	0.0000	1:2	[TOC] CCB 021711 [0.0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/11/20 06:12

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0.0 ppm	1	0.0000	0.0000	7.73	11.34	3.61	50.10	12:29

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	0 ppmC

Sample Type: Sample From Schedule Version 7

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	29	TOC	K1910566-001.08	2.9436 ppm	0.1200 ppm	4.0800%	2019/11/20 06:29

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.8588	28.5876	30.87	34.52	3.65	50.11	12:29
2	TOC	3.0285	30.2849	32.09	35.70	3.61	50.11	12:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	30	TOC	K1910617-001.01	0.0000 ppm	0.0000 ppm	0.0000%	2019/11/20 07:01

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.37	10.95	3.58	50.08	12:28
2	TOC	0.0000	0.0000	7.66	11.32	3.66	50.07	12:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	31	TOC	K1910617-002.01	0.0000 ppm	0.0000 ppm	0.0000%	2019/11/20 07:33

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.85	10.43	3.59	50.07	12:29

2	TOC	0.0000	0.0000	7.94	11.55	3.61	50.08	12:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	32	TOC	K1910378-001.08	19.6572 ppm	0.0035 ppm	0.0200%	2019/11/20 08:05

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	19.6547	196.5474	151.30	154.78	3.47	50.06	12:25
2	TOC	19.6596	196.5962	151.34	154.85	3.51	50.06	12:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	33	TOC	K1910381-001.01	0.9788 ppm	0.0939 ppm	9.5900%	2019/11/20 08:37

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.0452	10.4516	17.87	21.41	3.55	50.14	12:26
2	TOC	0.9124	9.1239	16.92	20.56	3.64	50.11	12:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	34	TOC	K1910401-001.01	13.8407 ppm	0.0255 ppm	0.1800%	2019/11/20 09:10

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	13.8226	138.2261	109.49	113.05	3.56	50.14	12:26
2	TOC	13.8587	138.5873	109.75	113.30	3.55	50.14	12:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	35	TOC	K1910401-002.01	12.1641 ppm	0.0398 ppm	0.3300%	2019/11/20 09:42

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	12.1923	121.9227	97.80	101.19	3.39	50.18	12:28
2	TOC	12.1359	121.3593	97.39	100.90	3.51	50.20	12:24

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time

◆	36	TOC	K1910415-001.01 2x	0.0000 ppm	0.0000 ppm	0.0000%	2019/11/20 10:14

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.60	12.26	3.66	50.22	12:24
2	TOC	0.0000	0.0000	8.23	11.87	3.64	50.22	12:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	37	TOC	K1910254-001.05	1.7054 ppm	0.0394 ppm	2.3100%	2019/11/20 10:46

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.7333	17.3328	22.80	26.36	3.55	50.22	12:26
2	TOC	1.6775	16.7749	22.40	26.06	3.66	50.21	12:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	38	TOC	K1910407-001.02 ms	26.5836 ppm	0.0000 ppm	0.0000%	2019/11/20 11:18

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	26.5836	265.8361	200.99	204.49	3.50	50.24	12:33

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

Sample Type: Check Standard --> CCV 021711 From Schedule Version 7

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆	B	TOC	25.0000	1:2	[TOC] CCV 021711 [25 ppm]	0 / infinity (NA / NA)	23.7272 ppm (PASS)	0.0000 ppm	0%	2019/11/20 11:34

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.7272	237.2721	181.30	184.90	3.60	50.27	12:32

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	50 ppmC

Sample Type: Check Standard --> CCB 021711 From Schedule Version 7

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time

◈	D	TOC	0.0000	1:2	[TOC] CCB 021711 [0.0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/11/20 11:51

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0.0 ppm	1	0.0000	0.0000	7.06	10.60	3.54	50.27	12:32

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	0 ppmC

Sample Type: Sample — From Schedule Version 7

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	39	TOC	MB3	0.0000 ppm	0.0000 ppm	0.0000%	2019/11/20 12:08

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.25	9.91	3.66	50.29	12:35

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

Sample Type: Check Standard --> LCS ER — From Schedule Version 7

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◈	C	TOC	25.0000	1:1	[TOC] LCS ER [25.0 ppm]	0 / infinity (NA / NA)	24.4498 ppm (PASS)	0.0000 ppm	0%	2019/11/20 12:24

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	24.4498	244.4977	186.48	190.12	3.65	50.28	12:29

Completion State	Success Action	Method	Calibration	STD Conc - Pos C
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	25 ppmC

Sample Type: Sample — From Schedule Version 7

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	40	TOC	K1910407-001.02	1.0674 ppm	0.0096 ppm	0.9000%	2019/11/20 12:41

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.0606	10.6064	17.98	21.56	3.58	50.27	12:25
2	TOC	1.0742	10.7417	18.08	21.58	3.50	50.26	12:25

Dilution	Blank Contribution	Method	Calibration

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	41	TOC	K1910407-002.02	0.2728 ppm	0.0063 ppm	2.3100%	2019/11/20 13:13

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.2683	2.6835	12.30	15.98	3.68	50.26	12:24
2	TOC	0.2773	2.7727	12.36	15.83	3.47	50.24	12:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	42	TOC	K1910407-003.02	0.0000 ppm	0.0000 ppm	0.0000%	2019/11/20 13:45

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	9.96	13.59	3.62	50.24	12:29
2	TOC	0.0000	0.0000	10.02	13.45	3.43	50.24	12:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	43	TOC	K1910407-004.02	0.0000 ppm	0.0000 ppm	0.0000%	2019/11/20 14:17

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	9.82	13.51	3.69	50.23	12:29
2	TOC	0.0000	0.0000	10.22	13.71	3.50	50.28	12:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	44	TOC	K1910407-005.02	0.3080 ppm	0.0065 ppm	2.1100%	2019/11/20 14:49

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.3126	3.1256	12.62	16.26	3.64	50.23	12:29
2	TOC	0.3034	3.0335	12.55	16.25	3.70	50.22	12:31

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	45	TOC	K1910407-006.02	0.0000 ppm	0.0000 ppm	0.0000%	2019/11/20 15:22

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	9.41	12.92	3.51	50.24	12:28
2	TOC	0.0000	0.0000	9.34	12.91	3.57	50.22	12:32

Dilution 1:10

Blank Contribution (TC) 10.3749 (IC) (v1321)

Method Extended Reaction 021711 (v4)

Calibration Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	46	TOC	K1910407-007.02	0.0000 ppm	0.0000 ppm	0.0000%	2019/11/20 15:54

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.98	11.60	3.62	50.25	12:28
2	TOC	0.0000	0.0000	7.87	11.52	3.66	50.26	12:30

Dilution 1:10

Blank Contribution (TC) 10.3749 (IC) (v1321)

Method Extended Reaction 021711 (v4)

Calibration Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	47	TOC	K1910407-008.02	0.0000 ppm	0.0000 ppm	0.0000%	2019/11/20 16:26

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.32	11.95	3.63	50.30	12:29
2	TOC	0.0000	0.0000	8.49	12.08	3.59	50.35	12:31

Dilution 1:10

Blank Contribution (TC) 10.3749 (IC) (v1321)

Method Extended Reaction 021711 (v4)

Calibration Extended Reaction 021711 (v27)

Sample Type: Check Standard --> CCV 021711 From Schedule Version 7

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◈	B	TOC	25.0000	1:2	[TOC] CCV 021711 [25 ppm]	0 / infinity (NA / NA)	23.5990 ppm (PASS)	0.0000 ppm	0%	2019/11/20 16:58

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.5990	235.9904	180.38	183.84	3.47	50.35	12:32

Completion State Success - Criteria met.

Success Action Do Nothing

Method Extended Reaction 021711 (v4)

Calibration Extended Reaction 021711 (v27)

STD Conc - Pos B 50 ppmC

Sample Type: Check Standard --> CCB 021711 From Schedule Version 7

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time

◆	D	TOC	0.0000	1:2	[TOC] CCB 021711 [0.0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/11/20 17:15

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0.0 ppm	1	0.0000	0.0000	6.76	10.46	3.70	50.36	12:32

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	0 ppmC

Sample Type: Sample From Schedule Version 7

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	48	TOC	K1910407-009.02	0.1397 ppm	0.0232 ppm	16.5900%	2019/11/20 17:31

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1233	1.2330	11.26	14.92	3.66	50.32	12:27
2	TOC	0.1561	1.5608	11.49	15.24	3.74	50.31	12:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	49	TOC	K1910407-010.02	0.0000 ppm	0.0000 ppm	0.0000%	2019/11/20 18:04

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.08	10.63	3.54	50.31	12:29
2	TOC	0.0000	0.0000	7.32	10.75	3.44	50.36	12:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	50	TOC	K1910407-011.02	0.3881 ppm	0.0347 ppm	8.9400%	2019/11/20 18:36

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.3636	3.6360	12.98	16.39	3.40	50.34	12:28
2	TOC	0.4127	4.1269	13.33	16.85	3.52	50.28	12:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	51	TOC	K1910407-012.02	1.0268 ppm	0.0368 ppm	3.5800%	2019/11/20 19:08

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.0008	10.0081	17.55	21.05	3.50	50.26	12:26
2	TOC	1.0528	10.5283	17.92	21.50	3.57	50.29	12:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	52	TOC	K1910407-013.02	0.1464 ppm	0.0551 ppm	37.6600%	2019/11/20 19:40

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1074	1.0740	11.14	14.63	3.48	50.24	12:34
2	TOC	0.1854	1.8537	11.70	15.25	3.54	50.23	12:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	53	TOC	K1910407-014.02	0.0000 ppm	0.0000 ppm	0.0000%	2019/11/20 20:12

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	9.62	13.19	3.57	50.22	12:28
2	TOC	0.0000	0.0000	9.69	13.33	3.64	50.22	12:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	54	TOC	K1910407-015.02	0.0000 ppm	0.0000 ppm	0.0000%	2019/11/20 20:44

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	9.75	13.32	3.57	50.23	12:30
2	TOC	0.0000	0.0000	9.71	13.51	3.80	50.22	12:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	55	TOC	K1910432-001.03	8.6884 ppm	0.1011 ppm	1.1600%	2019/11/20 21:16

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	8.7599	87.5992	73.19	76.87	3.69	50.19	12:26
2	TOC	8.6170	86.1696	72.16	75.86	3.70	50.18	12:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC)	Extended Reaction	Extended Reaction

(v1321) 021711 (v4) 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	56	TOC	K1910432-002.03	15.0661 ppm	0.0563 ppm	0.3700%	2019/11/20 21:48

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	15.0263	150.2633	118.12	121.55	3.43	50.17	12:27
2	TOC	15.1060	151.0596	118.69	122.17	3.48	50.15	12:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	57	TOC	K1910432-003.03	20.3168 ppm	0.0184 ppm	0.0900%	2019/11/20 22:20

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	20.3299	203.2988	156.15	159.56	3.42	50.14	12:28
2	TOC	20.3038	203.0380	155.96	159.49	3.53	50.15	12:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

Sample Type: Check Standard --> CCV 021711 From Schedule Version 7

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆	B	TOC	25.0000	1:2	[TOC] CCV 021711 [25 ppm]	0 / infinity (NA / NA)	23.8483 ppm (PASS)	0.0000 ppm	0%	2019/11/20 22:52

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.8483	238.4826	182.16	185.69	3.52	50.14	12:33

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	50 ppmC

Sample Type: Check Standard --> CCB 021711 From Schedule Version 7

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆	D	TOC	0.0000	1:2	[TOC] CCB 021711 [0.0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/11/20 23:09

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0.0 ppm	1	0.0000	0.0000	6.60	10.29	3.68	50.17	12:29

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	0 ppmC

Sample Type: Sample — From Schedule Version 7

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	58	TOC	MB4	0.0000 ppm	0.0000 ppm	0.0000%	2019/11/20 23:26

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	5.78	9.37	3.59	50.10	12:34

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

Sample Type: Check Standard --> LCS ER — From Schedule Version 7

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◈	C	TOC	25.0000	1:1	[TOC] LCS ER [25.0 ppm]	0 / infinity (NA / NA)	24.4997 ppm (PASS)	0.0000 ppm	0%	2019/11/20 23:43

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	24.4997	244.9970	186.83	190.47	3.63	50.12	12:31

Completion State	Success Action	Method	Calibration	STD Conc - Pos C
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	25 ppmC

Sample Type: Sample — From Schedule Version 7

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	59	TOC	K1910432-004.03	23.4712 ppm	0.1981 ppm	0.8400%	2019/11/21 00:00

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	23.6113	236.1134	179.68	183.22	3.54	50.11	12:26
2	TOC	23.3312	233.3116	177.67	181.23	3.57	50.10	12:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	60	TOC	K1910432-005.03	26.6166 ppm	0.1567 ppm	0.5900%	2019/11/21 00:32

Rep	Base	ppm	µg	Adjusted	NDIR (Abs)	Baseline	Pressure	Run

#	Analysis Type			(Abs)		(Abs)	(psig)	Time
1	TOC	26.5058	265.0578	200.43	203.98	3.55	50.10	12:29
2	TOC	26.7274	267.2739	202.02	205.65	3.63	50.08	12:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	61	TOC	K1910464-002.01	6.6893 ppm	0.0832 ppm	1.2400%	2019/11/21 01:04

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	6.7481	67.4814	58.76	62.55	3.79	50.06	12:26
2	TOC	6.6304	66.3043	57.92	61.57	3.66	50.04	12:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	62	TOC	K1910759-001.01	1.0334 ppm	0.0306 ppm	2.9600%	2019/11/21 01:36

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.0118	10.1183	17.63	21.28	3.65	50.04	12:26
2	TOC	1.0551	10.5507	17.94	21.44	3.50	50.02	12:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	63	TOC	K1910759-001.01 ms	26.0016 ppm	0.0000 ppm	0.0000%	2019/11/21 02:08

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	26.0016	260.0162	196.81	200.52	3.70	50.03	12:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	64	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/11/21 02:24

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.97	10.59	3.62	50.07	12:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time

◆	65	TOC	K1910759-002.01	0.8346 ppm	0.0004 ppm	0.0500%	2019/11/21 02:41

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.8349	8.3485	16.36	19.91	3.55	50.05	12:28
2	TOC	0.8343	8.3429	16.36	19.89	3.53	50.10	12:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	66	TOC	K1910759-003.01	1.6060 ppm	0.0289 ppm	1.8000%	2019/11/21 03:13

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.6265	16.2645	22.04	25.72	3.68	50.10	12:30
2	TOC	1.5856	15.8559	21.74	25.49	3.75	50.04	12:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

Sample Type: Check Standard --> CCV 021711 From Schedule Version 7

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆	B	TOC	25.0000	1:2	[TOC] CCV 021711 [25 ppm]	0 / infinity (NA / NA)	23.6066 ppm (PASS)	0.0000 ppm	0%	2019/11/21 03:45

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.6066	236.0657	180.43	184.01	3.58	50.06	12:31

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	50 ppmC

Sample Type: Check Standard --> CCB 021711 From Schedule Version 7

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆	D	TOC	0.0000	1:2	[TOC] CCB 021711 [0.0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/11/21 04:02

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0.0 ppm	1	0.0000	0.0000	6.15	9.95	3.80	50.06	12:29

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	0 ppmC

Sample Type: Sample From Schedule Version 7

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	67	TOC	K1910759-004.01	1.5096 ppm	0.0341 ppm	2.2600%	2019/11/21 04:18

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.4855	14.8545	21.03	24.73	3.70	50.08	12:27
2	TOC	1.5337	15.3371	21.37	24.95	3.58	50.04	12:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	68	TOC	K1910759-005.01	1.0800 ppm	0.0452 ppm	4.1800%	2019/11/21 04:51

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.1120	11.1197	18.35	21.93	3.58	50.03	12:25
2	TOC	1.0481	10.4809	17.89	21.55	3.66	50.04	12:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	69	TOC	K1910759-006.01	1.1674 ppm	0.0315 ppm	2.6900%	2019/11/21 05:23

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.1896	11.8965	18.90	22.57	3.67	50.01	12:30
2	TOC	1.1452	11.4516	18.59	22.17	3.59	50.02	12:31

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	70	TOC	K1910837-001.01	1.6524 ppm	0.0164 ppm	0.9900%	2019/11/21 05:55

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.6640	16.6397	22.31	25.89	3.59	50.07	12:29
2	TOC	1.6408	16.4082	22.14	25.69	3.55	50.07	12:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	71	TOC	K1910838-001.01	2.5144 ppm	0.0110 ppm	0.4400%	2019/11/21 06:27

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.5222	25.2223	28.46	32.00	3.54	50.06	12:25
2	TOC	2.5066	25.0661	28.35	31.91	3.56	50.04	12:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	72	TOC	K1910157-001.02 25x	3.1366 ppm	0.0614 ppm	1.9600%	2019/11/21 06:59

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.0932	30.9320	32.55	36.29	3.73	50.04	12:30
2	TOC	3.1801	31.8008	33.18	36.83	3.65	50.08	12:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	73	TOC	K1910765-005.01	15.2500 ppm	0.1025 ppm	0.6700%	2019/11/21 07:31

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	15.3224	153.2241	120.24	123.86	3.61	50.04	12:28
2	TOC	15.1775	151.7751	119.20	122.83	3.63	50.07	12:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	74	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/11/21 08:03

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.59	10.23	3.63	50.01	12:28
2	TOC	0.0000	0.0000	6.47	10.16	3.69	50.02	12:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3749 (IC) (v1321)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

Sample Type: Check Standard --> CCV 021711 From Schedule Version 7

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◈	B	TOC	25.0000	1:2	[TOC] CCV 021711 [25 ppm]	0 / infinity (NA / NA)	23.5480 ppm (PASS)	0.0000 ppm	0%	2019/11/21 08:36

Pos	Base Analysis	ID	Rep	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run

	Type		#							Time
B	TOC	25 ppm	1	23.5480	235.4799	180.01	183.60	3.59	50.05	12:28

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	50 ppmC

Sample Type: Check Standard --> CCB 021711 From Schedule Version 7

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◈	D	TOC	0.0000	1:2	[TOC] CCB 021711 [0.0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/11/21 08:52

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0.0 ppm	1	0.0000	0.0000	6.36	10.02	3.66	50.03	12:31

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	0 ppmC

Meta Data Used in this Report

Blanks

Version	Reagent (Abs)	Acid (Abs)	DI IC (Abs)	DI TC (Abs)	DI TOC (Abs)	Save Time	Operator
v1320	2.3307	1.7570	0.0000	0.0000	0.0000	2019/11/15 13:57	Fusion1 (Fusion1)
v1321	1.6360	1.5100	0.0000	0.0000	0.0000	2019/11/19 13:59	Fusion1 (Fusion1)

Calibrations

Name: Extended Reaction 021711 (TOC)

Version:	v27	Calibration curve formula:	TOC: y = 7.170x + 11.164
Ver Creation:	2019/03/11 21:51	r^2 value:	TOC: r^2 = 0.99991
Comment:			
Operator:	Fusion1 (Fusion1)		
Basic Analysis Type	TOC		

Basic Analysis Type: TOC

Sample ID	Y Raw Value	X Expected	Message	End Time
0.0 ppm	10.4100	0.0000		2019/03/11 20:12

0.50 ppm	14.7740	0.5000		2019/03/11 20:28
1.00 ppm	18.0020	1.0000		2019/03/11 20:44
5.00 ppm	47.2310	5.0000		2019/03/11 21:01
10.0 ppm	85.1320	10.0000		2019/03/11 21:17
25.0 ppm	188.5200	25.0000		2019/03/11 21:33
50.0 ppm	370.1610	50.0000		2019/03/11 21:49

Methods

Name: Extended Reaction 021711 (TOC)

Version: v4 Operator: Fusion1 (Fusion1)

Ver Creation: 2019/01/31 11:21

Comment:

Parameter	Value
SampleVolume	10.0 mL
Dilution	1:10
AcidVolume	0.5 ml
ReagentVolume	2.0 ml
UVReactorPrerinse	Off
UVReactorPrerinseVolume	5.0
NumberOfUVReactorPrerinses	1
ICSpargeTime	1.00 mins
DetectorSweepFlow	500 ml/min
PreSpargeTime	4.00 mins
SystemFlow	500 ml/min

Advanced Parameter	Value
NeedleRinseVolume	5.0 ml
VialPrimeVolume	2.0 ml
ICSamplePrimeVolume	2.0 ml
ICSpargeRinseVolume	12.0 ml
BaselineStabilizeTime	0.70 min
DetectorPressureFlow	150 ml/min
SyringeSpeedWaste	10
SyringeSpeedAcid	7
SyringeSpeedReagent	7
SyringeSpeedDIWater	7
NDIRPressurization	60 psig
SyringeSpeedSampleDispense	5
SyringeSpeedSampleAspirate	4
SyringeSpeedUVDispense	5
SyringeSpeedUVAspirate	5
SyringeSpeedICDispense	5
SyringeSpeedICAspirate	5
NDIRPressureStabilize	1.75 min
SampleMixing	Off
SampleMixingCycles	1
SampleMixingVolume	10.0
LowLevelFilterNDIR	Off

Acceptance / Approval

Electronic Signatures

Report Version	User Name	Acceptance	Reason	Date

Report History

Report History

Report Version	User Name	System Reason	User Reason	Date
1	Fusion1 (Fusion1)	Schedule completed	Schedule completed	2019/11/21 09:10

ALS Environmental

StarLIMS Run: 660502, 660505, 660506, 660507

Analysis: DOC/TOC

Method: SM 5310 C, 9060A, 415.1, 9060

CCV: 11-GEN-05-82C 50 ppm LCS: 11-GEN-05-79J 25.0 ppm

ICAL Date: 3/6/19

ICAL ID: 11-GEN-05-76H

ICS ID: 11-GEN-05-78M

ICS TV: 25.0 ppm ICS % R < 1

Spike ID: 11-GEN-05-82C 0.05 ml of 5000 ppm stock ---> 10.0 ml = 25.0 ppm x dilution factor

Sodium Persulfate: 11-GEN-05-83C

21 % H3PO4: 11-GEN-05-83B

Equipment ID: K-TOC-03

PIPETTE ID: 124276B, 129001F, N11314F, Marge

FILTER ID: 16967789

Analyzed By:	BD	Date Analyzed:	11/19/19
Reviewed By:		Date Reviewed:	11/21/19

LABORATORY REPORT

November 26, 2019

RJ Modashia
ALS Laboratory Group
10450 Stancliff Road Suite 210
Houston, TX 77099-4338

RE: HS19110644

Dear RJ:

Enclosed are the results of the samples submitted to our laboratory on November 14, 2019. For your reference, these analyses have been assigned our service request number P1906981.

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. 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.

Respectfully submitted,

ALS | Environmental

By Hayden Akers at 1:49 pm, Nov 26, 2019

Hayden Akers
Project Manager

Client: ALS Laboratory Group Service Request No: P1906981
Project: HS19110644

CASE NARRATIVE

The sample(s) were received intact under chain of custody on November 14, 2019 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 sample(s) at the time of sample receipt.

Methane, Ethene and Ethane Analysis

The samples were analyzed for methane, ethene, and ethane using a gas chromatograph equipped with a flame ionization detector (FID). A known amount of liquid was displaced by injecting 8.0 milliliters of helium creating a headspace in the sample vial. Each sample vial was agitated using a sonic disrupter for fifteen minutes and then allowed to equilibrate for at least two hours. A volume of the headspace was withdrawn using a gas-tight syringe and analyzed using a manual injection technique. The amount of dissolved gases (methane, ethene and ethane) in the original sample was calculated using Henry's Law. This method was performed with guidance from RSK 175. 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 laboratory's NELAP or DoD-ELAP accreditation.

Carbon Dioxide Analysis

The samples were also analyzed for carbon dioxide using a gas chromatograph equipped with a thermal conductivity detector (TCD). A known amount of liquid was displaced by injecting 8.0 milliliters of helium creating a headspace in the sample vial. Each sample vial was agitated using a sonic disrupter for fifteen minutes and then allowed to equilibrate for at least four hours. A volume of the headspace was withdrawn using a gas-tight syringe and analyzed using a manual injection technique. The amount of dissolved gases (carbon dioxide) in the original sample was calculated using Henry's Law. This method was performed with guidance from RSK 175 as described in laboratory SOP VOA-DISGAS. This analyte is included on the laboratory's NELAP and DoD-ELAP scope of accreditation.

Manual integrations were performed on the following sample(s) and analyte(s). Refer to the raw data for additional information.

Sample Identification(s)	Analyte(s)
P1906981-001	Methane
P1906981-003	Carbon dioxide
P1906981-005	Carbon dioxide
P1906981-006	Carbon dioxide

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.

ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
Alaska DEC	http://dec.alaska.gov/eh/lab.aspx	17-019
Arizona DHS	http://www.azdhs.gov/preparedness/state-laboratory/lab-licensure-certification/index.php#laboratory-licensure-home	AZ0694
Florida DOH (NELAP)	http://www.floridahealth.gov/licensing-and-regulation/environmental-laboratories/index.html	E871020
Louisiana DEQ (NELAP)	http://www.deq.louisiana.gov/page/la-lab-accreditation	05071
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/professionals/labCert.shtml	2018027
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	1521096
New Jersey DEP (NELAP)	http://www.nj.gov/dep/enforcement/oqa.html	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://www.oregon.gov/oha/ph/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-006
Pennsylvania DEP	http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx	68-03307 (Registration)
PJLA (DoD ELAP)	http://www.pjlabs.com/search-accredited-labs	65818 (Testing)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/agency/qa/env_lab_accreditation.html	T104704413-19-10
Utah DOH (NELAP)	http://health.utah.gov/lab/lab_cert_env	CA016272019-10
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

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 www.alsglobal.com, or at the accreditation body's website.

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.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: ALS Laboratory Group
Service Request: P1906981
Project ID: HS19110644

Date Received: 11/14/2019
Time Received: 09:15

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	RSK 175 - CO2	RSK 175 - Gases
50WW22-191112	P1906981-001	Water	11/12/2019	08:30	X	X
50WW08-191112	P1906981-002	Water	11/12/2019	09:30	X	X
50WW06-191112	P1906981-003	Water	11/12/2019	10:30	X	X
50WW11-191112	P1906981-004	Water	11/12/2019	11:30	X	X
50WW12-191112	P1906981-005	Water	11/12/2019	12:30	X	X
50WW12-191112-FD	P1906981-006	Water	11/12/2019	12:30	X	X

00988264

PP106981

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: **Texas** **COC ID:** **12624**

SUBCONTRACT TO:

ALS Environmental
2655 Park Center Drive, Suite A
Simi Valley, CA 93065

Phone: +1 805 526 7161

CUSTOMER INFORMATION:

Company:	ALS Houston
Contact:	RJ Modashia
Address:	10450 Stancliff Rd, Ste 210
Phone:	+1 281 530 5656
Email:	RJ.Modashia@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:	HS19110644
TSR:	Sonia West

	LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
	ANALYSIS REQUESTED			DUE DATE
1.	**HS19110644-05**	**50WW22-191112**	**Groundwater**	**12 Nov 2019 08:30**
	MEE + CO2. DOD IV. Equis EDD. EQuIS 5.0	Longhorn		27 Nov 2019
2.	**HS19110644-06**	**50WW08-191112**	**Groundwater**	**12 Nov 2019 09:30**
	MEE + CO2. DOD IV. Equis EDD. EQuIS 5.0 -	Longhorn		27 Nov 2019
3.	**HS19110644-07**	**50WW06-191112**	**Groundwater**	**12 Nov 2019 10:30**
	MEE + CO2. DOD IV. Equis EDD. EQuIS 5.0 -	Longhorn		27 Nov 2019
4.	**HS19110644-08**	**50WW11-191112**	**Groundwater**	**12 Nov 2019 11:30**
	MEE + CO2. DOD IV. Equis EDD. EQuIS 5.0 -	Longhorn		27 Nov 2019
5.	**HS19110644-09**	**50WW12-191112**	**Groundwater**	**12 Nov 2019 12:30**
	MEE + CO2. DOD IV. Equis EDD. EQuIS 5.0 -	Longhorn		27 Nov 2019
6.	**HS19110644-10**	**50WW12-191112-FD**	**Groundwater**	**12 Nov 2019 12:30**
	MEE + CO2. DOD IV. Equis EDD. EQuIS 5.0 -	Longhorn		27 Nov 2019

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

QC Level: DOD IV (DoD Data Package)

Subcontract Chain of Custody

SAMPLING STATE: **Texas**

COC ID: **12624**

Relinquished By: J [illegible]

Date/Time: 11/13/19 18:00

Received By: [signature]

Date/Time: 11-14-19 0911

Cooler ID(s):

Temperature(s): 1°C wet

ALS Environmental
Sample Acceptance Check Form

Client: ALS Laboratory Group Work order: P1906981

Project: HS19110644

Sample(s) received on: 11/14/19 Date opened: 11/14/19 by: ADAVID

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Did **sample containers** arrive in good condition?	☒	☐	☐
3	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
4	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
5	Was **sample volume** received adequate for analysis?	☒	☐	☐
6	Are samples within specified holding times?	☒	☐	☐
7	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☒	☐	☐
	Cooler Temperature: ° C Blank Temperature: 1° C Thermometer ID T-111 Wet Ic			
8	Were **custody seals** on outside of cooler/Box/Container?	☒	☐	☐
	Location of seal(s)? Cooler lid. Sealing Lid?	☒	☐	☐
	Were signature and date included?	☒	☐	☐
	Were seals intact?	☒	☐	☐
9	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☒	☐	☐
	Is there a client indication that the submitted samples are **pH** preserved?	☒	☐	☐
	Were **VOA vials** checked for presence/absence of air bubbles?	☒	☐	☐
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☒	☐
10	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
11	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1906981-001.01	40mL VOA NP		6		A	LD/WH 11/19/2019
P1906981-001.02	40mL VOA NP					
P1906981-001.03	40mL VOA NP					
P1906981-001.04	40ml VOA HCL		1		A	LD/WH 11/18/2019
P1906981-001.05	40ml VOA HCL					
P1906981-001.06	40ml VOA HCL					
P1906981-002.01	40mL VOA NP		6		A	LD/WH 11/19/2019
P1906981-002.02	40mL VOA NP					
P1906981-002.03	40mL VOA NP					
P1906981-002.04	40ml VOA HCL		1		A	LD/WH 11/18/2019
P1906981-002.05	40ml VOA HCL					
P1906981-002.06	40ml VOA HCL					
P1906981-003.01	40mL VOA NP		6		A	LD/WH 11/19/2019
P1906981-003.02	40mL VOA NP					
P1906981-003.03	40mL VOA NP					

Explain any discrepancies: (include lab sample ID numbers):

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS Environmental
Sample Acceptance Check Form

Client: ALS Laboratory Group Work order: P1906981

Project: HS19110644

Sample(s) received on: 11/14/19 Date opened: 11/14/19 by: ADAVID

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1906981-003.04	40ml VOA HCL		1		A	LD/WH 11/18/2019
P1906981-003.05	40ml VOA HCL					
P1906981-003.06	40ml VOA HCL					
P1906981-004.01	40mL VOA NP		6		A	LD/WH 11/19/2019
P1906981-004.02	40mL VOA NP					
P1906981-004.03	40mL VOA NP					
P1906981-004.04	40ml VOA HCL		1		A	LD/WH 11/18/2019
P1906981-004.05	40ml VOA HCL					
P1906981-004.06	40ml VOA HCL					
P1906981-005.01	40mL VOA NP		6		A	LD/WH 11/19/2019
P1906981-005.02	40mL VOA NP					
P1906981-005.03	40mL VOA NP					
P1906981-005.04	40ml VOA HCL		1		A	LD/WH 11/18/2019
P1906981-005.05	40ml VOA HCL					
P1906981-005.06	40ml VOA HCL					
P1906981-006.01	40mL VOA NP		6		A	LD/WH 11/19/2019
P1906981-006.02	40mL VOA NP					
P1906981-006.03	40mL VOA NP					
P1906981-006.04	40ml VOA HCL		1		A	LD/WH 11/18/2019
P1906981-006.05	40ml VOA HCL					
P1906981-006.06	40ml VOA HCL					

Explain any discrepancies: (include lab sample ID numbers):

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **ALS Laboratory Group**
Client Project ID: **HS19110644** ALS Project ID: P1906981

Carbon Dioxide

Test Code: RSK 175
Instrument ID: HP5890A/GC10/TCD
Analyst: Li Donghao/Wade Henton
Matrix: Water
Test Notes:

Date(s) Collected: 11/12/19
Date Received: 11/14/19
Date Analyzed: 11/19/19

Client Sample ID	ALS Sample ID	Injection Volume ml(s)	Result µg/L	LOQ µg/L	LOD µg/L	MDL µg/L	Data Qualifier
50WW22-191112	P1906981-001	0.10	**79,000**	1,000	860	370	
50WW08-191112	P1906981-002	0.10	**69,000**	1,000	860	370	
50WW06-191112	P1906981-003	0.10	**120,000**	1,000	860	370	
50WW11-191112	P1906981-004	0.10	**270,000**	1,000	860	370	
50WW12-191112	P1906981-005	0.10	**250,000**	1,000	860	370	
50WW12-191112-FD	P1906981-006	0.10	**300,000**	1,000	860	370	
Method Control Sample	P191119-MB	0.10	860	1,000	860	370	**U**

The Method Control Sample is laboratory water carried through the entire analytical process.
U = Compound was analyzed for, but not detected above the laboratory detection limit.
LOQ = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE / DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Client: **ALS Laboratory Group**
Client Sample ID: **Duplicate Lab Control Sample** ALS Project ID: P1906981
Client Project ID: **HS19110644** ALS Sample ID: P191119-DLCS

Test Code: RSK 175 Date Collected: NA
Instrument ID: HP5890A/GC10/TCD Date Received: NA
Analyst: Li Donghao/Wade Henton Date Analyzed: 11/19/19
Matrix: Water Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	Compound	Spike Amount LCS / DLCS ug/L	Result[1] LCS ug/L	Result[1] DLCS ug/L	% Recovery LCS	% Recovery DLCS	DOD Acceptance Limits	RPD	RPD Limit	Data Qualifier
124-38-9	Carbon Dioxide	22,900	21,100	21,100	**92**	**92**	80-122	0	12	

[1] = The concentration shown includes a subtraction of the Method Control Sample value, even if the result is less than the MRL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **ALS Laboratory Group**
Client Sample ID: **50WW22-191112**
Client Project ID: **HS19110644**

ALS Project ID: P1906981
ALS Sample ID: P1906981-001

Test Code: RSK 175
Instrument ID: HP5890A/GC10/FID
Analyst: Li Donghao/Wade Henton
Matrix: Water
Test Notes:

Date Collected: 11/12/19
Date Received: 11/14/19
Date Analyzed: 11/18/19
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result µg/L	LOQ µg/L	LOD µg/L	MDL µg/L	Data Qualifier
74-82-8	Methane	**0.55**	1.3	1.0	0.51	**J**
74-85-1	Ethene	0.55	1.0	0.55	0.24	**U**
74-84-0	Ethane	0.47	0.60	0.47	0.16	**U**

U = Compound was analyzed for, but not detected above the laboratory detection limit.
LOQ = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **ALS Laboratory Group**
Client Sample ID: **50WW08-191112**
Client Project ID: **HS19110644**

ALS Project ID: P1906981
ALS Sample ID: P1906981-002

Test Code: RSK 175
Instrument ID: HP5890A/GC10/FID
Analyst: Li Donghao/Wade Henton
Matrix: Water
Test Notes:

Date Collected: 11/12/19
Date Received: 11/14/19
Date Analyzed: 11/18/19
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result µg/L	LOQ µg/L	LOD µg/L	MDL µg/L	Data Qualifier
74-82-8	Methane	**3.0**	1.3	1.0	0.51	
74-85-1	Ethene	0.55	1.0	0.55	0.24	**U**
74-84-0	Ethane	0.47	0.60	0.47	0.16	**U**

U = Compound was analyzed for, but not detected above the laboratory detection limit.
LOQ = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **ALS Laboratory Group**
Client Sample ID: **50WW06-191112**
Client Project ID: **HS19110644**

ALS Project ID: P1906981
ALS Sample ID: P1906981-003

Test Code: RSK 175
Instrument ID: HP5890A/GC10/FID
Analyst: Li Donghao/Wade Henton
Matrix: Water
Test Notes:

Date Collected: 11/12/19
Date Received: 11/14/19
Date Analyzed: 11/18/19
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result µg/L	LOQ µg/L	LOD µg/L	MDL µg/L	Data Qualifier
74-82-8	Methane	**1.1**	1.3	1.0	0.51	**J**
74-85-1	Ethene	0.55	1.0	0.55	0.24	**U**
74-84-0	Ethane	0.47	0.60	0.47	0.16	**U**

U = Compound was analyzed for, but not detected above the laboratory detection limit.
LOQ = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **ALS Laboratory Group**
Client Sample ID: **50WW11-191112**
Client Project ID: **HS19110644**

ALS Project ID: P1906981
ALS Sample ID: P1906981-004

Test Code: RSK 175
Instrument ID: HP5890A/GC10/FID
Analyst: Li Donghao/Wade Henton
Matrix: Water
Test Notes:

Date Collected: 11/12/19
Date Received: 11/14/19
Date Analyzed: 11/18/19
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result µg/L	LOQ µg/L	LOD µg/L	MDL µg/L	Data Qualifier
74-82-8	Methane	**6.8**	1.3	1.0	0.51	
74-85-1	Ethene	0.55	1.0	0.55	0.24	**U**
74-84-0	Ethane	0.47	0.60	0.47	0.16	**U**

U = Compound was analyzed for, but not detected above the laboratory detection limit.
LOQ = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **ALS Laboratory Group**
Client Sample ID: **50WW12-191112** ALS Project ID: P1906981
Client Project ID: **HS19110644** ALS Sample ID: P1906981-005

Test Code: RSK 175 Date Collected: 11/12/19
Instrument ID: HP5890A/GC10/FID Date Received: 11/14/19
Analyst: Li Donghao/Wade Henton Date Analyzed: 11/18/19
Matrix: Water Volume(s) Analyzed: 0.10 ml(s)
Test Notes:

CAS #	Compound	Result µg/L	LOQ µg/L	LOD µg/L	MDL µg/L	Data Qualifier
74-82-8	Methane	**1.5**	1.3	1.0	0.51	
74-85-1	Ethene	0.55	1.0	0.55	0.24	**U**
74-84-0	Ethane	0.47	0.60	0.47	0.16	**U**

U = Compound was analyzed for, but not detected above the laboratory detection limit.
LOQ = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **ALS Laboratory Group**
Client Sample ID: **50WW12-191112-FD**
Client Project ID: **HS19110644**

ALS Project ID: P1906981
ALS Sample ID: P1906981-006

Test Code: RSK 175
Instrument ID: HP5890A/GC10/FID
Analyst: Li Donghao/Wade Henton
Matrix: Water
Test Notes:

Date Collected: 11/12/19
Date Received: 11/14/19
Date Analyzed: 11/18/19
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result µg/L	LOQ µg/L	LOD µg/L	MDL µg/L	Data Qualifier
74-82-8	Methane	**1.6**	1.3	1.0	0.51	
74-85-1	Ethene	0.55	1.0	0.55	0.24	**U**
74-84-0	Ethane	0.47	0.60	0.47	0.16	**U**

U = Compound was analyzed for, but not detected above the laboratory detection limit.
LOQ = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **ALS Laboratory Group**
Client Sample ID: **Method Control Sample**
Client Project ID: **HS19110644**

ALS Project ID: P1906981
ALS Sample ID: P191118-MB

Test Code: RSK 175
Instrument ID: HP5890A/GC10/FID
Analyst: Li Donghao/Wade Henton
Matrix: Water
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 11/18/19
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result µg/L	LOQ µg/L	LOD µg/L	MDL µg/L	Data Qualifier
74-82-8	Methane	1.0	1.3	1.0	0.51	**U**
74-85-1	Ethene	0.55	1.0	0.55	0.24	**U**
74-84-0	Ethane	0.47	0.60	0.47	0.16	**U**

The Method Control Sample is laboratory water carried through the entire analytical process.
U = Compound was analyzed for, but not detected above the laboratory detection limit.
LOQ = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE / DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Client: **ALS Laboratory Group**
Client Sample ID: **Duplicate Lab Control Sample**
Client Project ID: **HS19110644**

ALS Project ID: P1906981
ALS Sample ID: P191118-LCS
P191118-DLCS

Test Code: RSK 175
Instrument ID: HP5890A/GC10/FID
Analyst: Li Donghao/Wade Henton
Matrix: Water
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 11/18/19
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Spike Amount LCS / DLCS µg/L	Result$_1$ LCS µg/L	Result$_1$ DLCS µg/L	% Recovery LCS	% Recovery DLCS	DOD Acceptance Limits	RPD	RPD Limit	Data Qualifier
74-82-8	Methane	2.52	2.27	2.24	**90**	**89**	73-125	1	26	
74-85-1	Ethene	4.40	4.29	4.24	**98**	**96**	72-133	2	11	
74-84-0	Ethane	4.72	4.38	4.35	**93**	**92**	74-131	1	10	

$_1$ = The concentration shown includes a subtraction of the Method Control Sample value, even if the result is less than the MRL.

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191907.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 12:54:42
Operator : WH/LD
Sample : P1906981-001 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 13:23:01 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

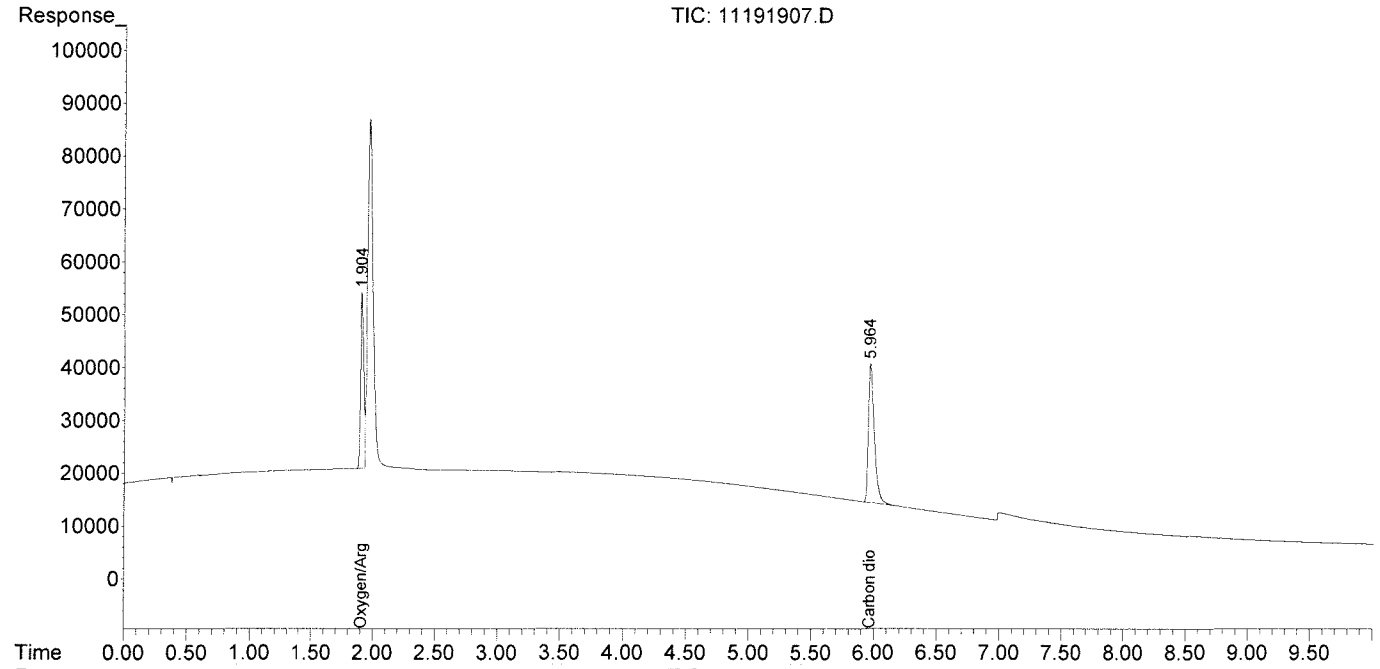
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.905f	565206	0.119	ppm
2)	Carbon monoxide	1.905	565206	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	5.965	853972	3638.117	ppm
6)	Methane (FID)	0.000	0	N.D.	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	0.000	0	N.D.	ppm
10)	Propane	0.000	0	N.D.	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	0.000	0	N.D.	ppm
13)	n-Butane	0.000	0	N.D.	ppm

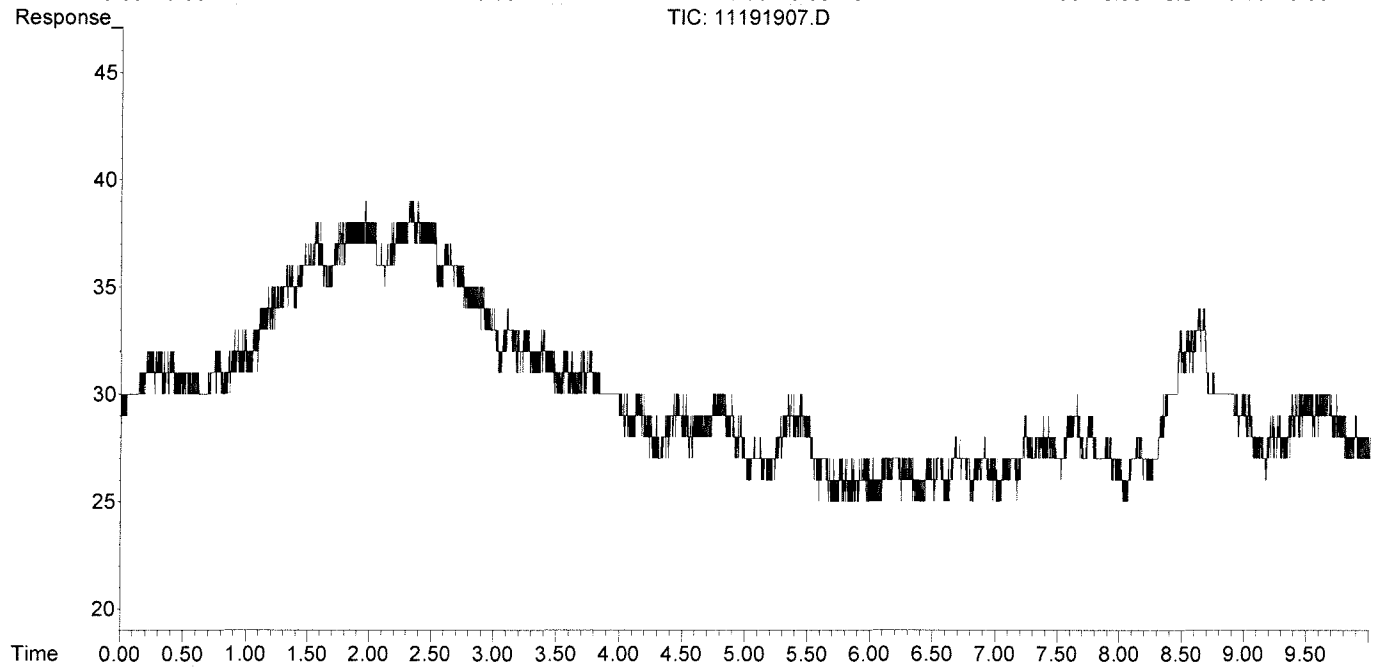
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191907.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 12:54:42
Operator : WH/LD
Sample : P1906981-001 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 13:23:01 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191908.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 13:43:34
Operator : WH/LD
Sample : P1906981-002 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 13:23:15 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

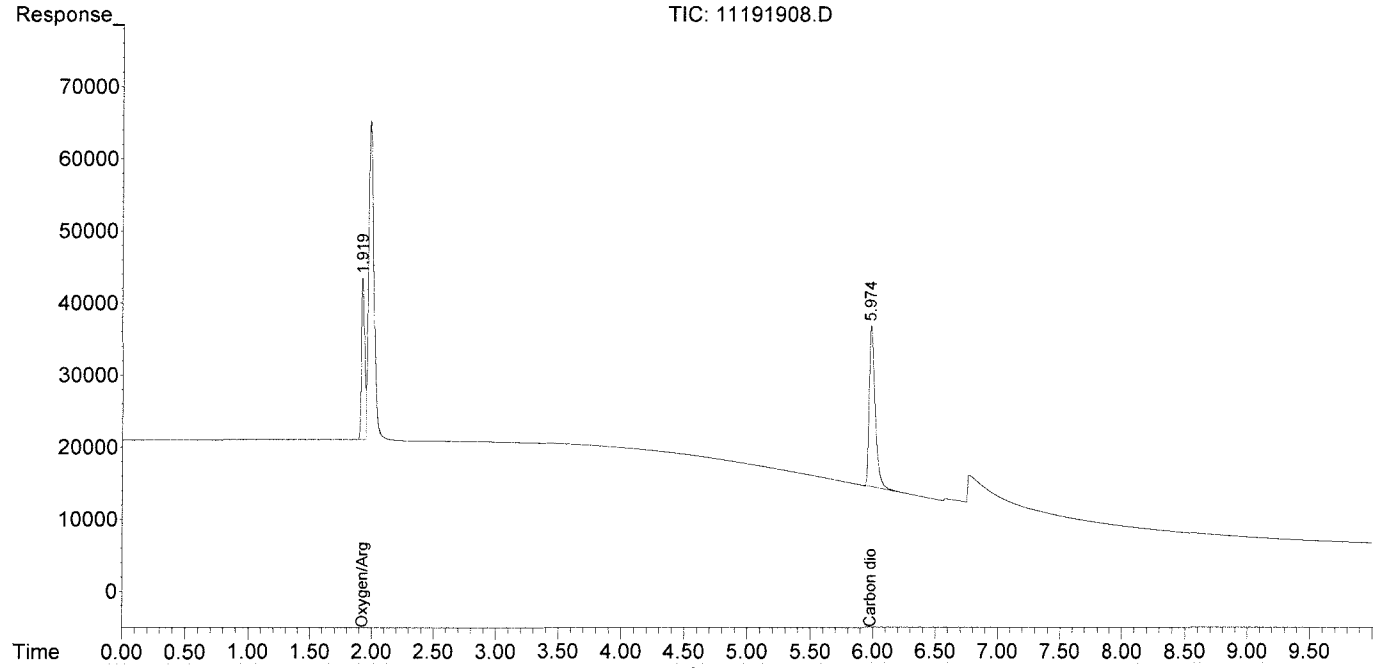
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.920f	399837	0.084	ppm
2)	Carbon monoxide	1.920f	399837	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	5.975	741977	3160.990	ppm
6)	Methane (FID)	0.000	0	N.D.	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	0.000	0	N.D.	ppm
10)	Propane	0.000	0	N.D.	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	0.000	0	N.D.	ppm
13)	n-Butane	0.000	0	N.D.	ppm

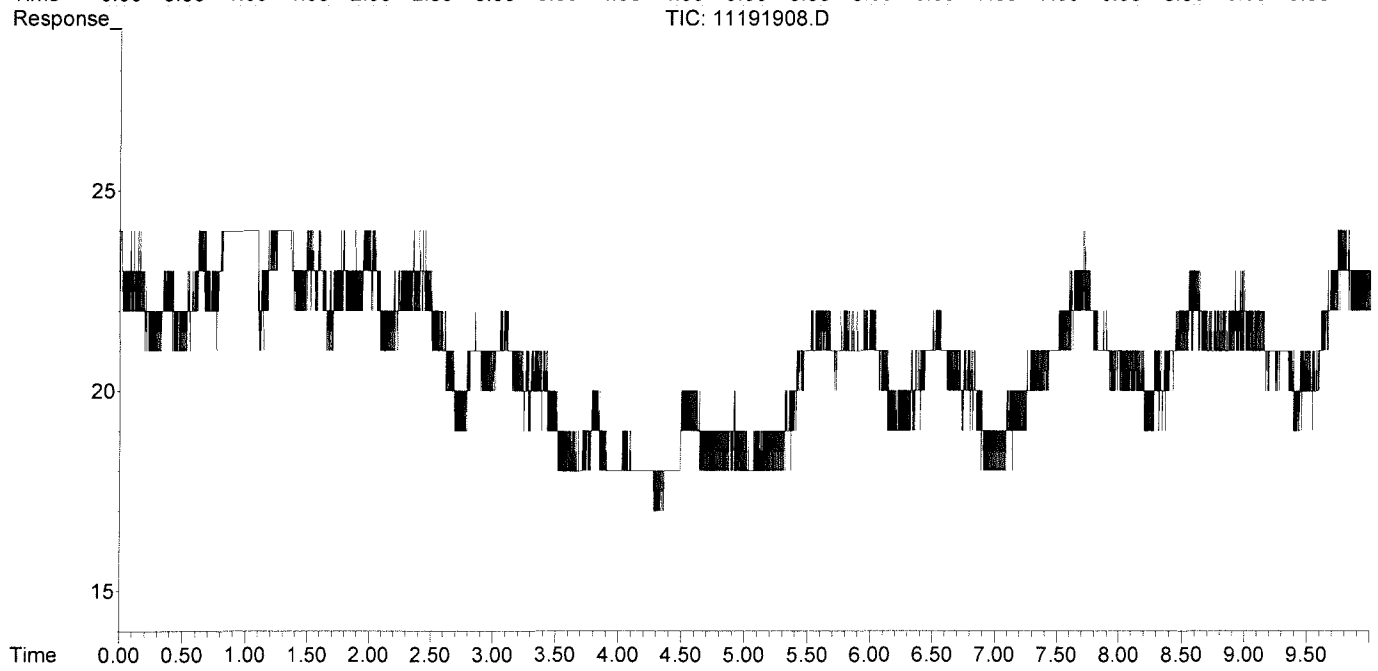
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191908.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 13:43:34
Operator : WH/LD
Sample : P1906981-002 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 13:23:15 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191909.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 14:15:19
Operator : WH/LD
Sample : P1906981-003 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 13:31:07 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

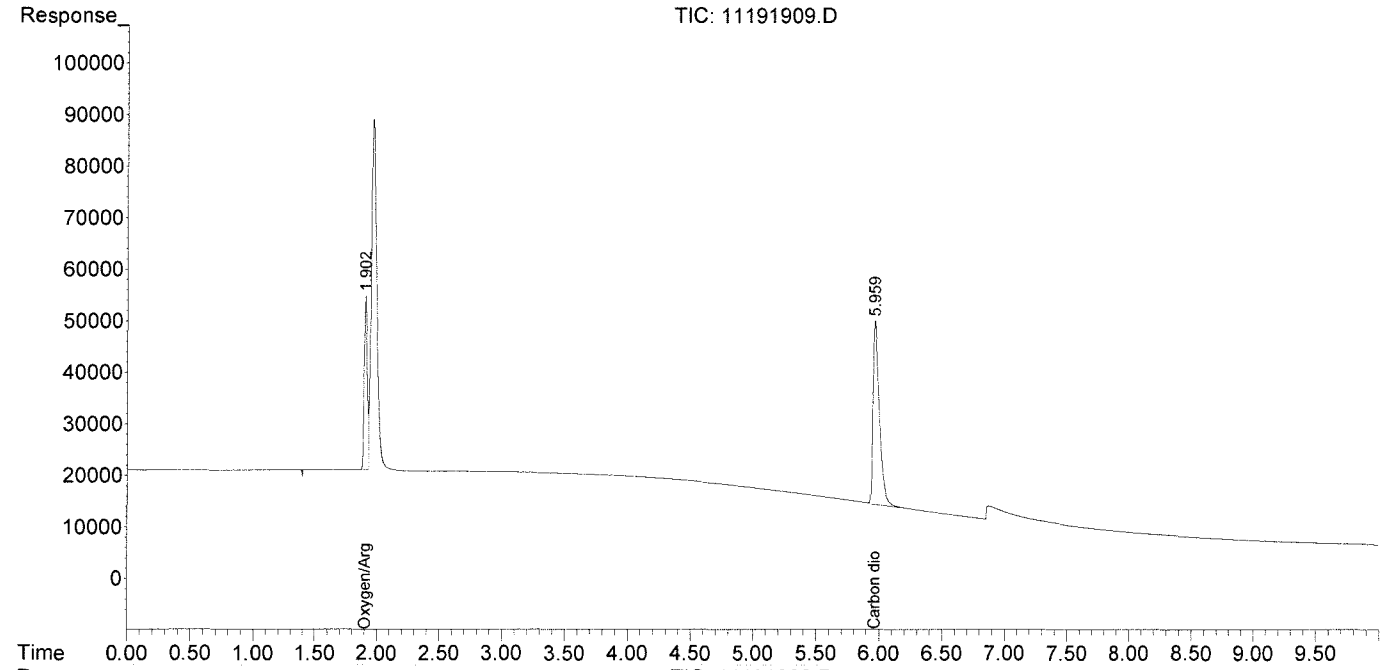
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.903	575266	0.121	ppm	
2)	Carbon monoxide	1.903	575266	N.D.	ppm	
3)	Methane (TCD)	0.000	0	N.D.	ppm	
4)	Carbon dioxide	5.959	1248003	5316.778	ppm	m
6)	Methane (FID)	0.000	0	N.D.	ppm	
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	0	N.D.	ppm	
9)	Propylene	0.000	0	N.D.	ppm	
10)	Propane	0.000	0	N.D.	ppm	
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	0.000	0	N.D.	ppm	
13)	n-Butane	0.000	0	N.D.	ppm	

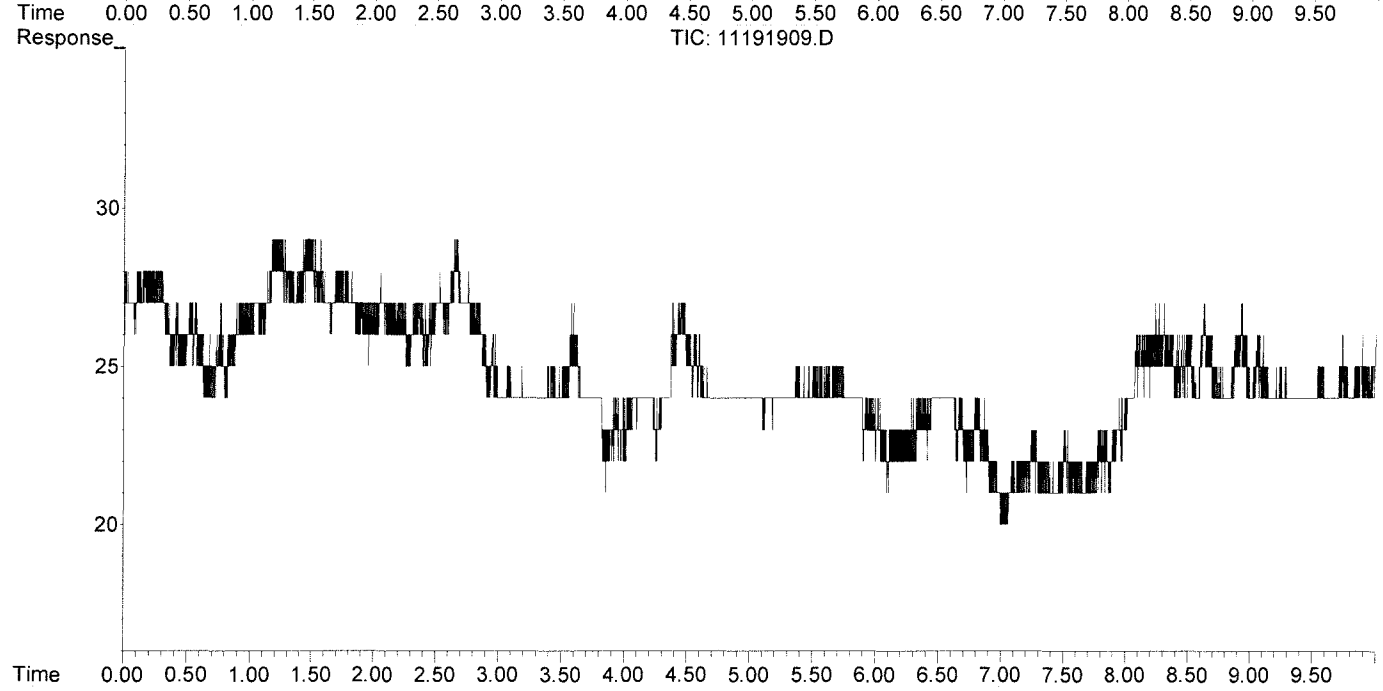
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191909.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 14:15:19
Operator : WH/LD
Sample : P1906981-003 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 13:31:07 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

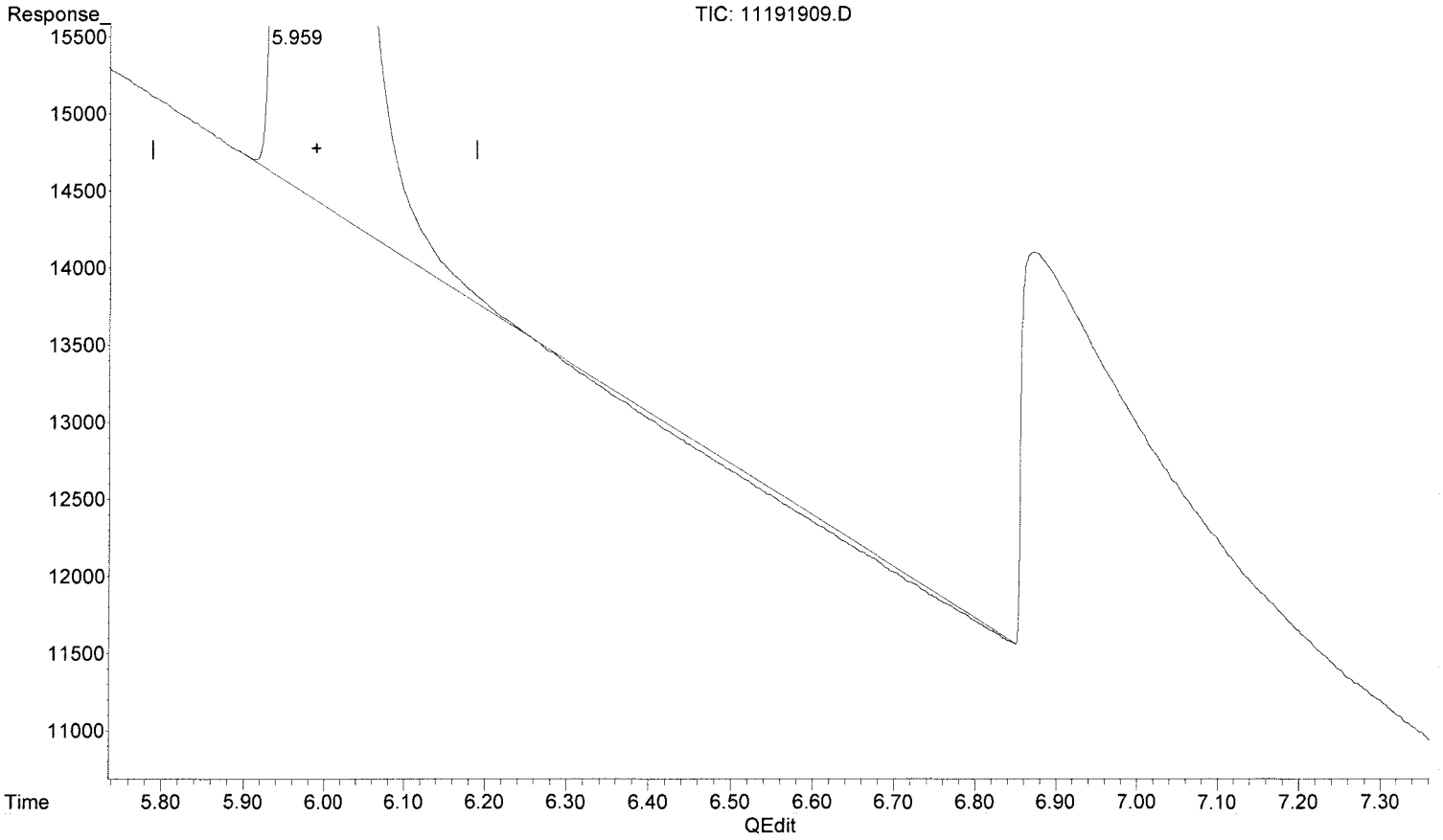




Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191909.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 14:15:19
Operator : WH/LD
Sample : P1906981-003 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 13:31:07 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



(4) Carbon dioxide

5.960min 5277.217 ppm

response 1238717

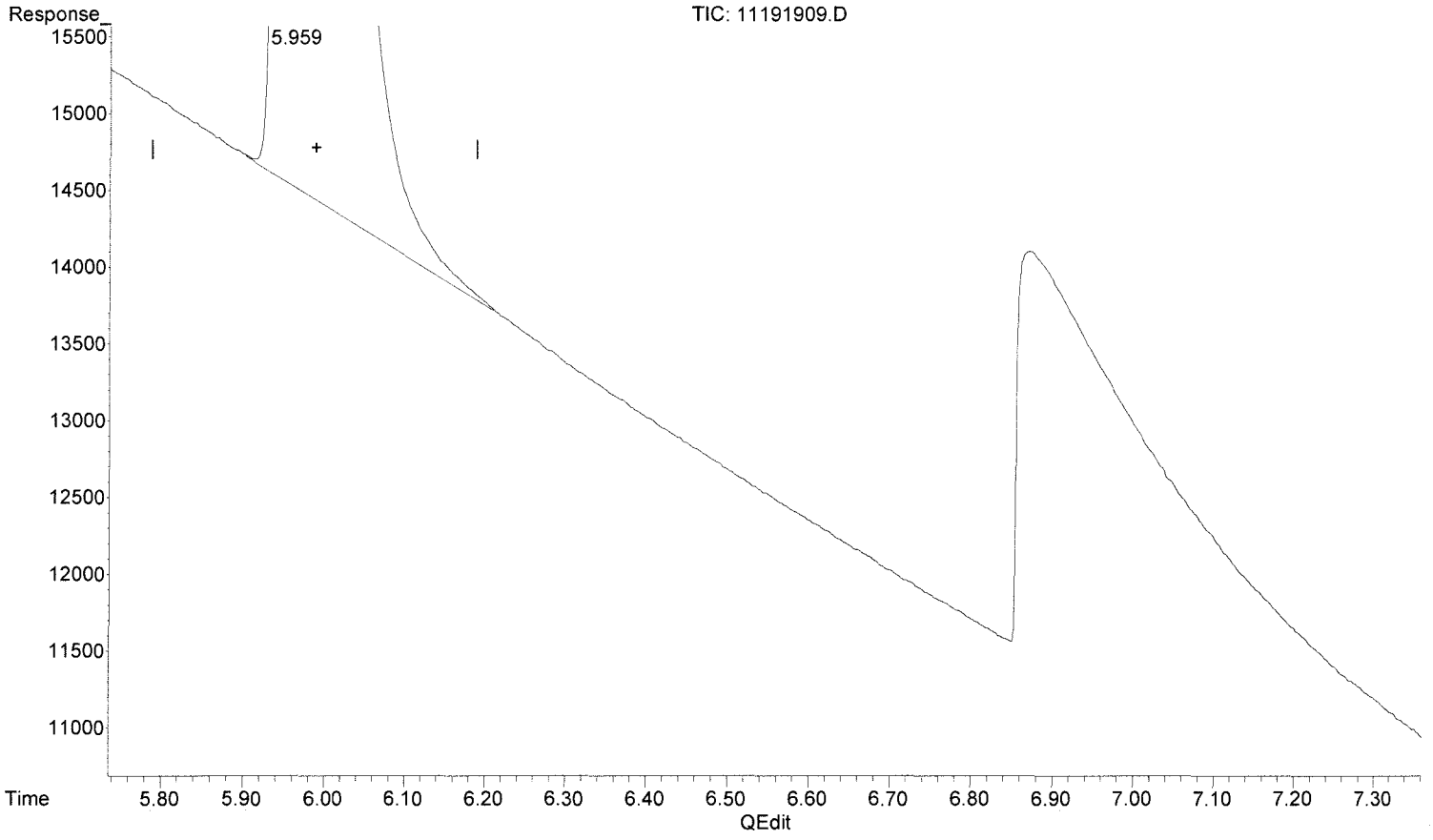
(+) = Expected Retention Time

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191909.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 14:15:19
Operator : WH/LD
Sample : P1906981-003 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 13:31:07 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

CD
11/19
BLC

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



(4) Carbon dioxide

5.959min 5316.778 ppm m

response 1248003

(+) = Expected Retention Time

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191910.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 14:29:15
Operator : WH/LD
Sample : P1906981-004 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 14:18:42 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

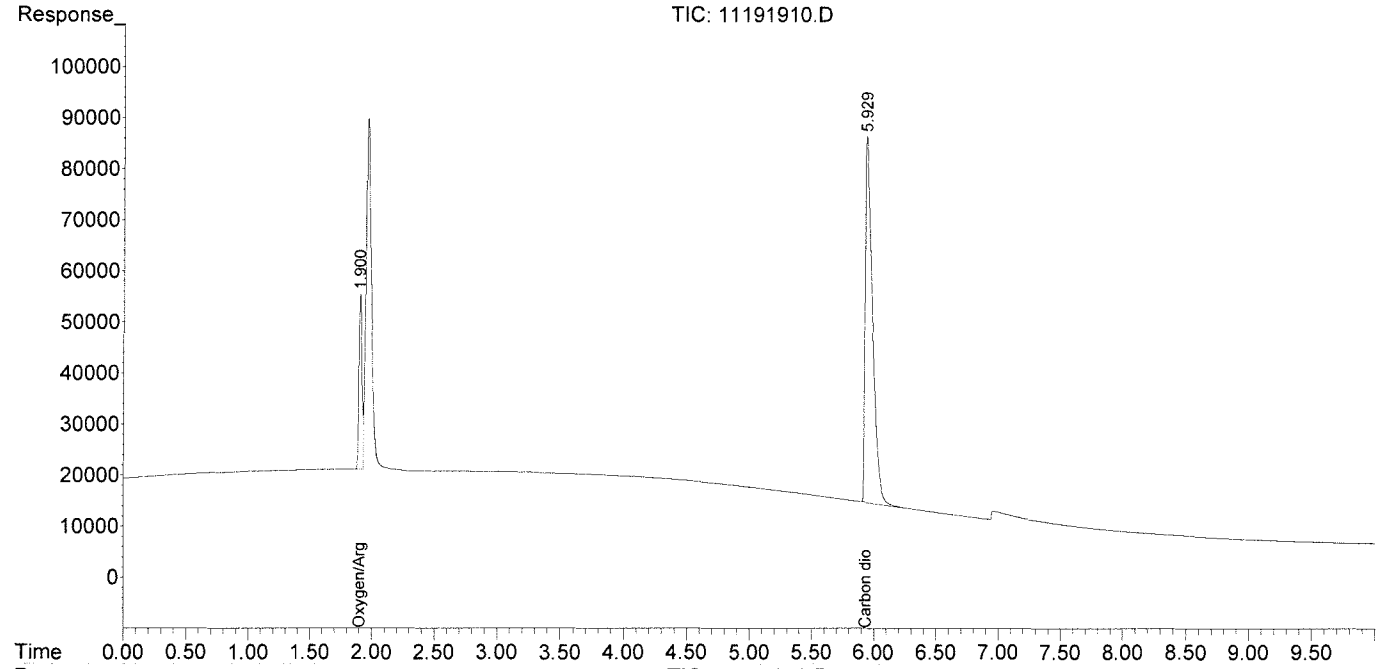
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.901	578218	0.121	ppm
2)	Carbon monoxide	1.901	578218	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	5.930	2942979	12537.765	ppm
6)	Methane (FID)	0.000	0	N.D.	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	0.000	0	N.D.	ppm
10)	Propane	0.000	0	N.D.	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	0.000	0	N.D.	ppm
13)	n-Butane	0.000	0	N.D.	ppm

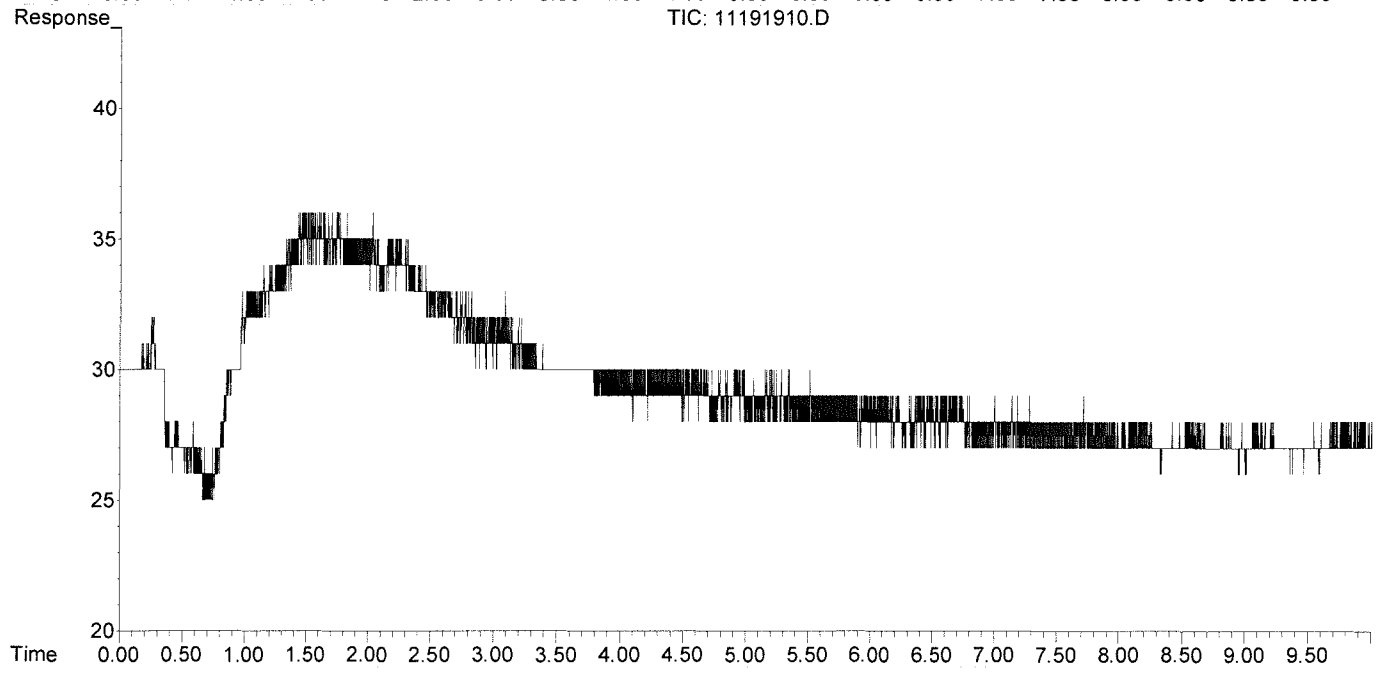
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191910.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 14:29:15
Operator : WH/LD
Sample : P1906981-004 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 14:18:42 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191911.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 14:42:11
Operator : WH/LD
Sample : P1906981-005 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 14:18:55 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

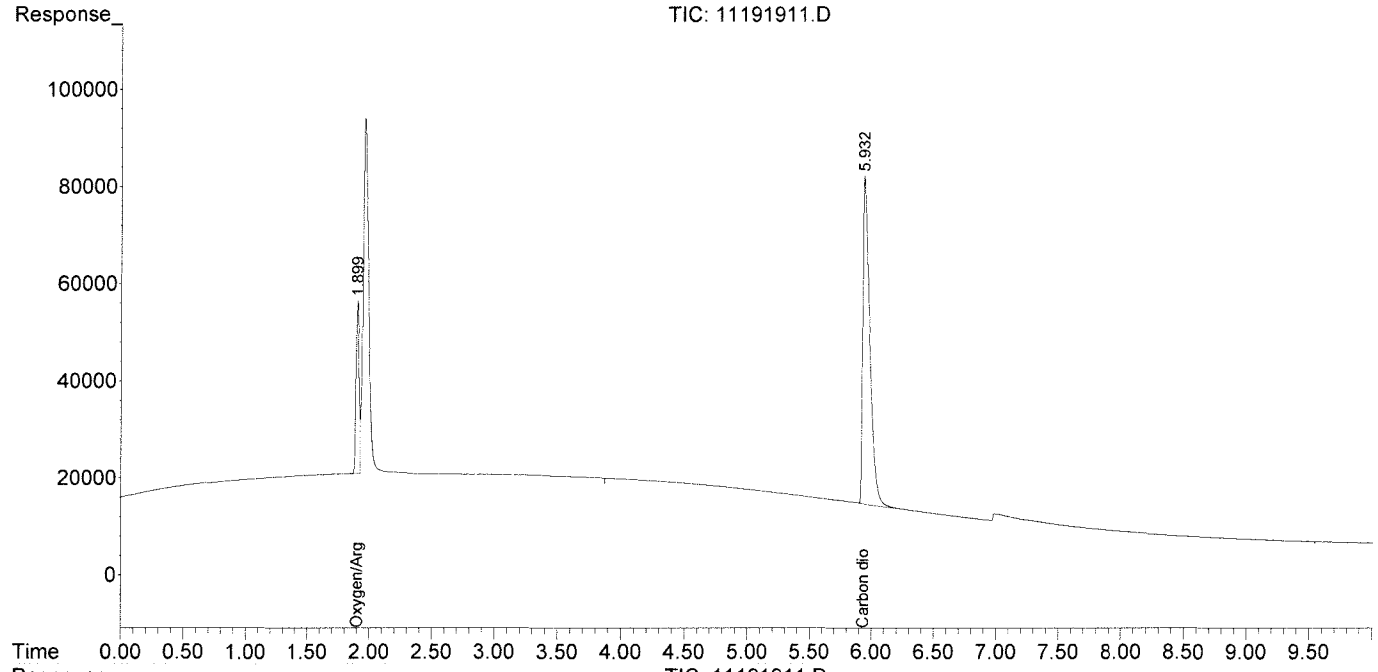
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.900	597951	0.126	ppm	
2)	Carbon monoxide	1.900	597951	N.D.	ppm	
3)	Methane (TCD)	0.000	0	N.D.	ppm	
4)	Carbon dioxide	5.932	2669272	11371.711	ppm	m
6)	Methane (FID)	0.000	0	N.D.	ppm	
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	0	N.D.	ppm	
9)	Propylene	0.000	0	N.D.	ppm	
10)	Propane	0.000	0	N.D.	ppm	
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	0.000	0	N.D.	ppm	
13)	n-Butane	0.000	0	N.D.	ppm	

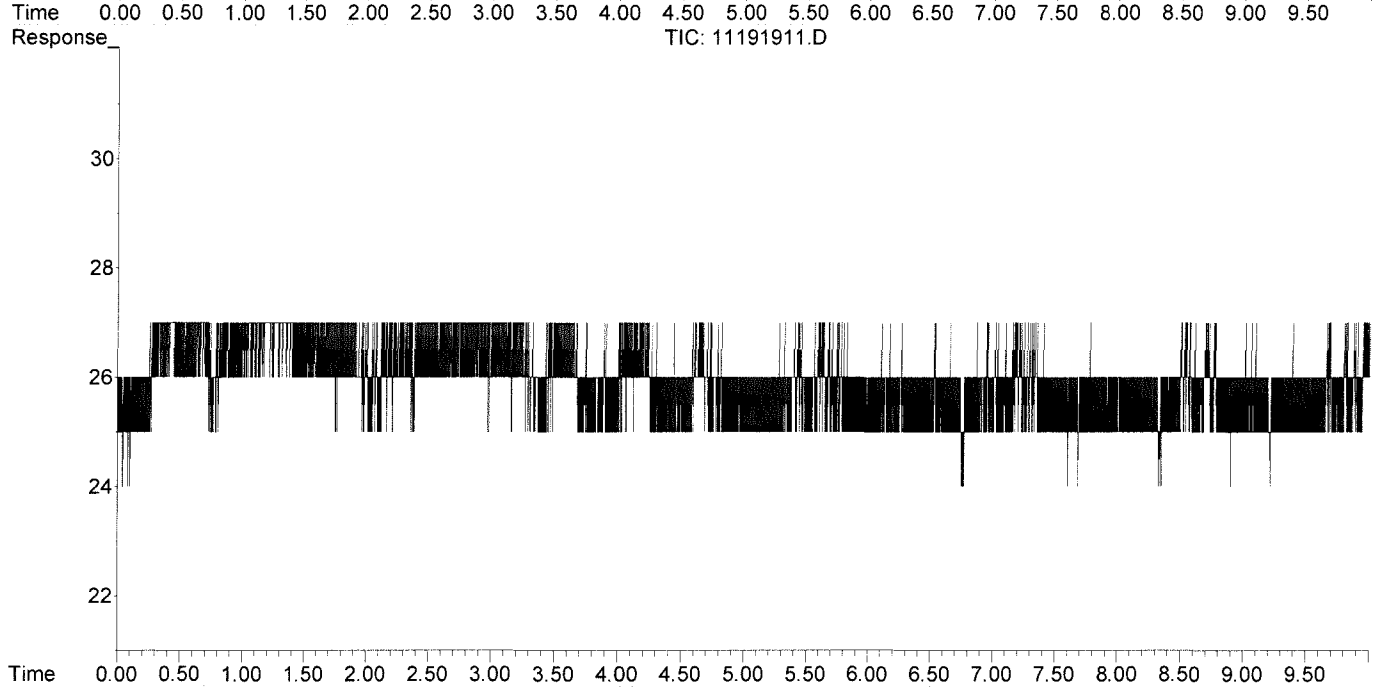
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191911.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 14:42:11
Operator : WH/LD
Sample : P1906981-005 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 14:18:55 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

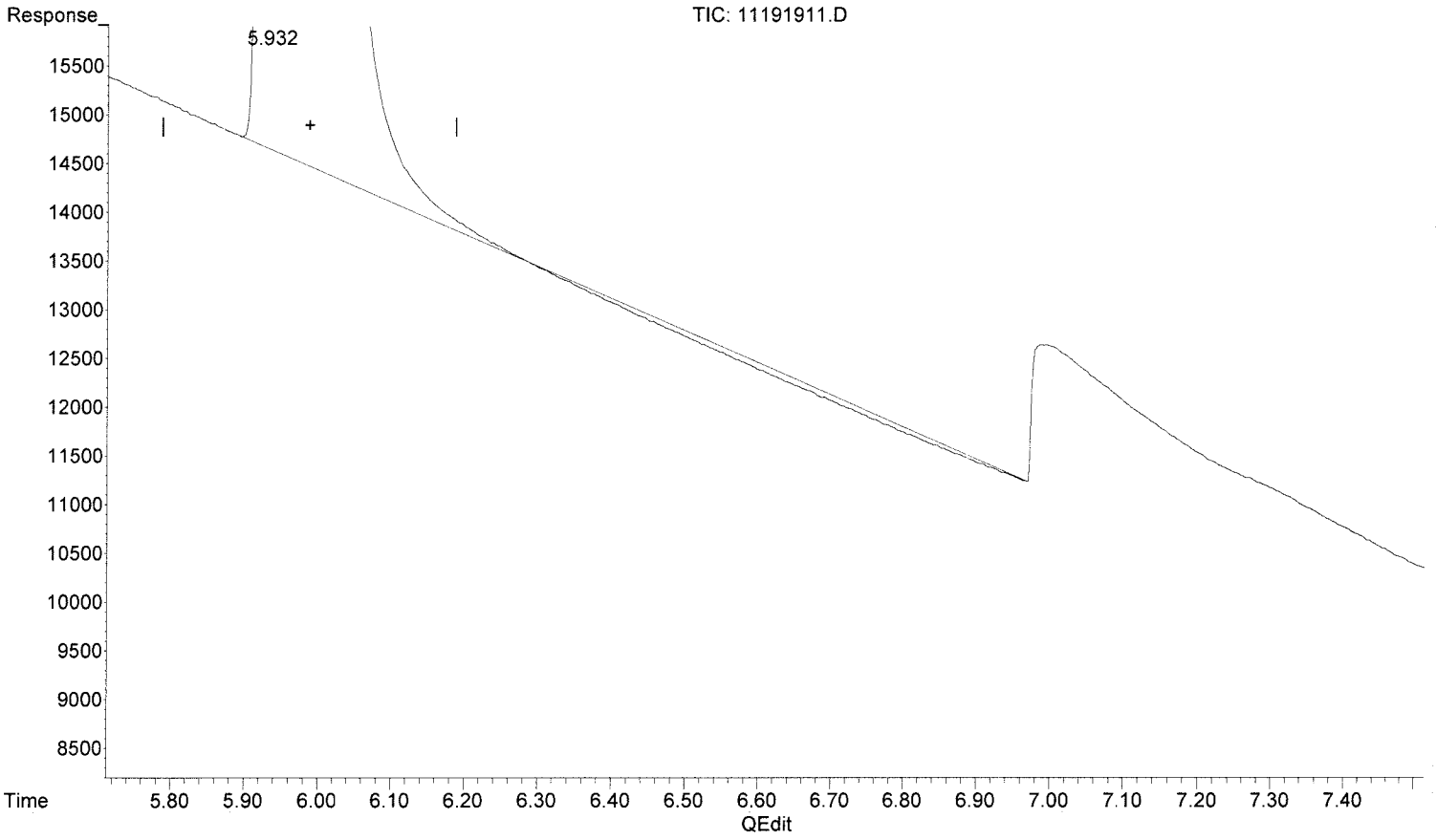




Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191911.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 14:42:11
Operator : WH/LD
Sample : P1906981-005 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 14:18:55 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



(4) Carbon dioxide

5.934min 11301.373 ppm

response 2652762

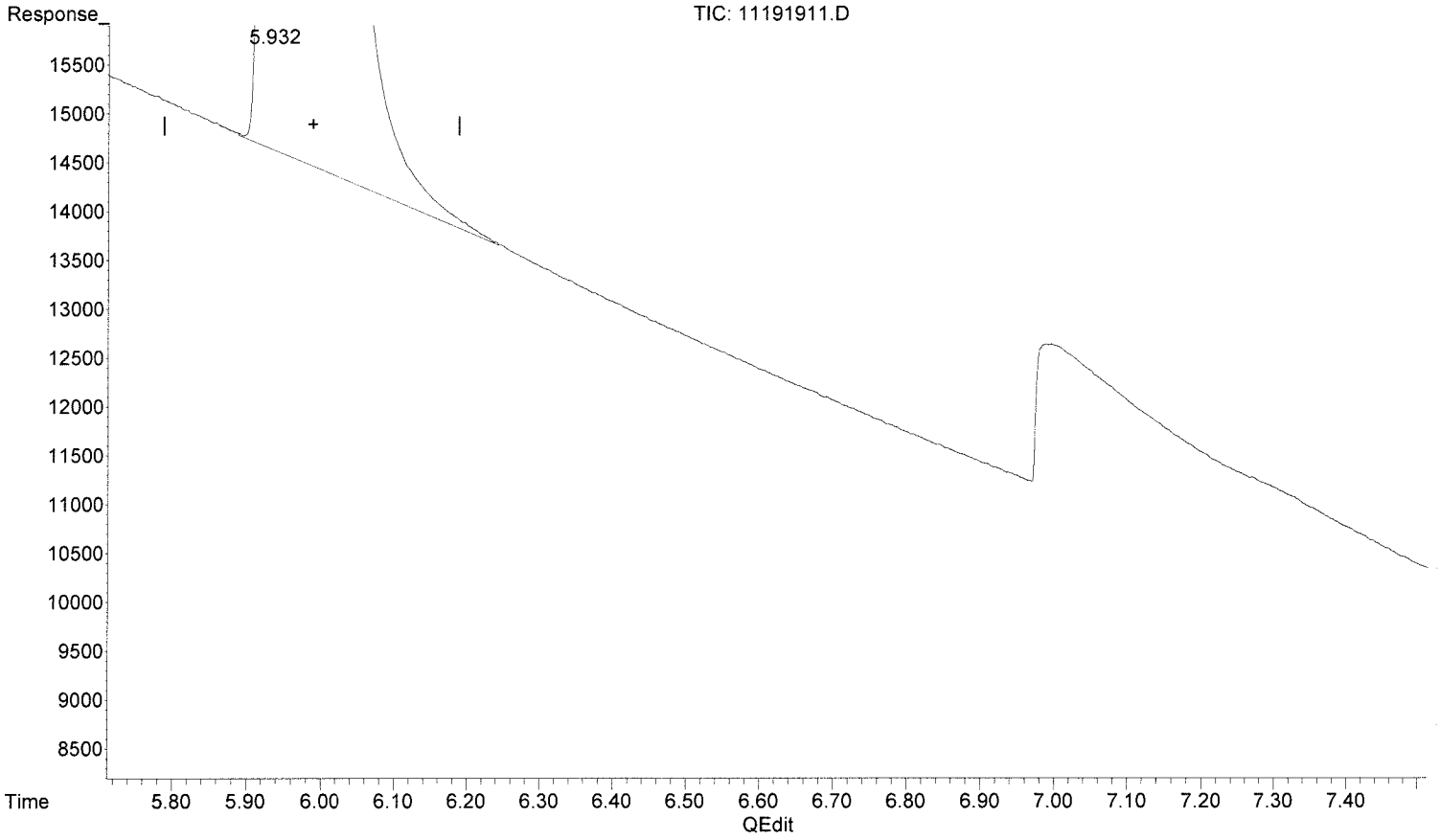
(+) = Expected Retention Time

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191911.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 14:42:11
Operator : WH/LD
Sample : P1906981-005 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 14:18:55 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

LP
11/19
BLC

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



(4) Carbon dioxide

5.932min 11371.711 ppm m

response 2669272

11/20/19

(+) = Expected Retention Time

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191912.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 14:55:10
Operator : WH/LD
Sample : P1906981-006 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 14:19:12 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

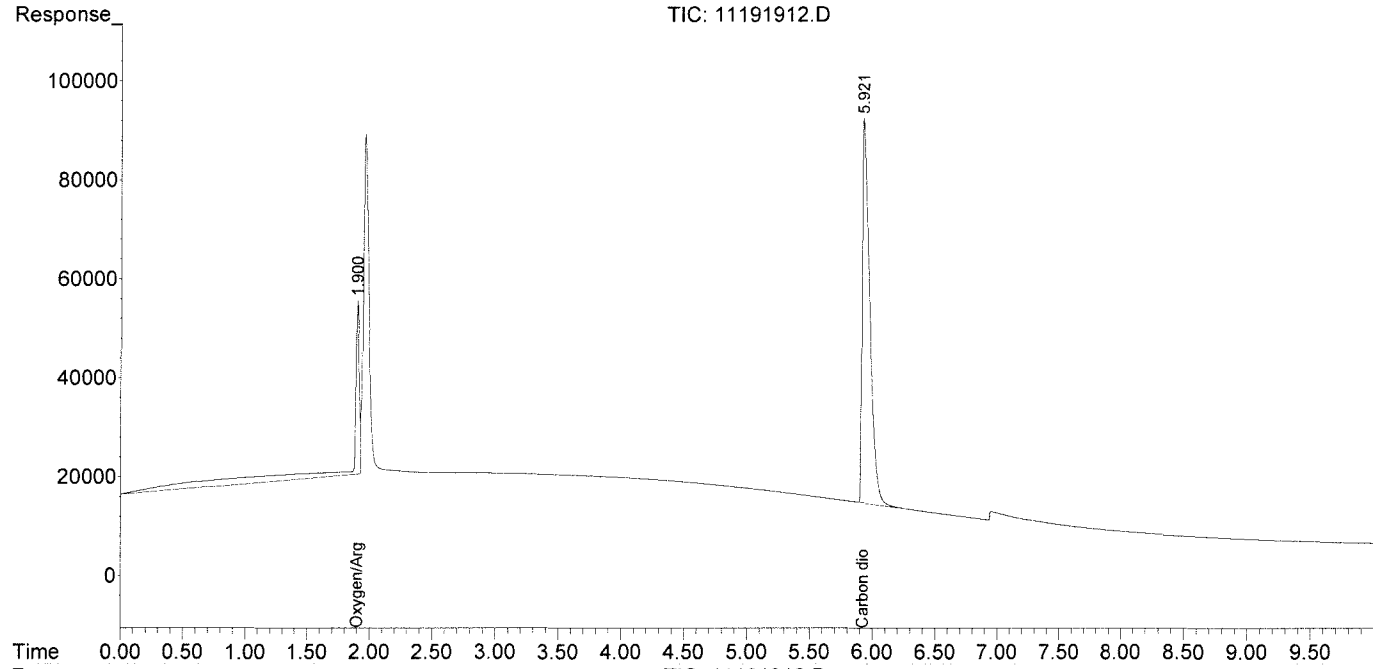
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.901	1701904	0.358	ppm	
2)	Carbon monoxide	1.901	1701904	N.D.	ppm	
3)	Methane (TCD)	0.000	0	N.D.	ppm	
4)	Carbon dioxide	5.921	3225515	13741.433	ppm	m
6)	Methane (FID)	0.000	0	N.D.	ppm	
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	0	N.D.	ppm	
9)	Propylene	0.000	0	N.D.	ppm	
10)	Propane	0.000	0	N.D.	ppm	
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	0.000	0	N.D.	ppm	
13)	n-Butane	0.000	0	N.D.	ppm	

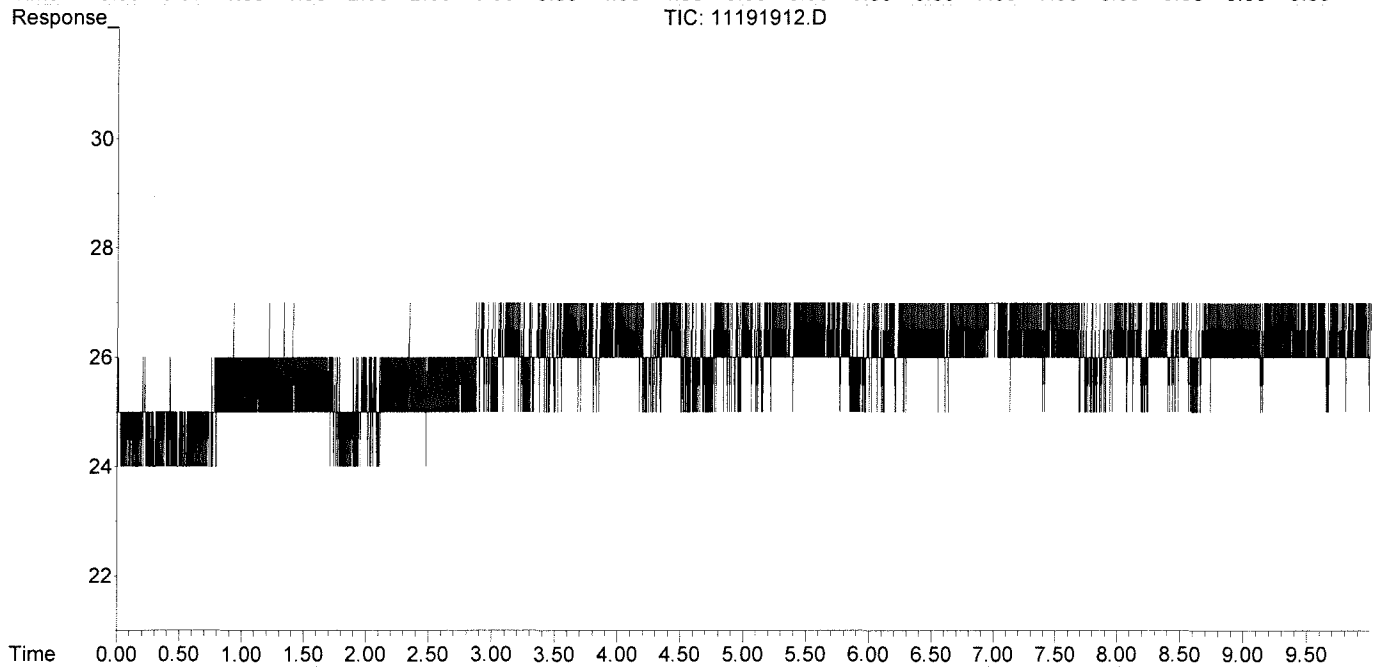
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191912.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 14:55:10
Operator : WH/LD
Sample : P1906981-006 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 14:19:12 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

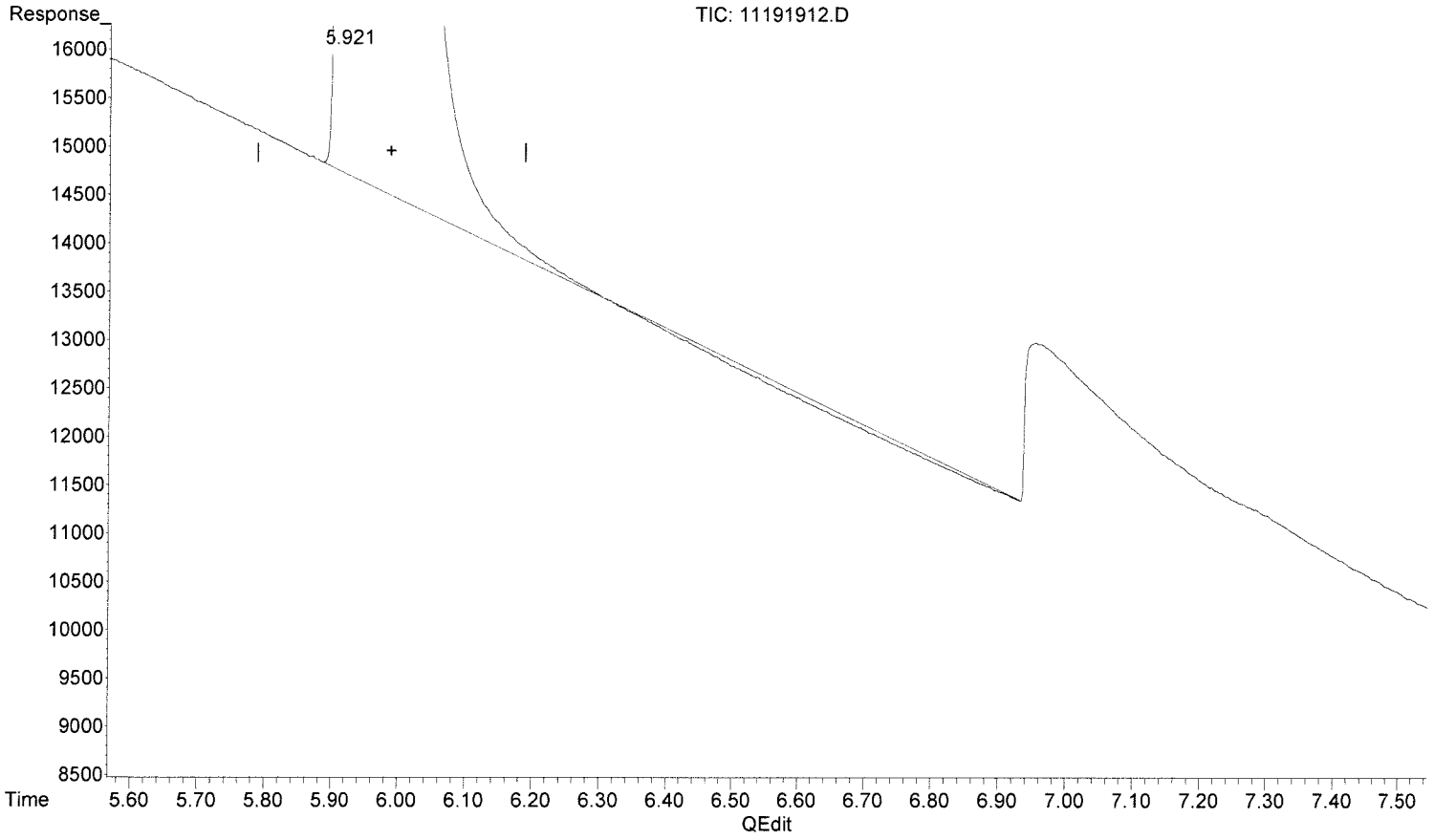




Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191912.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 14:55:10
Operator : WH/LD
Sample : P1906981-006 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 14:19:12 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



(4) Carbon dioxide

5.922min 13688.986 ppm

response 3213205

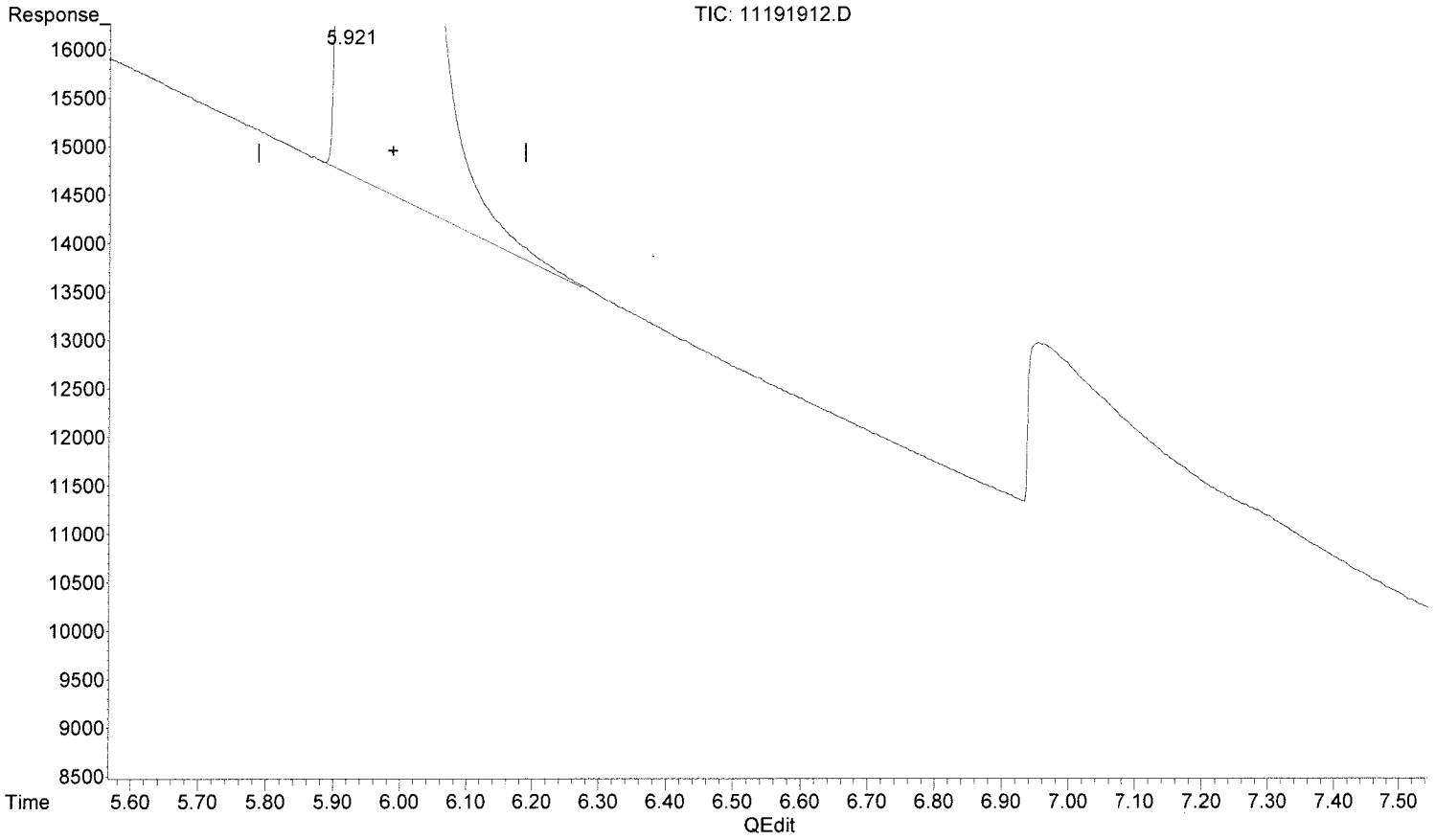
(+) = Expected Retention Time

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191912.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 14:55:10
Operator : WH/LD
Sample : P1906981-006 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 14:19:12 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

LD
BLC
11/19

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



(4) Carbon dioxide

5.921min 13741.433 ppm m

response 3225515

12/20/19

(+) = Expected Retention Time

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191904.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 12:14:52
Operator : WH/LD
Sample : MCS 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 11:25:26 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

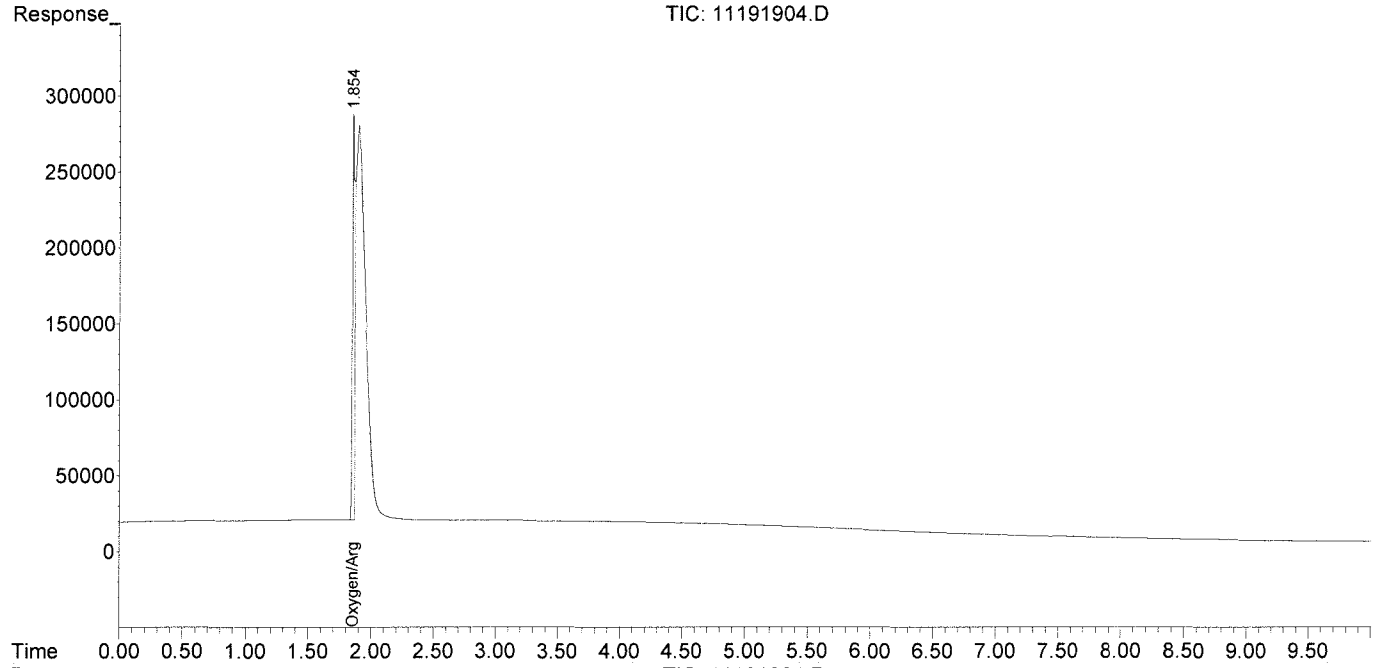
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.855	3182198	0.669	ppm
2)	Carbon monoxide	1.855	3182198	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	0.000	0	N.D.	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	0.000	0	N.D.	ppm
10)	Propane	0.000	0	N.D.	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	0.000	0	N.D.	ppm
13)	n-Butane	0.000	0	N.D.	ppm

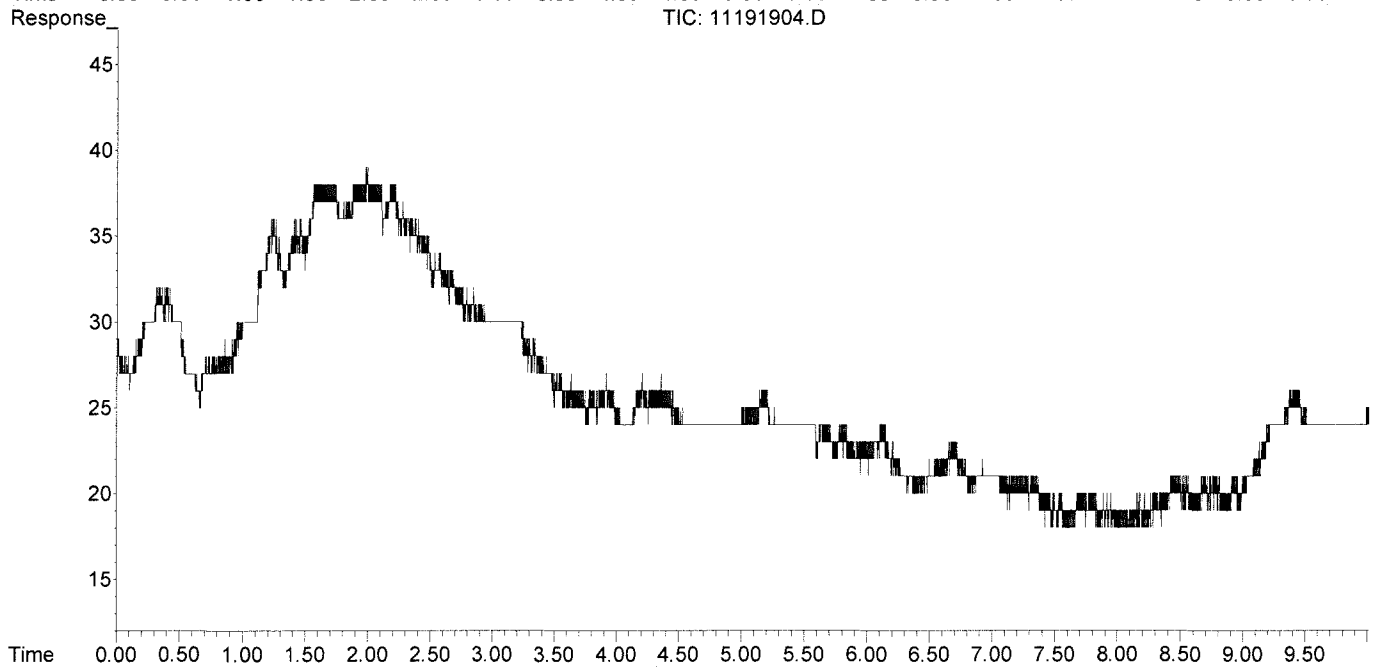
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191904.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 12:14:52
Operator : WH/LD
Sample : MCS 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 11:25:26 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191914.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 15:30:06
Operator : WH/LD
Sample : LCS S32-08141901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 14:43:39 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

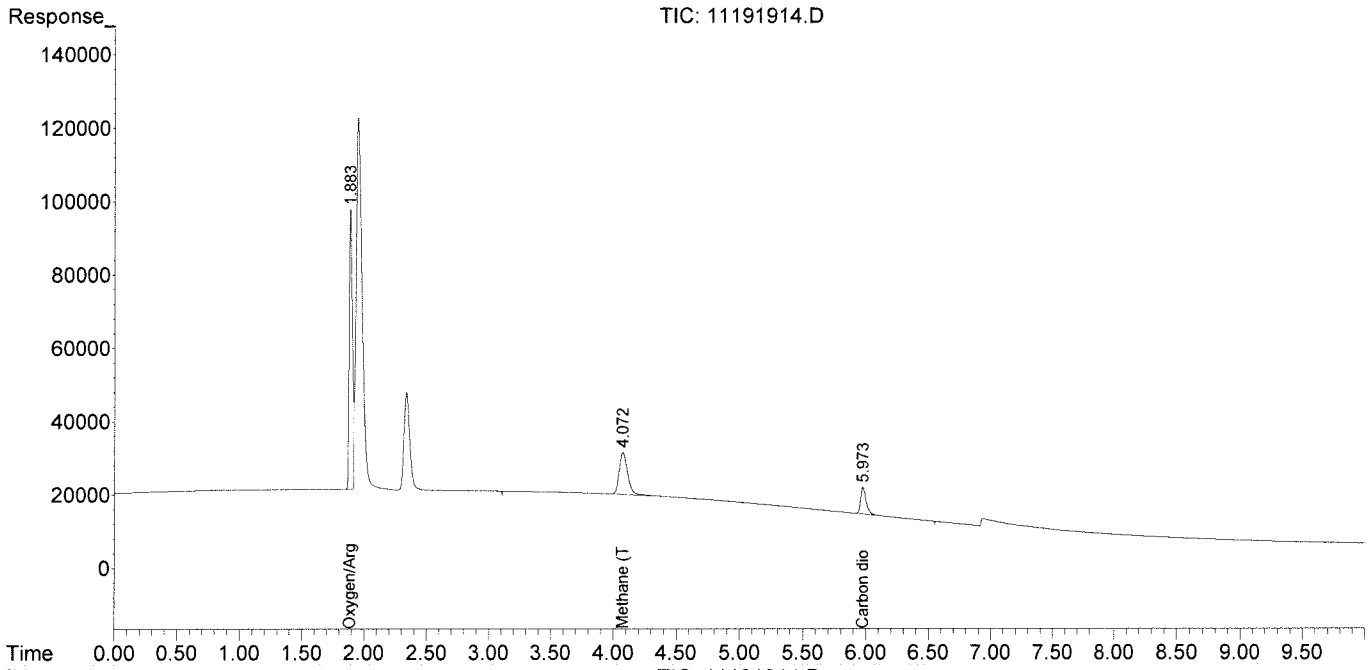
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.883	1353672	0.284	ppm	
2)	Carbon monoxide	1.883	1353672	N.D.	ppm	
3)	Methane (TCD)	4.073f	530835	56129.320	ppm	
4)	Carbon dioxide	5.973	227313	968.407	ppm	m
6)	Methane (FID)	0.000	0	N.D.	ppm	
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	0	N.D.	ppm	
9)	Propylene	0.000	0	N.D.	ppm	
10)	Propane	0.000	0	N.D.	ppm	
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	0.000	0	N.D.	ppm	
13)	n-Butane	0.000	0	N.D.	ppm	

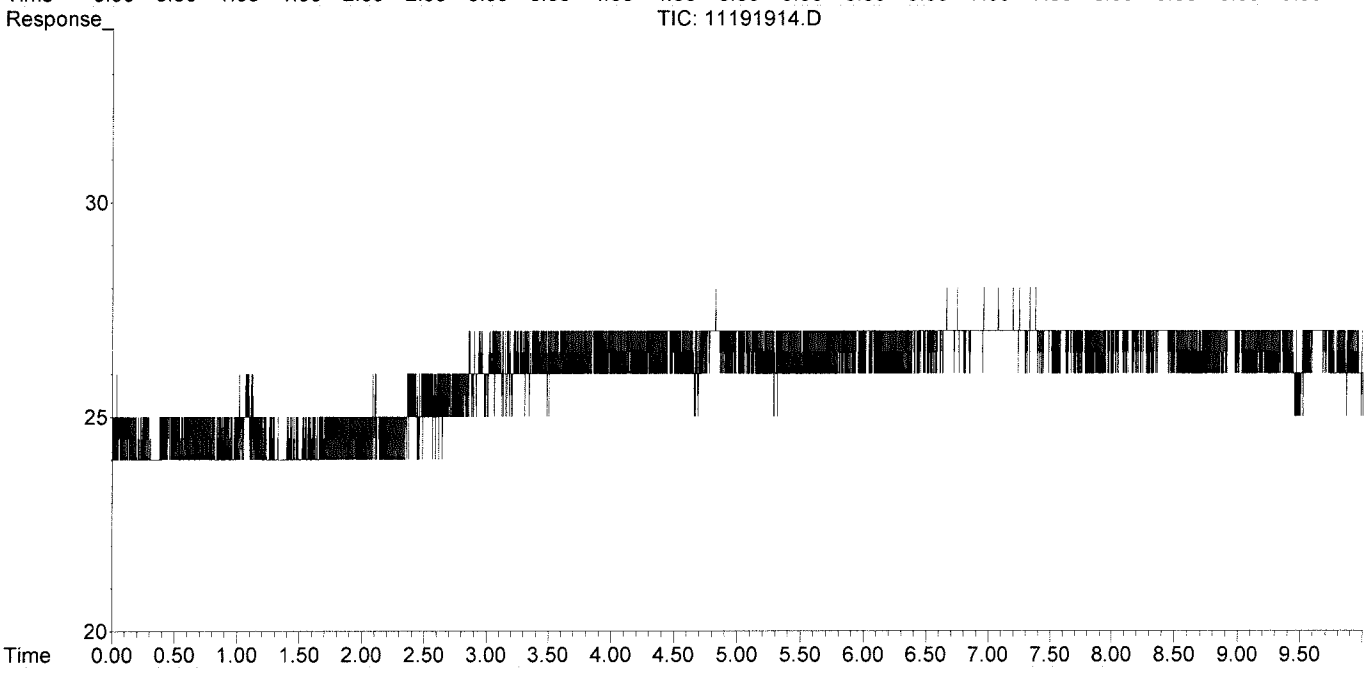
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191914.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 15:30:06
Operator : WH/LD
Sample : LCS S32-08141901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 14:43:39 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

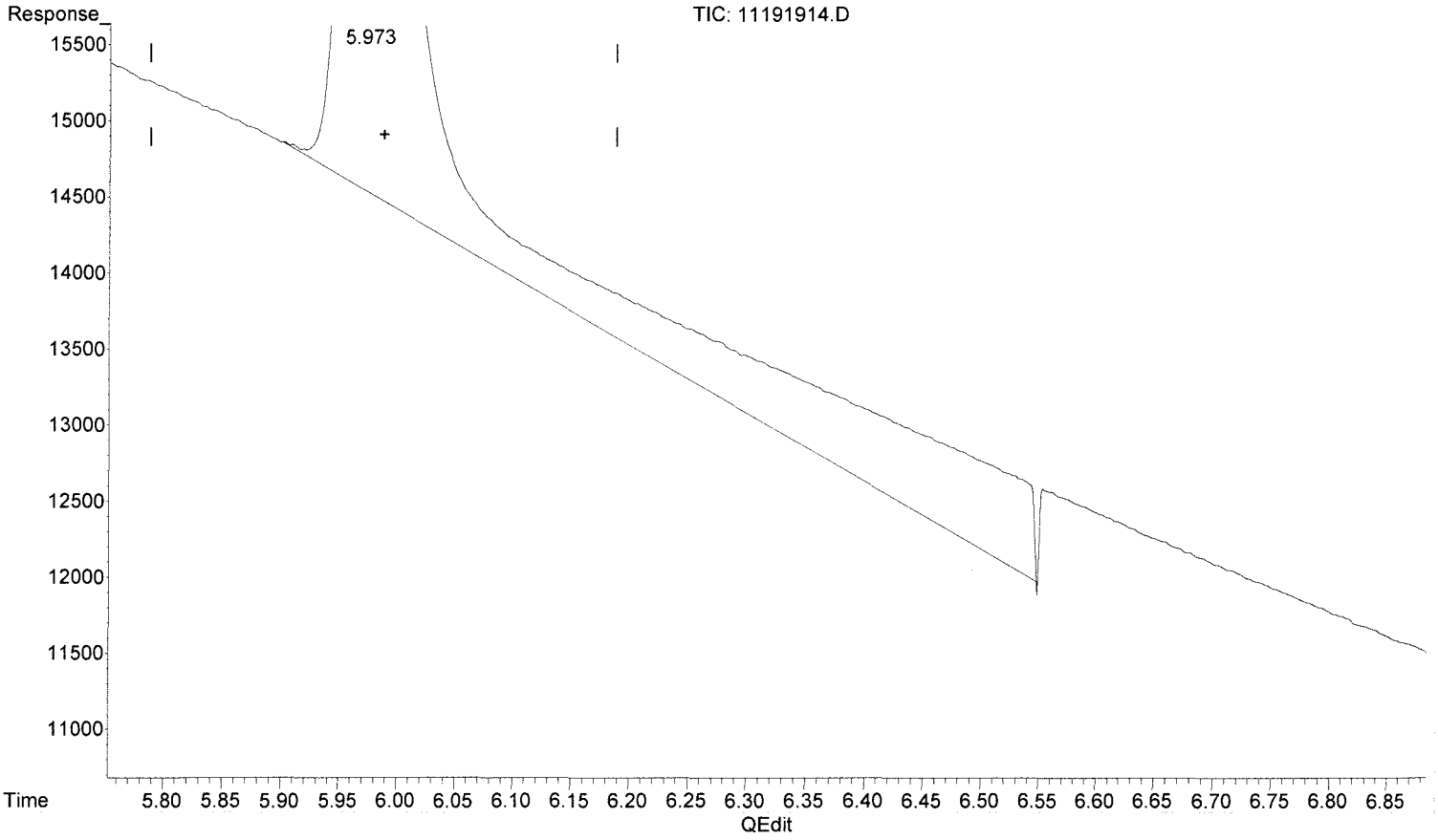




Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191914.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 15:30:06
Operator : WH/LD
Sample : LCS S32-08141901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 14:43:39 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



(4) Carbon dioxide

5.974min 1495.113 ppm

response 350947

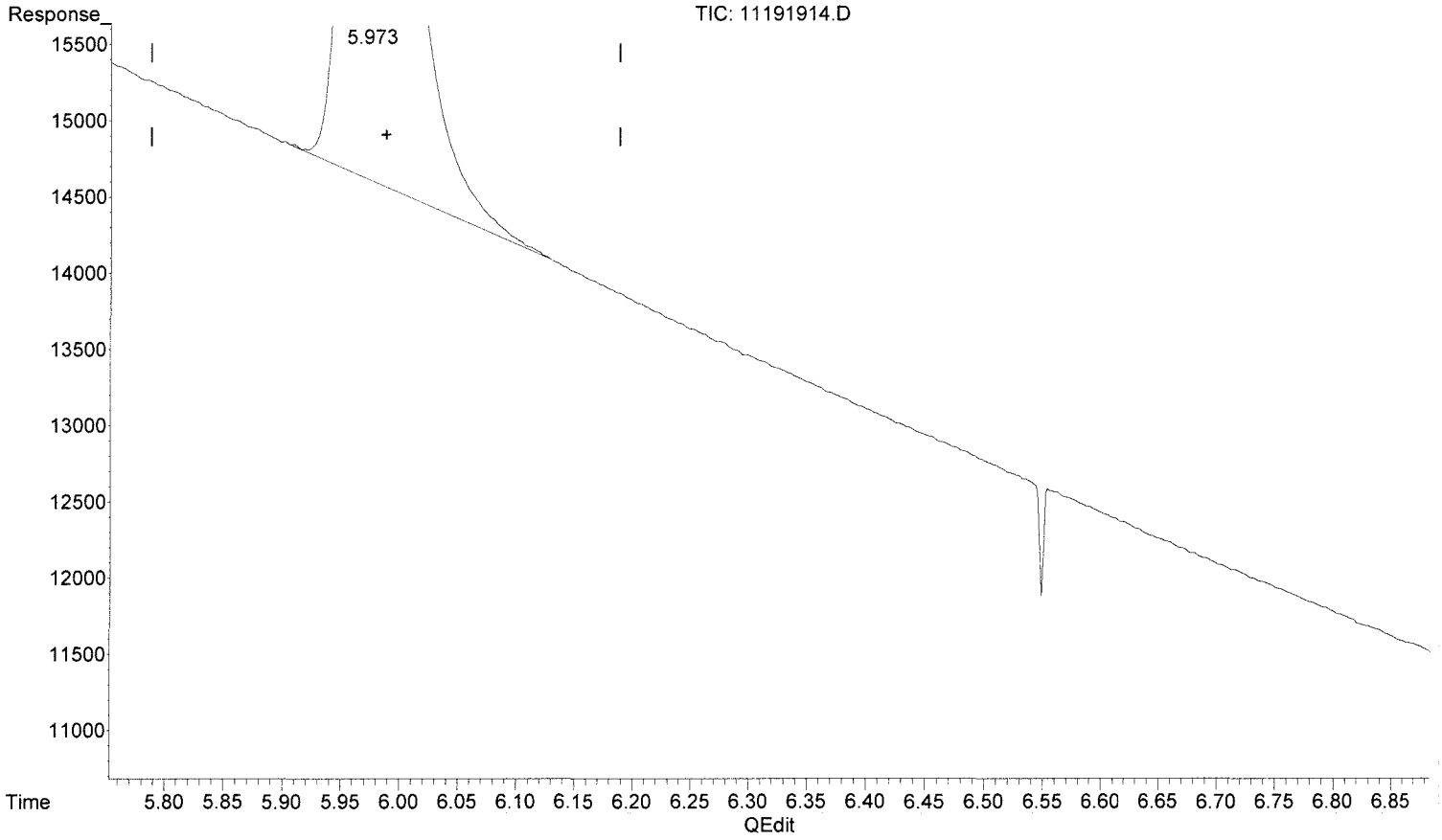
(+) = Expected Retention Time

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191914.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 15:30:06
Operator : WH/LD
Sample : LCS S32-08141901
Misc :
ALS Vial : 1 Sample Multiplier: 1

LD
BLL
11/19

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 14:43:39 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



(4) Carbon dioxide

5.973min 968.407 ppm m

response 227313

11/20/19

(+) = Expected Retention Time

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191915.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 15:43:01
Operator : WH/LD
Sample : LCSD S32-08141901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 14:56:34 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

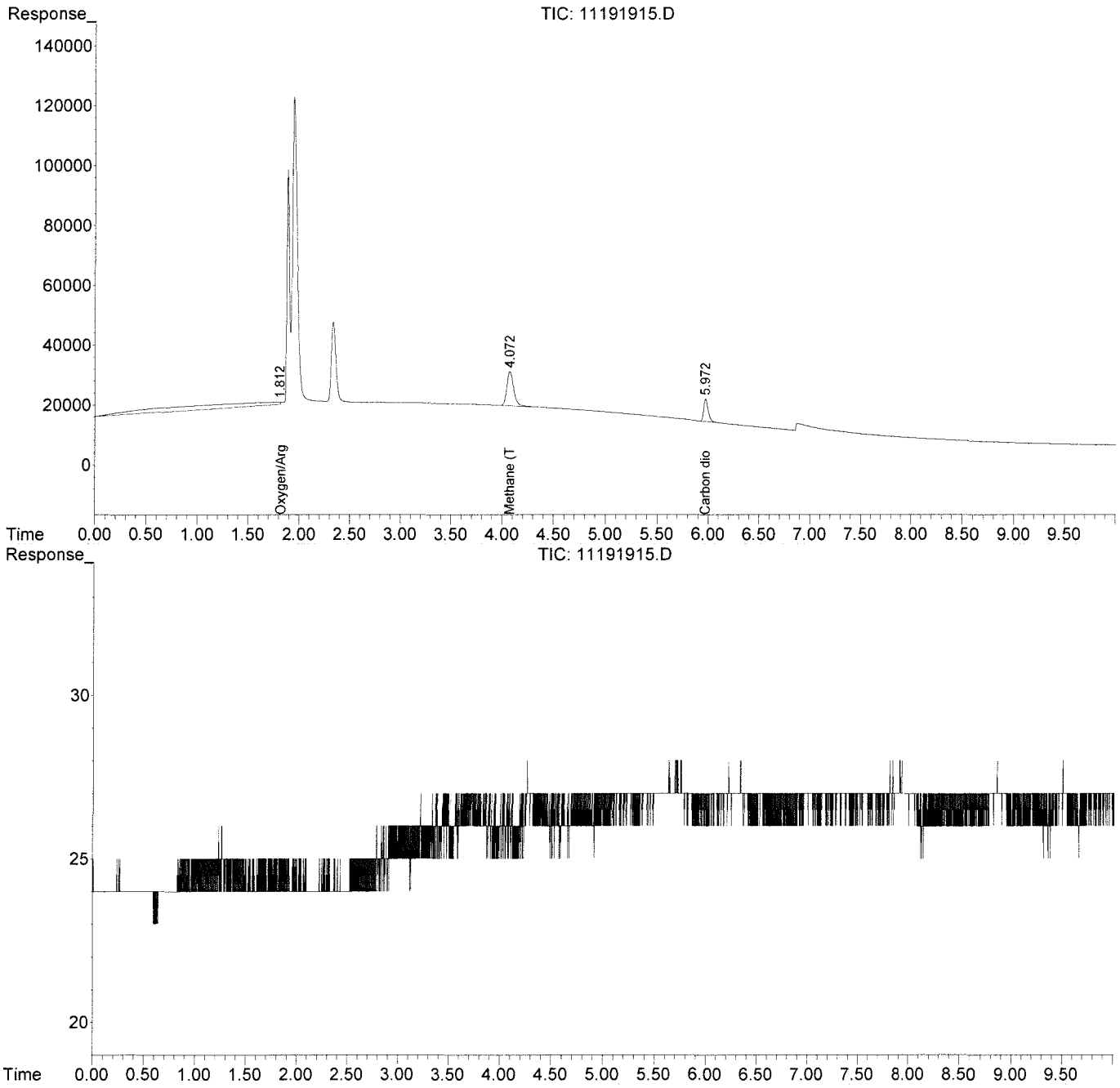
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.812	1190812	0.250	ppm	
2)	Carbon monoxide	1.812	1190812	N.D.	ppm	
3)	Methane (TCD)	4.073f	523663	55370.957	ppm	
4)	Carbon dioxide	5.972	226846	966.415	ppm	m
6)	Methane (FID)	0.000	0	N.D.	ppm	
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	0	N.D.	ppm	
9)	Propylene	0.000	0	N.D.	ppm	
10)	Propane	0.000	0	N.D.	ppm	
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	0.000	0	N.D.	ppm	
13)	n-Butane	0.000	0	N.D.	ppm	

(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191915.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 15:43:01
Operator : WH/LD
Sample : LCSD S32-08141901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 14:56:34 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

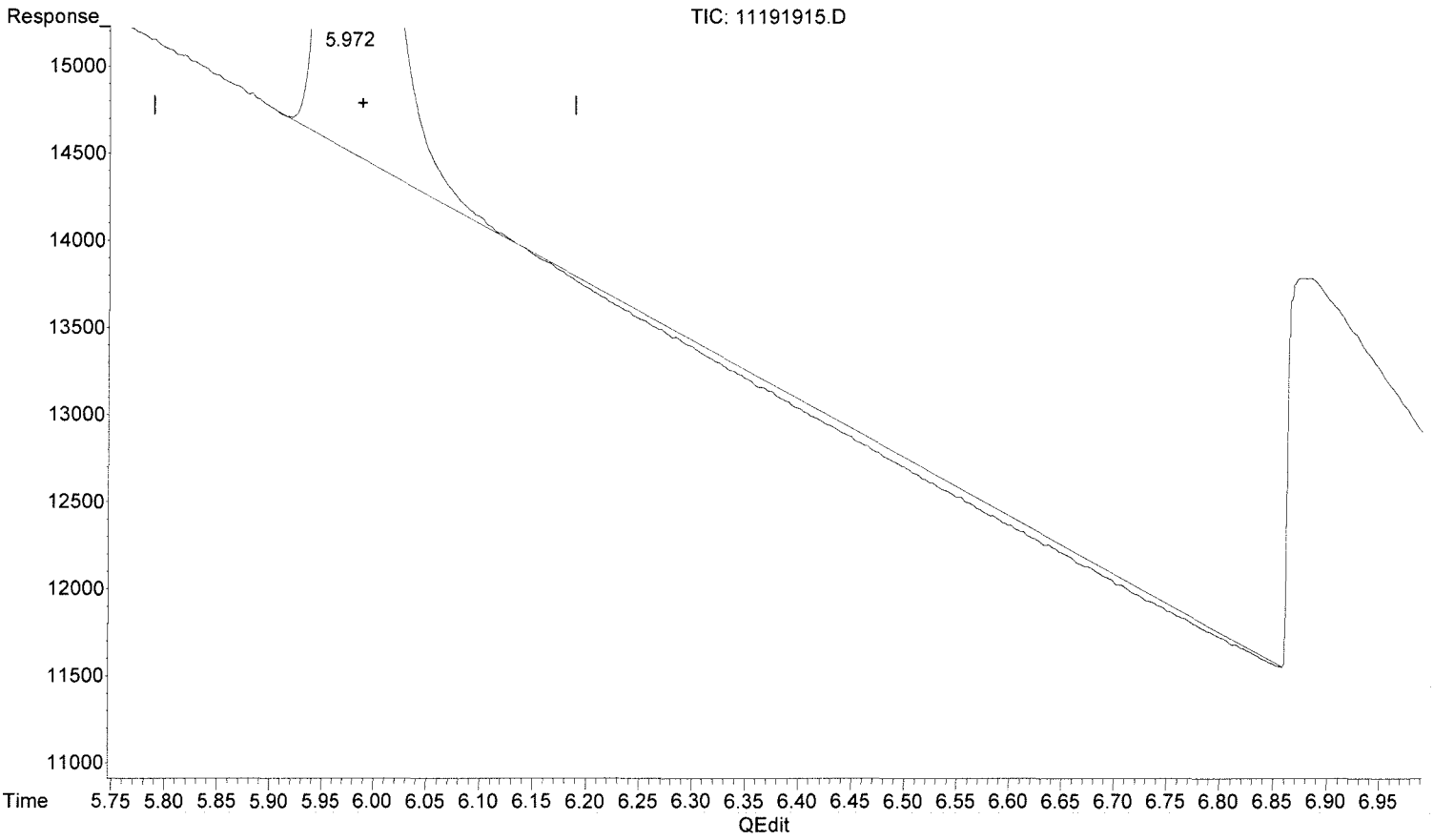
Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191915.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 15:43:01
Operator : WH/LD
Sample : LCSD S32-08141901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 14:56:34 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



(4) Carbon dioxide

5.973min 898.264 ppm

response 210849

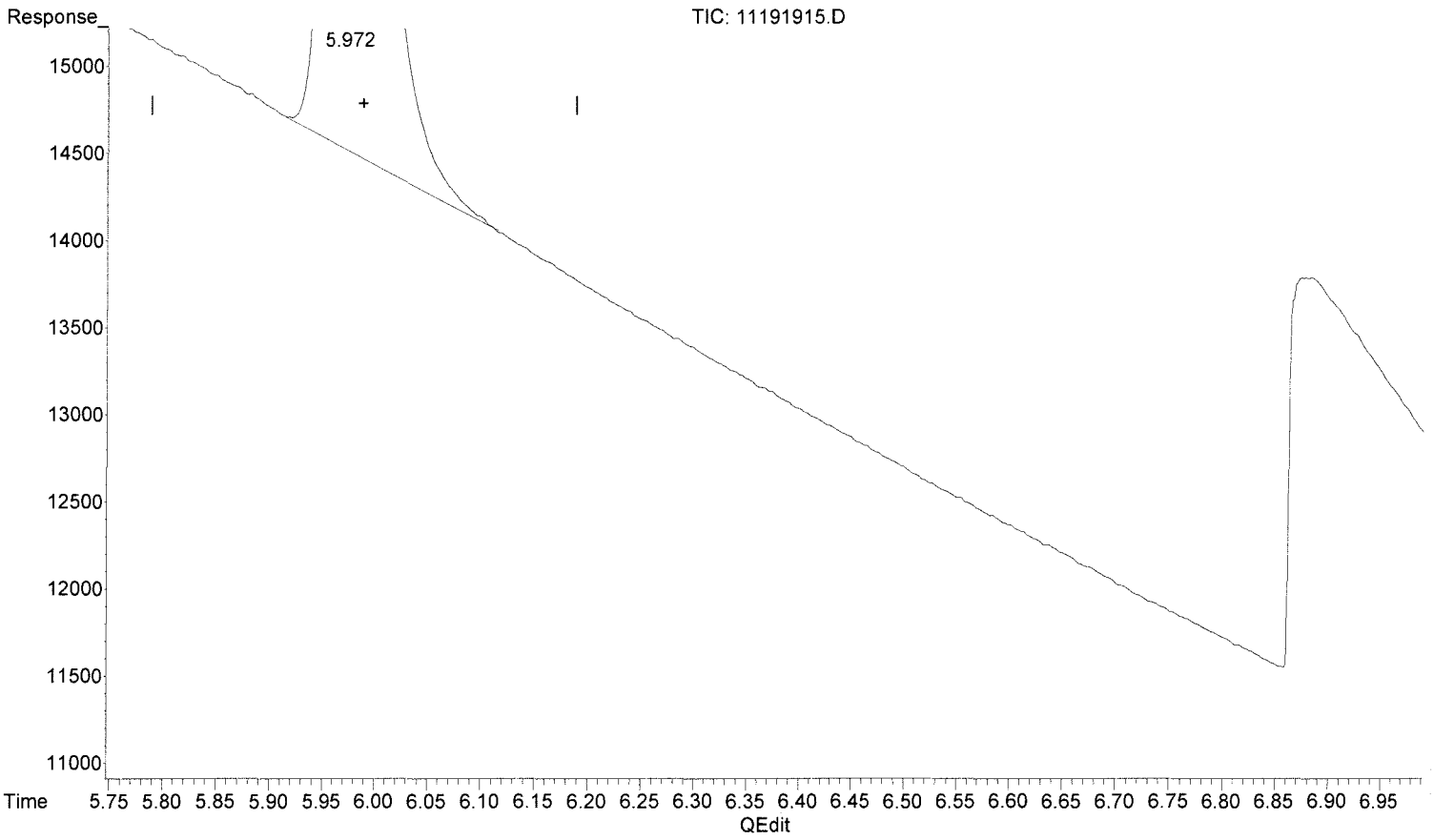
(+) = Expected Retention Time

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191915.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 15:43:01
Operator : WH/LD
Sample : LCSD S32-08141901
Misc :
ALS Vial : 1 Sample Multiplier: 1

LD
11/19
BLC

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 14:56:34 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



(4) Carbon dioxide

5.972min 966.415 ppm m

response 226846

11/20/19

(+) = Expected Retention Time

Response Factor Report HP5890

Method Path : I:\GC10\METHODS\
Method File : RS082817_CO2.M
Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
Last Update : Tue Aug 29 16:13:13 2017
Response Via : Initial Calibration

Calibration Files
1 =08291715.D 2 =08291716.D 3 =08291717.D
4 =08291719.D 5 =08291720.D 6 =08291721.D

	Compound	1	2	3	4	5	6	Avg		%RSD
1)	Oxygen/Argon	4.760						4.760	E6	0.00
2)	Carbon monoxide	2.775		1.066	0.043	0.033	0.027	0.657	E6	170.12
3)	Methane (TCD)							9.457		0.00
4)	Carbon dioxide	2.717	2.193	2.338	2.272	2.265	2.298	2.347	E2	7.99

Signal #2 Calibration Files
1 =08291715.D 2 =08291716.D 3 =08291717.D
4 =08291719.D 5 =08291720.D 6 =08291721.D

	Compound	1	2	3	4	5	6	Avg		%RSD
6)	Methane (FID)	1.253	1.160	1.005	0.927	0.848	0.848	0.945	E4	15.85
7)	Ethylene	1.677	1.605	1.900	1.749	1.597	1.579	1.684	E4	7.30
8)	Ethane	1.769	1.631	1.866	1.767	1.639	1.667	1.723	E4	5.40
9)	Propylene	2.402	2.309	2.767	2.551	2.331	2.333	2.449	E4	7.32
10)	Propane	2.906	2.737	2.817	2.639	2.410	2.420	2.655	E4	7.75
11)	Isobutylene							0.000		-1.00
12)	Isobutane							0.000		-1.00
13)	n-Butane							0.000		-1.00

(#) = Out of Range ### Number of calibration levels exceeded format ###

RS082817_CO2.M Wed Aug 30 13:24:19 2017

dit Compounds -- Compound #4 -- Carbon dioxide

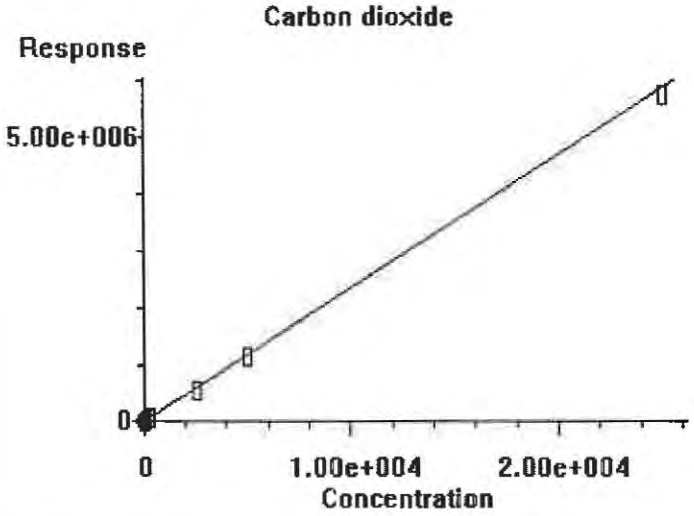
Search by: Ret Time | Name | Index | Find Compound

- Compound Database
- External Standard Compoun
  - Oxygen/Argon
  - Carbon monoxide
  - Methane (TCD)
  - Carbon dioxide
  - Signal #2
  - Methane (FID)
  - Ethylene
  - Ethane
  - Propylene
  - Propane
  - Isobutylene
  - Isobutane
  - n-Butane

Identification | Calibration | User-Defined | Advanced | Reporting

Lvl ID	Concentration	Response
1	25.000000	6793.665186
2	100.000000	21932.418000
3	250.000000	58460.642510
4	2500.000000	568043.388750
5	5000.000000	1132363.215937
6	25000.000000	5744294.891563
7	25000.000000	
8	25000.000000	
9	2000.000000	
10	30000.000000	

Lvl ID	Concentration	Response



0.000e+000	Quadratic term
2.347e+002	Linear term
0.000e+000	Constant term
7.987%	RF Rel Std Dev

OK | Cancel | Help | Print Calibration Curve | Copy Calibration Curve

Calibration Status Report HP5890

Method Path : I:\GC10\METHODS\
Method File : RS082817_CO2.M
Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
Last Update : Tue Aug 29 16:13:13 2017
Response Via : Initial Calibration

#	ID	Conc	ISTD Conc	Path\File
1	1	0	0	J:\GC10\DATA\RSK_FID\2017_08\29\08291715.D
2	2	0	0	J:\GC10\DATA\RSK_FID\2017_08\29\08291716.D
3	3	3	0	J:\GC10\DATA\RSK_FID\2017_08\29\08291717.D
4	4	10	0	J:\GC10\DATA\RSK_FID\2017_08\29\08291719.D
5	5	25	0	J:\GC10\DATA\RSK_FID\2017_08\29\08291720.D
6	6	125	0	J:\GC10\DATA\RSK_FID\2017_08\29\08291721.D
7	7	5000	0	J:\GC10\DATA\RSK_FID\2017_08\24\08241708.D
8	8	25000	0	J:\GC10\DATA\RSK_FID\2017_08\24\08241709.D
9	9	2000	0	J:\GC10\DATA\RSK_FID\2017_08\24\08241710.D
10	10	30000	0	J:\GC10\DATA\RSK_FID\2017_08\24\08241711.D

#	ID	Update Time	Quant Time	Acquisition Time
1	1	Aug 29 14:21 2017	Aug 29 14:20 2017	29-Aug-2017, 14:07
2	2	Aug 29 14:52 2017	Aug 29 14:51 2017	29-Aug-2017, 14:22
3	3	Aug 29 15:04 2017	Aug 29 15:04 2017	29-Aug-2017, 14:53
4	4	Aug 29 15:36 2017	Aug 29 15:36 2017	29-Aug-2017, 15:23
5	5	Aug 29 15:57 2017	Aug 29 15:57 2017	29-Aug-2017, 15:44
6	6	Aug 29 16:13 2017	Aug 29 16:13 2017	29-Aug-2017, 16:00
7	7	Aug 25 09:05 2017	Aug 24 16:00 2017	24-Aug-2017, 15:44
8	8	Aug 25 09:06 2017	Aug 24 16:13 2017	24-Aug-2017, 16:02
9	9	Aug 25 09:06 2017	Aug 24 16:31 2017	24-Aug-2017, 16:16
10	10	Aug 25 09:07 2017	Aug 24 16:42 2017	24-Aug-2017, 16:33

RS082817_CO2.M Wed Aug 30 13:24:30 2017

Data Path : J:\GC10\DATA\RSK_FID\2017_08\29\
Data File : 08291715.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 29-Aug-2017, 14:07
Operator : MC
Sample : 25ppm s32-08291701 0.25ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Aug 29 14:20:06 2017
Quant Method : I:\GC10\METHODS\RS082417.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Fri Aug 25 09:19:14 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

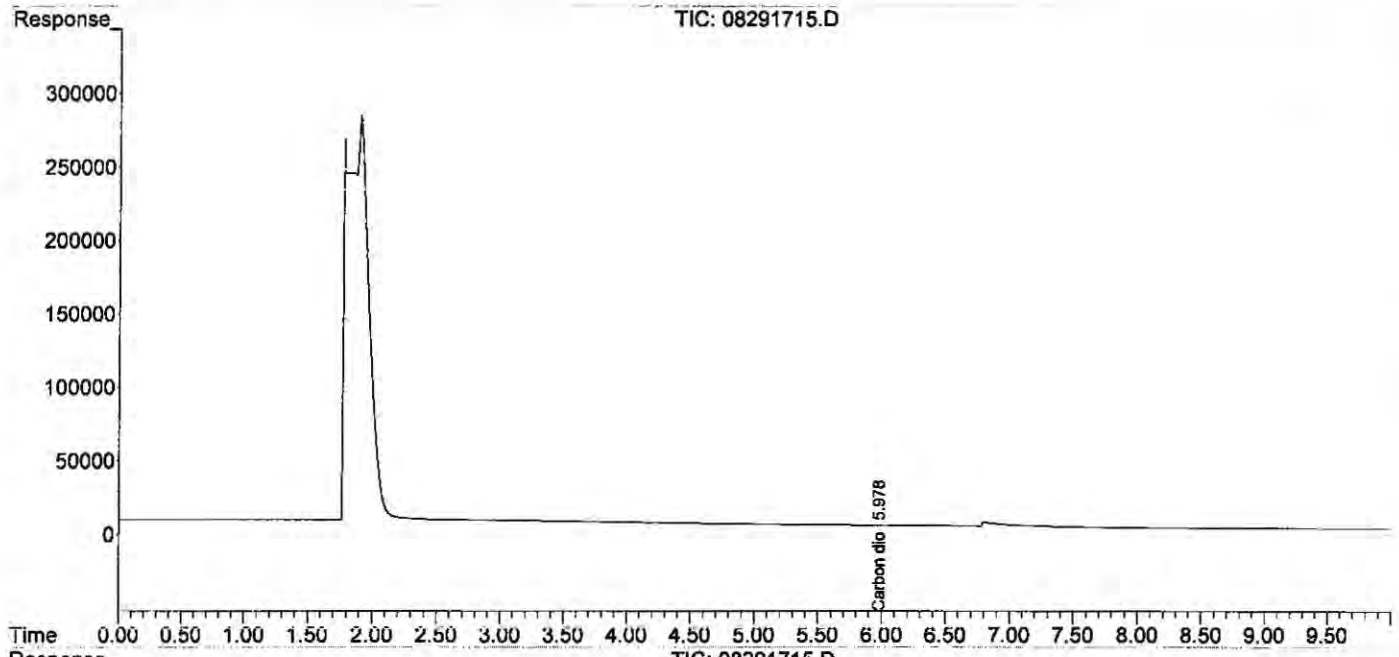
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	0.000	0	N.D.	ppm	d
2)	Carbon monoxide	1.776	277465	N.D.	ppm	
3)	Methane (TCD)	0.000	0	N.D.	ppm	
4)	Carbon dioxide	5.978	6794	27.870	ppm	m
6)	Methane (FID)	0.000	0	N.D.	ppm	d
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	0	N.D.	ppm	
9)	Propylene	0.000	0	N.D.	ppm	
10)	Propane	0.000	0	N.D.	ppm	
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	0.000	0	N.D.	ppm	
13)	n-Butane	0.000	0	N.D.	ppm	

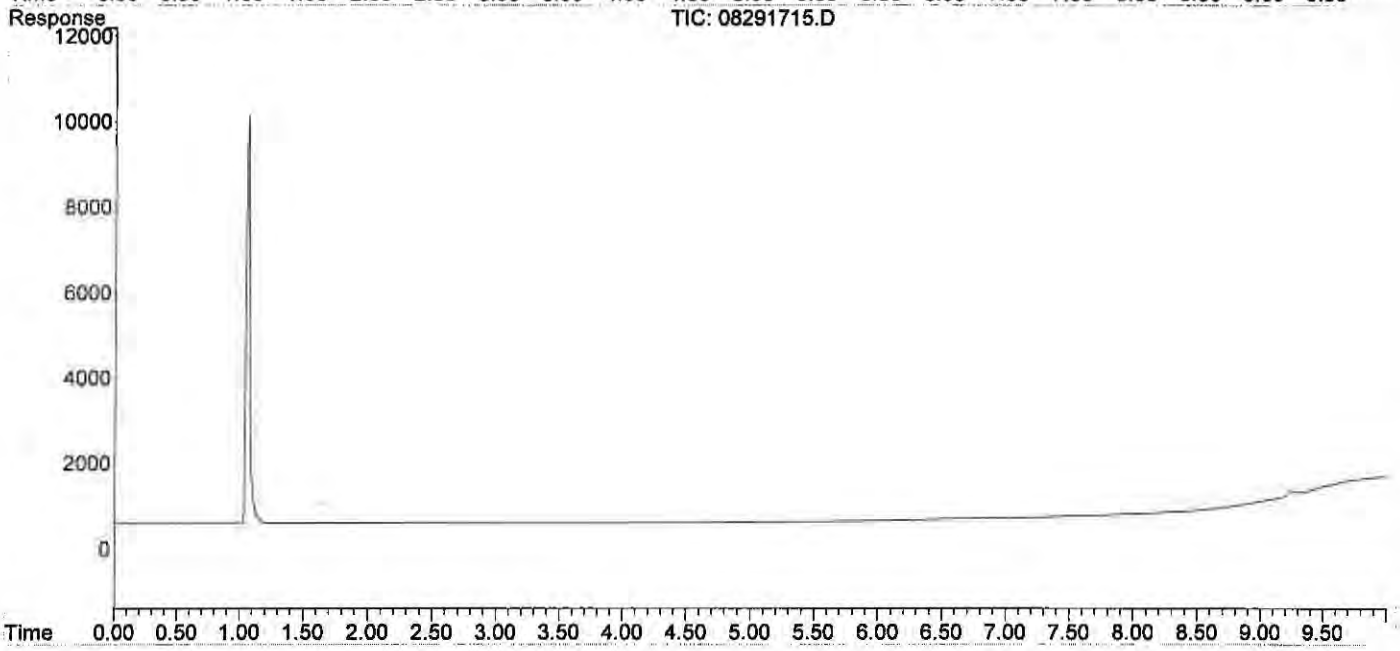
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2017_08\29\
Data File : 08291715.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 29-Aug-2017, 14:07
Operator : MC
Sample : 25ppm s32-08291701 0.25ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Aug 29 14:20:06 2017
Quant Method : I:\GC10\METHODS\RS082417.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Fri Aug 25 09:19:14 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



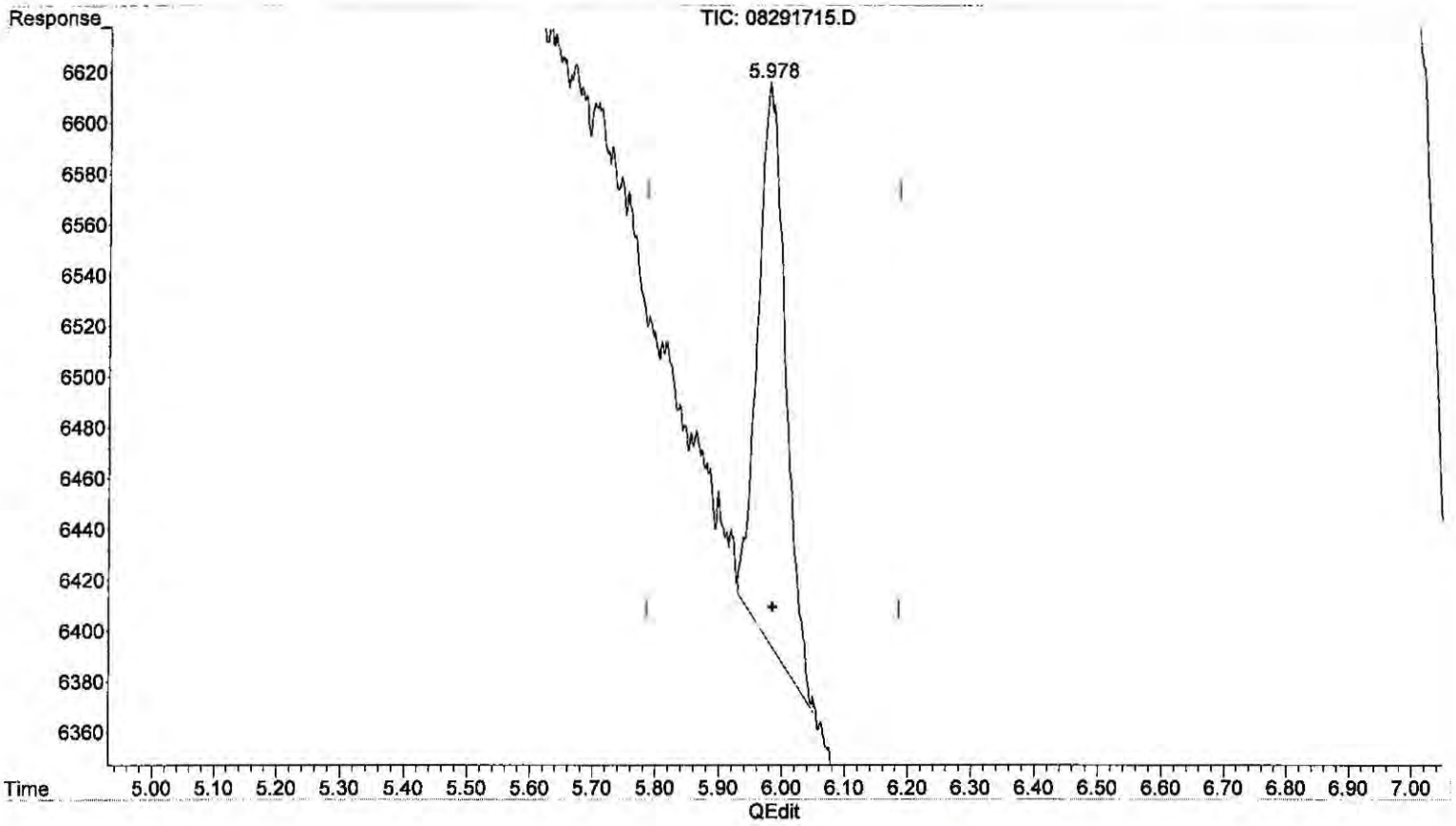


Quantitation Report (Qedit)

Data Path : J:\GC10\DATA\RSK_FID\2017_08\29\
Data File : 08291715.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 29-Aug-2017, 14:07
Operator : MC
Sample : 25ppm s32-08291701 0.25ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Aug 29 14:20:06 2017
Quant Method : I:\GC10\METHODS\RS082417.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Fri Aug 25 09:19:14 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



(4) Carbon dioxide

5.978min 27.870 ppm m

response 6794

8/30/17 BW M. prcw

8/4/17

(+) = Expected Retention Time

Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_08\29\
Data File : 08291716.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 29-Aug-2017, 14:22
Operator : MC
Sample : 100ppm s32-08291702 0.2ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Aug 29 14:51:38 2017
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 14:21:08 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

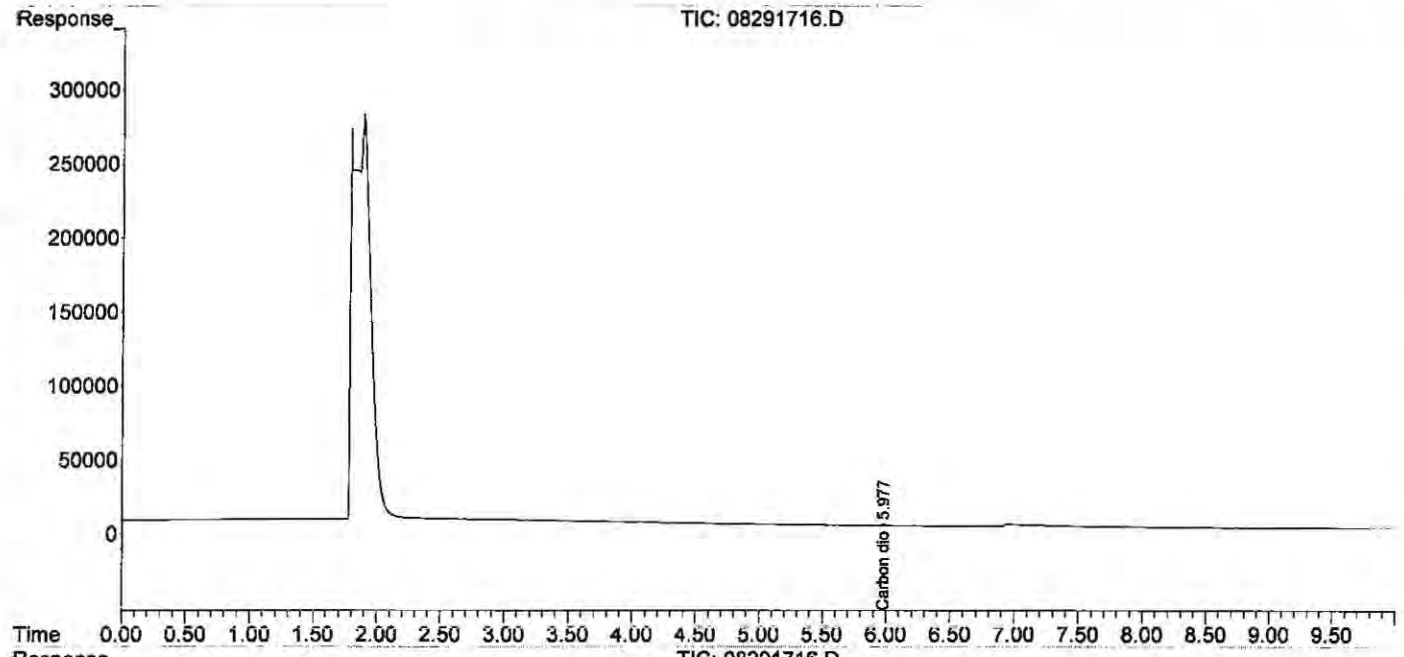
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.790	-598962	N.D.	ppm	
2)	Carbon monoxide	0.000	0	N.D.	ppm	d
3)	Methane (TCD)	0.000	0	N.D.	ppm	
4)	Carbon dioxide	5.978	21932	87.858	ppm	
6)	Methane (FID)	0.000	0	N.D.	ppm	d
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	0	N.D.	ppm	
9)	Propylene	0.000	0	N.D.	ppm	
10)	Propane	0.000	0	N.D.	ppm	
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	0.000	0	N.D.	ppm	
13)	n-Butane	0.000	0	N.D.	ppm	

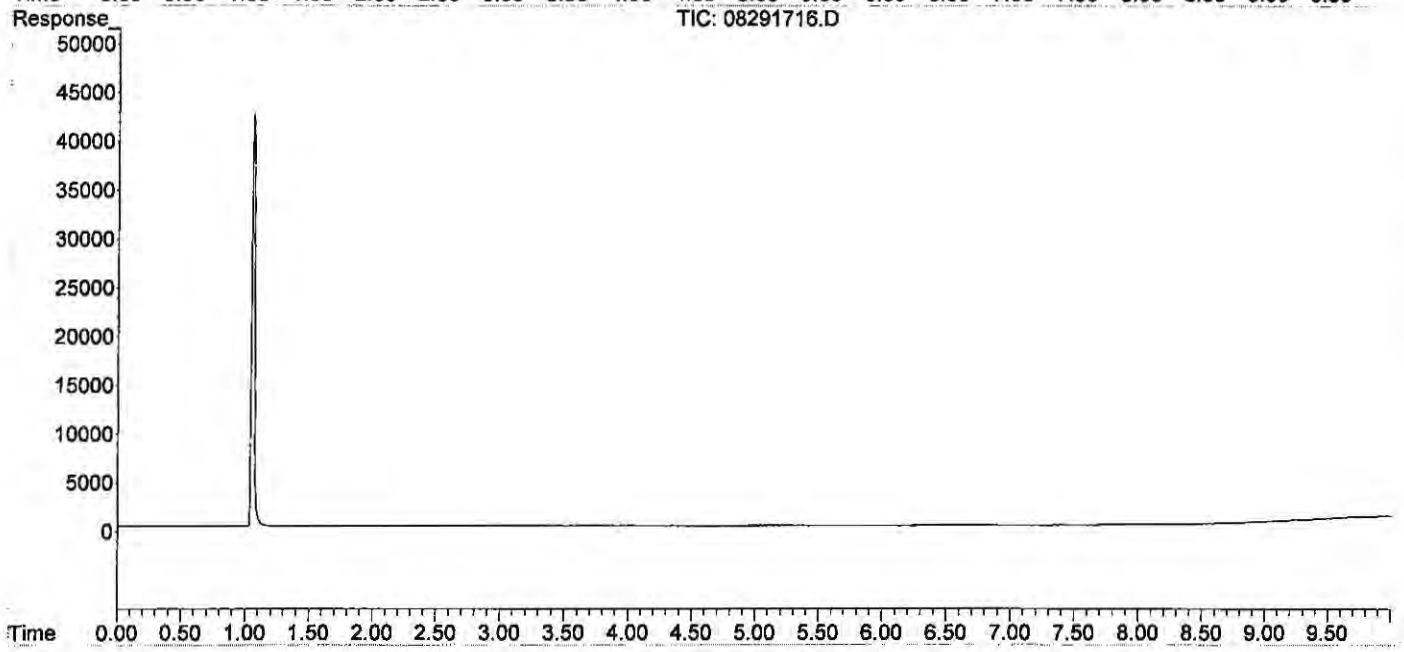
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2017_08\29\
Data File : 08291716.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 29-Aug-2017, 14:22
Operator : MC
Sample : 100ppm s32-08291702 0.2ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Aug 29 14:51:38 2017
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 14:21:08 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_08\29\
Data File : 08291717.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 29-Aug-2017, 14:53
Operator : MC
Sample : 250ppm s32-08291702 0.5ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Aug 29 15:03:42 2017
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 14:52:06 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

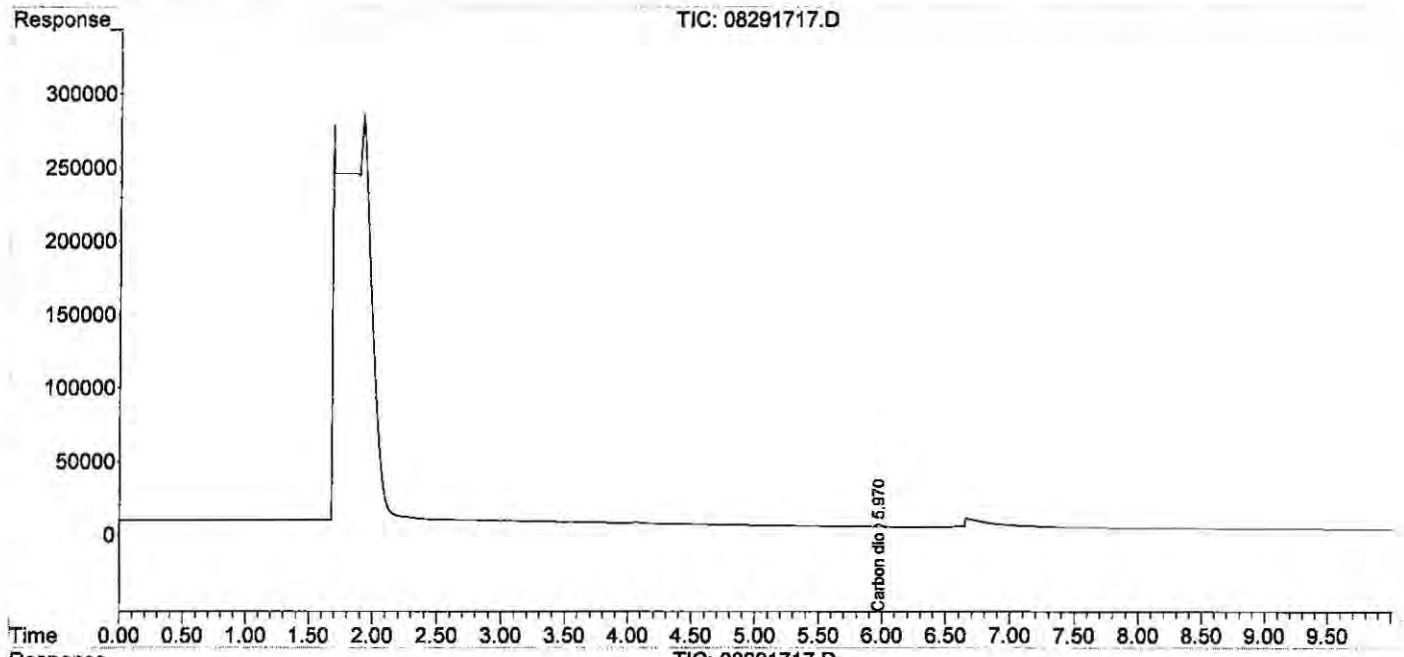
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.920f	-30716454	N.D.	ppm	
2)	Carbon monoxide	0.000	0	N.D.	ppm	d
3)	Methane (TCD)	0.000	0	N.D.	ppm	d
4)	Carbon dioxide	5.970	58461	240.204	ppm	m
6)	Methane (FID)	0.000	0	N.D.	ppm	d
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	0	N.D.	ppm	
9)	Propylene	0.000	0	N.D.	ppm	
10)	Propane	0.000	0	N.D.	ppm	
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	0.000	0	N.D.	ppm	
13)	n-Butane	0.000	0	N.D.	ppm	

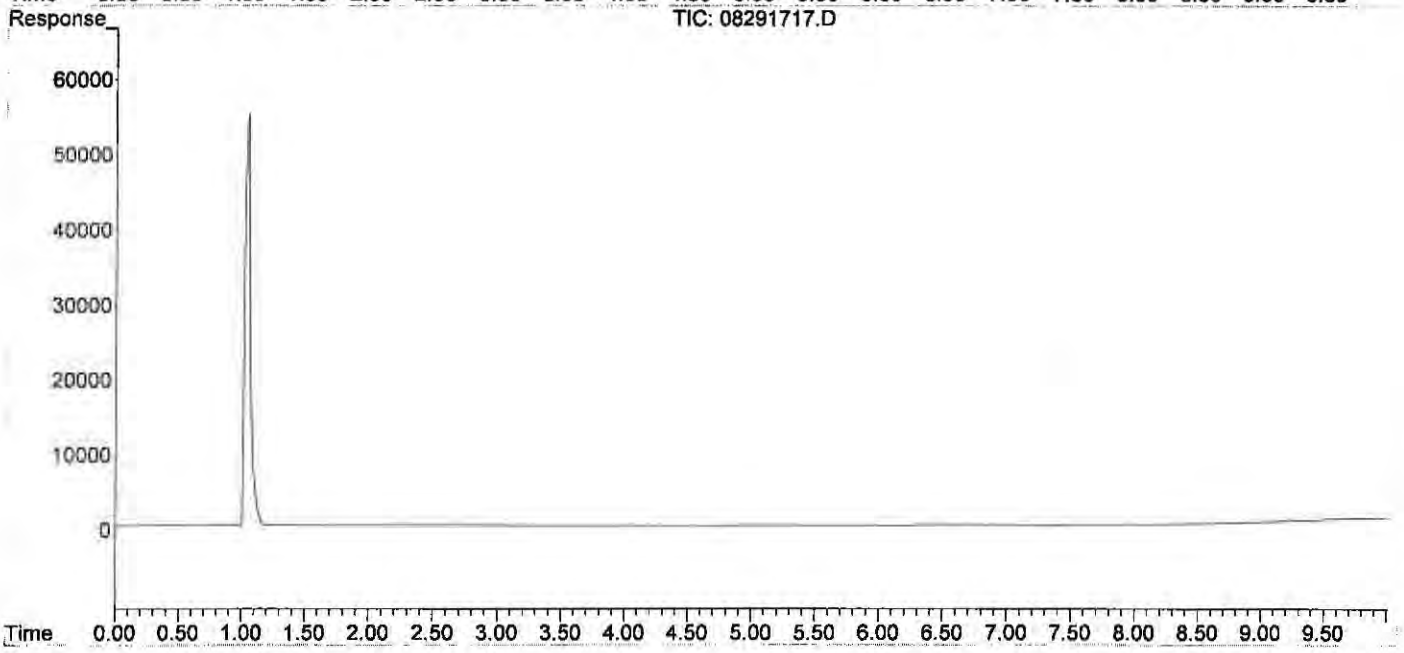
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2017_08\29\
Data File : 08291717.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 29-Aug-2017, 14:53
Operator : MC
Sample : 250ppm s32-08291702 0.5ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Aug 29 15:03:42 2017
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 14:52:06 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

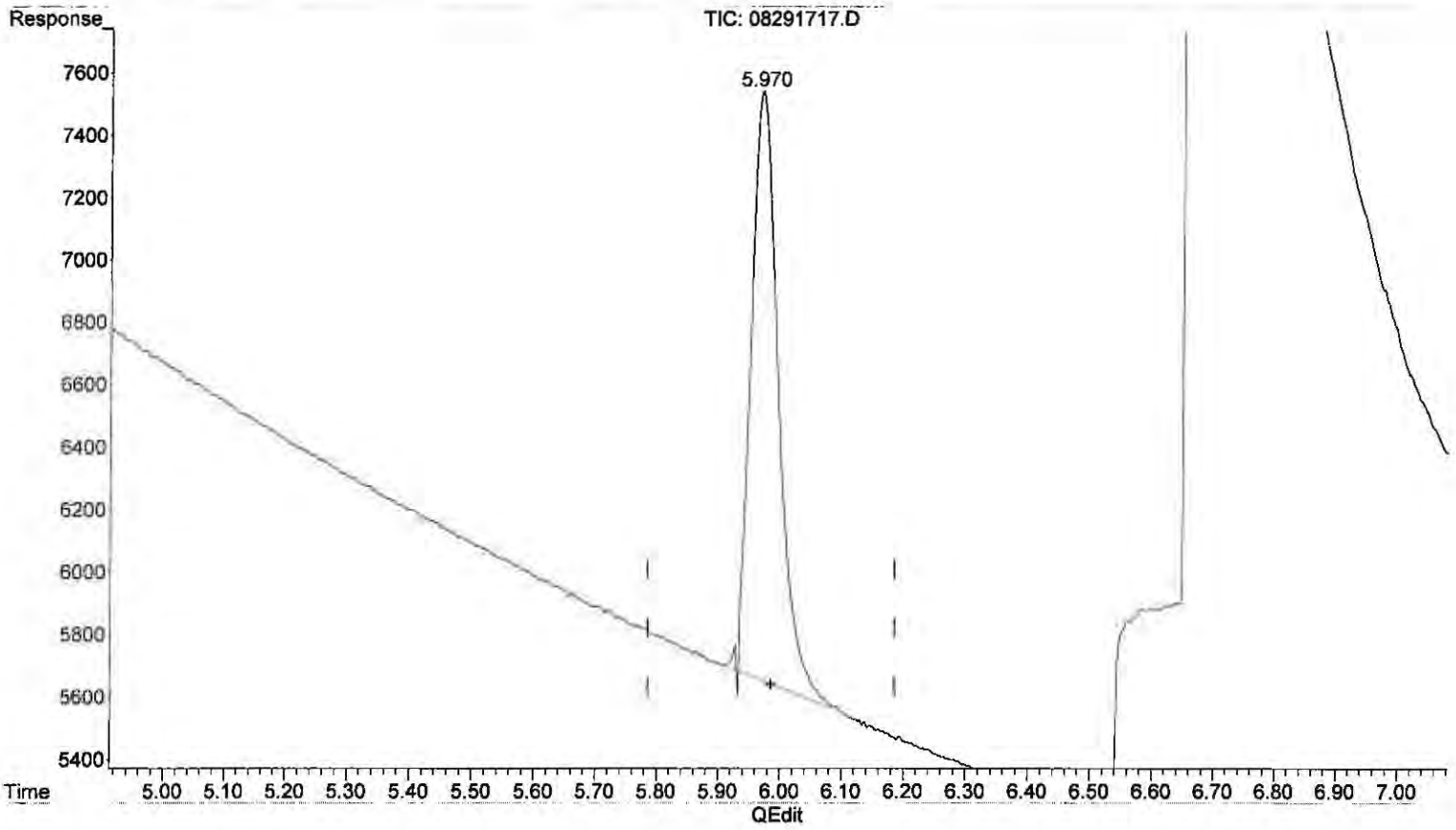




Data Path : J:\GC10\DATA\RSK_FID\2017_08\29\
Data File : 08291717.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 29-Aug-2017, 14:53
Operator : MC
Sample : 250ppm s32-08291702 0.5ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Aug 29 15:03:42 2017
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 14:52:06 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



(4) Carbon dioxide

5.970min 240.204 ppm m

response 58461

(+) = Expected Retention Time

Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_08\29\
Data File : 08291719.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 29-Aug-2017, 15:23
Operator : MC
Sample : 2500ppm s32-08231701 50ul
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Aug 29 15:35:50 2017
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 15:04:14 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

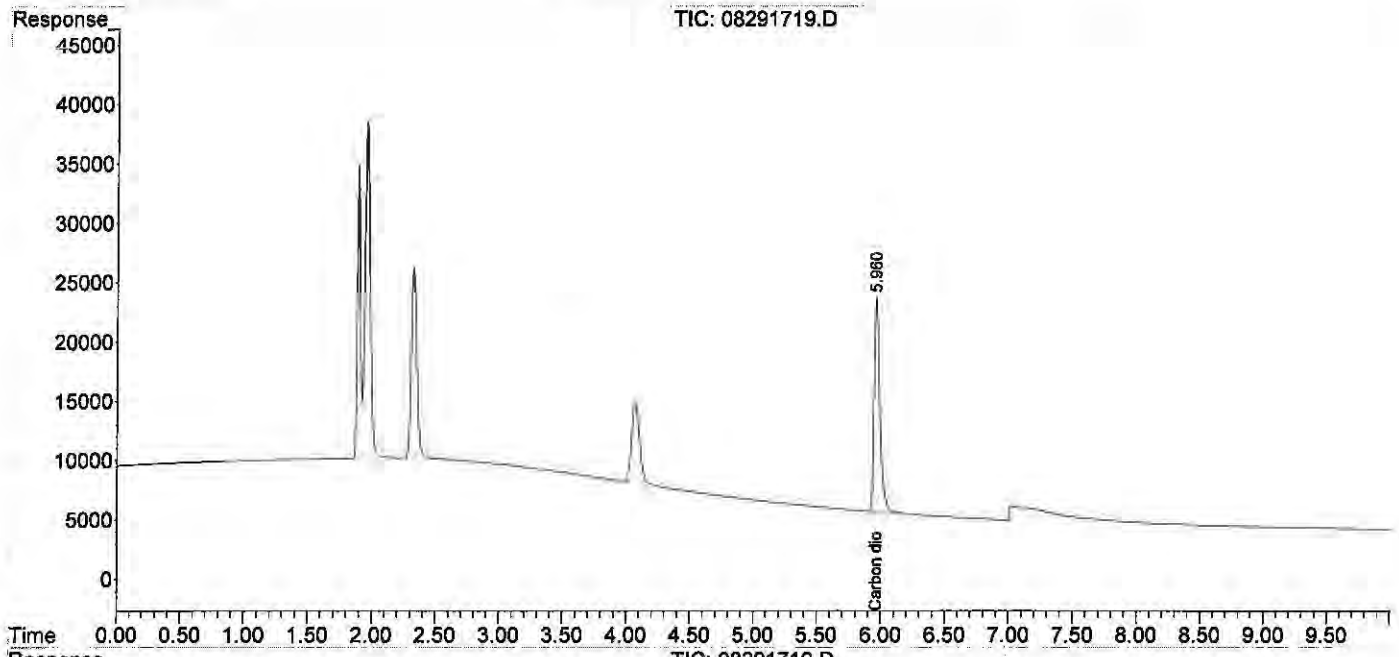
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	0.000	0	N.D.	ppm	d
2)	Carbon monoxide	1.891	425113	N.D.	ppm	
3)	Methane (TCD)	0.000	0	N.D.	ppm	d
4)	Carbon dioxide	5.962	568043	2369.673	ppm	
6)	Methane (FID)	0.000	0	N.D.	ppm	d
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	0	N.D.	ppm	
9)	Propylene	0.000	0	N.D.	ppm	
10)	Propane	0.000	0	N.D.	ppm	
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	0.000	0	N.D.	ppm	
13)	n-Butane	0.000	0	N.D.	ppm	

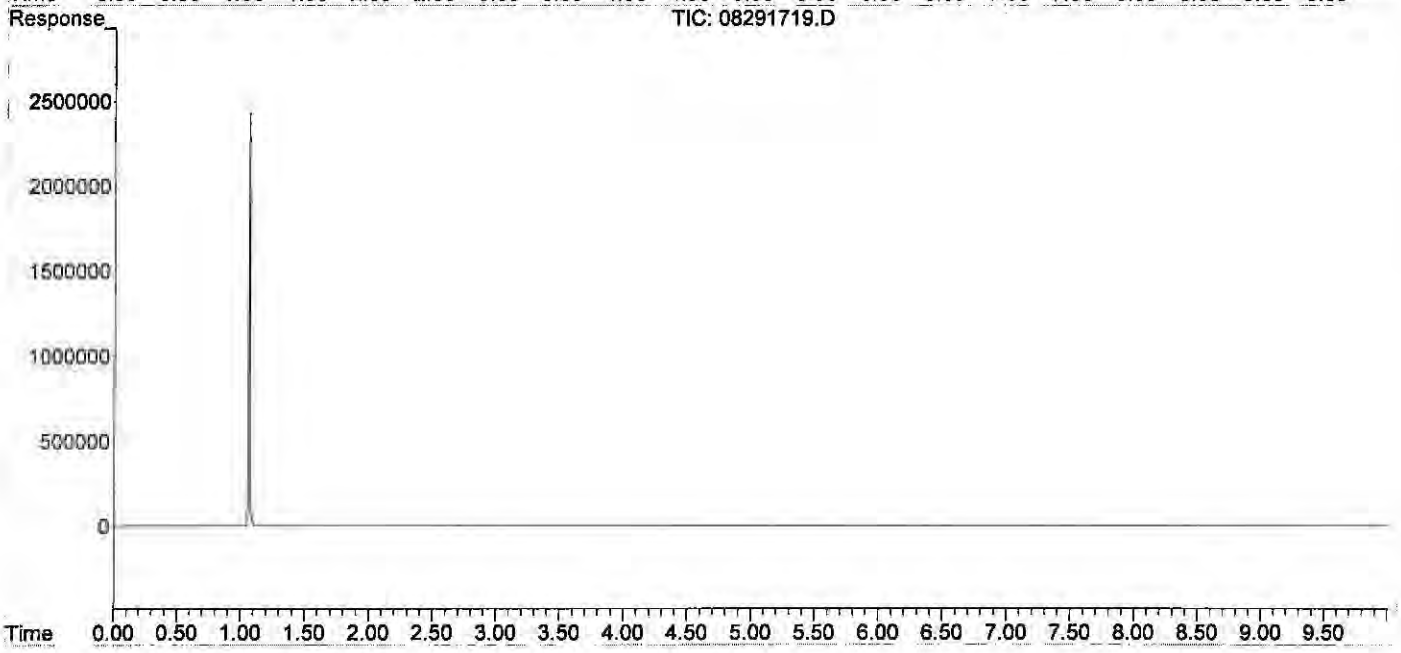
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2017_08\29\
Data File : 08291719.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 29-Aug-2017, 15:23
Operator : MC
Sample : 2500ppm s32-08231701 50ul
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Aug 29 15:35:50 2017
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 15:04:14 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_08\29\
Data File : 08291720.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 29-Aug-2017, 15:44
Operator : MC
Sample : 5000ppm s32-08231701 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Aug 29 15:57:17 2017
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 15:36:14 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

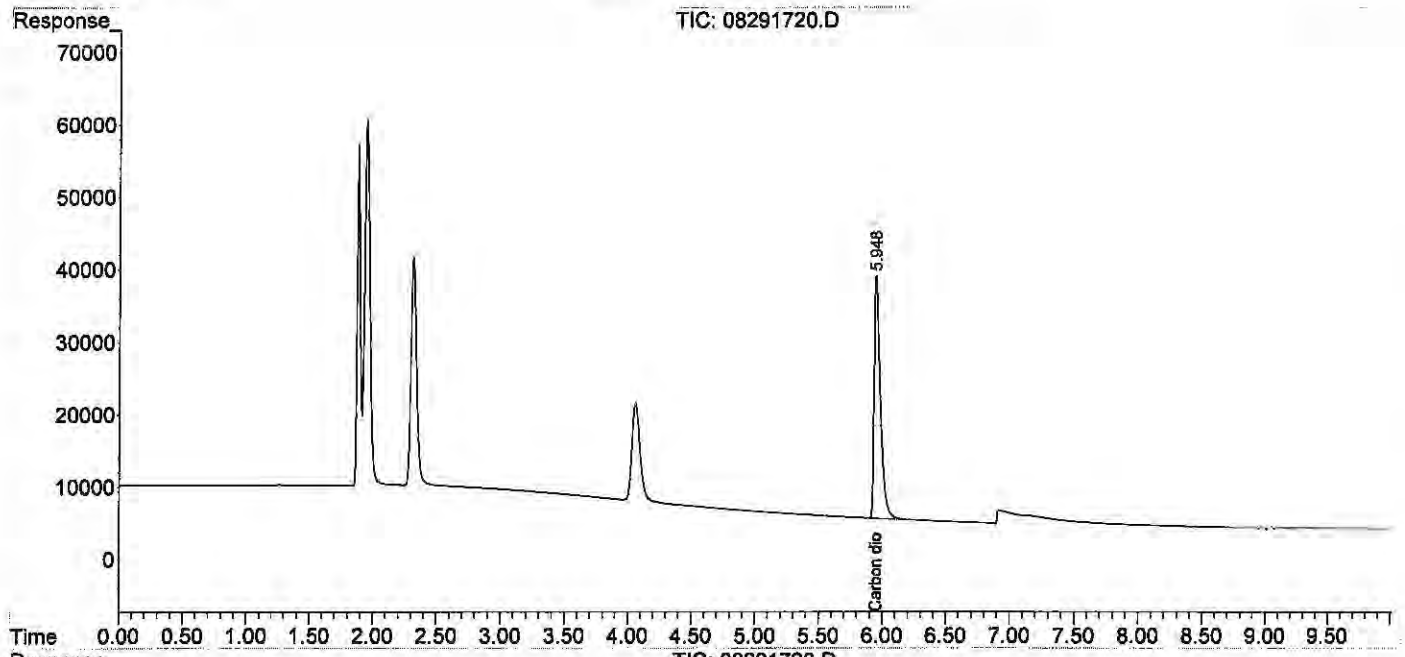
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	0.000	0	N.D.	ppm	d
2)	Carbon monoxide	1.880	819221	N.D.	ppm	
3)	Methane (TCD)	0.000	0	N.D.	ppm	d
4)	Carbon dioxide	5.948	1132363	4753.126	ppm	
6)	Methane (FID)	0.000	0	N.D.	ppm	d
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	0	N.D.	ppm	
9)	Propylene	0.000	0	N.D.	ppm	
10)	Propane	0.000	0	N.D.	ppm	
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	0.000	0	N.D.	ppm	
13)	n-Butane	0.000	0	N.D.	ppm	

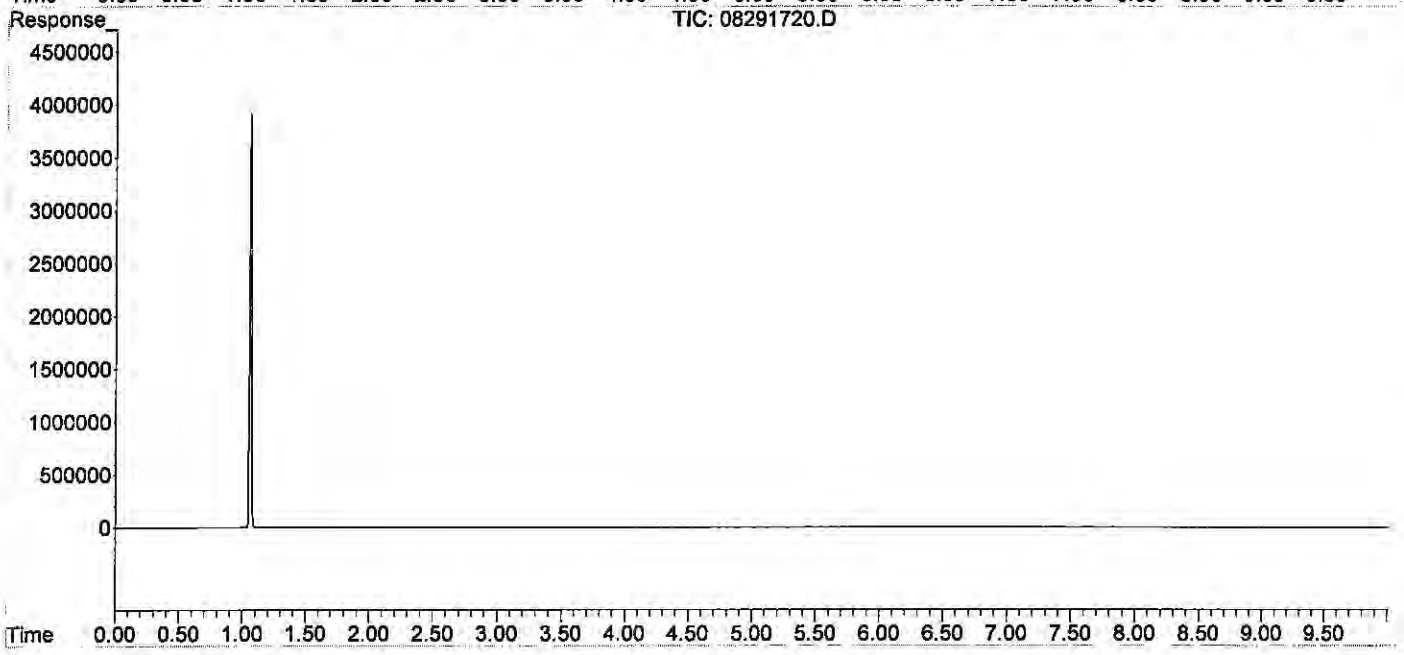
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2017_08\29\
Data File : 08291720.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 29-Aug-2017, 15:44
Operator : MC
Sample : 5000ppm s32-08231701 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Aug 29 15:57:17 2017
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 15:36:14 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Data Path : J:\GC10\DATA\RSK_FID\2017_08\29\
Data File : 08291721.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 29-Aug-2017, 16:00
Operator : MC
Sample : 25000ppm s32-08231701 0.5ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Aug 29 16:12:53 2017
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 15:57:37 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	0.000	0	N.D.	ppm	d
2)	Carbon monoxide	1.827	3325463	N.D.	ppm	
3)	Methane (TCD)	0.000	0	N.D.	ppm	d
4)	Carbon dioxide	5.879f	5744295	24443.288	ppm	
6)	Methane (FID)	0.000	0	N.D.	ppm	d
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	0	N.D.	ppm	
9)	Propylene	0.000	0	N.D.	ppm	
10)	Propane	0.000	0	N.D.	ppm	
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	0.000	0	N.D.	ppm	
13)	n-Butane	0.000	0	N.D.	ppm	

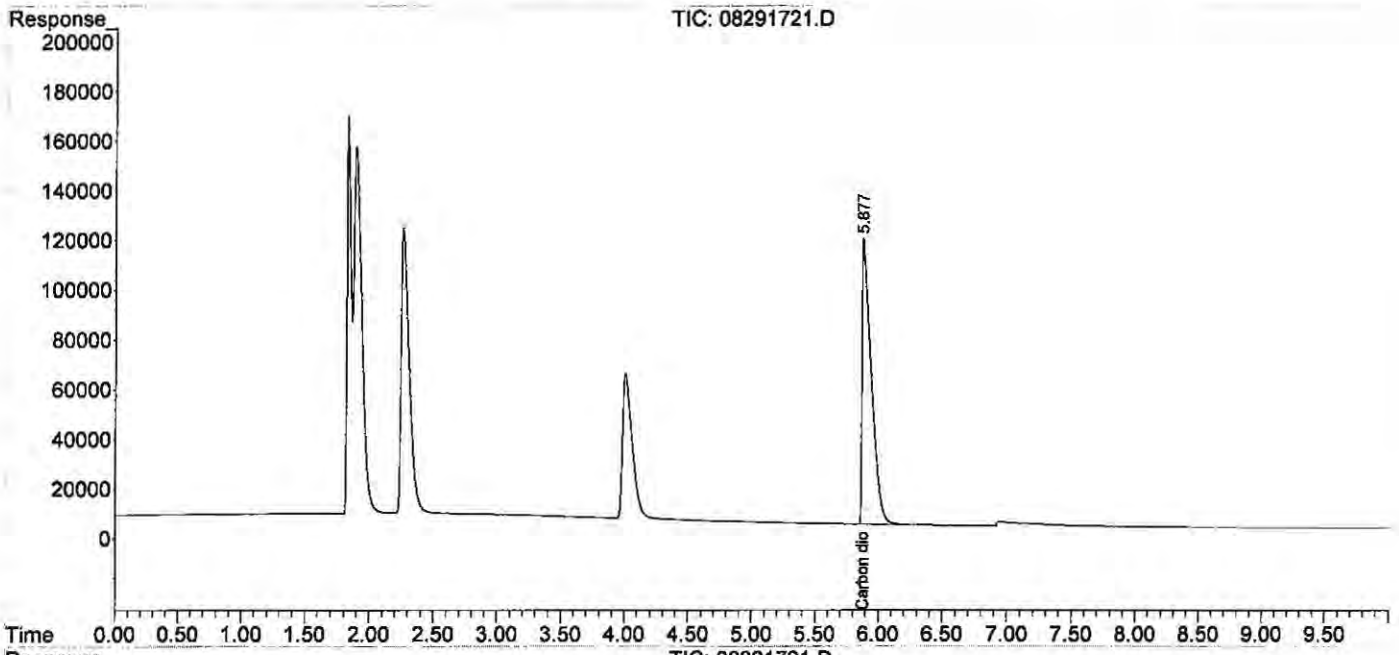
(f)=RT Delta > 1/2 Window (m)=manual int.

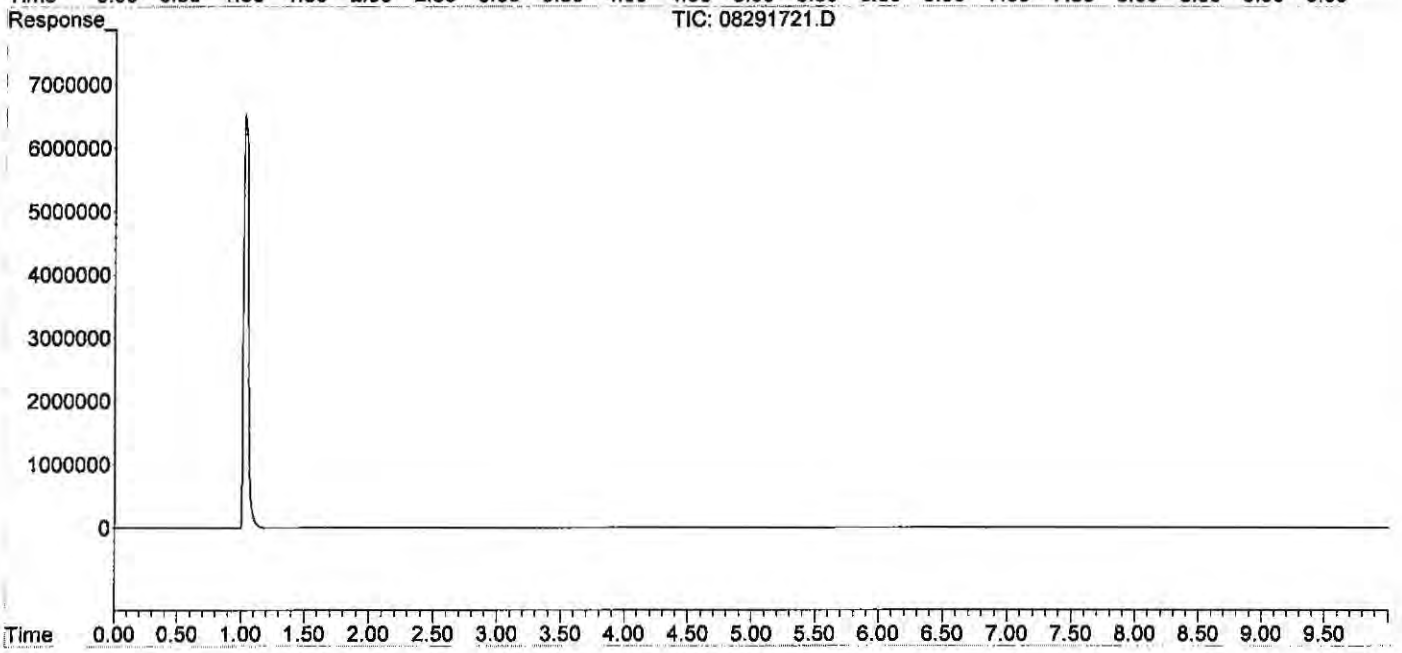
Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_08\29\
Data File : 08291721.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 29-Aug-2017, 16:00
Operator : MC
Sample : 25000ppm s32-08231701 0.5ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Aug 29 16:12:53 2017
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 15:57:37 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_08\29\
Data File : 08291723.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 29-Aug-2017, 16:35
Operator : MC
Sample : icv s30-07071701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Aug 29 16:54:07 2017
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.886	536422	0.113	ppm	actual %D
2)	Carbon monoxide	1.886	536422	N.D.	ppm	
3)	Methane (TCD)	4.059f	626500	66244.710	ppm	
4)	Carbon dioxide	5.947	1163775	4957.948	ppm	5000 99.16
6)	Methane (FID)	1.062	37290742	3947.023	ppm	
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	0	N.D.	ppm	
9)	Propylene	0.000	0	N.D.	ppm	
10)	Propane	0.000	0	N.D.	ppm	
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	0.000	0	N.D.	ppm	
13)	n-Butane	0.000	0	N.D.	ppm	

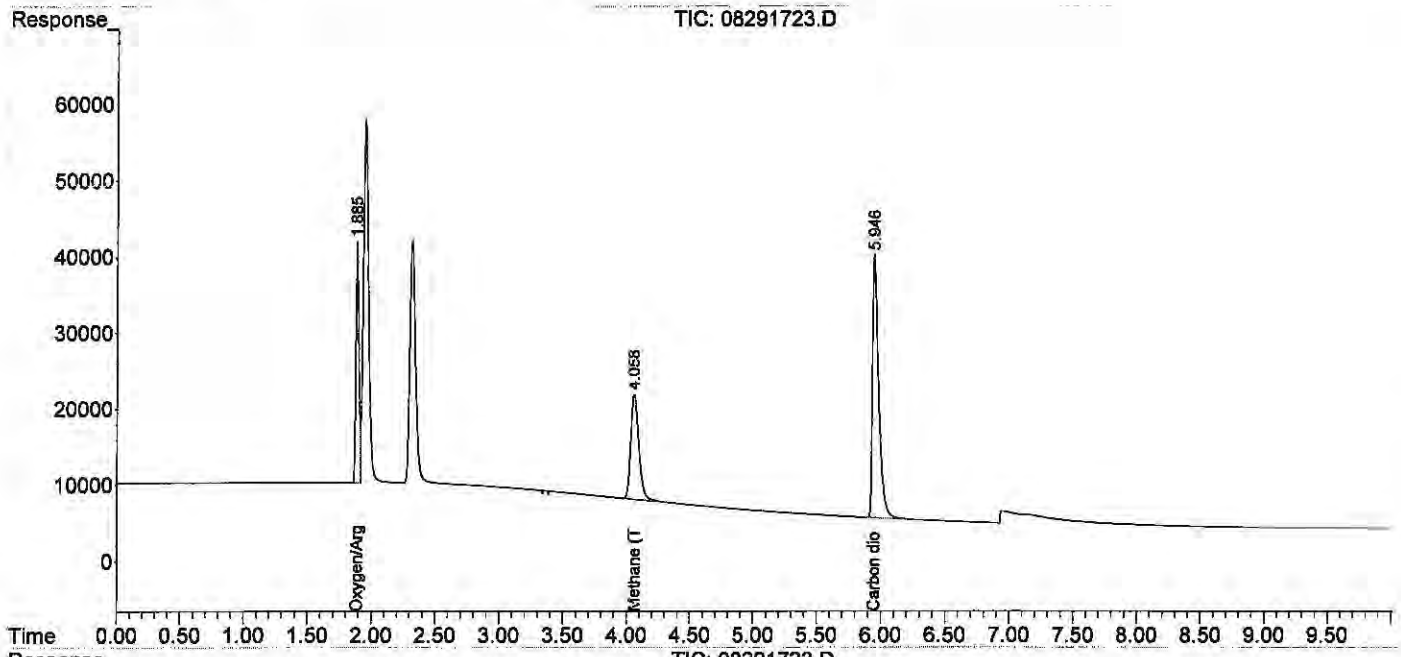
(f)=RT Delta > 1/2 Window (m)=manual int.

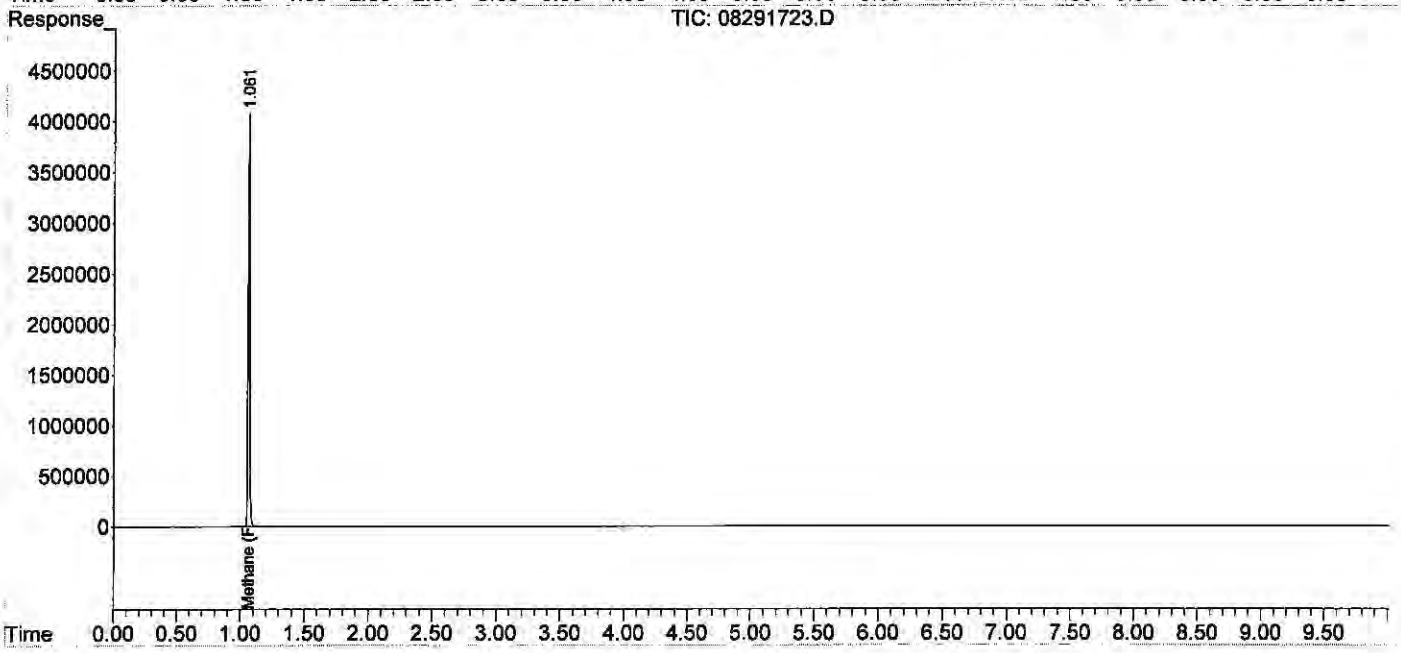
W 9/4/17

Data Path : J:\GC10\DATA\RSK_FID\2017_08\29\
Data File : 08291723.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 29-Aug-2017, 16:35
Operator : MC
Sample : icv s30-07071701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Aug 29 16:54:07 2017
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Dissolved Gases by RSK175

ALS Environmental

Method : RSK175 Headspace Method for Dissolved Hydrocarbon in Water by FID/TCD
Client : ALS Laboratory Group | Analyst : WH/LD | Instrument : GC#10
Service Request: P1906981 | Date Analysis : 11/19/19 | Detector : FID#10, TCD#10
Sample Vol. (ml) : 32.00 ml | Head Space Vol.(ml) : 8.00 ml | Gas Constant : 24.05684 (20°C)

HEAD SPACE RESULT (ppm)

Sample ID	Inj. Vol.	Carbon Dioxide
STD S32-10291901	0.100	5006.629
ACTUAL		5000.00
%Difference		0.1%
MCS 0.1ml	0.100	0.000
RB 0.1ml	0.100	0.000
LCS S32-08141901	0.100	968.407
LCSD S32-08141901	0.100	966.415
P1906981-001 0.1ml	0.100	3638.117
P1906981-002 0.1ml	0.100	3160.990
P1906981-003 0.1ml	0.100	5316.778
P1906981-004 0.1ml	0.100	12537.77
P1906981-005 0.1ml	0.100	11371.71
P1906981-006 0.1ml	0.100	13741.43

FINAL HEAD SPACE RESULT (ppm)

	Carbon Dioxide
WWt.	44.10
HENRY'S CONSTANT	1.42E+03
RL	100.00
MCS 0.1ml	0.000
LCS S32-08141901	9684.070
LCSD S32-08141901	9664.150
P1906981-001 0.1ml	36381.170
P1906981-002 0.1ml	31609.900
P1906981-003 0.1ml	53167.780
P1906981-004 0.1ml	125377.65
P1906981-005 0.1ml	113717.11
P1906981-006 0.1ml	137414.33

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LD
11/19

STD S32-10291901	0.000	0.000	0.000	0.000	0.000	4992.314	14:55:10	0.00	0.00	0.00	0.00	0.00
ACTUAL	101.50	100.90	101.40	102.20	101.30	5000.00						
%Difference	100.0%	100.0%	100.0%	100.0%	100.0%	0.2%						

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191902.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 11:47:44
Operator : WH/LD
Sample : STD S32-10291901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 10:57:47 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

LD
11/19

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

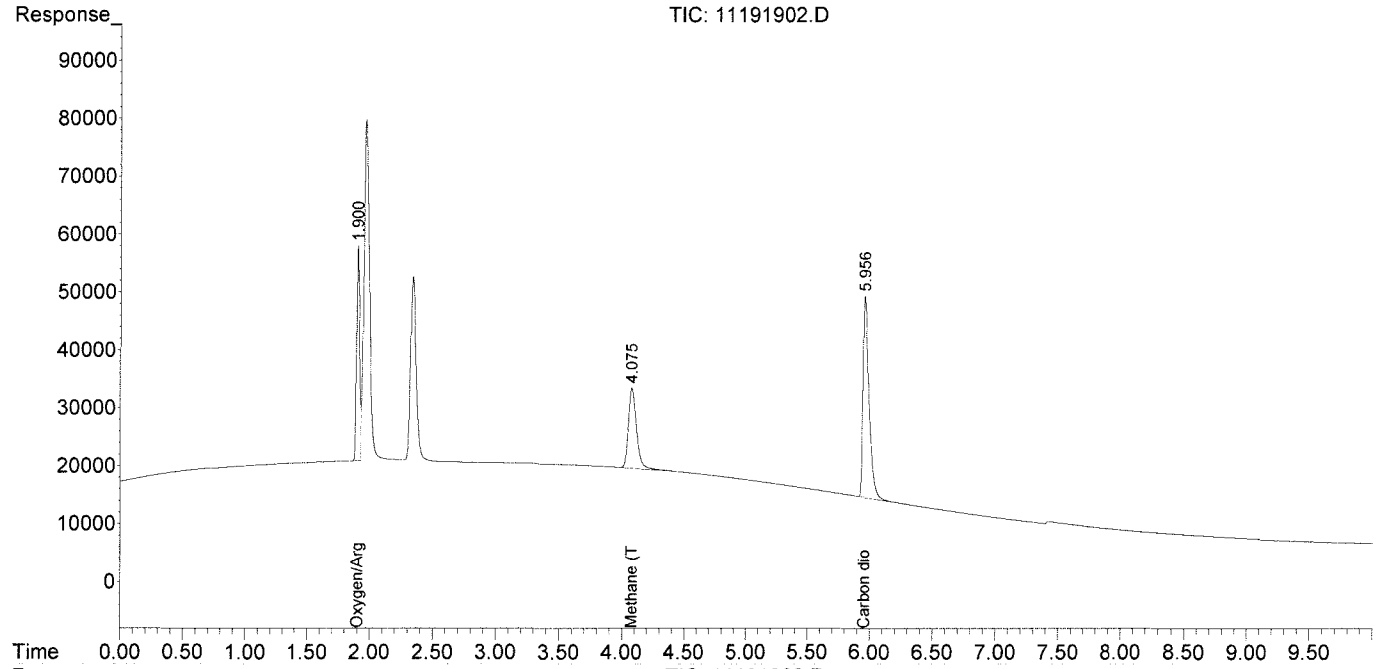
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.901	633578	0.133	ppm	
2)	Carbon monoxide	1.901	633578	N.D.	ppm	
3)	Methane (TCD)	4.076f	642456	67931.889	ppm	
4)	Carbon dioxide	5.956	1175202	5006.629	ppm	m
6)	Methane (FID)	0.000	0	N.D.	ppm	
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	0	N.D.	ppm	
9)	Propylene	0.000	0	N.D.	ppm	
10)	Propane	0.000	0	N.D.	ppm	
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	0.000	0	N.D.	ppm	
13)	n-Butane	0.000	0	N.D.	ppm	

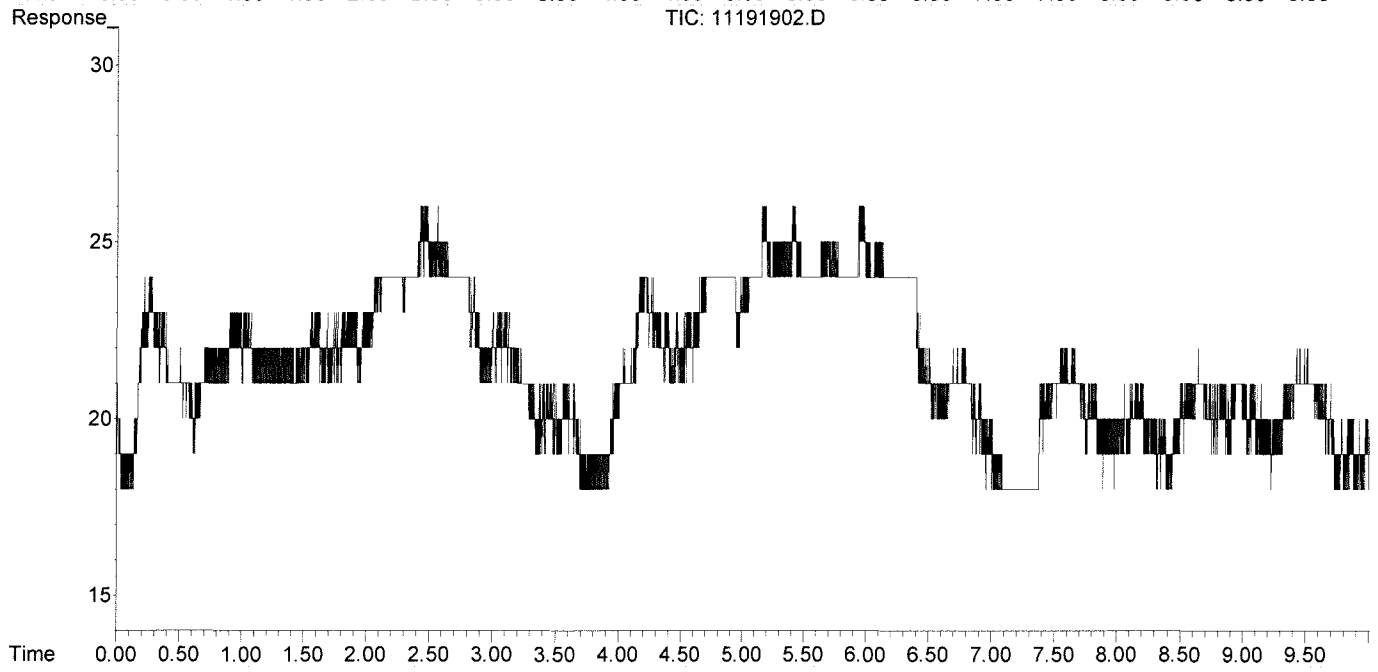
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191902.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 11:47:44
Operator : WH/LD
Sample : STD S32-10291901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 10:57:47 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

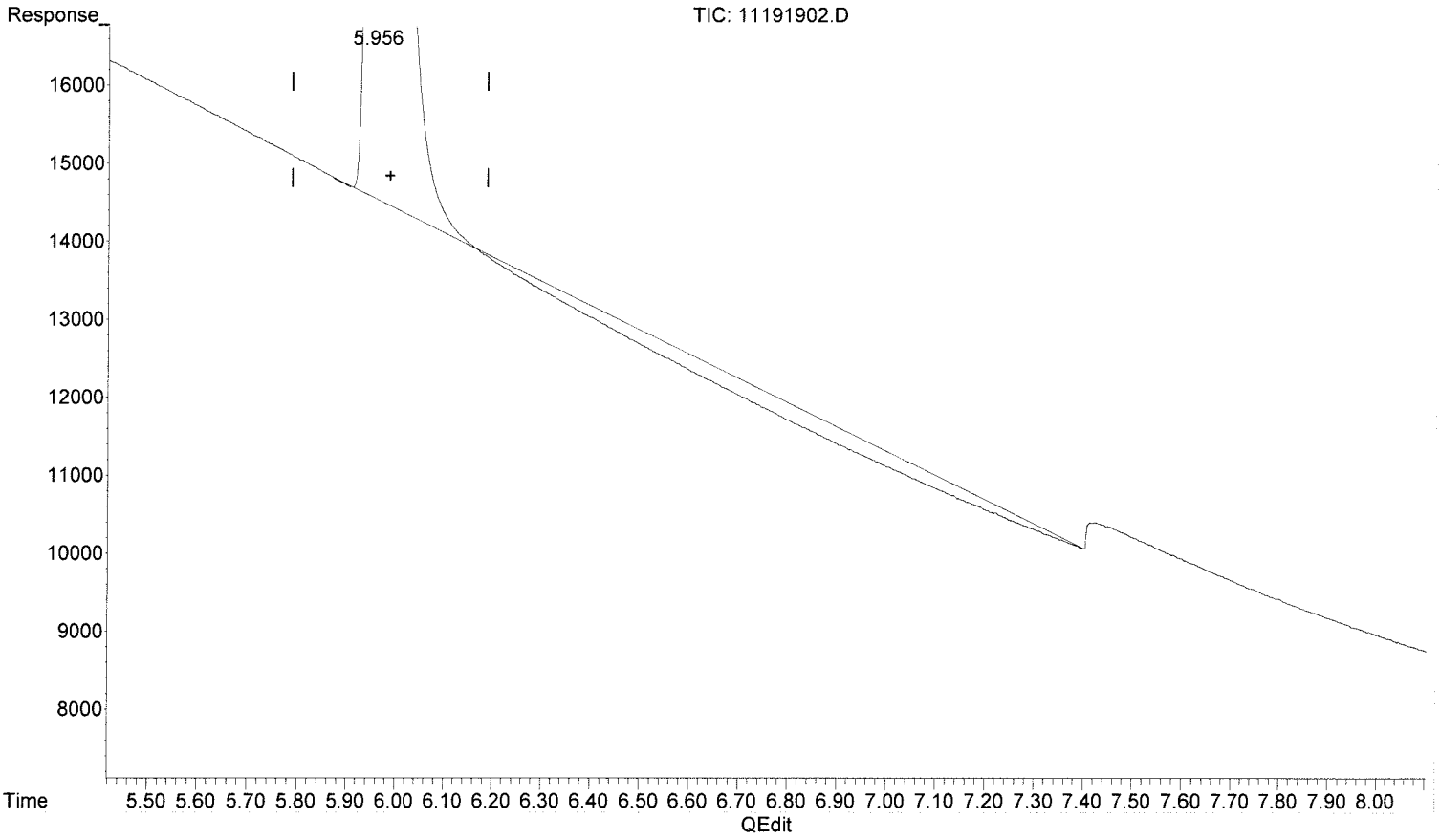




Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191902.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 11:47:44
Operator : WH/LD
Sample : STD S32-10291901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 10:57:47 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



(4) Carbon dioxide

5.957min 4519.618 ppm

response 1060886

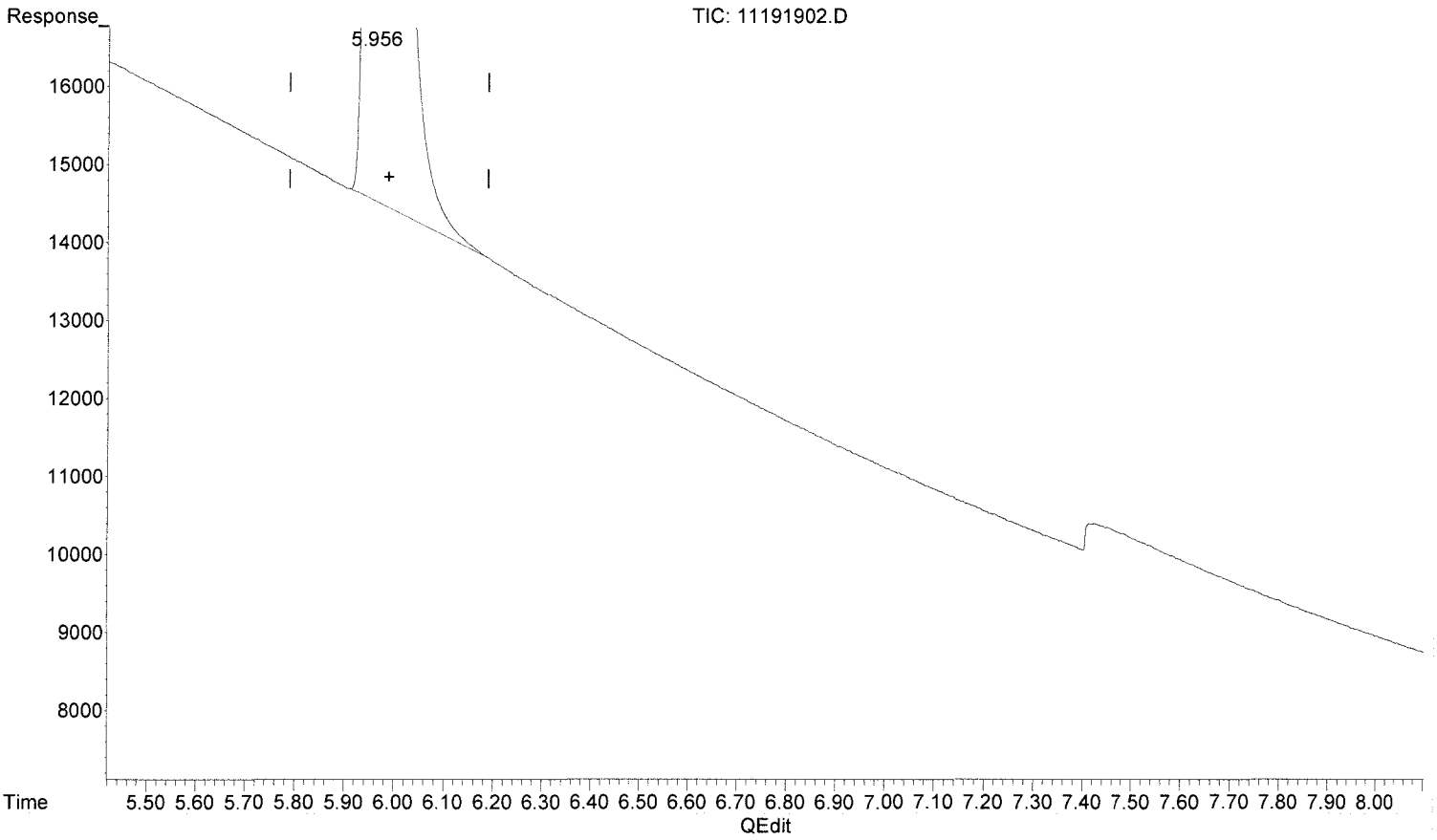
(+) = Expected Retention Time

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191902.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 11:47:44
Operator : WH/LD
Sample : STD S32-10291901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 10:57:47 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

LD
BLC
11/19

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



(4) Carbon dioxide

5.956min 5006.629 ppm m

response 1175202

11/20/19

(+) = Expected Retention Time
RS082817_CO2.M Tue Nov 19 10:58:24 2019

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191916.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 15:56:00
Operator : WH/LD
Sample : STD S32-10291901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 15:04:00 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

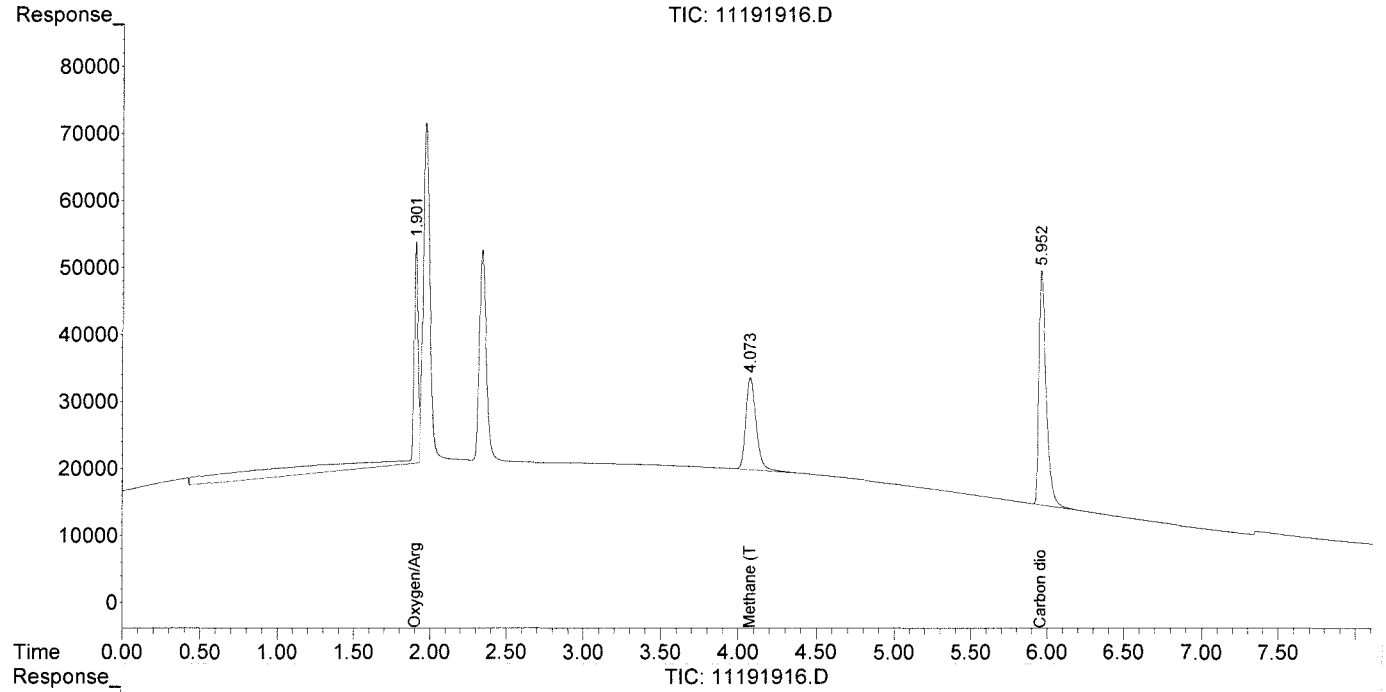
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.902	1497758	0.315	ppm	
2)	Carbon monoxide	1.902	1497758	N.D.	ppm	
3)	Methane (TCD)	4.073f	632021	66828.577	ppm	
4)	Carbon dioxide	5.952	1171842	4992.314	ppm	m
6)	Methane (FID)	0.000	0	N.D.	ppm	
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	0	N.D.	ppm	
9)	Propylene	0.000	0	N.D.	ppm	
10)	Propane	0.000	0	N.D.	ppm	
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	0.000	0	N.D.	ppm	
13)	n-Butane	0.000	0	N.D.	ppm	

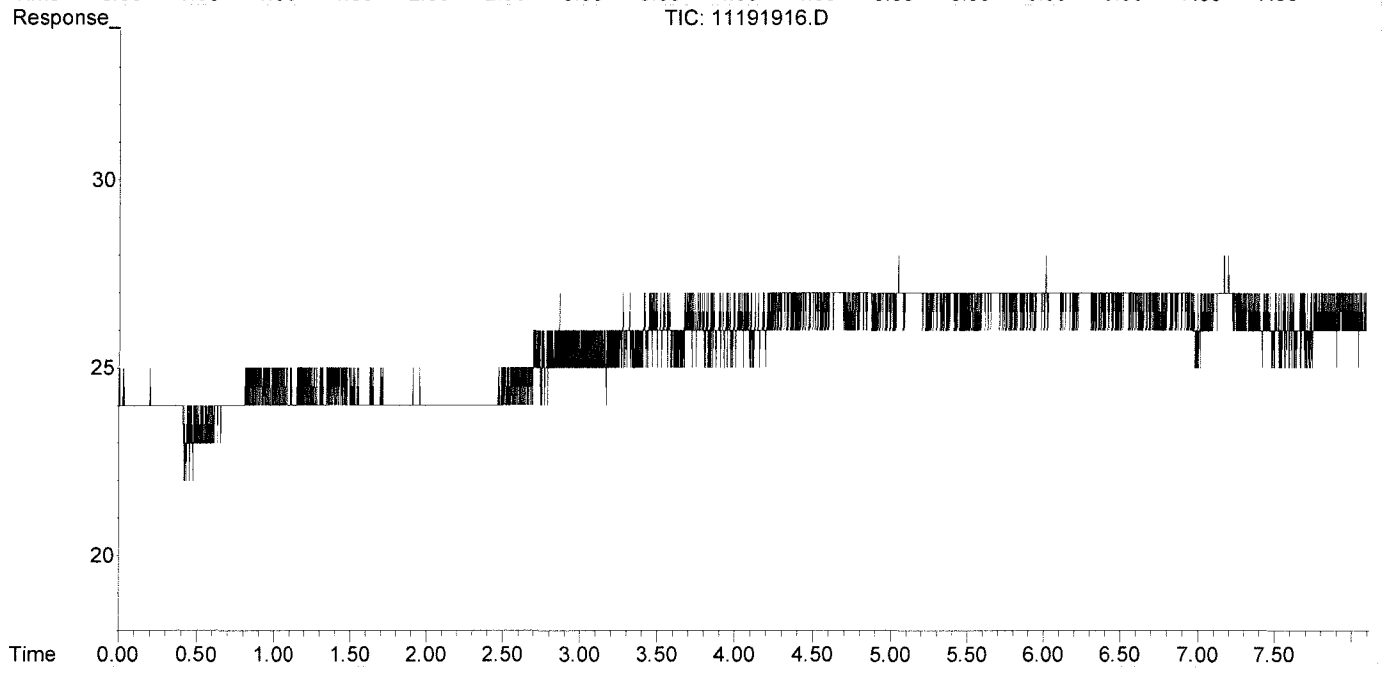
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191916.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 15:56:00
Operator : WH/LD
Sample : STD S32-10291901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 15:04:00 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

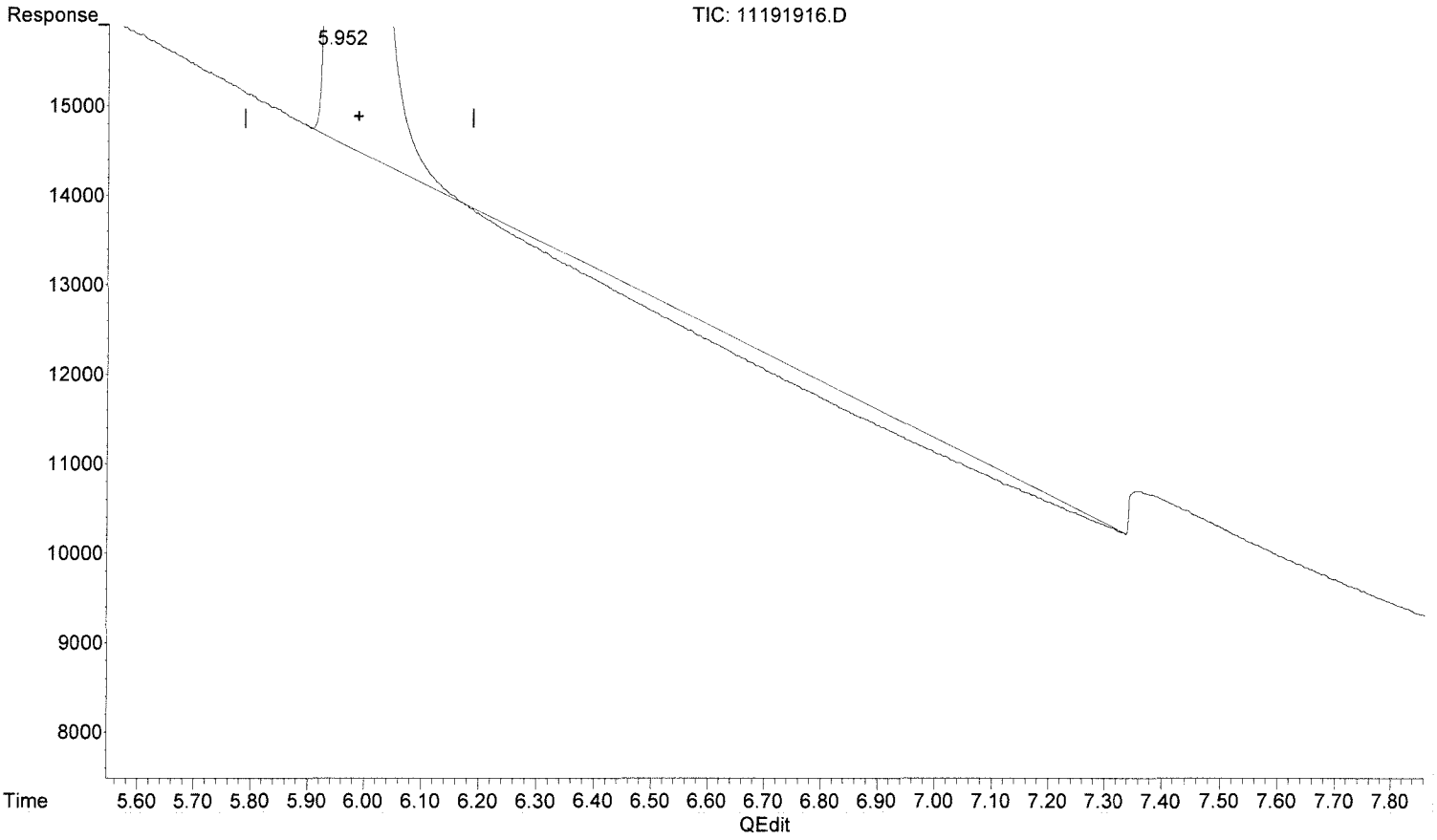




Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191916.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 15:56:00
Operator : WH/LD
Sample : STD S32-10291901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 15:04:00 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



(4) Carbon dioxide

5.953min 4592.713 ppm

response 1078044

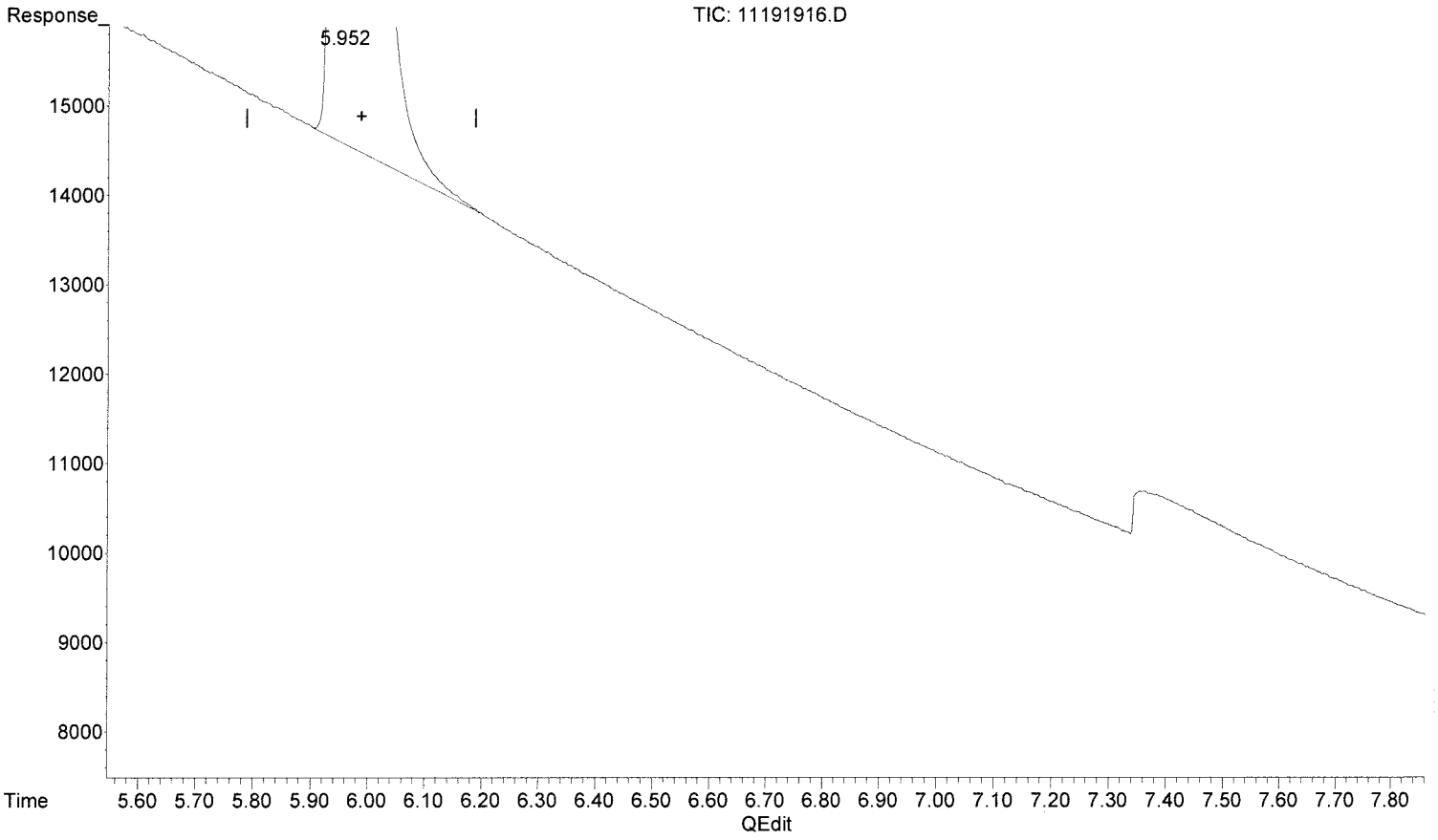
(+) = Expected Retention Time

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191916.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 15:56:00
Operator : WH/LD
Sample : STD S32-10291901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 19 15:04:00 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

CD
BLC
11/19

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



(4) Carbon dioxide

5.952min 4992.314 ppm m

response 1171842

11/20/19

(+) = Expected Retention Time

Injection Log

Directory: I:\GC10\DATA\RSK_FID\2017_08\29\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Acquisition Method	Comments
1	29-Aug-17, 07:58:00	08291701.D	std s30-06161601		MC	RSKBOTH.M	Pass
2	29-Aug-17, 08:11:02	08291702.D	mb 0.5ml		MC	RSKBOTH.M	Pass
3	29-Aug-17, 08:24:13	08291703.D	4089-001 0.5ml		MC	RSKBOTH.M	
4	29-Aug-17, 08:39:29	08291704.D	4089-002 0.5ml		MC	RSKBOTH.M	
5	29-Aug-17, 08:53:38	08291705.D	4089-003 0.5ml		MC	RSKBOTH.M	
6	29-Aug-17, 09:33:52	08291706.D	4089-004 0.5ml		MC	RSKBOTH.M	
7	29-Aug-17, 09:50:51	08291707.D	4089-005 0.5ml		MC	RSKBOTH.M	
8	29-Aug-17, 10:07:54	08291708.D	4089-006 0.5ml		MC	RSKBOTH.M	
9	29-Aug-17, 10:42:34	08291709.D	4089-007 0.5ml		MC	RSKBOTH.M	
10	29-Aug-17, 11:06:01	08291710.D	4089-008 0.5ml		MC	RSKBOTH.M	
11	29-Aug-17, 11:23:53	08291711.D	4089-009 0.5ml		MC	RSKBOTH.M	
12	29-Aug-17, 11:37:17	08291712.D	lcs s30-05241604		MC	RSKBOTH.M	Pass
13	29-Aug-17, 11:50:31	08291713.D	lcs s30-05241604		MC	RSKBOTH.M	Pass
14	29-Aug-17, 12:29:45	08291714.D	std s30-06161601		MC	RSKBOTH.M	Pass
15	29-Aug-17, 14:07:01	08291715.D	25ppm s32-08291701 0.25ml		MC	RSKBOTH.M	Curve
16	29-Aug-17, 14:22:12	08291716.D	100ppm s32-08291702 0.2ml		MC	RSKBOTH.M	Curve
17	29-Aug-17, 14:53:00	08291717.D	250ppm s32-08291702 0.5ml		MC	RSKBOTH.M	Curve
18	29-Aug-17, 15:07:43	08291718.D	mls inject		MC	RSKBOTH.M	
19	29-Aug-17, 15:23:21	08291719.D	2500ppm s32-08231701 50ul		MC	RSKBOTH.M	Curve
20	29-Aug-17, 15:44:54	08291720.D	5000ppm s32-08231701 0.1ml		MC	RSKBOTH.M	Curve
21	29-Aug-17, 16:00:09	08291721.D	25000ppm s32-08231701 0.5ml		MC	RSKBOTH.M	Curve
22	29-Aug-17, 16:15:43	08291722.D	mb 0.1ml		MC	RSKBOTH.M	Pass
23	29-Aug-17, 16:35:37	08291723.D	lcv s30-07071701		MC	RSKBOTH.M	Pass

Injection Log

Directory: I:\GC10\DATA\RSK_TCD\2019_11\19\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Acquisition Method	Comments
1	19-Nov-19, 11:34:26	11191901.D	prime		WH/LD	RSKBOTH.M	
2	19-Nov-19, 11:47:44	11191902.D	STD S32-10291901		WH/LD	RSKBOTH.M	PASS
3	19-Nov-19, 12:00:53	11191903.D	RB 0.1ml		WH/LD	RSKBOTH.M	PASS
4	19-Nov-19, 12:14:52	11191904.D	MCS 0.1ml		WH/LD	RSKBOTH.M	PASS
5	19-Nov-19, 12:28:01	11191905.D	xxxxxLCS S32-08141901		WH/LD	RSKBOTH.M	FAIL
6	19-Nov-19, 12:41:11	11191906.D	xxxxxLCS S32-08141901		WH/LD	RSKBOTH.M	FAIL
7	19-Nov-19, 12:54:42	11191907.D	P1906981-001 0.1ml		WH/LD	RSKBOTH.M	
8	19-Nov-19, 13:43:34	11191908.D	P1906981-002 0.1ml		WH/LD	RSKBOTH.M	
9	19-Nov-19, 14:15:19	11191909.D	P1906981-003 0.1ml		WH/LD	RSKBOTH.M	
10	19-Nov-19, 14:29:15	11191910.D	P1906981-004 0.1ml		WH/LD	RSKBOTH.M	
11	19-Nov-19, 14:42:11	11191911.D	P1906981-005 0.1ml		WH/LD	RSKBOTH.M	
12	19-Nov-19, 14:55:10	11191912.D	P1906981-006 0.1ml		WH/LD	RSKBOTH.M	
13	19-Nov-19, 15:15:48	11191913.D	XXXLCS S32-08141901		WH/LD	RSKBOTH.M	FAIL
14	19-Nov-19, 15:30:06	11191914.D	LCS S32-08141901		WH/LD	RSKBOTH.M	PASS
15	19-Nov-19, 15:43:01	11191915.D	LCSD S32-08141901		WH/LD	RSKBOTH.M	PASS
16	19-Nov-19, 15:56:00	11191916.D	STD S32-10291901		WH/LD	RSKBOTH.M	PASS

Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2019_11\18\
Data File : 11181908.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 18-Nov-2019, 14:48:34
Operator : WH/LD
Sample : p1906981-001 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 18 14:04:28 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

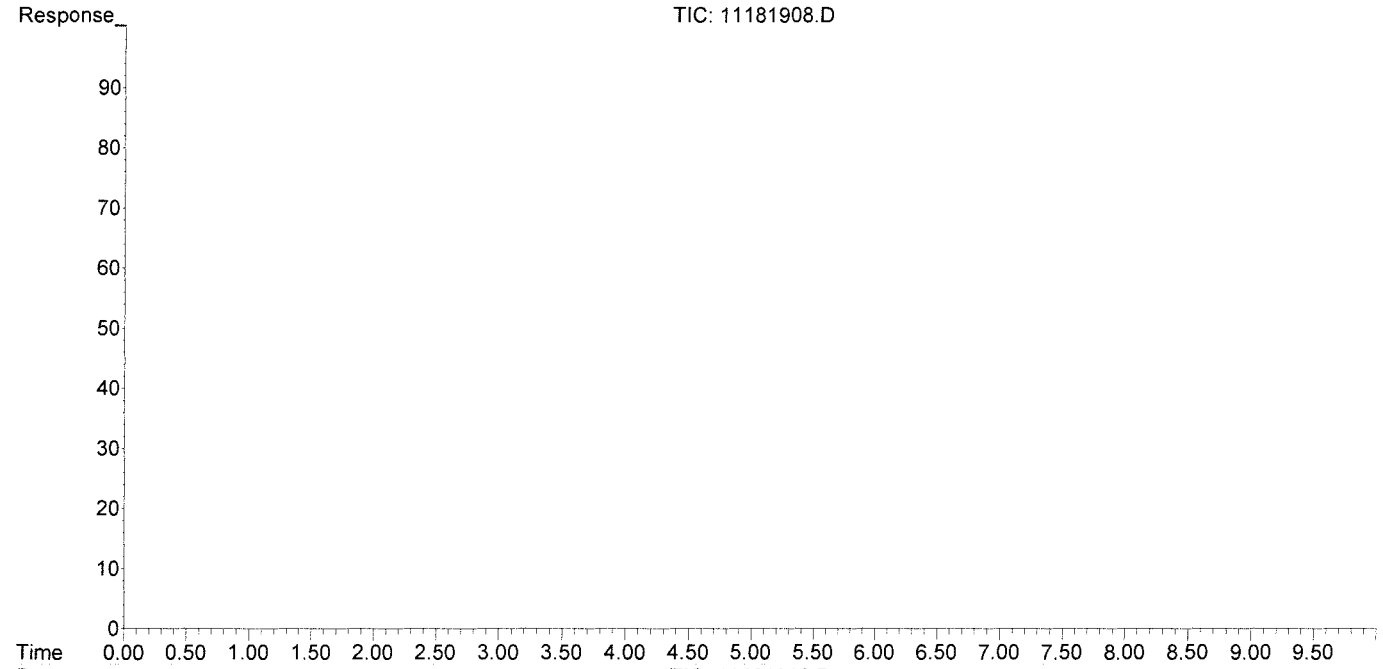
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	0.000	0	N.D.	ppm	
2)	Carbon monoxide	0.000	0	N.D.	ppm	
3)	Methane (TCD)	0.000	0	N.D.	ppm	
4)	Carbon dioxide	0.000	0	N.D.	ppm	
6)	Methane (FID)	1.144	2609	0.288	ppm	m
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	0	N.D.	ppm	
9)	Propylene	0.000	0	N.D.	ppm	
10)	Propane	0.000	0	N.D.	ppm	
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	0.000	0	N.D.	ppm	
13)	n-Butane	0.000	0	N.D.	ppm	

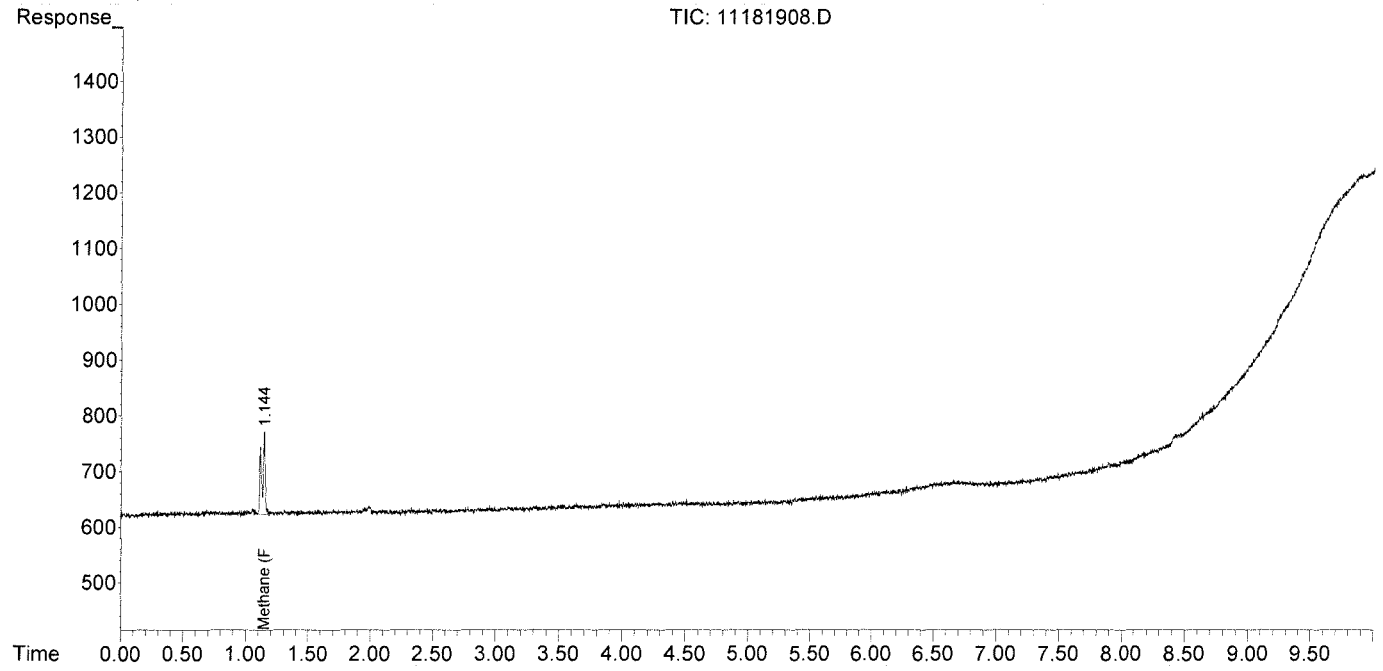
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2019_11\18\
Data File : 11181908.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 18-Nov-2019, 14:48:34
Operator : WH/LD
Sample : p1906981-001 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 18 14:04:28 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

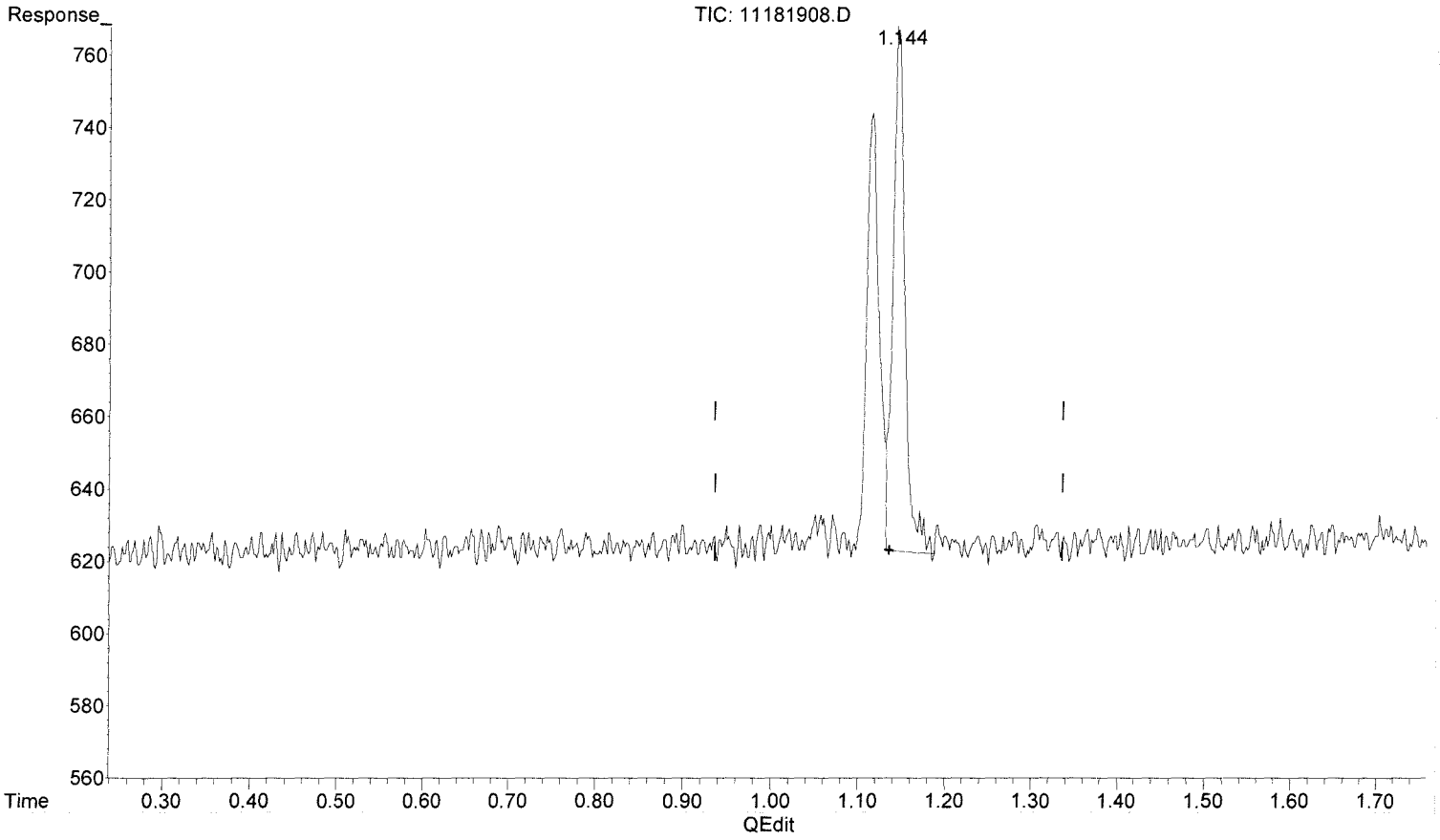




Data Path : J:\GC10\DATA\RSK_FID\2019_11\18\
Data File : 11181908.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 18-Nov-2019, 14:48:34
Operator : WH/LD
Sample : p1906981-001 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 18 14:04:28 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



(6) Methane (FID)

1.145min 0.157 ppm

response 1420

(+) = Expected Retention Time

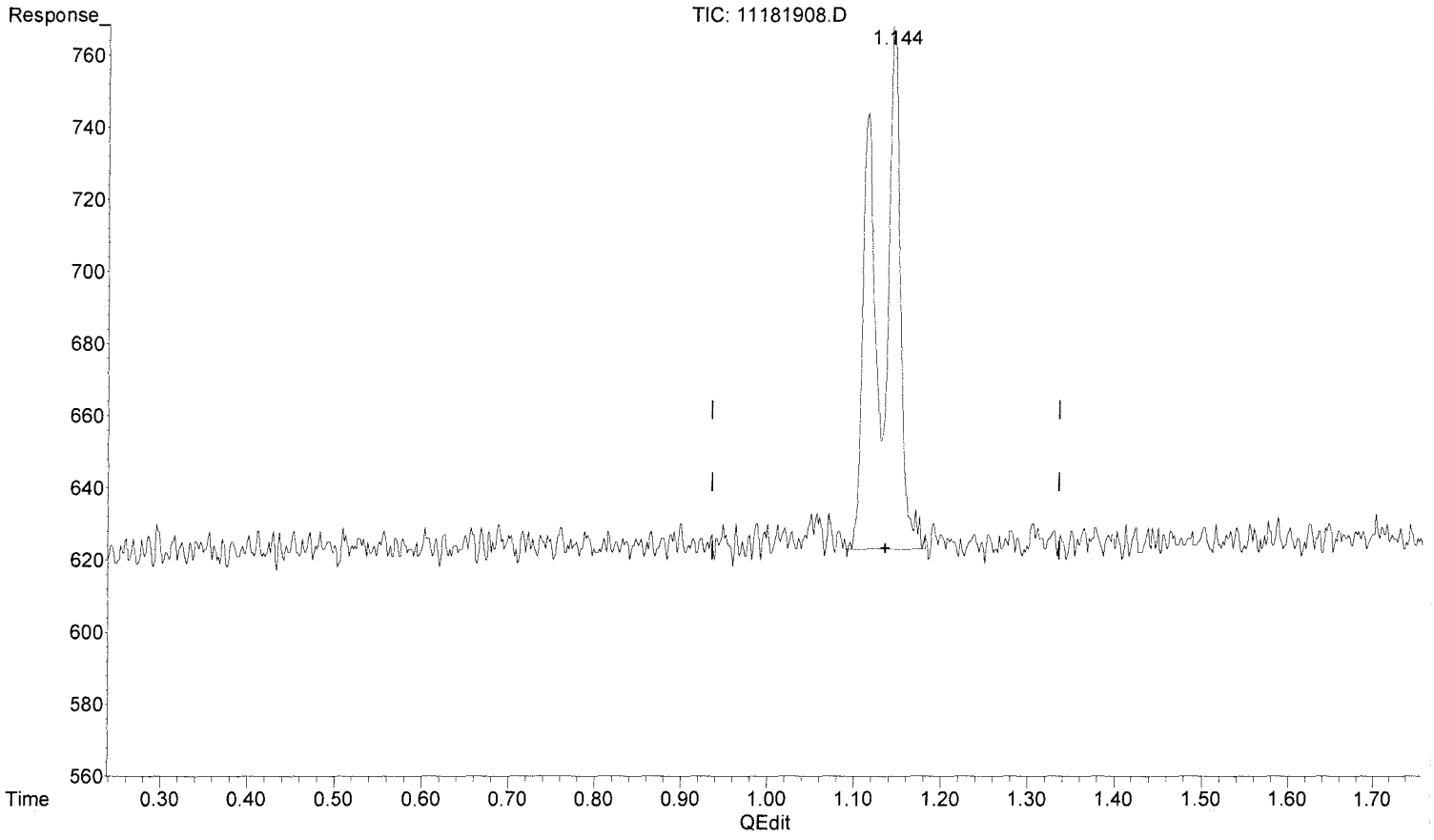
00988339

Data Path : J:\GC10\DATA\RSK_FID\2019_11\18\
Data File : 11181908.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 18-Nov-2019, 14:48:34
Operator : WH/LD
Sample : p1906981-001 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

LD
SP
11/18

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 18 14:04:28 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



(6) Methane (FID)

1.144min 0.288 ppm m

response 2609

11/19/19

(+) = Expected Retention Time

Data Path : J:\GC10\DATA\RSK_FID\2019_11\18\
Data File : 11181909.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 18-Nov-2019, 15:01:59
Operator : WH/LD
Sample : p1906981-002 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 18 14:43:21 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

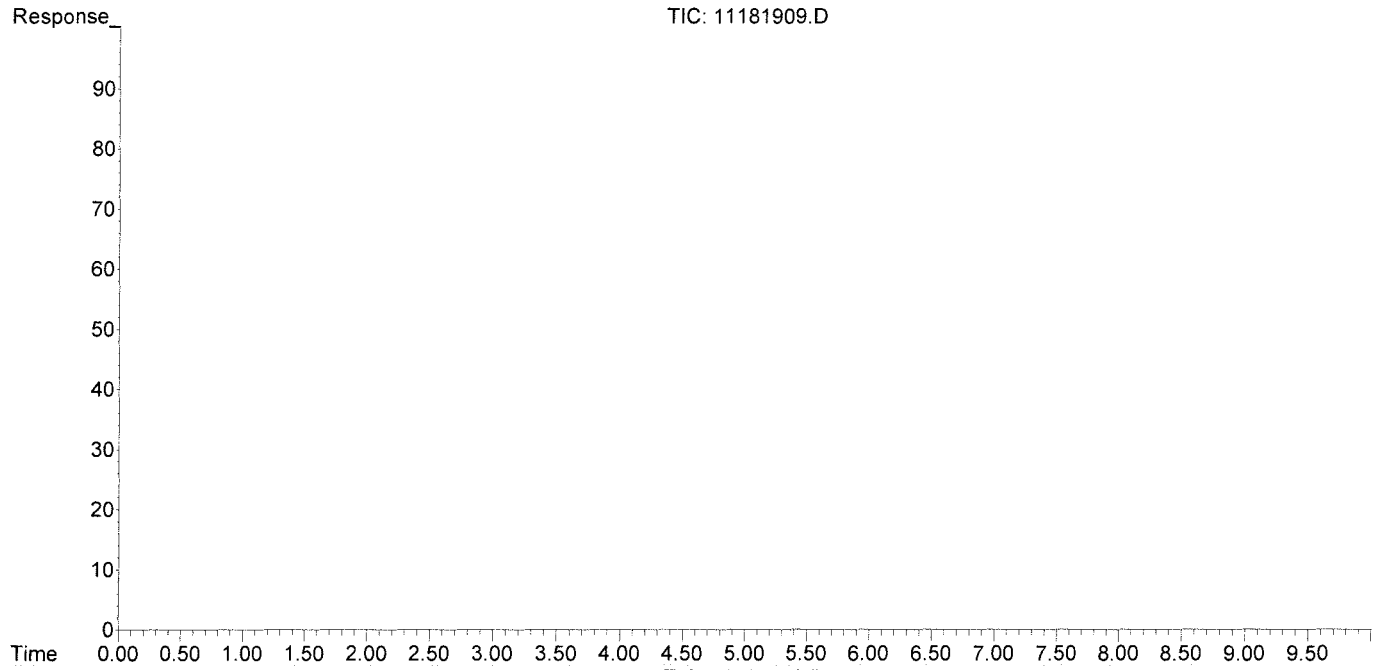
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.116	14418	1.590	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	0.000	0	N.D.	ppm
10)	Propane	0.000	0	N.D.	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	0.000	0	N.D.	ppm
13)	n-Butane	0.000	0	N.D.	ppm

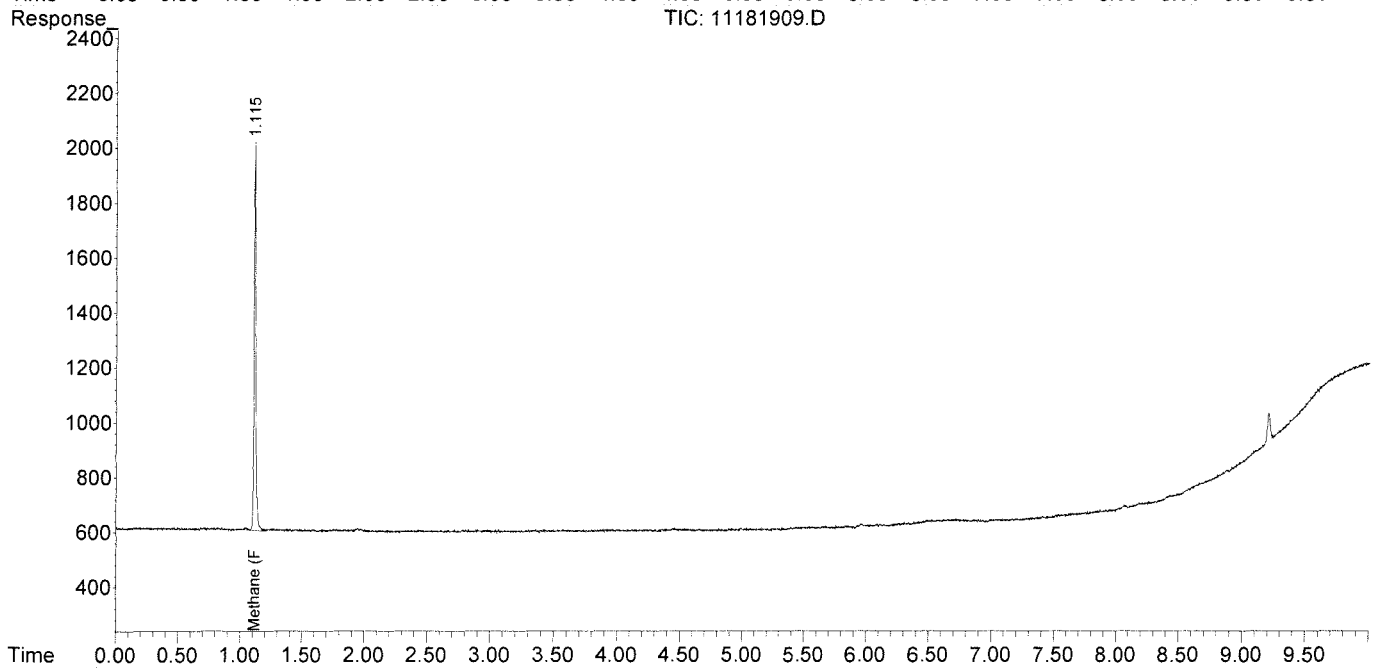
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2019_11\18\
Data File : 11181909.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 18-Nov-2019, 15:01:59
Operator : WH/LD
Sample : p1906981-002 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 18 14:43:21 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Data Path : J:\GC10\DATA\RSK_FID\2019_11\18\
Data File : 11181910.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 18-Nov-2019, 15:15:50
Operator : WH/LD
Sample : p1906981-003 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 18 14:43:41 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

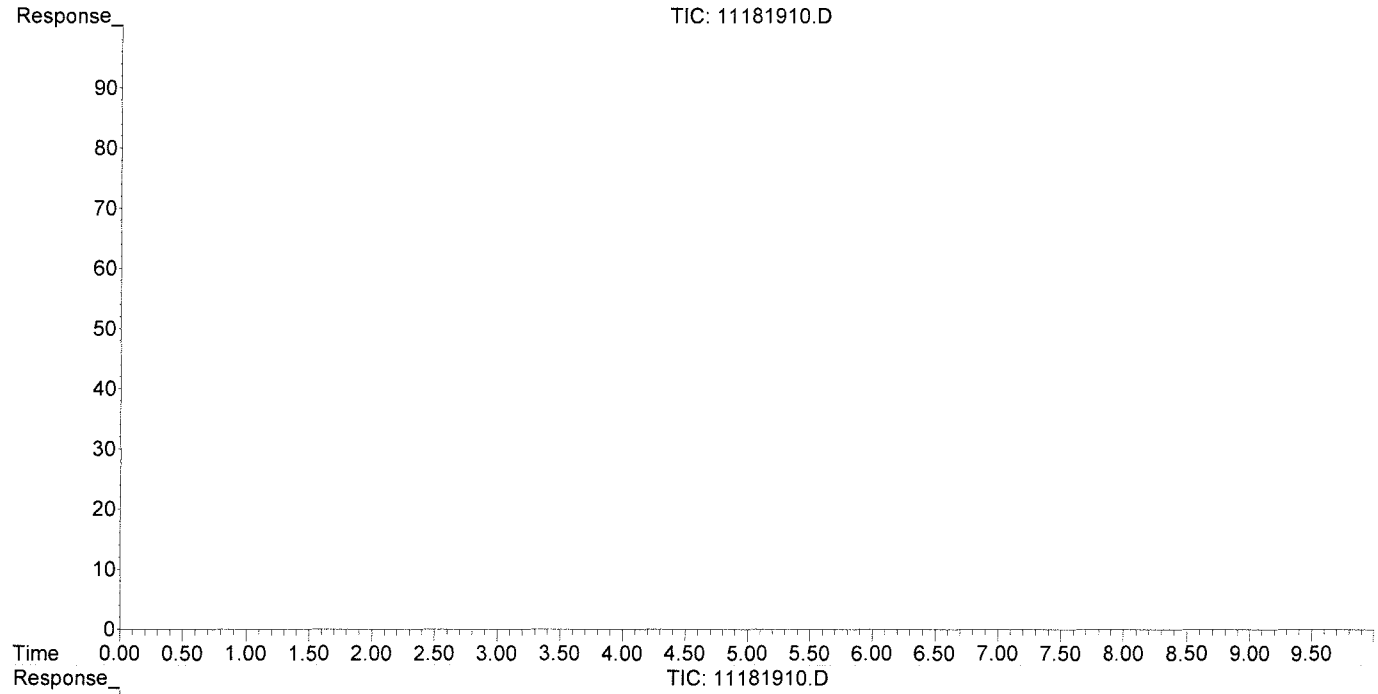
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.119	5075	0.560	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	0.000	0	N.D.	ppm
10)	Propane	0.000	0	N.D.	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	0.000	0	N.D.	ppm
13)	n-Butane	0.000	0	N.D.	ppm

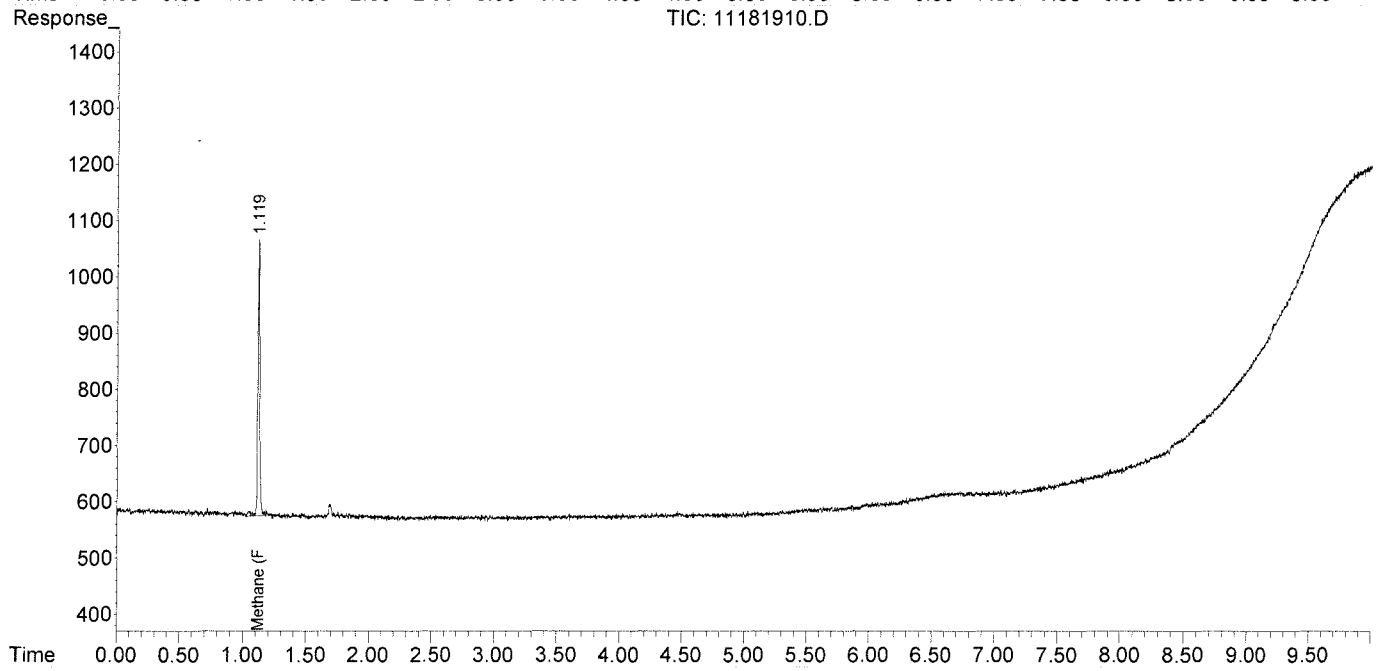
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2019_11\18\
Data File : 11181910.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 18-Nov-2019, 15:15:50
Operator : WH/LD
Sample : p1906981-003 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 18 14:43:41 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Data Path : J:\GC10\DATA\RSK_FID\2019_11\18\
Data File : 11181911.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 18-Nov-2019, 15:28:41
Operator : WH/LD
Sample : p1906981-004 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 18 14:44:11 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

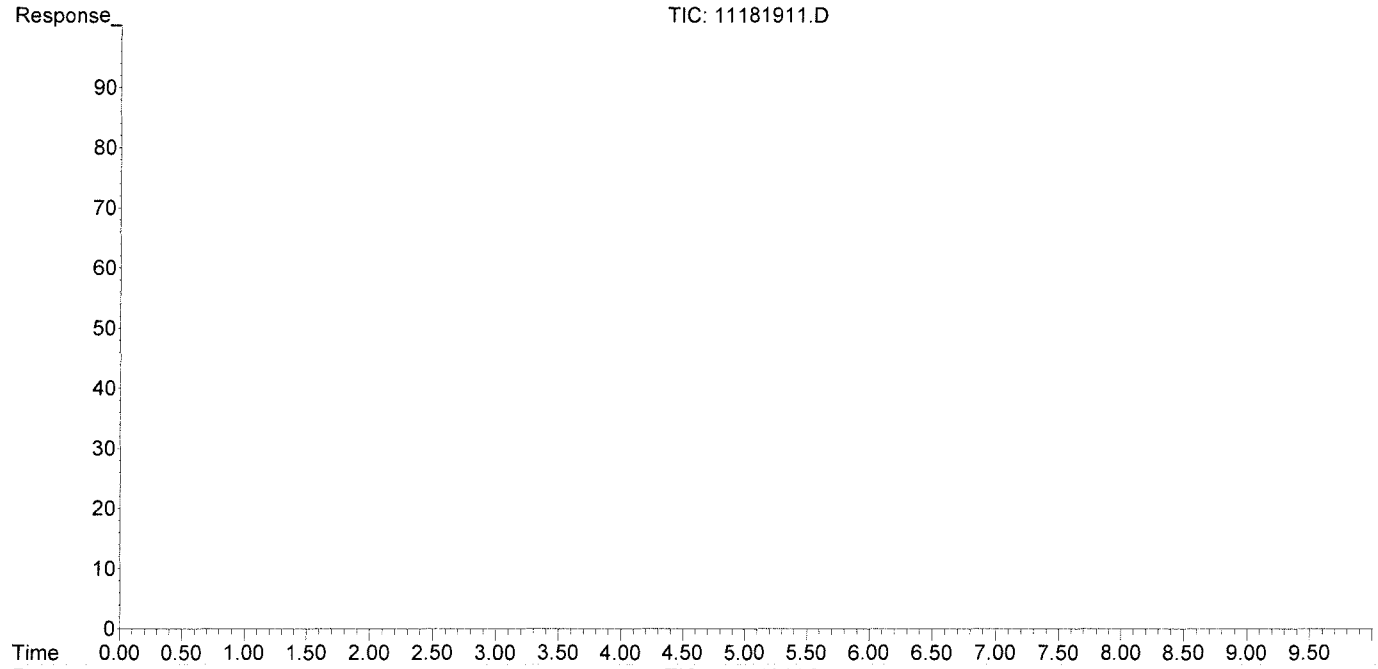
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.111	32616	3.596	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	0.000	0	N.D.	ppm
10)	Propane	0.000	0	N.D.	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	0.000	0	N.D.	ppm
13)	n-Butane	0.000	0	N.D.	ppm

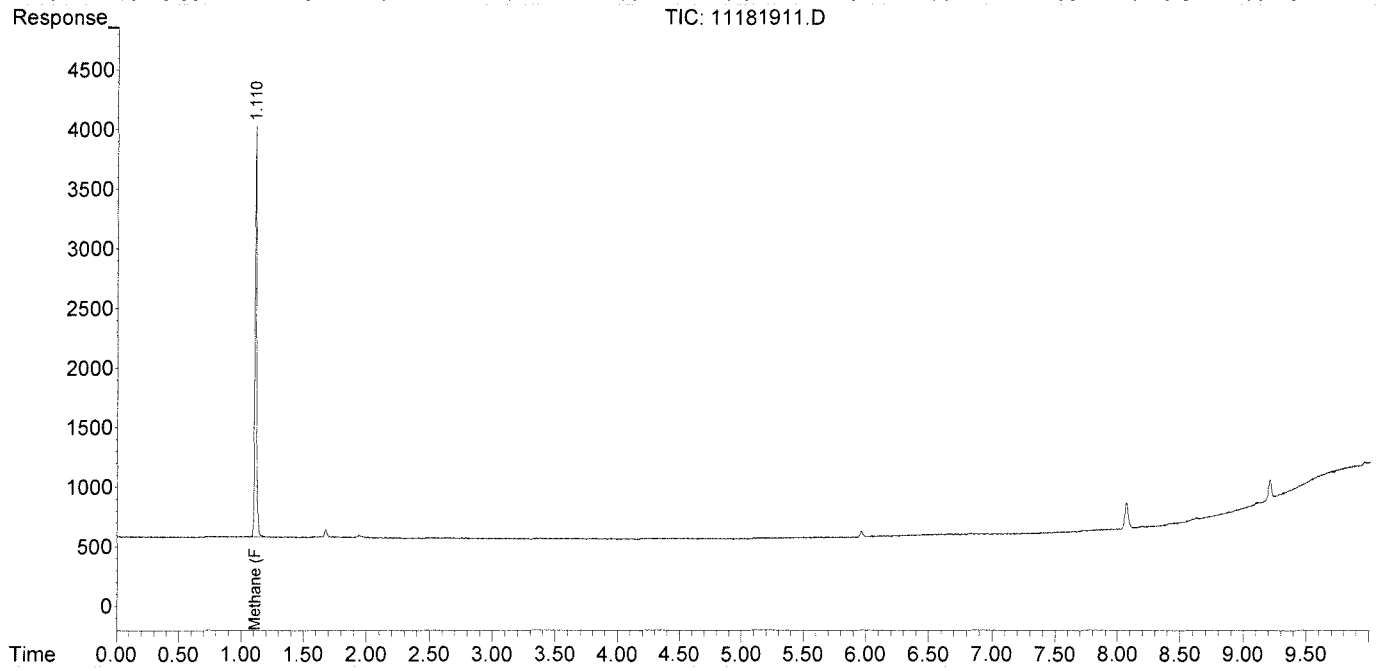
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2019_11\18\
Data File : 11181911.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 18-Nov-2019, 15:28:41
Operator : WH/LD
Sample : p1906981-004 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 18 14:44:11 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





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Data Path : J:\GC10\DATA\RSK_FID\2019_11\18\
Data File : 11181912.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 18-Nov-2019, 15:42:36
Operator : WH/LD
Sample : p1906981-005 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 18 14:57:02 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

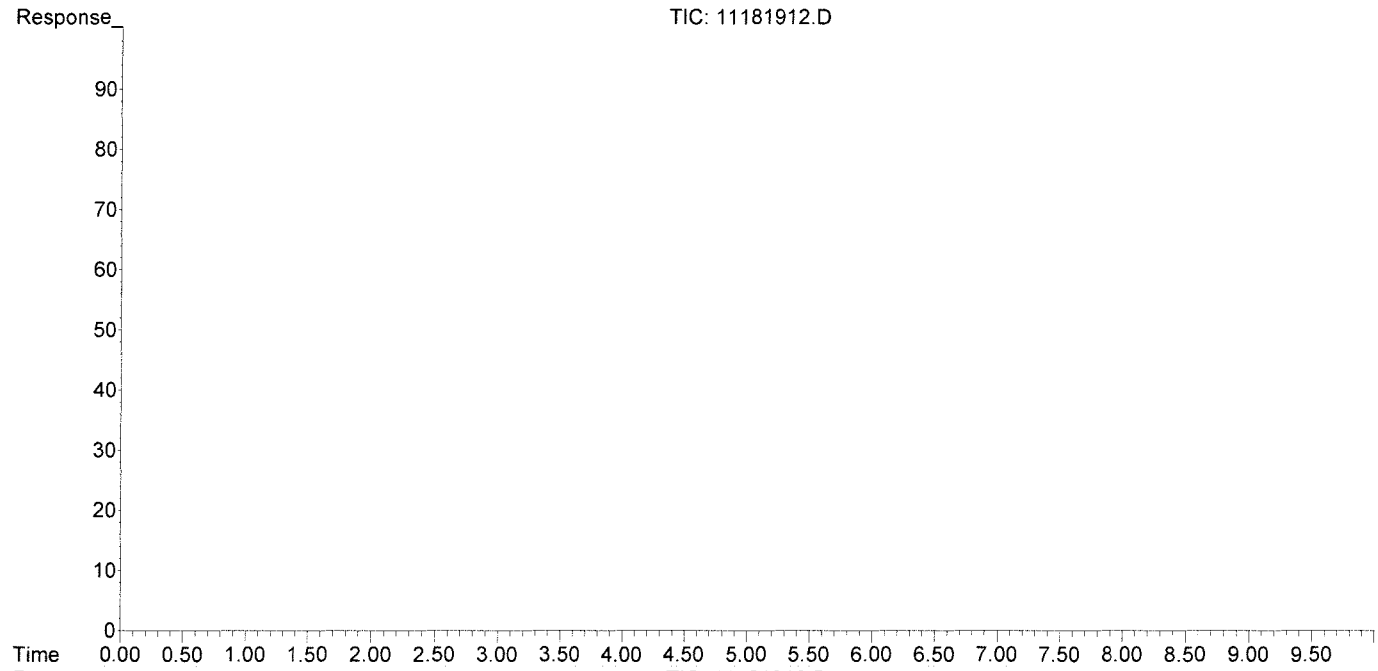
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.121	7128	0.786	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	0.000	0	N.D.	ppm
10)	Propane	0.000	0	N.D.	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	0.000	0	N.D.	ppm
13)	n-Butane	0.000	0	N.D.	ppm

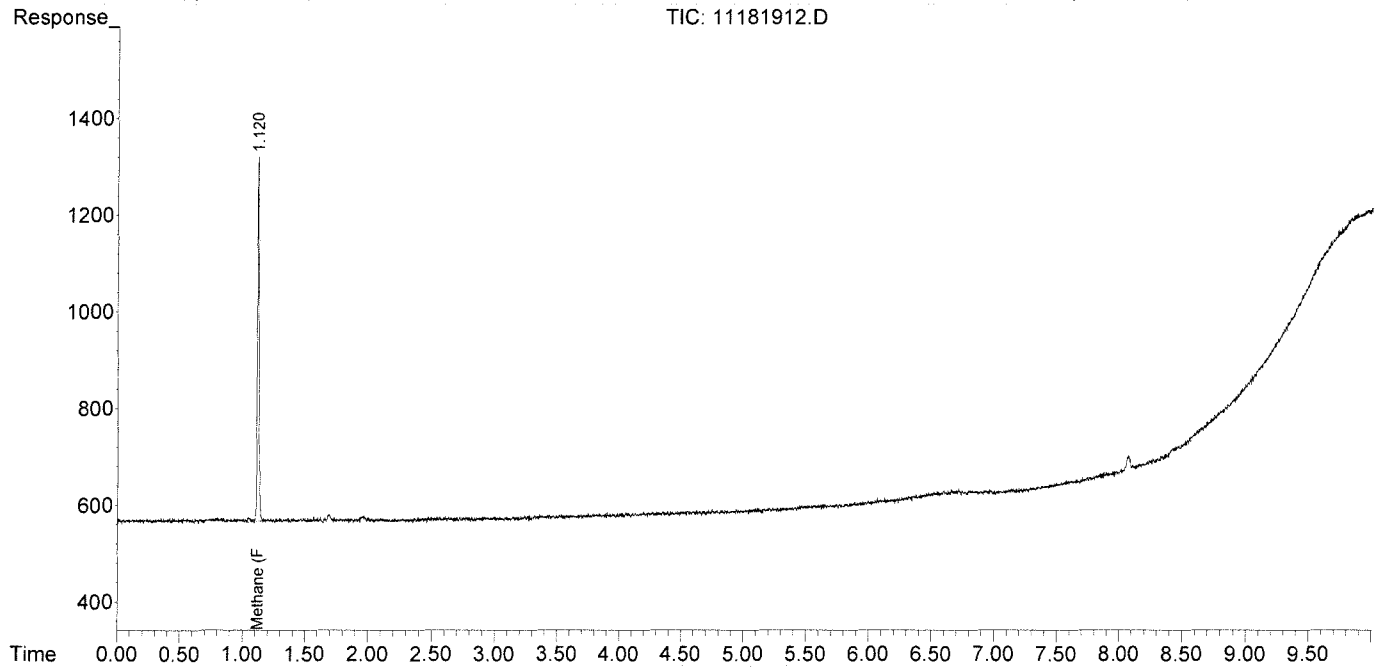
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2019_11\18\
Data File : 11181912.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 18-Nov-2019, 15:42:36
Operator : WH/LD
Sample : p1906981-005 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 18 14:57:02 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Data Path : J:\GC10\DATA\RSK_FID\2019_11\18\
Data File : 11181913.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 18-Nov-2019, 15:55:33
Operator : WH/LD
Sample : p1906981-006 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 18 15:05:44 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

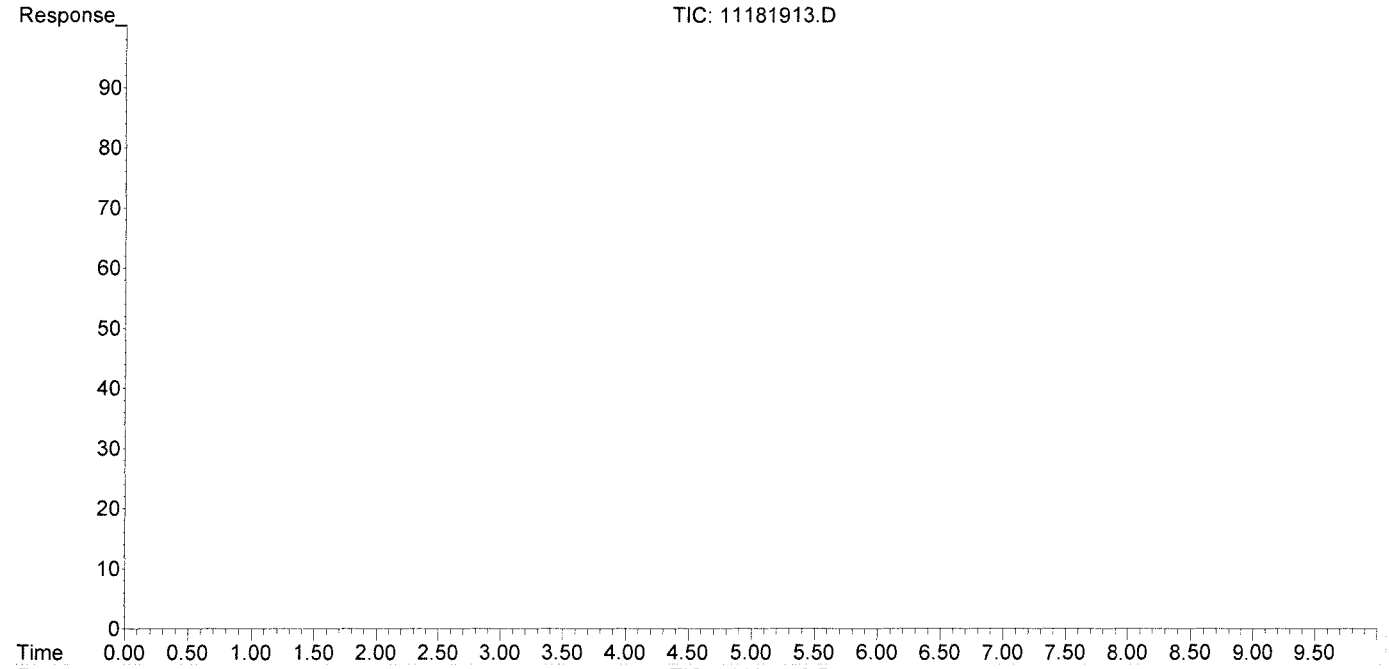
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.118	7753	0.855	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	0.000	0	N.D.	ppm
10)	Propane	0.000	0	N.D.	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	0.000	0	N.D.	ppm
13)	n-Butane	0.000	0	N.D.	ppm

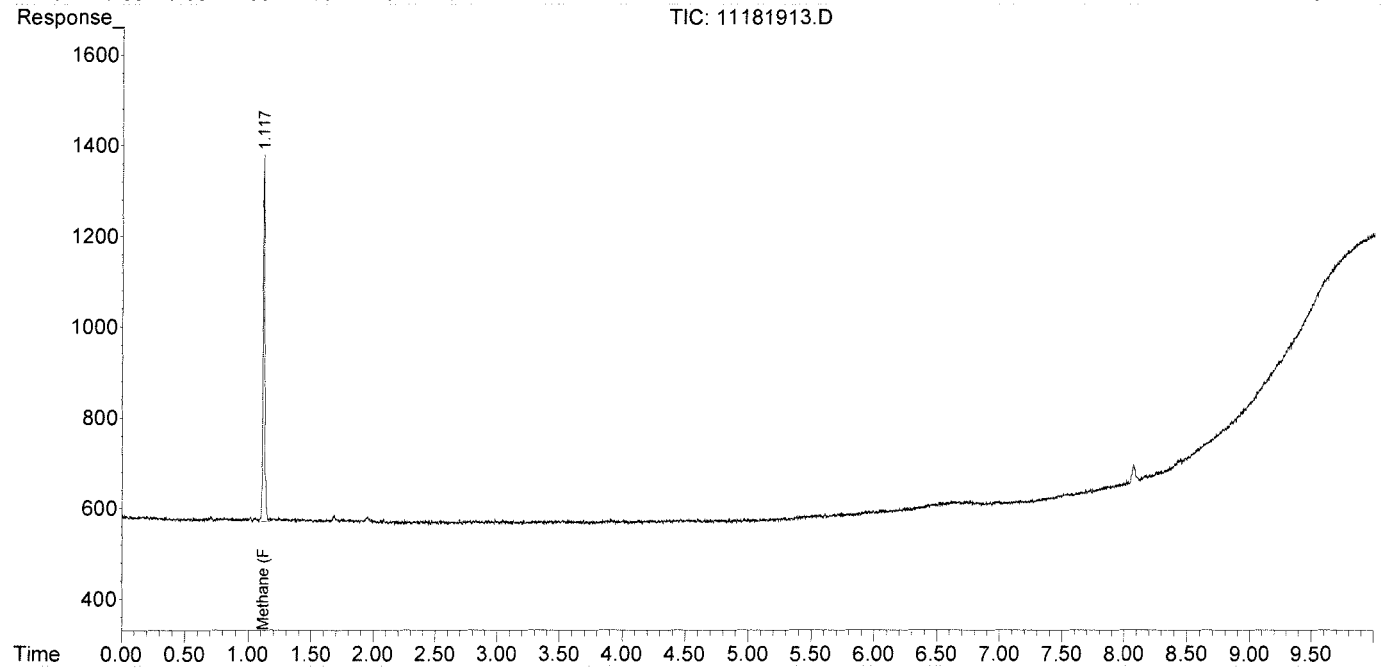
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2019_11\18\
Data File : 11181913.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 18-Nov-2019, 15:55:33
Operator : WH/LD
Sample : p1906981-006 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 18 15:05:44 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Data Path : J:\GC10\DATA\RSK_FID\2019_11\18\
Data File : 11181903.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 18-Nov-2019, 13:36:03
Operator : WH/LD
Sample : MCS 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 18 12:50:33 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

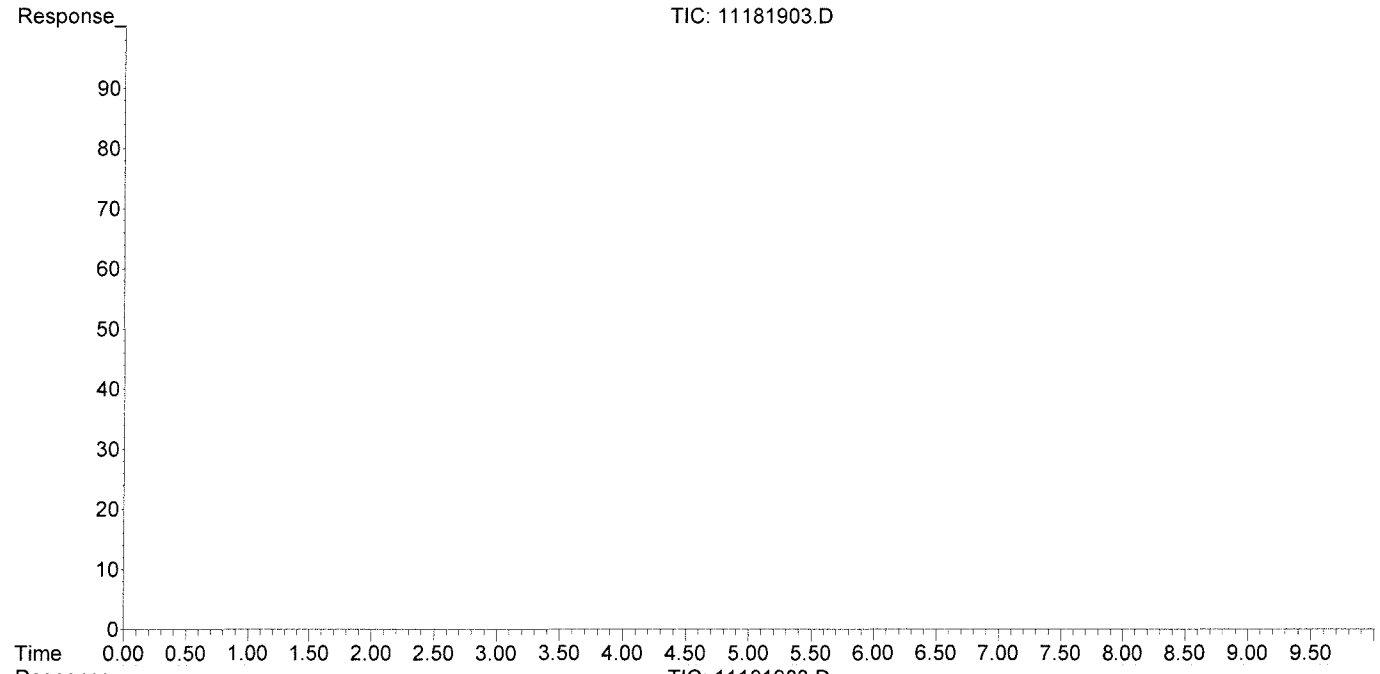
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.117	1685	0.186	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	0.000	0	N.D.	ppm
10)	Propane	0.000	0	N.D.	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	0.000	0	N.D.	ppm
13)	n-Butane	0.000	0	N.D.	ppm

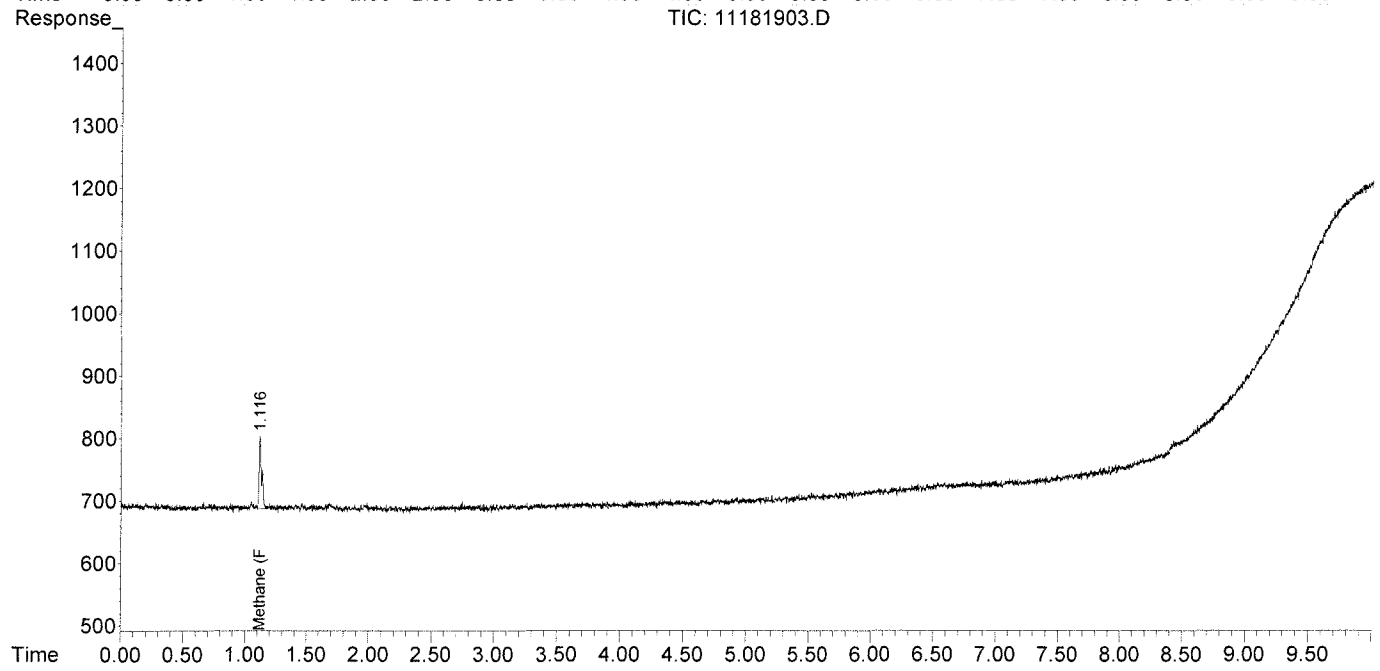
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2019_11\18\
Data File : 11181903.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 18-Nov-2019, 13:36:03
Operator : WH/LD
Sample : MCS 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 18 12:50:33 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Data Path : J:\GC10\DATA\RSK_FID\2019_11\18\
Data File : 11181904.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 18-Nov-2019, 13:52:11
Operator : WH/LD
Sample : LCS FID 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 18 13:05:19 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

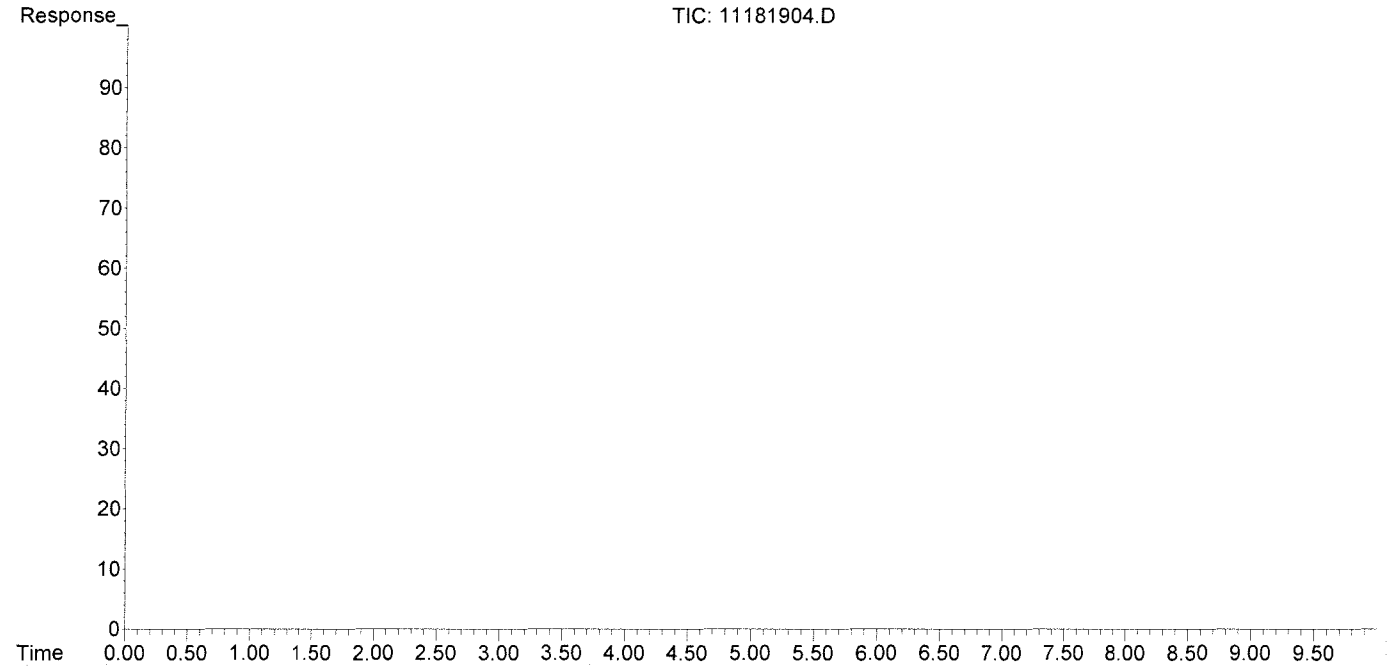
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.104	12525	1.381	ppm
7)	Ethylene	1.678	16145	0.965	ppm
8)	Ethane	1.945	19741	1.165	ppm
9)	Propylene	4.330	21516	0.918	ppm
10)	Propane	4.453	29676	1.193	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	6.656	38343	1.441	ppm
13)	n-Butane	6.656	38343	1.441	ppm

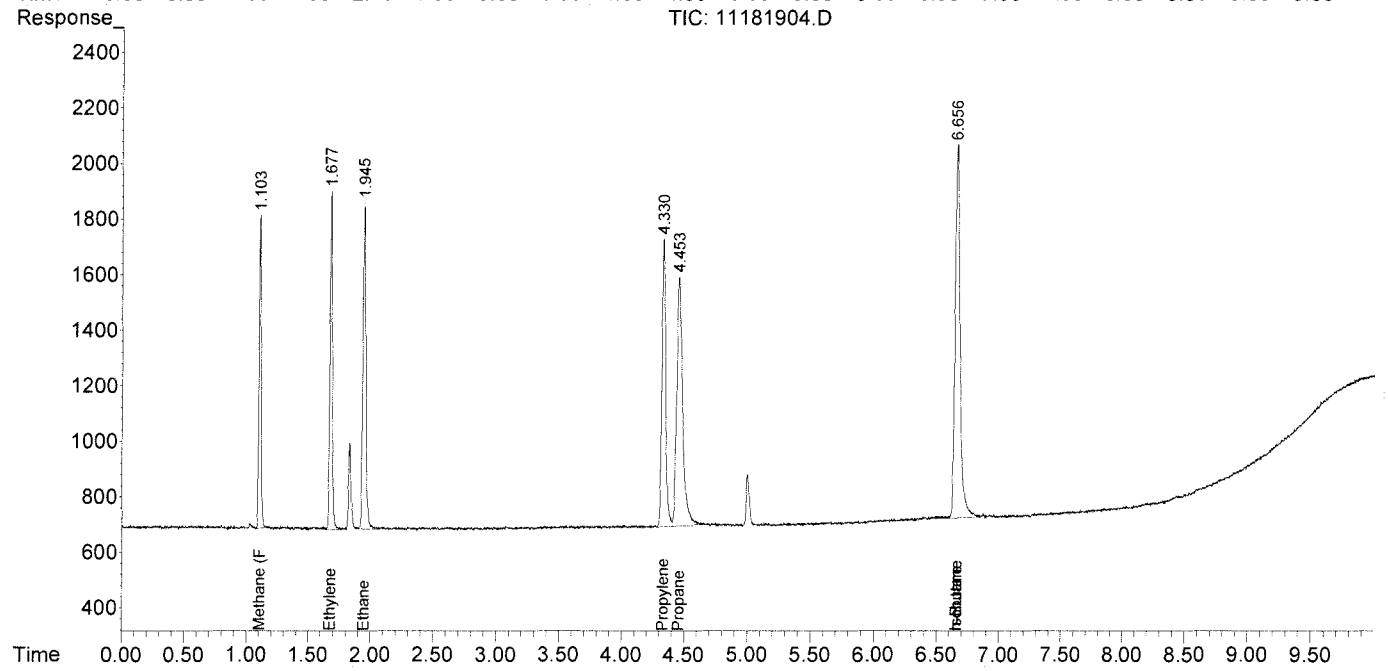
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2019_11\18\
Data File : 11181904.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 18-Nov-2019, 13:52:11
Operator : WH/LD
Sample : LCS FID 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 18 13:05:19 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Data Path : J:\GC10\DATA\RSK_FID\2019_11\18\
Data File : 11181905.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 18-Nov-2019, 14:05:22
Operator : WH/LD
Sample : LCSD FID 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 18 13:15:54 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

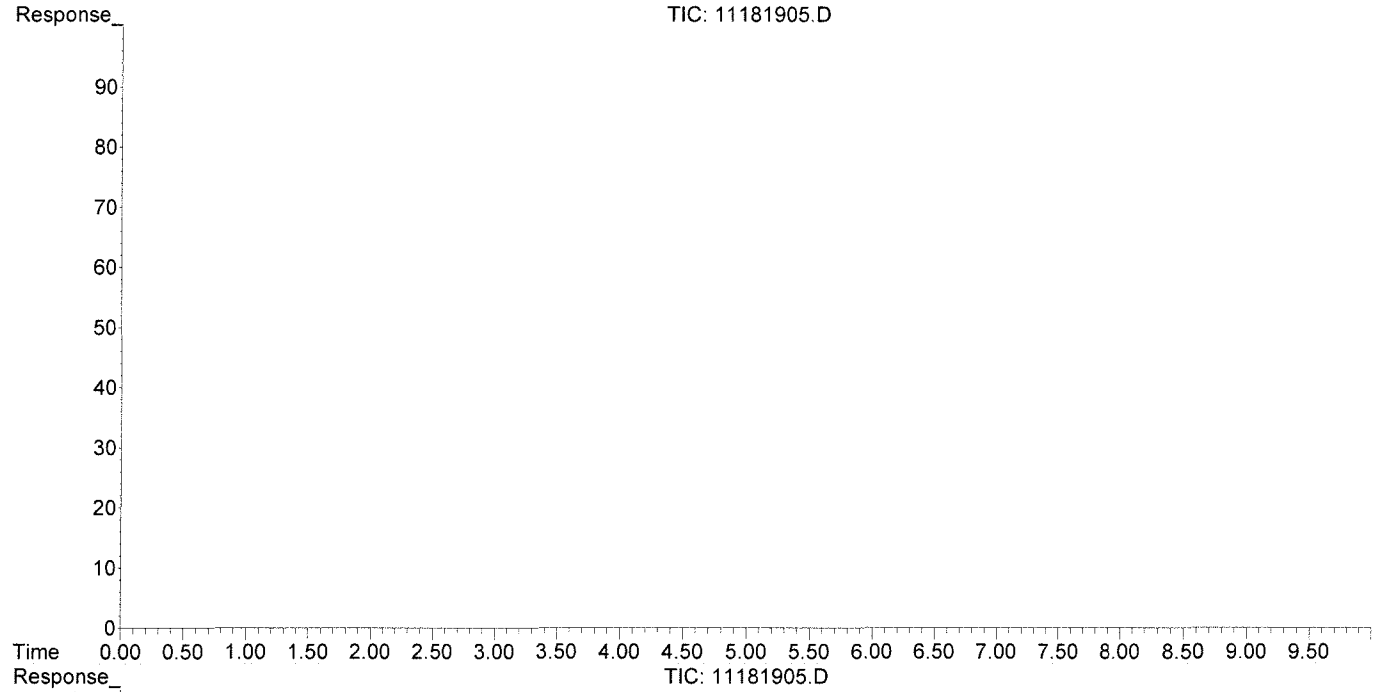
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.120	12378	1.365	ppm
7)	Ethylene	1.693	15989	0.955	ppm
8)	Ethane	1.960	19608	1.157	ppm
9)	Propylene	4.337	21486	0.917	ppm
10)	Propane	4.459	29068	1.168	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	6.659	36967	1.389	ppm
13)	n-Butane	6.659	36967	1.389	ppm

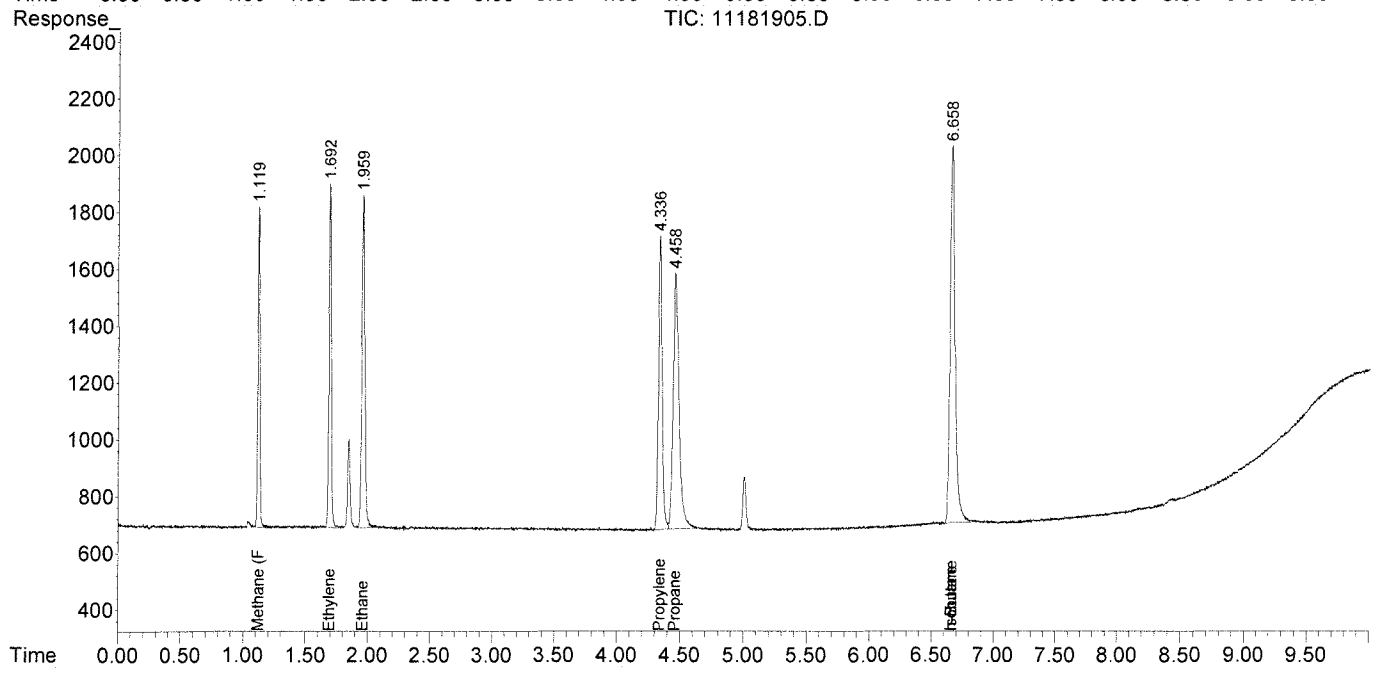
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2019_11\18\
Data File : 11181905.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 18-Nov-2019, 14:05:22
Operator : WH/LD
Sample : LCSD FID 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 18 13:15:54 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Response Factor Report HP5890

Method Path : J:\GC10\METHODS\
Method File : RS091217_R.M
Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
Last Update : Wed Sep 13 11:14:47 2017
Response Via : Initial Calibration

Calibration Files
1 =09121702.D 2 =09121703.D 3 =09121704.D
4 =09121705.D 5 =09121706.D 6 =09121707.D

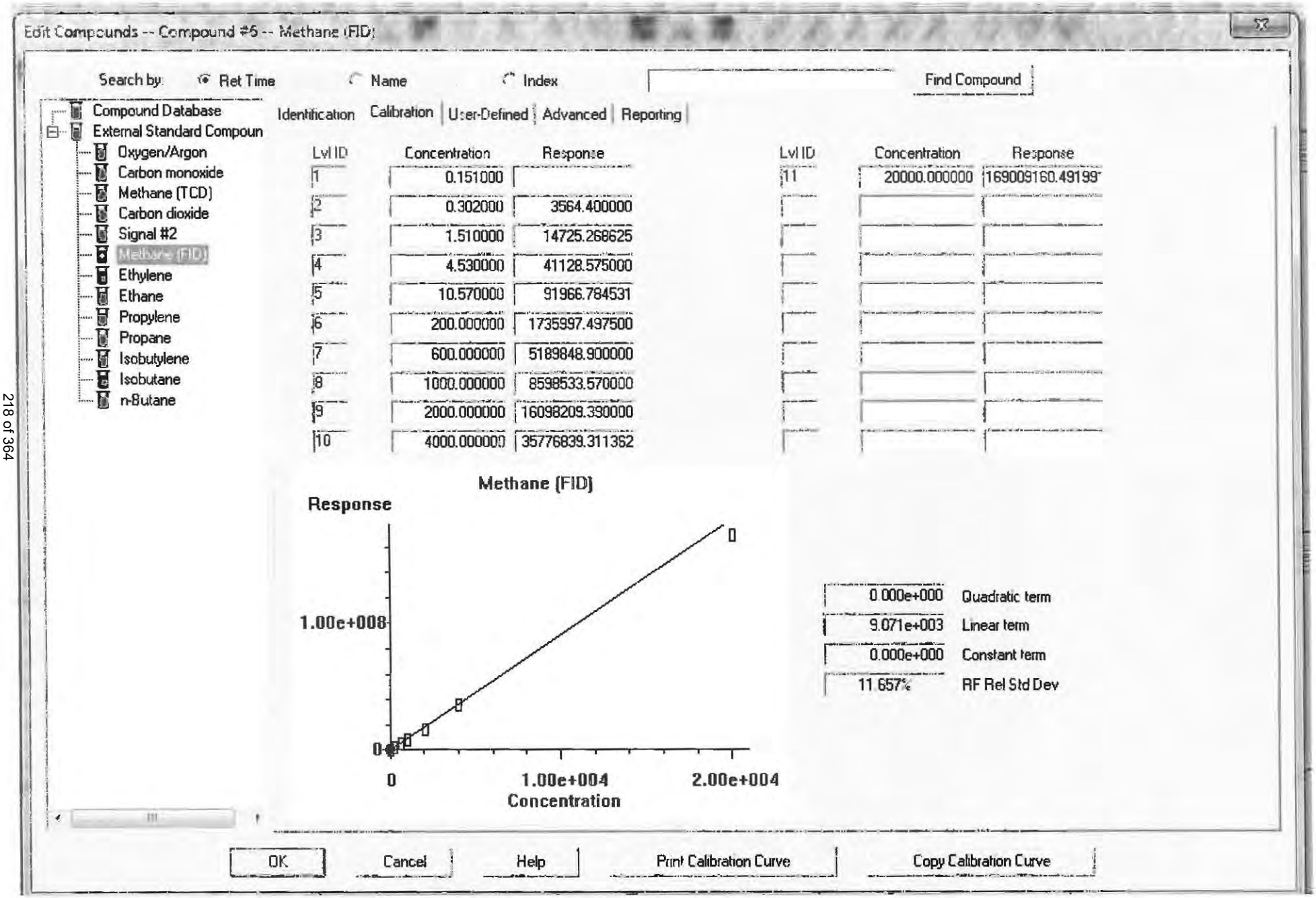
	Compound	1	2	3	4	5	6	Avg		%RSD
1)	Oxygen/Argon	3.739		1.014			0.001	0.793	E6	189.17
2)	Carbon monoxide	3.739		1.014			0.001	0.594	E6	221.92
3)	Methane (TCD)						2.161	0.951	E2	106.37
4)	Carbon dioxide	2.365	2.569	2.558	2.361	2.459	2.314	2.438	E2	4.44

Signal #2 Calibration Files
1 =09121702.D 2 =09121703.D 3 =09121704.D
4 =09121705.D 5 =09121706.D 6 =09121707.D

	Compound	1	2	3	4	5	6	Avg		%RSD
6)	Methane (FID)		1.180	0.975	0.908	0.870	0.868	0.907	E4	11.66
7)	Ethylene	1.736	1.638	1.780	1.720	1.628	1.670	1.673	E4	3.90
8)	Ethane	1.781	1.676	1.784	1.730	1.692	1.675	1.695	E4	3.83
9)	Propylene	2.505	2.296	2.592	2.480	2.346	2.252	2.343	E4	6.56
10)	Propane	2.439	2.283	2.645	2.555	2.433	2.522	2.488	E4	4.20
11)	Isobutylene							0.652	E1	138.46
12)	Isobutane	6.058	4.793	2.214	1.553	1.353		2.662	E4	86.17
13)	n-Butane	6.058	4.793	2.214	1.553	1.353		2.662	E4	86.17

(#) = Out of Range ### Number of calibration levels exceeded format ###

RS091217_R.M Wed Sep 13 15:11:48 2017


Edit Compounds -- Compound #6 -- Methane (FID)
Search by: Ret Time Name Index
Find Compound
Compound Database
External Standard Compoun
Oxygen/Argon
Carbon monoxide
Methane (TCD)
Carbon dioxide
Signal #2
Methane (FID)
Ethylene
Ethane
Propylene
Propane
Isobutylene
Isobutane
n-Butane
Identification Calibration User-Defined Advanced Reporting
Lvl ID Concentration Response
1 0.151000
2 0.302000 3564.400000
3 1.510000 14725.268625
4 4.530000 41128.575000
5 10.570000 91966.784531
6 200.000000 1735997.497500
7 600.000000 5189848.900000
8 1000.000000 8598533.570000
9 2000.000000 16098209.390000
10 4000.000000 35776839.311362
Lvl ID Concentration Response
11 20000.000000 169009160.49199
Methane (FID)
Response
1.00e+008
0
0
1.00e+004
2.00e+004
Concentration
0.000e+000 Quadratic term
9.071e+003 Linear term
0.000e+000 Constant term
11.657% RF Rel Std Dev
OK
Cancel
Help
Print Calibration Curve
Copy Calibration Curve

Edit Compounds -- Compound #7 -- Ethylene

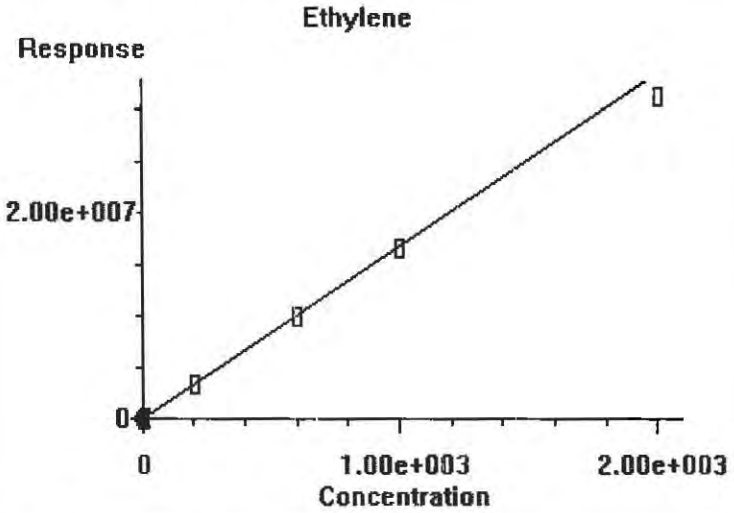
Search by: Ret Time | Name | Index | Find Compound

- Compound Database
- External Standard Compoun
  - Oxygen/Argon
  - Carbon monoxide
  - Methane (TCD)
  - Carbon dioxide
  - Signal #2
  - Methane (FID)
  - Ethylene
  - Ethane
  - Propylene
  - Propane
  - Isobutylene
  - Isobutane
  - n-Butane

Identification | Calibration | User-Defined | Advanced | Reporting

Lvl ID	Concentration	Response
1	0.151000	2621.970000
2	0.302000	4946.731301
3	1.510000	26884.746847
4	4.530000	77902.721497
5	10.570000	172085.529560
6	200.000000	3339702.313219
7	600.000000	10007758.776971
8	1000.000000	16608503.805988
9	2000.000000	31192443.898600
10	4000.000000	

Lvl ID	Concentration	Response
11	20000.000000	



0.000e+000	Quadratic term
1.673e+004	Linear term
0.000e+000	Constant term
3.897%	RF Rel Std Dev

OK | Cancel | Help | Print Calibration Curve | Copy Calibration Curve

Edit Compounds -- Compound #8 -- Ethane

Search by: Ret Time | Name | Index — Find Compound

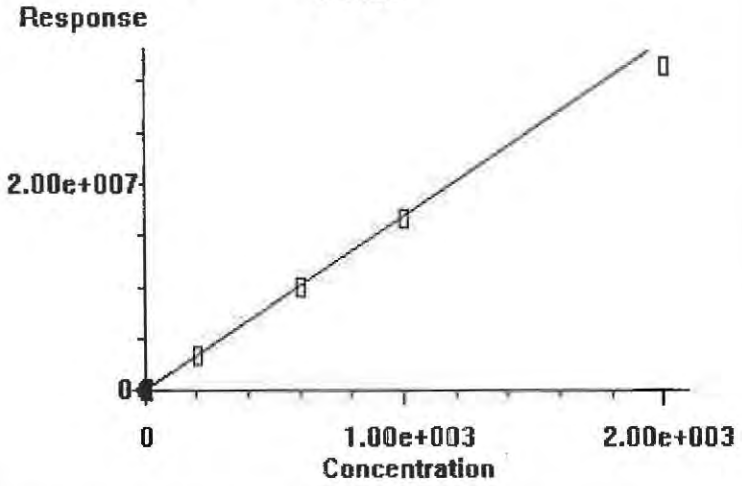
- Compound Database
- External Standard Compoun
  - Oxygen/Argon
  - Carbon monoxide
  - Methane (TCD)
  - Carbon dioxide
  - Signal #2
  - Methane (FID)
  - Ethylene
  - Ethane
  - Propylene
  - Propane
  - Isobutylene
  - Isobutane
  - n-Butane

Identification | Calibration | User-Defined | Advanced | Reporting

Lvl ID	Concentration	Response
1	0.151000	2689.928008
2	0.302000	5060.331943
3	1.510000	26943.667500
4	4.530000	78353.525045
5	10.570000	178840.731148
6	200.000000	3350442.319129
7	600.000000	10048964.218029
8	1000.000000	16703164.879012
9	2000.000000	31424217.938900
10	4000.000000	

Lvl ID	Concentration	Response
11	20000.000000	

Ethane



0.000e+000	Quadratic term
1.695e+004	Linear term
0.000e+000	Constant term
3.831%	RF Rel Std Dev

OK | Cancel | Help | Print Calibration Curve | Copy Calibration Curve

Edit Compounds -- Compound #9 -- Propylene

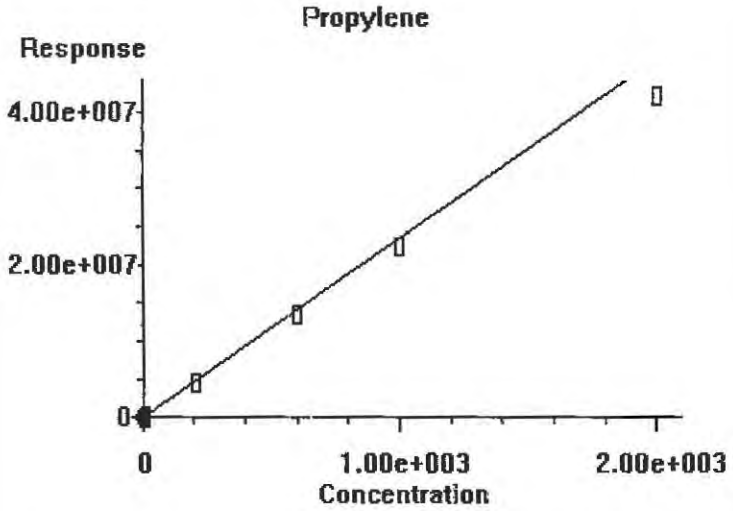
Search by: Ret Time | Name | Index | Find Compound

- Compound Database
- External Standard Compoun
  - Oxygen/Argon
  - Carbon monoxide
  - Methane (TCD)
  - Carbon dioxide
  - Signal #2
  - Methane (FID)
  - Ethylene
  - Ethane
  - Propylene
  - Propane
  - Isobutylene
  - Isobutane
  - n-Butane

Identification | Calibration | User-Defined | Advanced | Reporting

Lvl ID	Concentration	Response
1	0.151000	3782.537646
2	0.302000	6933.285530
3	1.510000	39139.518208
4	4.530000	112341.896872
5	10.570000	248003.903623
6	200.000000	4504060.086084
7	600.000000	13569342.761419
8	1000.000000	22494887.720990
9	2000.000000	42124689.656800
10	4000.000000	

Lvl ID	Concentration	Response
11	20000.000000	



0.000e+000	Quadratic term
2.343e+004	Linear term
0.000e+000	Constant term
6.559%	RF Rel Std Dev

OK | Cancel | Help | Print Calibration Curve | Copy Calibration Curve

Edit Compounds -- Compound #10 -- Propane

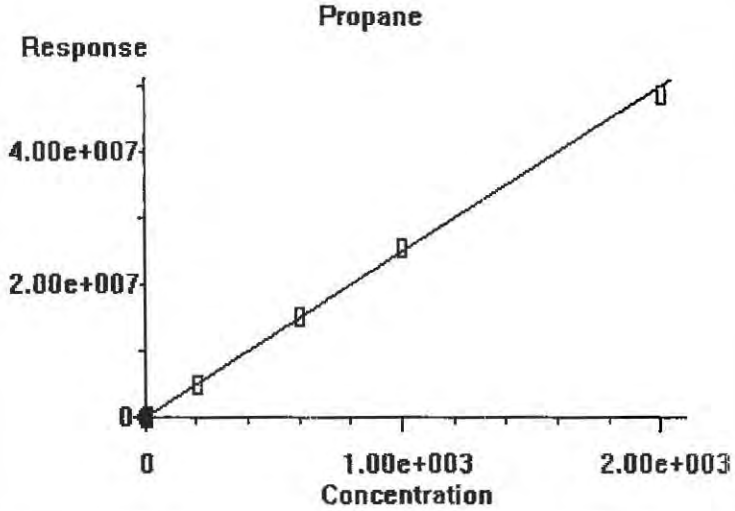
Search by Ret Time Name Index Find Compound

- Compound Database
- External Standard Compoun
  - Oxygen/Argon
  - Carbon monoxide
  - Methane (TCD)
  - Carbon dioxide
  - Signal #2
  - Methane (FID)
  - Ethylene
  - Ethane
  - Propylene
  - Propane
  - Isobutylene
  - Isobutane
  - n-Butane

Identification | Calibration | User-Defined | Advanced | Reporting

Lvl ID	Concentration	Response
1	0.151000	3682.897354
2	0.302000	6894.237803
3	1.510000	39934.166792
4	4.530000	115723.428128
5	10.570000	257124.432806
6	200.000000	5043035.663316
7	600.000000	15251325.797404
8	1000.000000	25459410.657938
9	2000.000000	48583085.287451
10	4000.000000	

Lvl ID	Concentration	Response
11	20000.000000	



0.000e+000	Quadratic term
2.488e+004	Linear term
0.000e+000	Constant term
4.200%	RF Rel Std Dev

OK Cancel Help Print Calibration Curve Copy Calibration Curve

Calibration Status Report HP5890

Method Path : J:\GC10\METHODS\
Method File : RS091217_R.M
Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
Last Update : Wed Sep 13 11:14:47 2017
Response Via : Initial Calibration

#	ID	Conc	ISTD Conc	Path\File
1	1	0	0	J:\GC10\DATA\RSK_FID\2017_09\12\09121702.D
2	2	0	0	J:\GC10\DATA\RSK_FID\2017_09\12\09121703.D
3	3	3	0	J:\GC10\DATA\RSK_FID\2017_09\12\09121704.D
4	4	10	0	J:\GC10\DATA\RSK_FID\2017_09\12\09121705.D
5	5	25	0	J:\GC10\DATA\RSK_FID\2017_09\12\09121706.D
6	6	125	0	J:\GC10\DATA\RSK_FID\2017_09\12\09121707.D
7	7	5000	0	J:\GC10\DATA\RSK_FID\2017_09\12\09121708.D
8	8	25000	0	J:\GC10\DATA\RSK_FID\2017_09\12\09121709.D
9	9	2000	0	J:\GC10\DATA\RSK_FID\2017_09\12\09121710.D
10	10	30000	0	J:\GC10\DATA\RSK_FID\2017_09\12\09121711.D
11	11	20000	0	J:\GC10\DATA\RSK_FID\2017_09\12\09121712.D

#	ID	Update Time	Quant Time	Acquisition Time
1	1	Sep 13 11:04 2017	Sep 12 15:03 2017	12-Sep-2017, 10:52
2	2	Sep 13 11:05 2017	Sep 13 11:05 2017	12-Sep-2017, 11:05
3	3	Sep 13 11:06 2017	Sep 13 11:05 2017	12-Sep-2017, 11:45
4	4	Sep 13 11:09 2017	Sep 13 11:06 2017	12-Sep-2017, 12:09
5	5	Sep 13 11:09 2017	Sep 13 11:09 2017	12-Sep-2017, 12:30
6	6	Sep 13 11:10 2017	Sep 13 11:10 2017	12-Sep-2017, 12:47
7	7	Sep 13 11:11 2017	Sep 13 11:10 2017	12-Sep-2017, 13:00
8	8	Sep 13 11:12 2017	Sep 13 11:11 2017	12-Sep-2017, 13:47
9	9	Sep 13 11:12 2017	Sep 13 11:12 2017	12-Sep-2017, 14:07
10	10	Sep 13 11:14 2017	Sep 13 11:13 2017	12-Sep-2017, 14:48
11	11	Sep 13 11:14 2017	Sep 13 11:14 2017	12-Sep-2017, 15:21

RS091217_R.M Wed Sep 13 15:11:22 2017

Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121702.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 10:52
Operator : MC
Sample : 0.151ppm 0.250ml s32-09121702
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 12 11:03:15 2017
Quant Method : I:\GC10\METHODS\RS082417.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Fri Aug 25 09:19:14 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.767	373920	0.128	ppm	
2)	Carbon monoxide	1.767	373920	N.D.	ppm	
3)	Methane (TCD)	0.000	0	N.D.	ppm	
4)	Carbon dioxide	0.000	0	N.D.	ppm	
6)	Methane (FID)	0.000	0	N.D.	ppm	d
7)	Ethylene	1.595	2622	0.156	ppm	
8)	Ethane	1.848	2690	0.156	ppm	
9)	Propylene	4.222	3783	0.154	ppm	
10)	Propane	4.348	3683	0.139	ppm	
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	6.582f	6058	NoCal	ppm	
13)	n-Butane	6.582f	6058	NoCal	ppm	

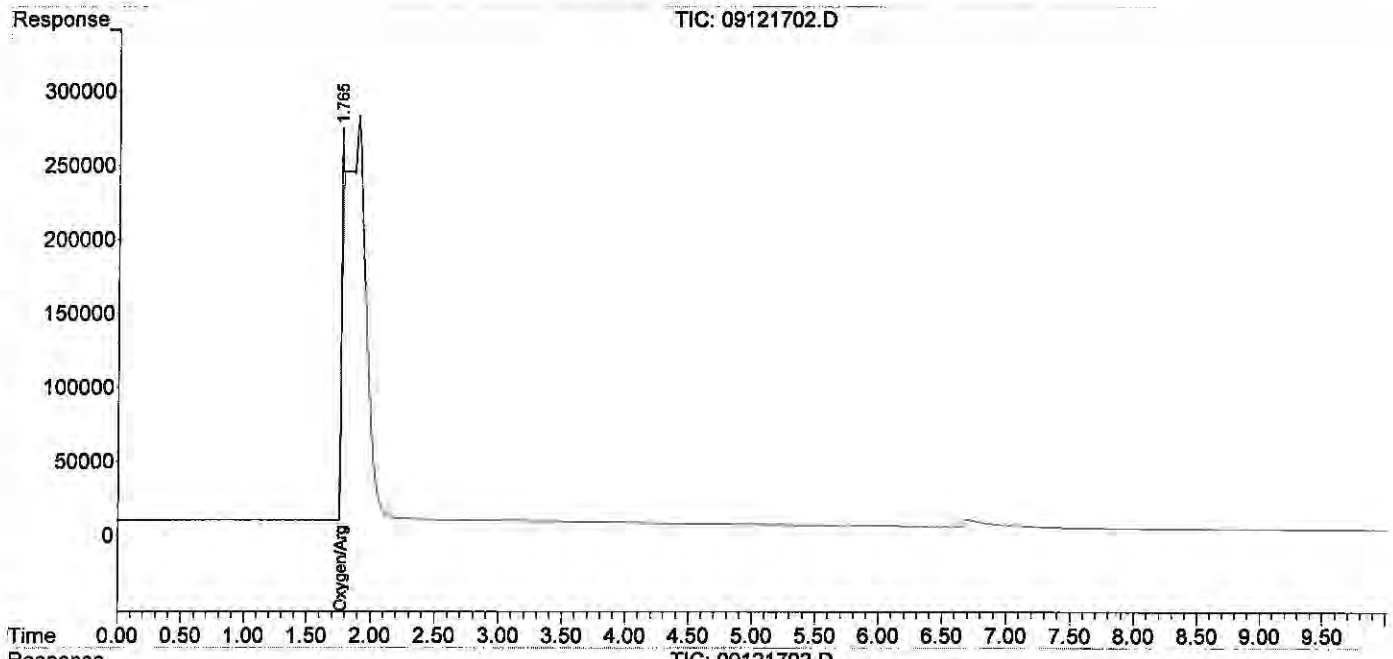
(f)=RT Delta > 1/2 Window (m)=manual int.

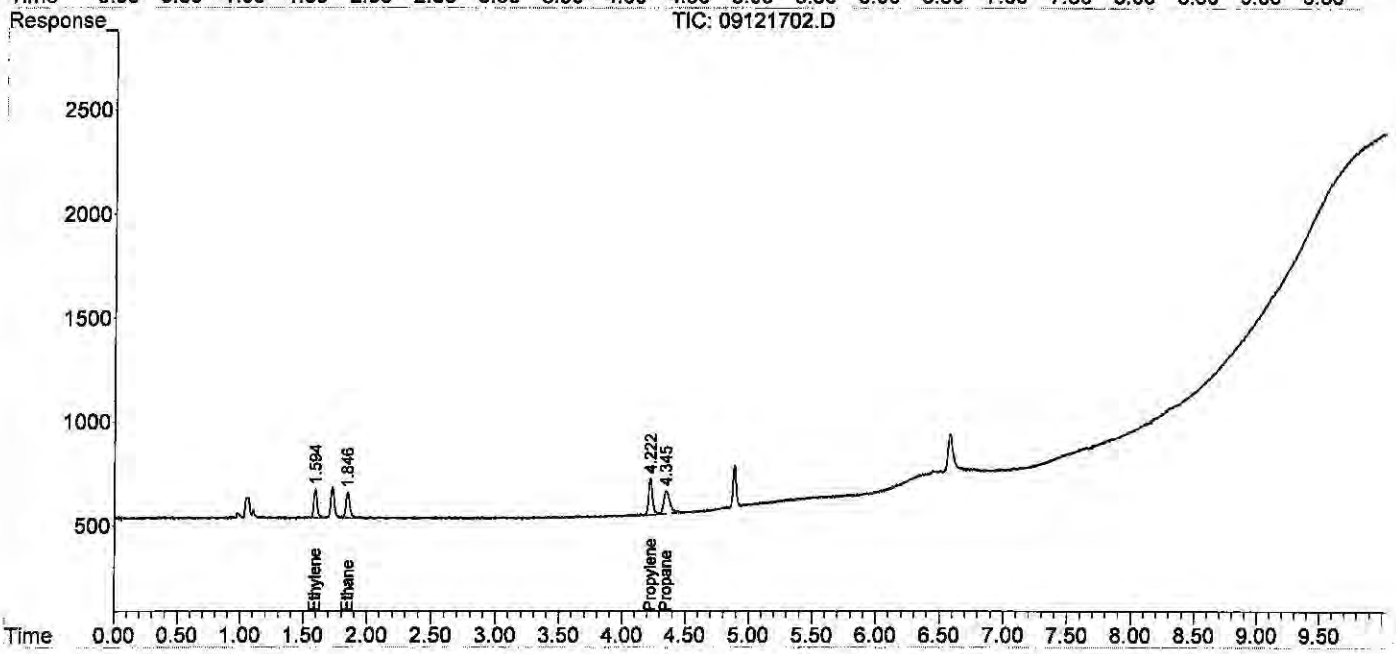
9/13/17

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121702.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 10:52
Operator : MC
Sample : 0.151ppm 0.250ml s32-09121702
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 12 11:03:15 2017
Quant Method : I:\GC10\METHODS\RS082417.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Fri Aug 25 09:19:14 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121703.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 11:05
Operator : MC
Sample : 0.302ppm 0.5ml s32-09121702
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:05:03 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:04:50 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.913f	-25181981	N.D.	ppm	
2)	Carbon monoxide	1.913f	-25181981	1.089	ppm	
3)	Methane (TCD)	0.000	0	N.D.	ppm	
4)	Carbon dioxide	0.000	0	N.D.	ppm	
6)	Methane (FID)	1.049	3564	0.391	ppm	m
7)	Ethylene	1.577	4947	0.292	ppm	
8)	Ethane	1.828	5060	0.293	ppm	
9)	Propylene	4.207	6933	0.281	ppm	
10)	Propane	4.337	6894	0.268	ppm	
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	6.579f	9587	0.158	ppm	
13)	n-Butane	6.579f	9587	0.158	ppm	

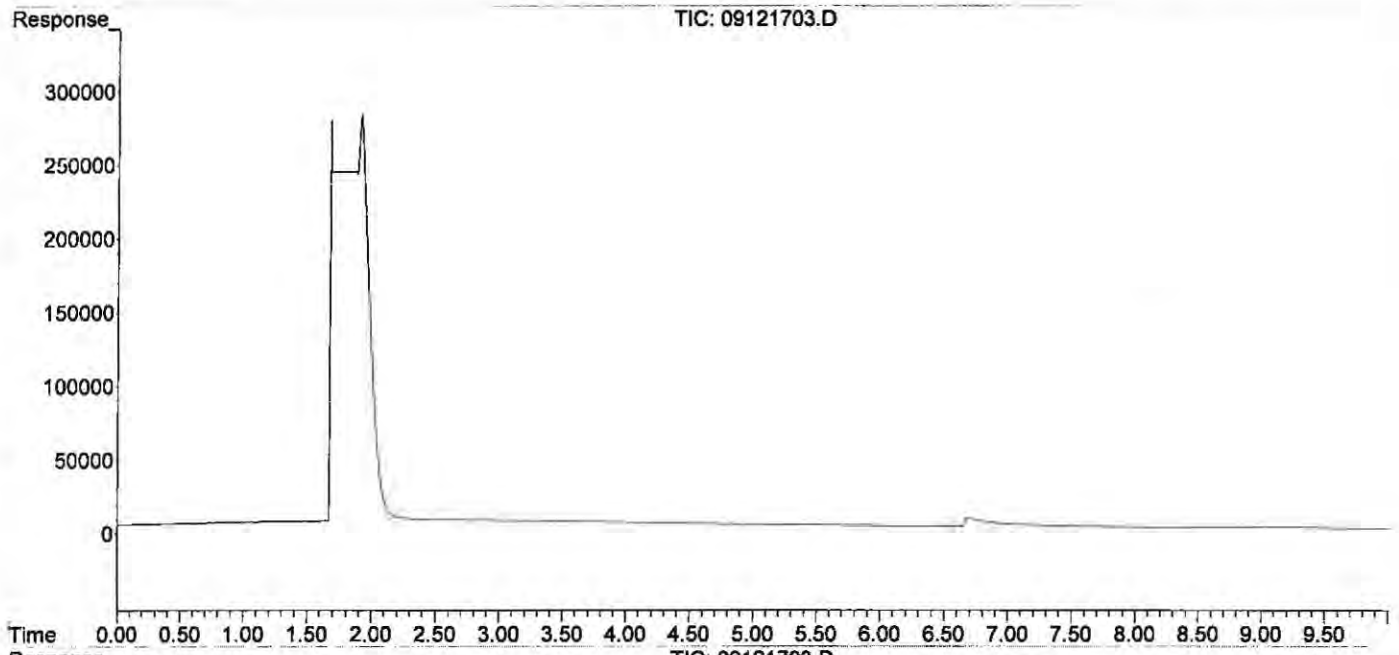
(f)=RT Delta > 1/2 Window (m)=manual int.

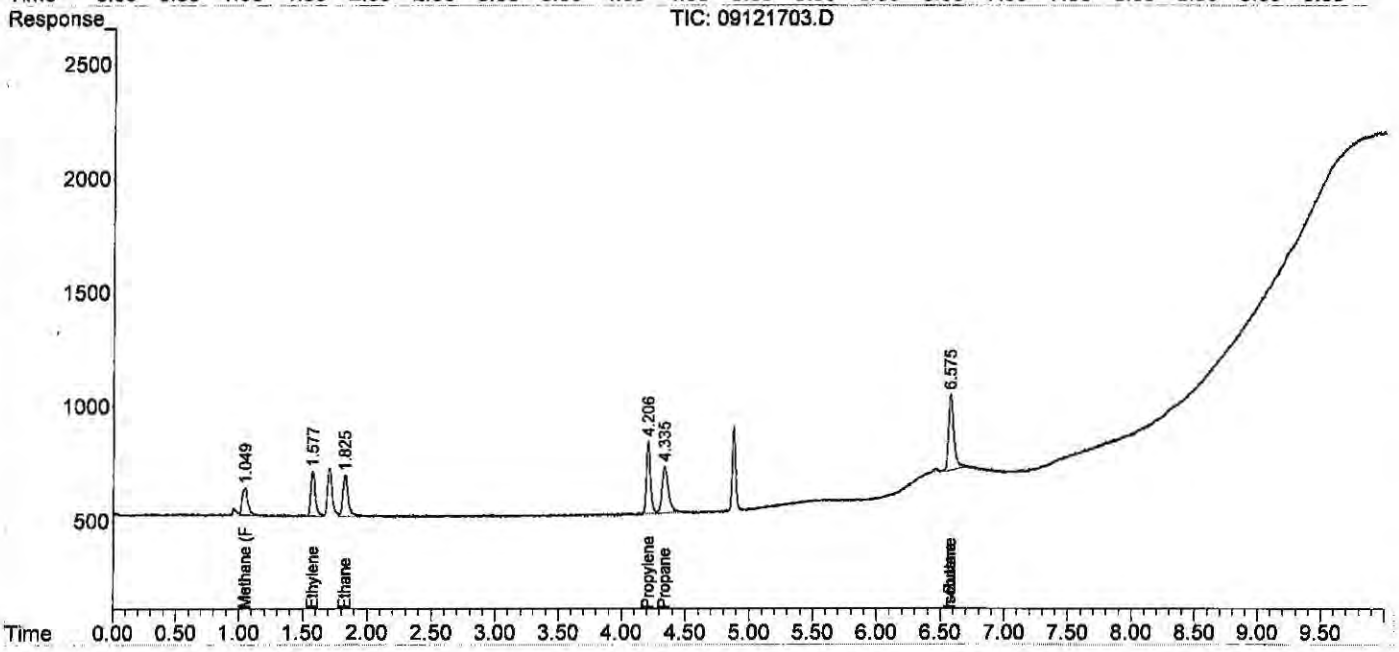
Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121703.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 11:05
Operator : MC
Sample : 0.302ppm 0.5ml s32-09121702
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:05:03 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:04:50 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



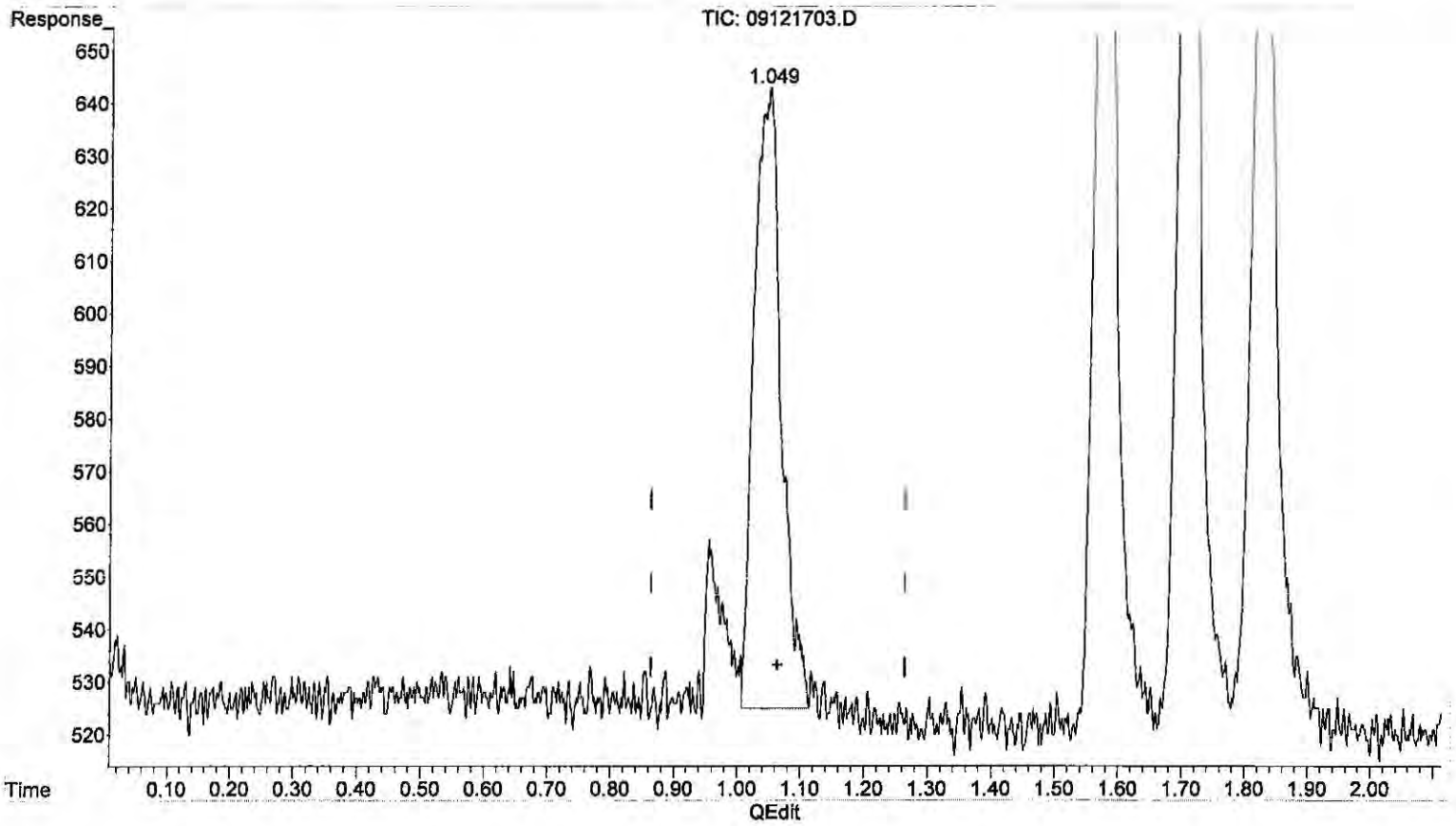


Quantitation Report (Qedit)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121703.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 11:05
Operator : MC
Sample : 0.302ppm 0.5ml s32-09121702
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:05:03 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:04:50 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase :
Signal #1 Info :
Signal #2 Phase:
Signal #2 Info :



(6) Methane (FID)

1.049min 0.391 ppm m

response 3564

(+) = Expected Retention Time

Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121704.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 11:45
Operator : MC
Sample : 1.51ppm 0.1ml s32-09051701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:05:55 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:04:50 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

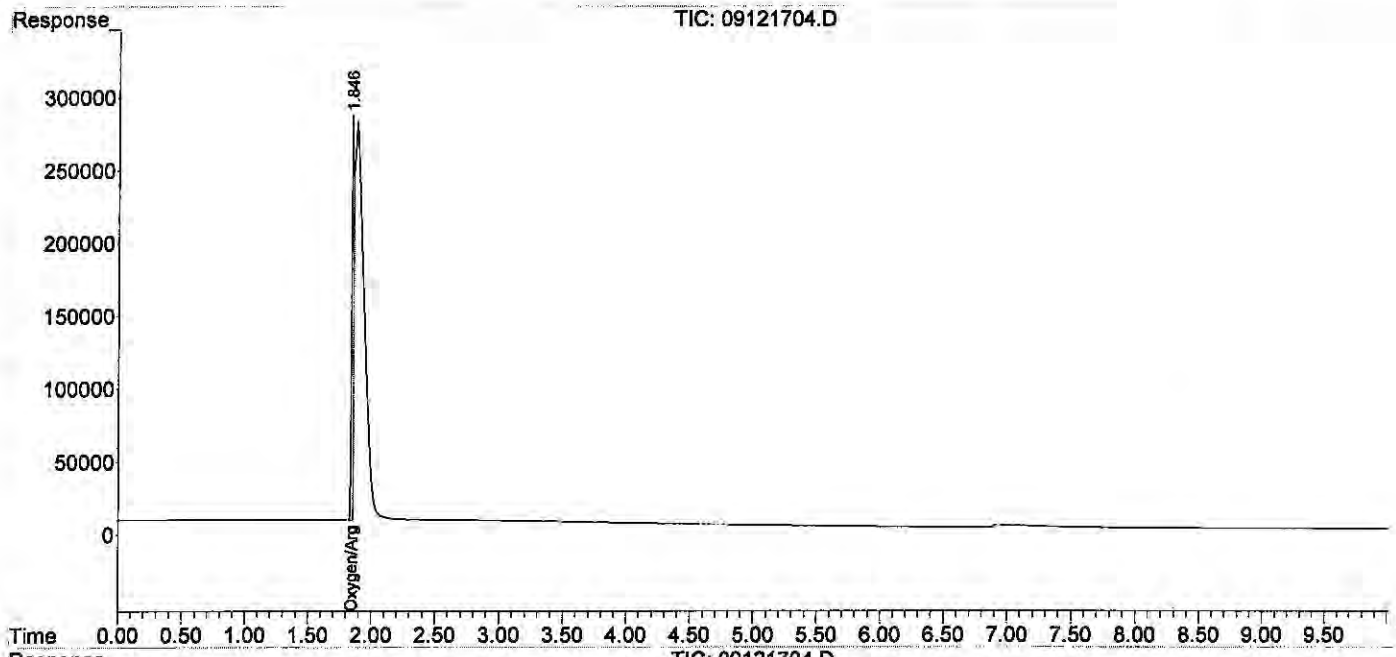
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.847	2536230	1.056	ppm
2)	Carbon monoxide	1.847	2536230	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.064	14725	1.613	ppm
7)	Ethylene	1.598	26885	1.582	ppm
8)	Ethane	1.851	26944	1.555	ppm
9)	Propylene	4.220	39140	1.589	ppm
10)	Propane	4.349	39934	1.596	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	6.578f	55348	1.020	ppm
13)	n-Butane	6.578f	55348	1.020	ppm

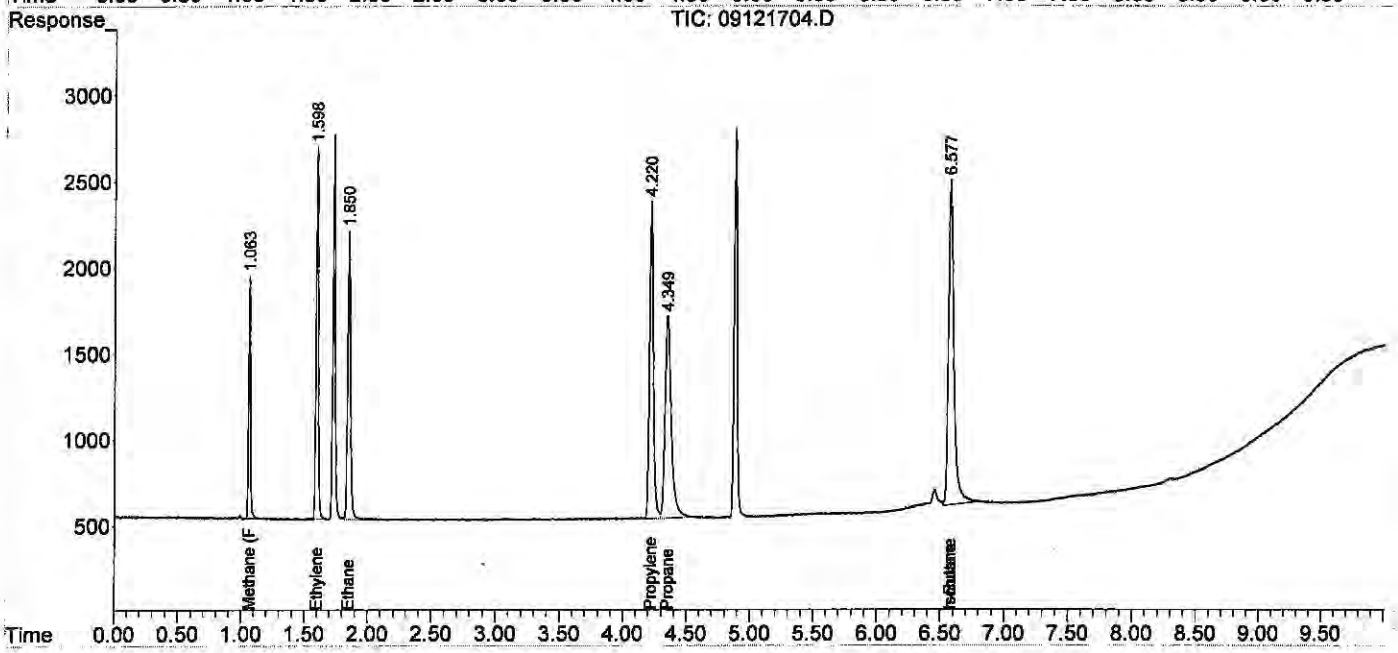
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121704.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 11:45
Operator : MC
Sample : 1.51ppm 0.1ml s32-09051701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:05:55 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:04:50 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121705.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 12:09
Operator : MC
Sample : 4.53ppm 0.3ml s32-09051701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:06:32 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:04:50 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

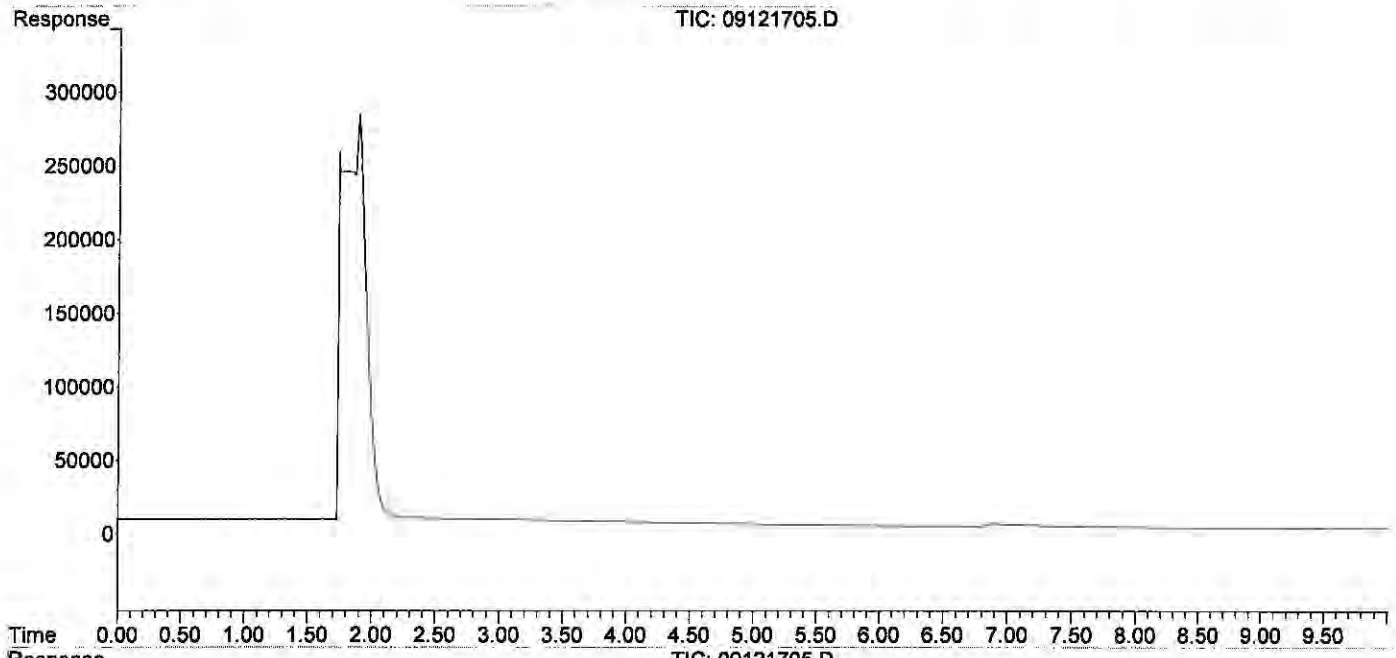
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.738	-331216	N.D.	ppm
2)	Carbon monoxide	1.738	-331216	0.019	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.052	41129	4.522	ppm
7)	Ethylene	1.586	77903	4.637	ppm
8)	Ethane	1.838	78354	4.558	ppm
9)	Propylene	4.218	112342	4.614	ppm
10)	Propane	4.347	115723	4.680	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	6.580f	155256	3.565	ppm
13)	n-Butane	6.580f	155256	3.565	ppm

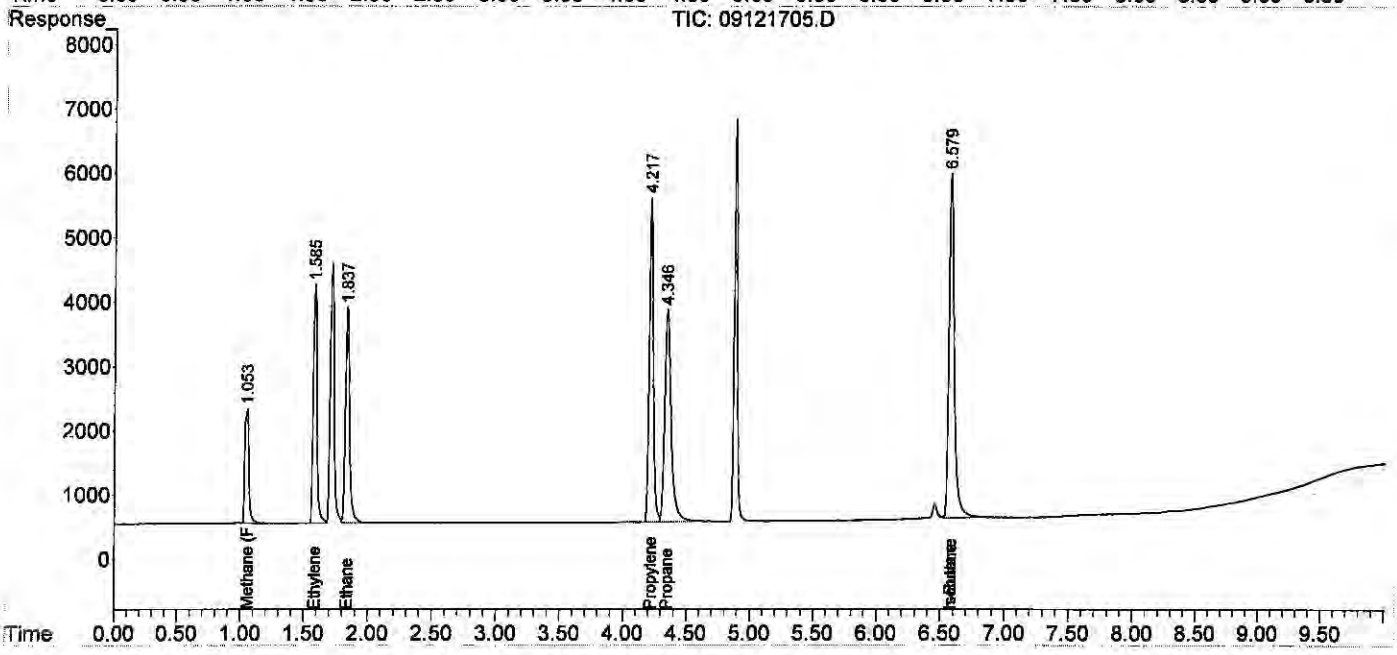
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121705.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 12:09
Operator : MC
Sample : 4.53ppm 0.3ml s32-09051701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:06:32 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:04:50 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121706.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 12:30
Operator : MC
Sample : 10.57ppm 0.7ml s32-09051701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:09:24 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:04:50 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.929f	-31871242	N.D.	ppm
2)	Carbon monoxide	1.929f	-31871242	1.818	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.025	91967	10.135	ppm
7)	Ethylene	1.568	172086	10.273	ppm
8)	Ethane	1.822	178841	10.441	ppm
9)	Propylene	4.214	248004	10.236	ppm
10)	Propane	4.344	257124	10.458	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	6.578f	338181	9.254	ppm
13)	n-Butane	6.578f	338181	9.254	ppm

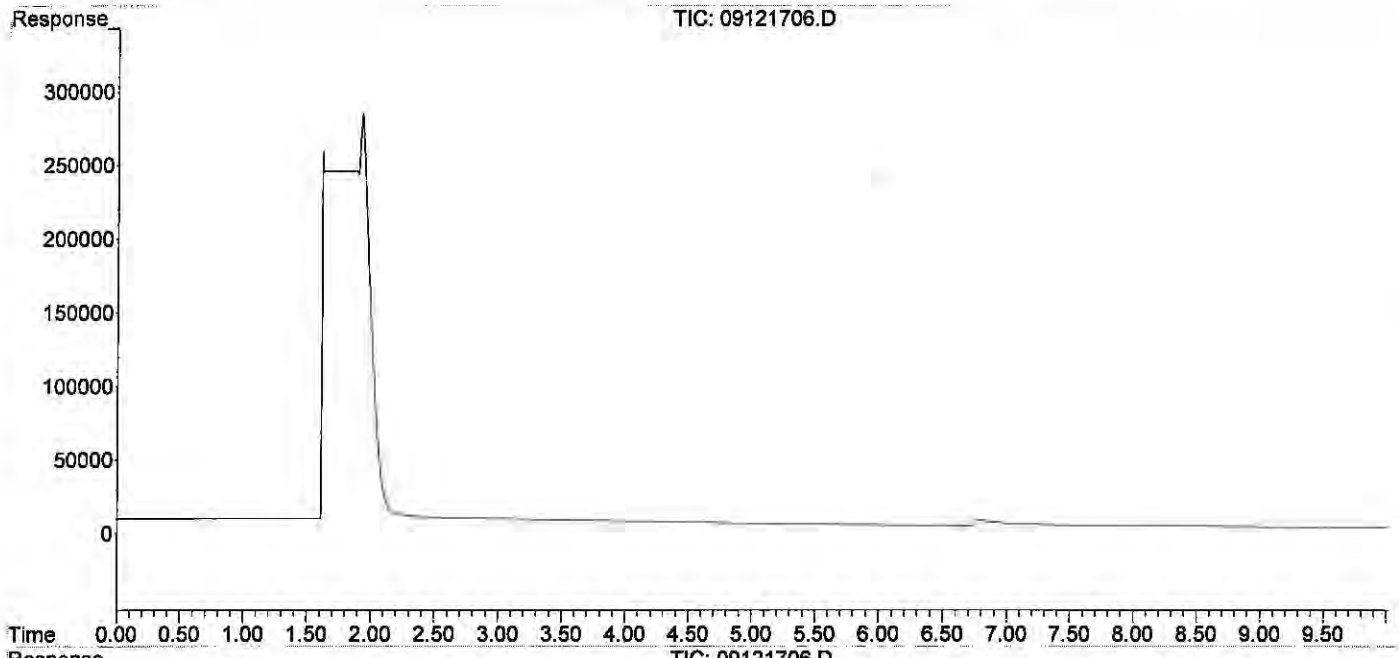
(f)=RT Delta > 1/2 Window (m)=manual int.

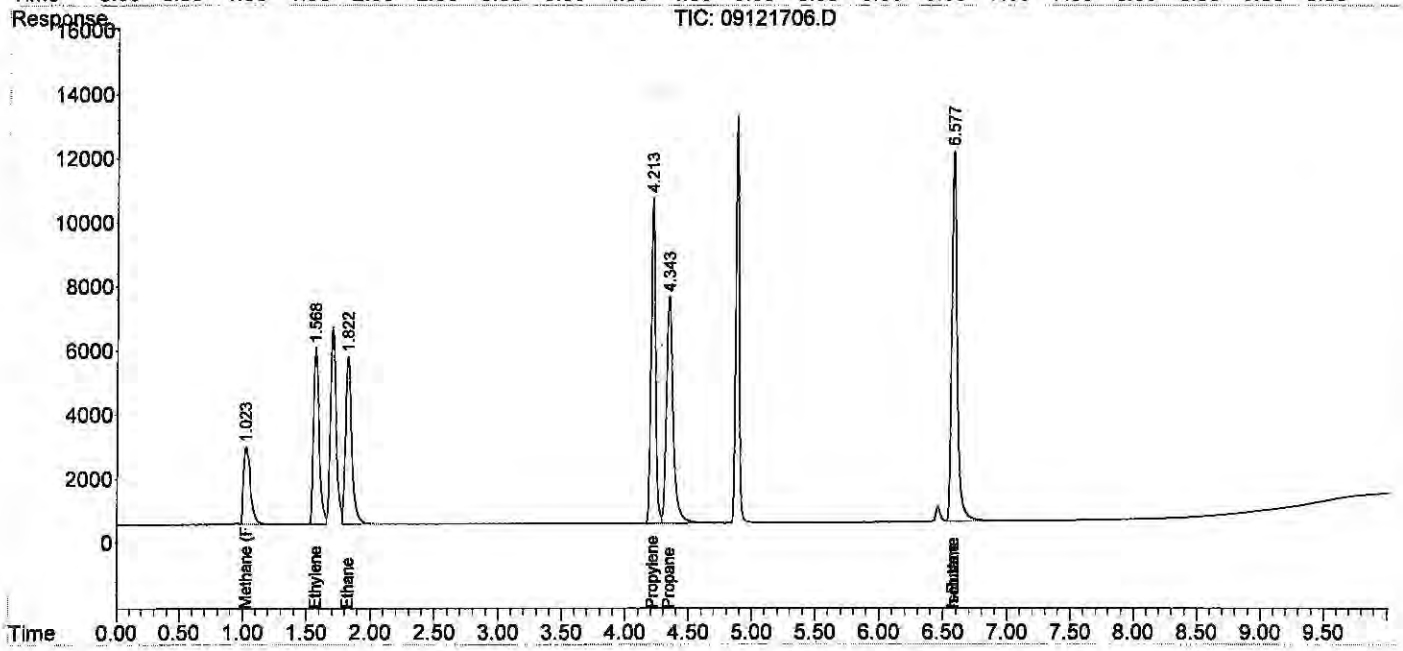
Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121706.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 12:30
Operator : MC
Sample : 10.57ppm 0.7ml s32-09051701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:09:24 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:04:50 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121707.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 12:47
Operator : MC
Sample : 200ppm 0.1ml s32-09121701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:09:59 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:04:50 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.897	155286	0.065	ppm
2)	Carbon monoxide	1.897	155286	N.D.	ppm
3)	Methane (TCD)	4.079f	27015	2856.472	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.063	1735997	190.792	ppm
7)	Ethylene	1.597	3339702	198.758	ppm
8)	Ethane	1.849	3350442	194.597	ppm
9)	Propylene	4.201	4504060	185.706	ppm
10)	Propane	4.333	5043036	204.809	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	0.000	0	N.D.	ppm
13)	n-Butane	0.000	0	N.D.	ppm

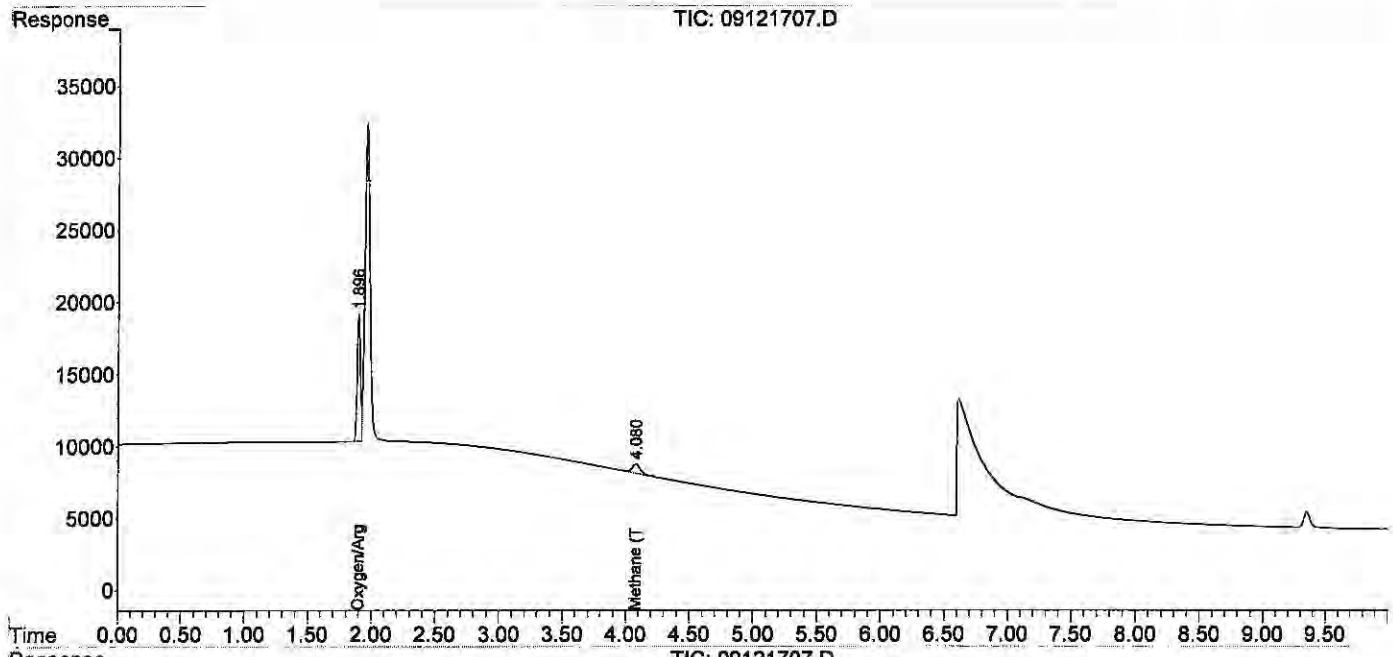
(f)=RT Delta > 1/2 Window (m)=manual int.

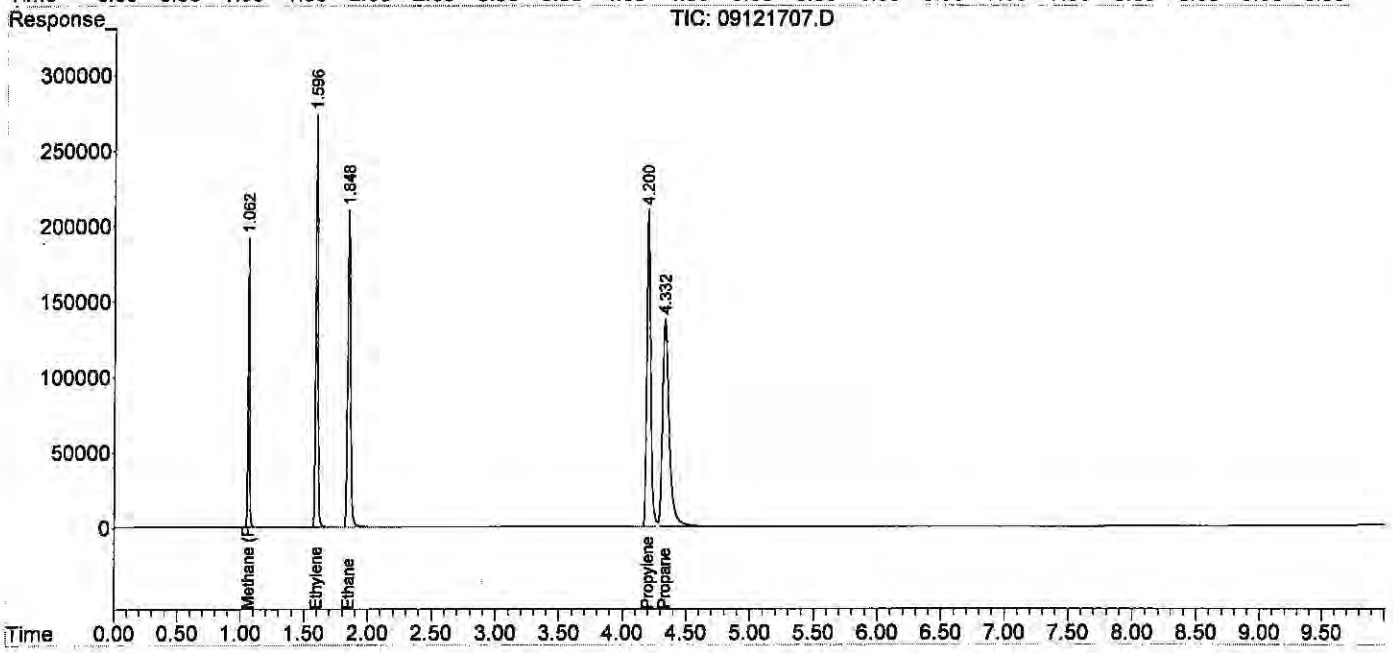
Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121707.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 12:47
Operator : MC
Sample : 200ppm 0.1ml s32-09121701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:09:59 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:04:50 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121708.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 13:00
Operator : MC
Sample : 600ppm 0.3ml s32-09121701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:10:57 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:10:50 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.884	196022	0.124	ppm
2)	Carbon monoxide	1.884	196022	N.D.	ppm
3)	Methane (TCD)	4.070f	88282	782.730	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.044	5189849	539.759	ppm
7)	Ethylene	1.573	10007759	590.286	ppm
8)	Ethane	1.822	10048964	583.213	ppm
9)	Propylene	4.160	13569343	562.612	ppm
10)	Propane	4.300	15251326	615.171	ppm
11)	Isobutylene	6.143	9815	NoCal	ppm
12)	Isobutane	0.000	0	N.D.	ppm
13)	n-Butane	0.000	0	N.D.	ppm

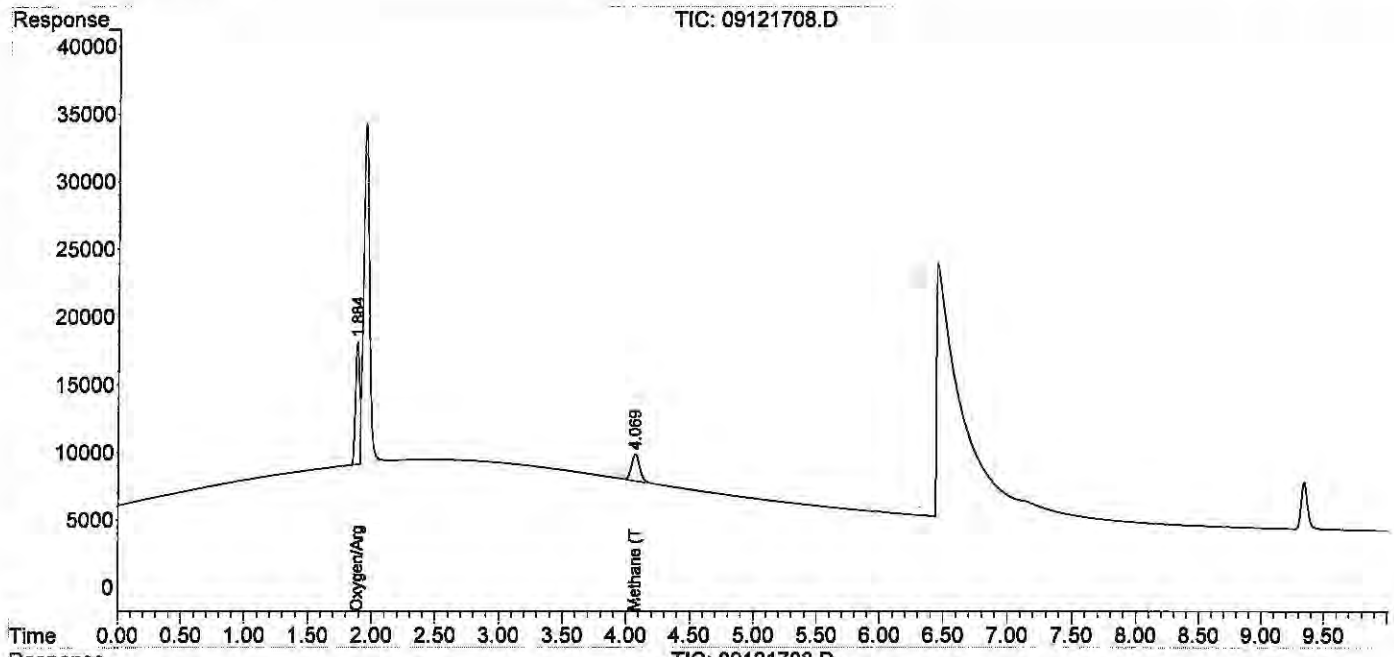
(f)=RT Delta > 1/2 Window (m)=manual int.

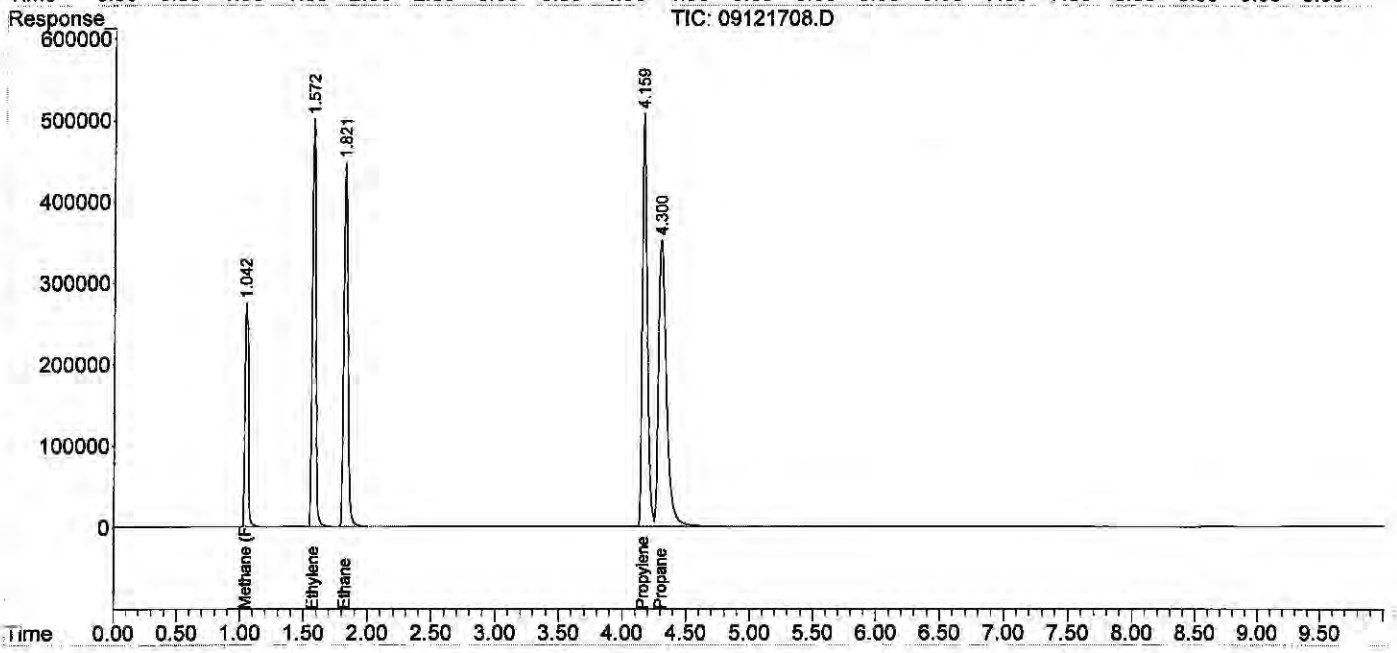
Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121708.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 13:00
Operator : MC
Sample : 600ppm 0.3ml s32-09121701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:10:57 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:10:50 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121709.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 13:47
Operator : MC
Sample : 1000ppm 0.5ml s32-09121701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:11:46 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:11:38 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.879	192611	0.162	ppm
2)	Carbon monoxide	1.879	192611	N.D.	ppm
3)	Methane (TCD)	4.070f	145492	1244.729	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.039	8598534	945.644	ppm
7)	Ethylene	1.576	16608504	981.887	ppm
8)	Ethane	1.827	16709165	973.644	ppm
9)	Propylene	4.161	22494888	941.060	ppm
10)	Propane	4.298	25459411	1023.223	ppm
11)	Isobutylene	6.138	16970	8645.243	ppm
12)	Isobutane	0.000	0	N.D.	ppm
13)	n-Butane	0.000	0	N.D.	ppm

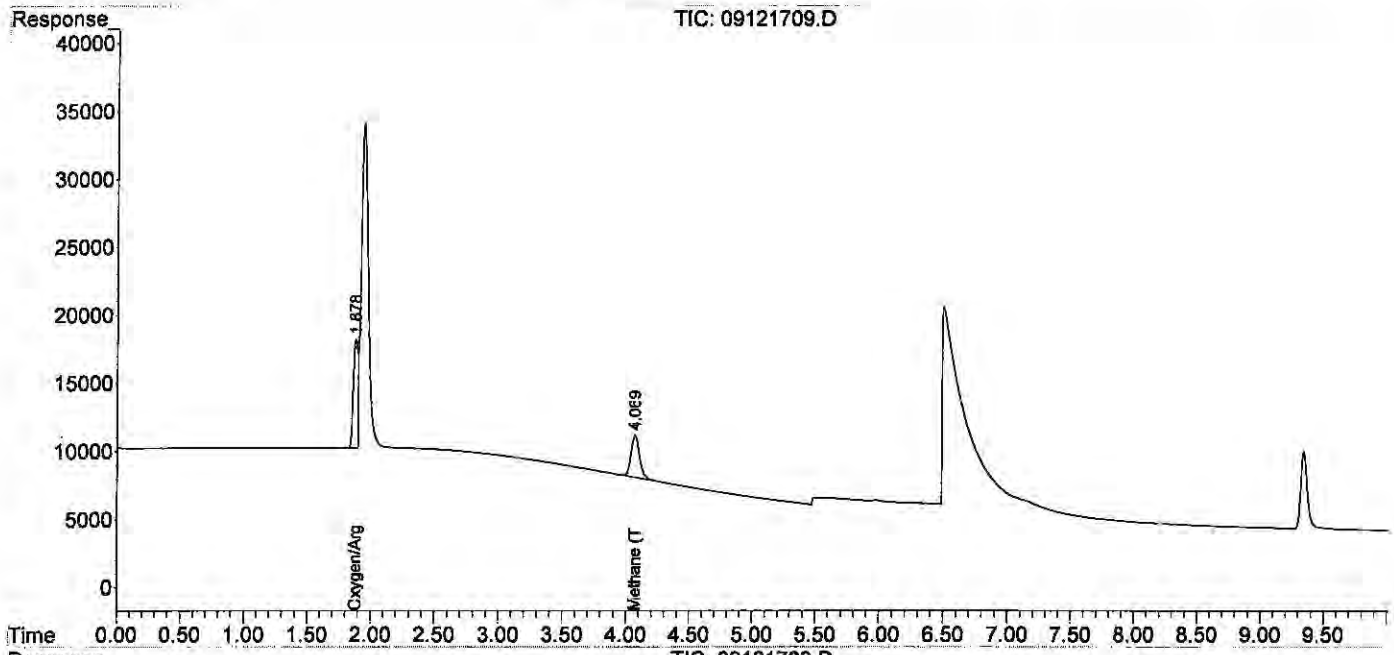
(f)=RT Delta > 1/2 Window (m)=manual int.

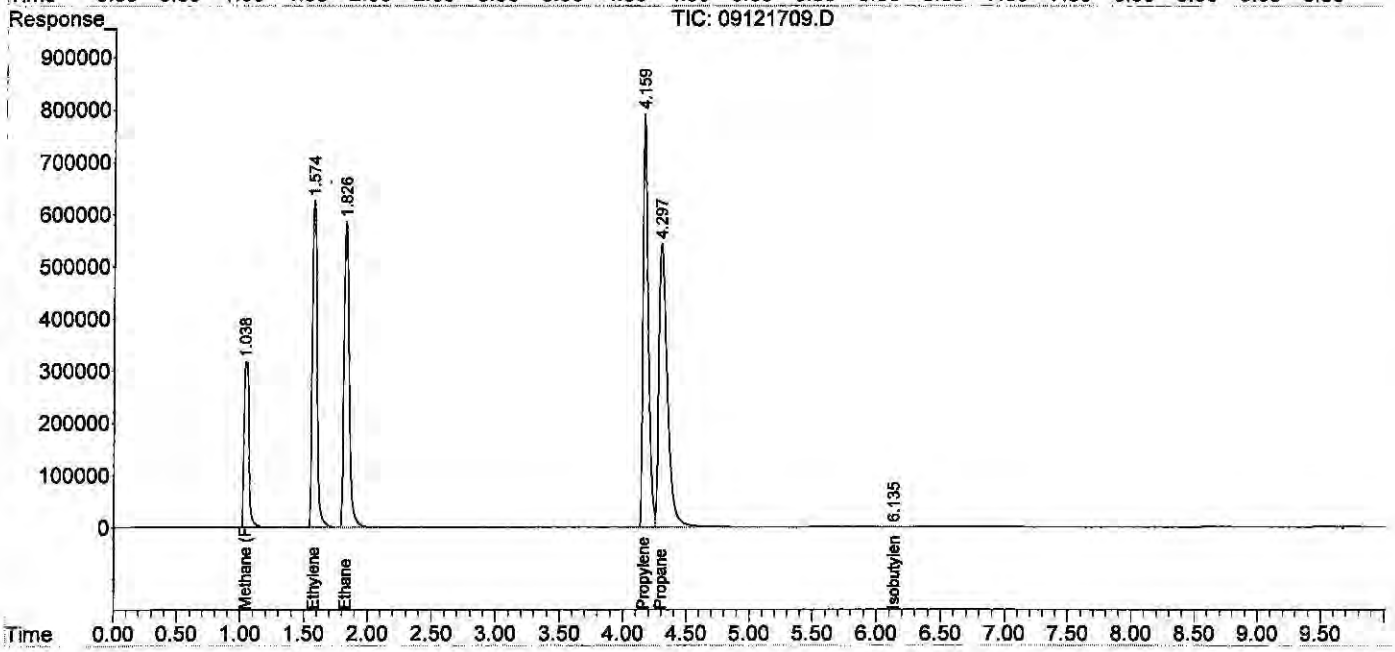
Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121709.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 13:47
Operator : MC
Sample : 1000ppm 0.5ml s32-09121701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:11:46 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:11:38 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121710.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 14:07
Operator : MC
Sample : 2000ppm 1ml s32-09121701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:12:33 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:12:25 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

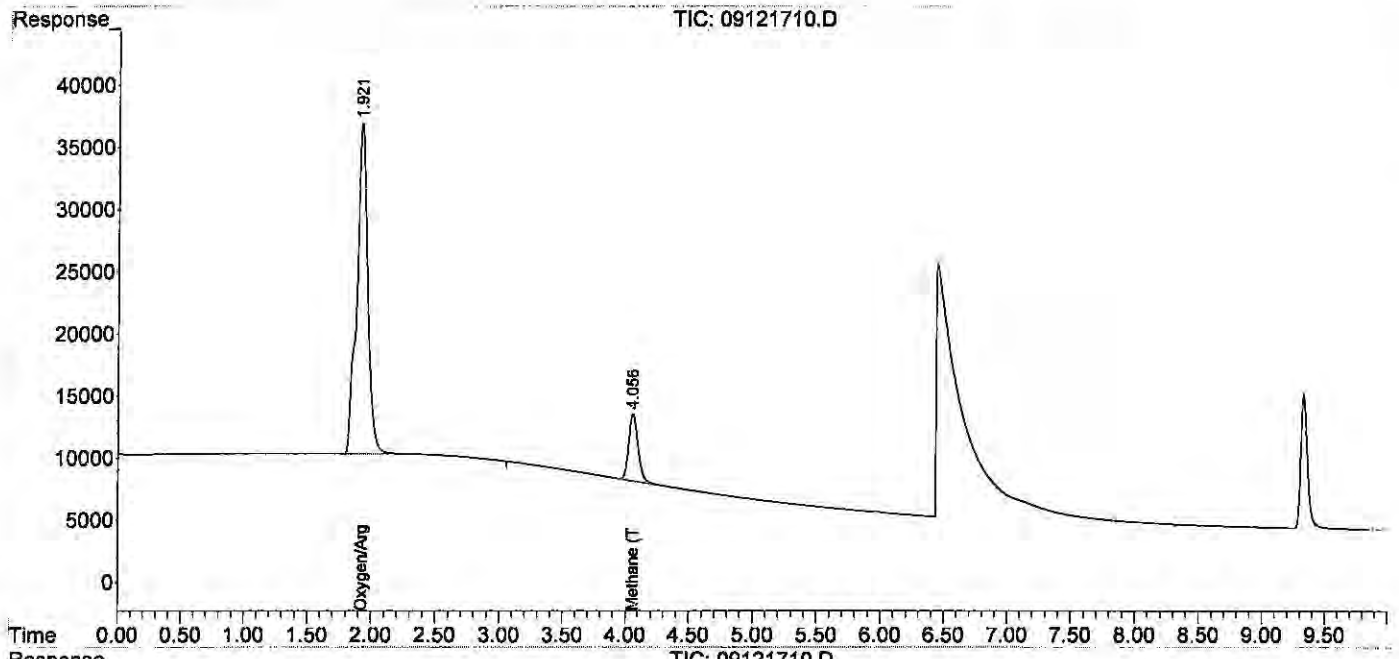
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.922f	1578147	1.659	ppm	
2)	Carbon monoxide	1.922f	1578147	N.D.	ppm	
3)	Methane (TCD)	4.057f	281651	3526.607	ppm	
4)	Carbon dioxide	0.000	0	N.D.	ppm	
6)	Methane (FID)	1.016	16098209	1763.622	ppm	
7)	Ethylene	1.552	31192444	1848.268	ppm	
8)	Ethane	1.801	31424218	1837.143	ppm	
9)	Propylene	4.129	42124690	1775.341	ppm	m
10)	Propane	4.269	48583085	1946.921	ppm	
11)	Isobutylene	6.136	33832	25613.603	ppm	
12)	Isobutane	6.576f	3845	0.120	ppm	
13)	n-Butane	6.576f	3845	0.120	ppm	

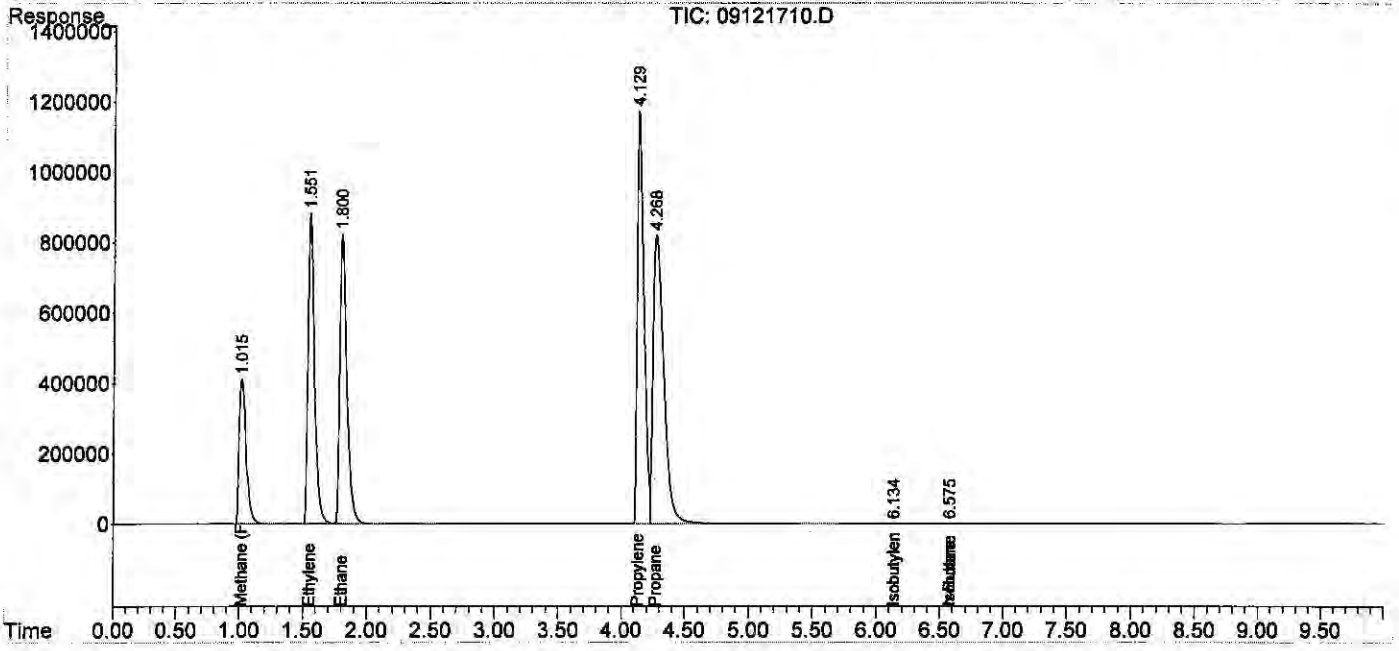
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121710.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 14:07
Operator : MC
Sample : 2000ppm 1ml s32-09121701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:12:33 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:12:25 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



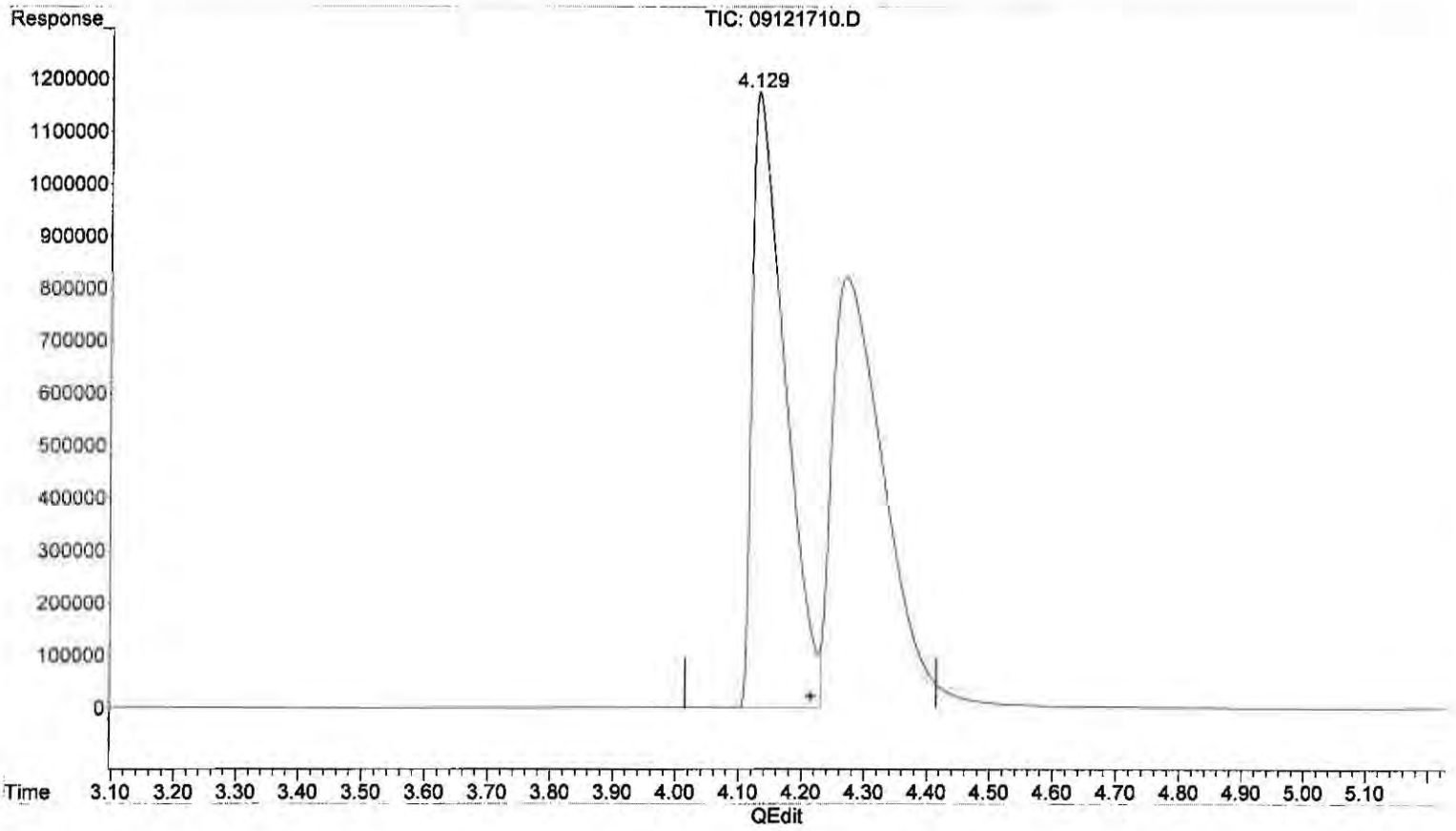


Quantitation Report (Qedit)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121710.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 14:07
Operator : MC
Sample : 2000ppm 1ml s32-09121701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:12:33 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:12:25 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



(9) Propylene
4.129min 1775.341 ppm m
response 42124690

(+) = Expected Retention Time
RS091217_R.M Wed Sep 13 15:08:03 2017

Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121711.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 14:48
Operator : MC
Sample : 4000ppm 0.1ml s32-08231701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:13:37 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:13:29 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

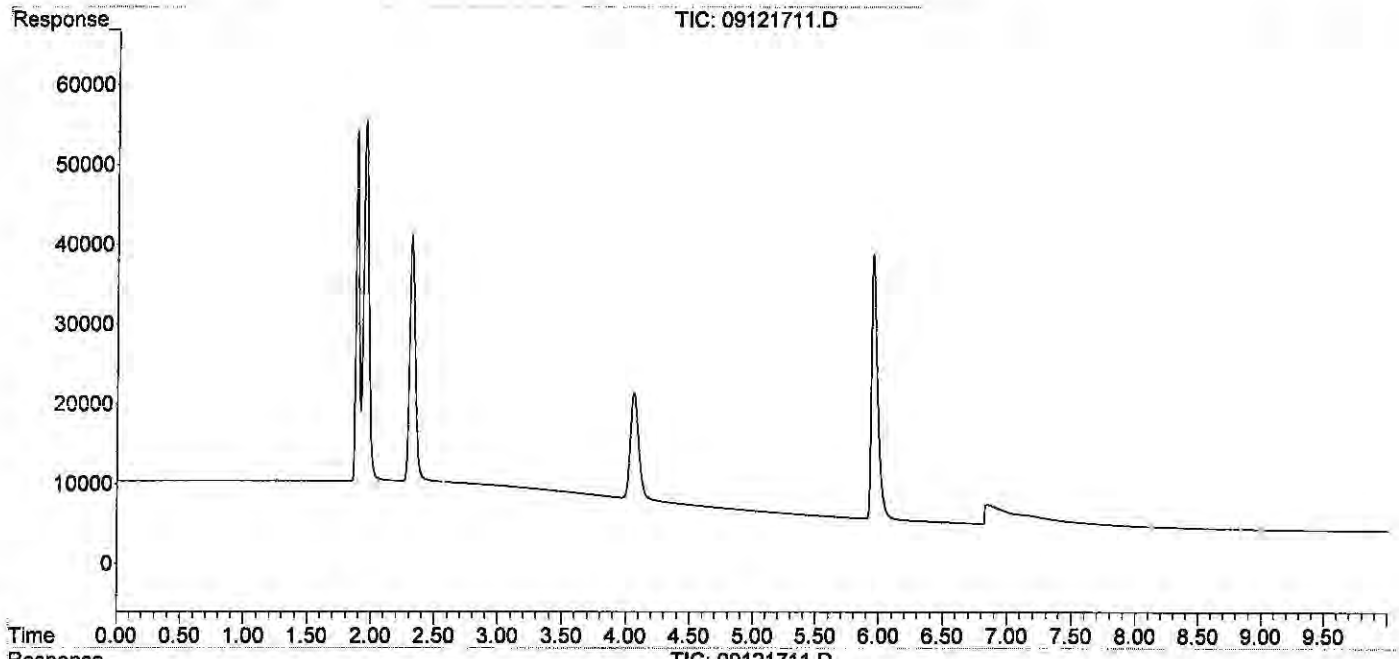
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	0.000	0	N.D.	ppm	d
2)	Carbon monoxide	0.000	0	N.D.	ppm	d
3)	Methane (TCD)	0.000	0	N.D.	ppm	d
4)	Carbon dioxide	0.000	0	N.D.	ppm	d
6)	Methane (FID)	1.059	35776839	3925.122	ppm	
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	0	N.D.	ppm	
9)	Propylene	0.000	0	N.D.	ppm	
10)	Propane	0.000	0	N.D.	ppm	
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	0.000	0	N.D.	ppm	
13)	n-Butane	0.000	0	N.D.	ppm	

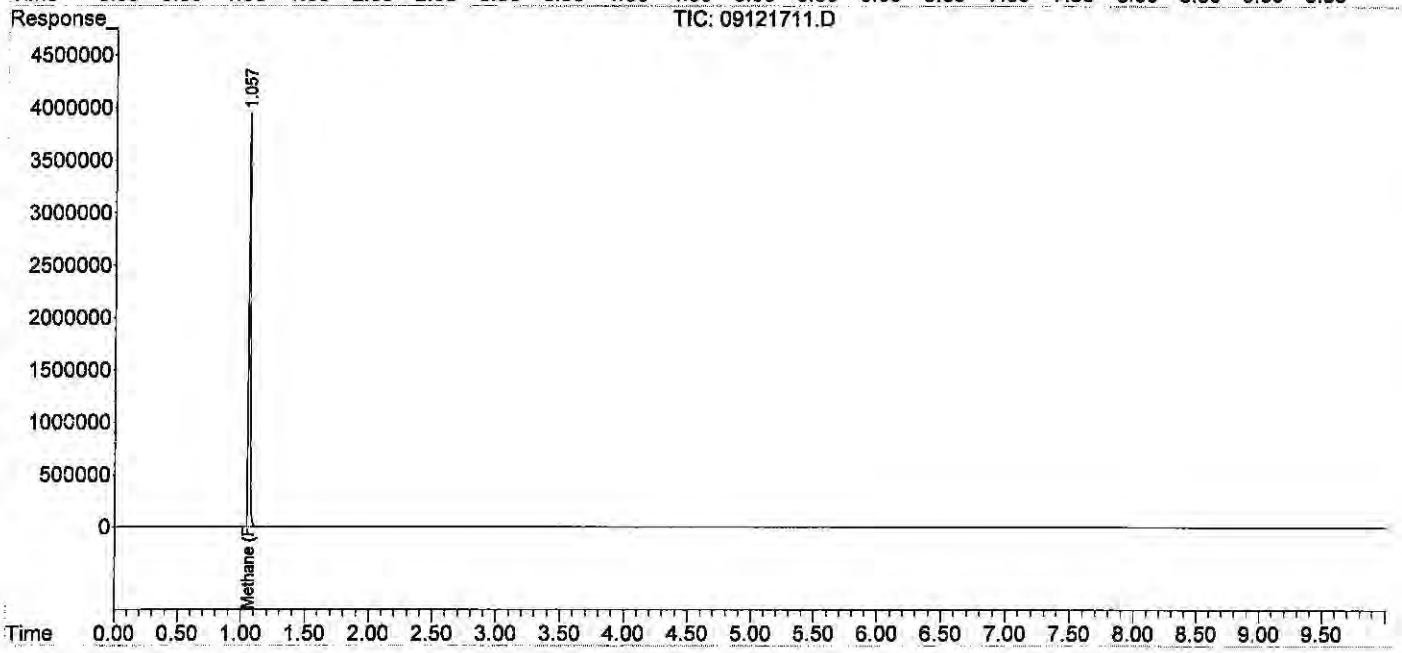
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121711.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 14:48
Operator : MC
Sample : 4000ppm 0.1ml s32-08231701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:13:37 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:13:29 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase :
Signal #1 Info :
Signal #2 Phase:
Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121712.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 15:21
Operator : MC
Sample : 20000ppm 0.5ml s32-08231701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:14:17 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:13:29 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

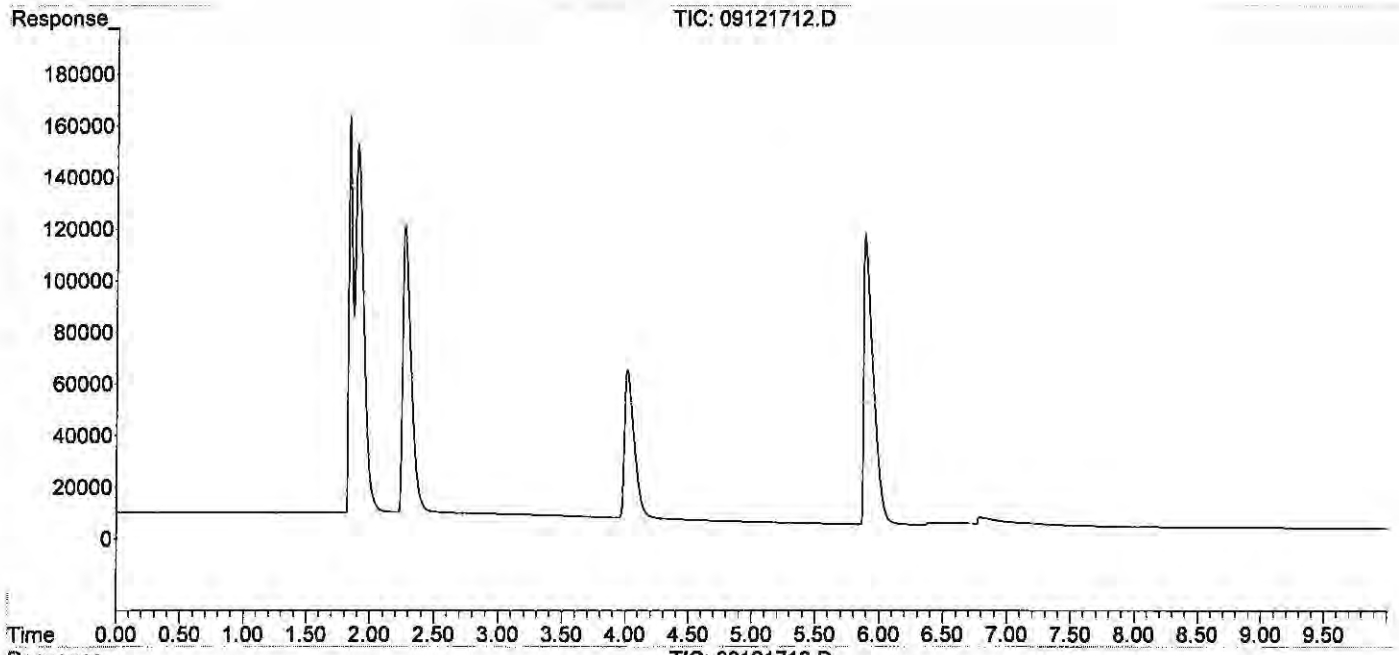
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	0.000	0	N.D.	ppm	d
2)	Carbon monoxide	1.836	3190788	N.D.	ppm	
3)	Methane (TCD)	0.000	0	N.D.	ppm	d
4)	Carbon dioxide	0.000	0	N.D.	ppm	d
6)	Methane (FID)	1.034	169009160	18492.064	ppm	
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	0	N.D.	ppm	
9)	Propylene	0.000	0	N.D.	ppm	
10)	Propane	0.000	0	N.D.	ppm	
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	0.000	0	N.D.	ppm	
13)	n-Butane	0.000	0	N.D.	ppm	

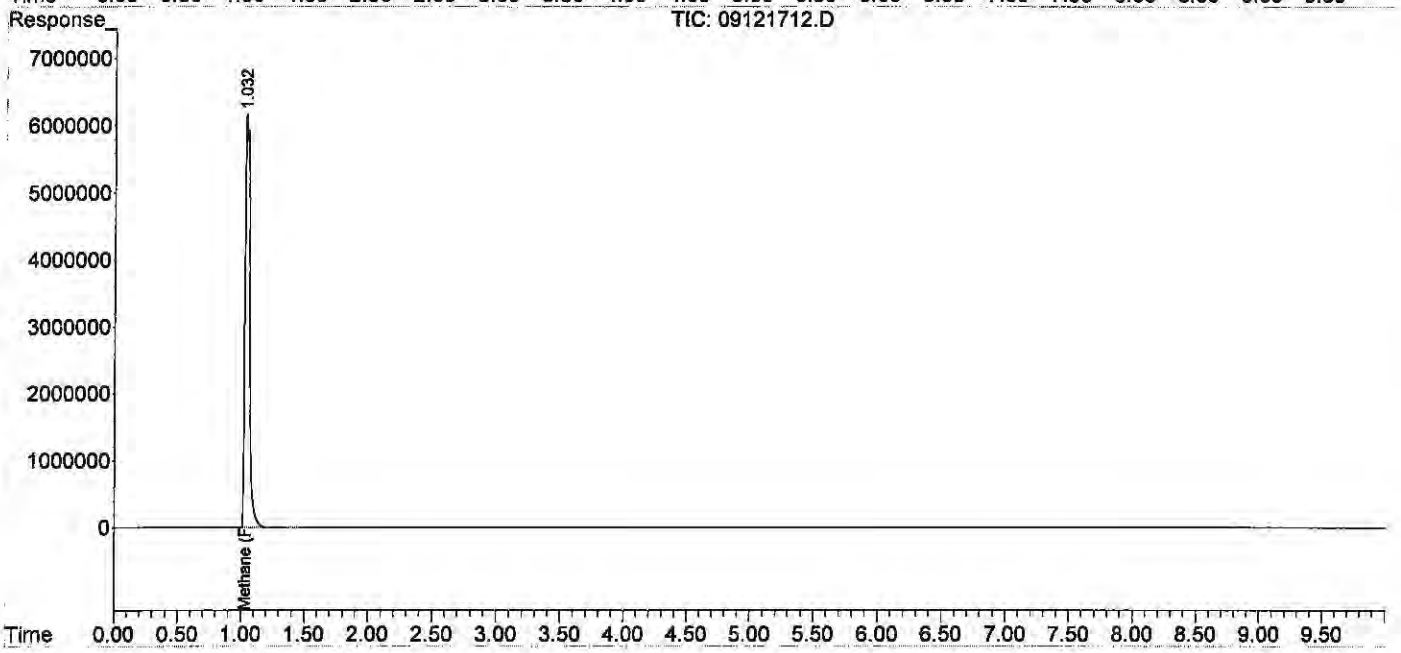
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121712.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 15:21
Operator : MC
Sample : 20000ppm 0.5ml s32-08231701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:14:17 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:13:29 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121715.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 16:15
Operator : MC
Sample : icv s30-05241604
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:15:11 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:13:29 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

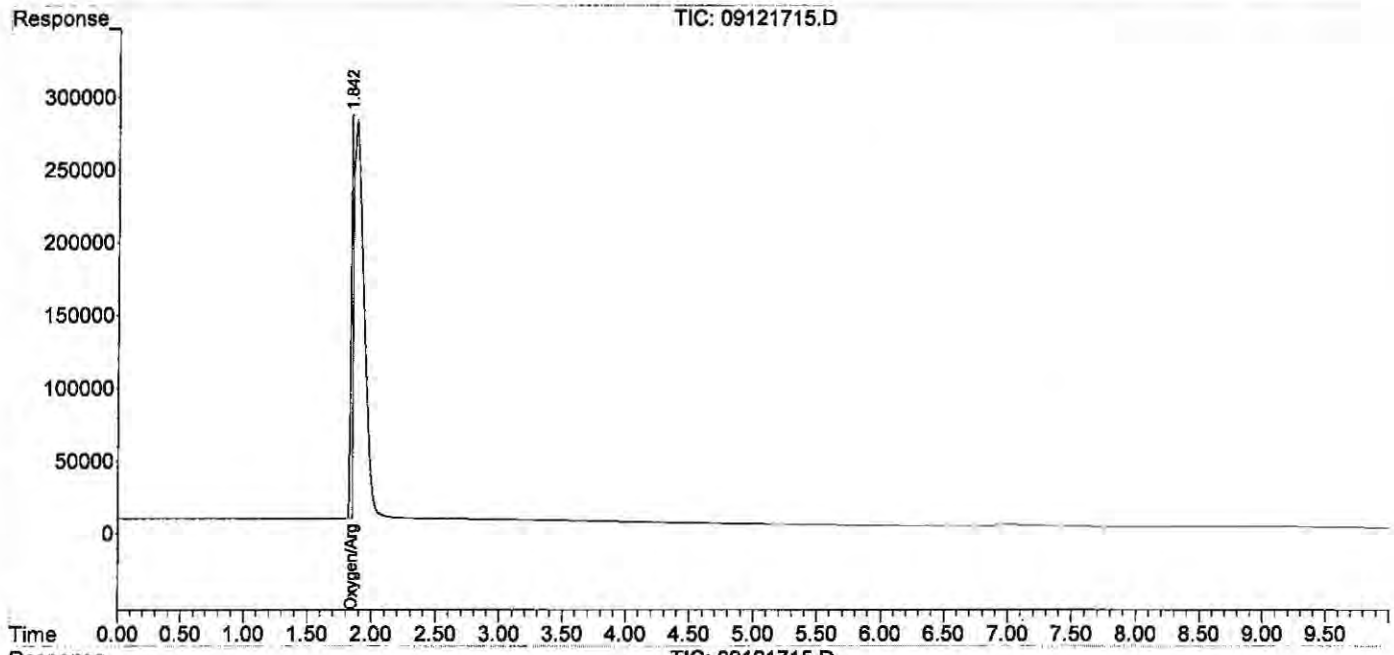
	Compound	R.T.	Response	Conc	Units		
Target Compounds							
1)	Oxygen/Argon	1.843	2922459	3.687	ppm		
2)	Carbon monoxide	1.843	2922459	N.D.	ppm		
3)	Methane (TCD)	0.000	0	N.D.	ppm	actual	%D
4)	Carbon dioxide	0.000	0	N.D.	ppm		
6)	Methane (FID)	1.063	13748	1.516	ppm	~~1510~~ 1.50	101.1
7)	Ethylene	1.598	24153	1.443	ppm	~~1470~~ 1.50	96.2
8)	Ethane	1.850	24488	1.445	ppm	~~1470~~ 1.50	96.3
9)	Propylene	4.221	36004	1.537	ppm	~~1470~~ 1.50	102.5
10)	Propane	4.350	37738	1.517	ppm	~~1511~~ 1.51	100.5
11)	Isobutylene	0.000	0	N.D.	ppm		
12)	Isobutane	6.579f	48019	1.804	ppm	9/14/2	
13)	n-Butane	6.579f	48019	1.804	ppm		

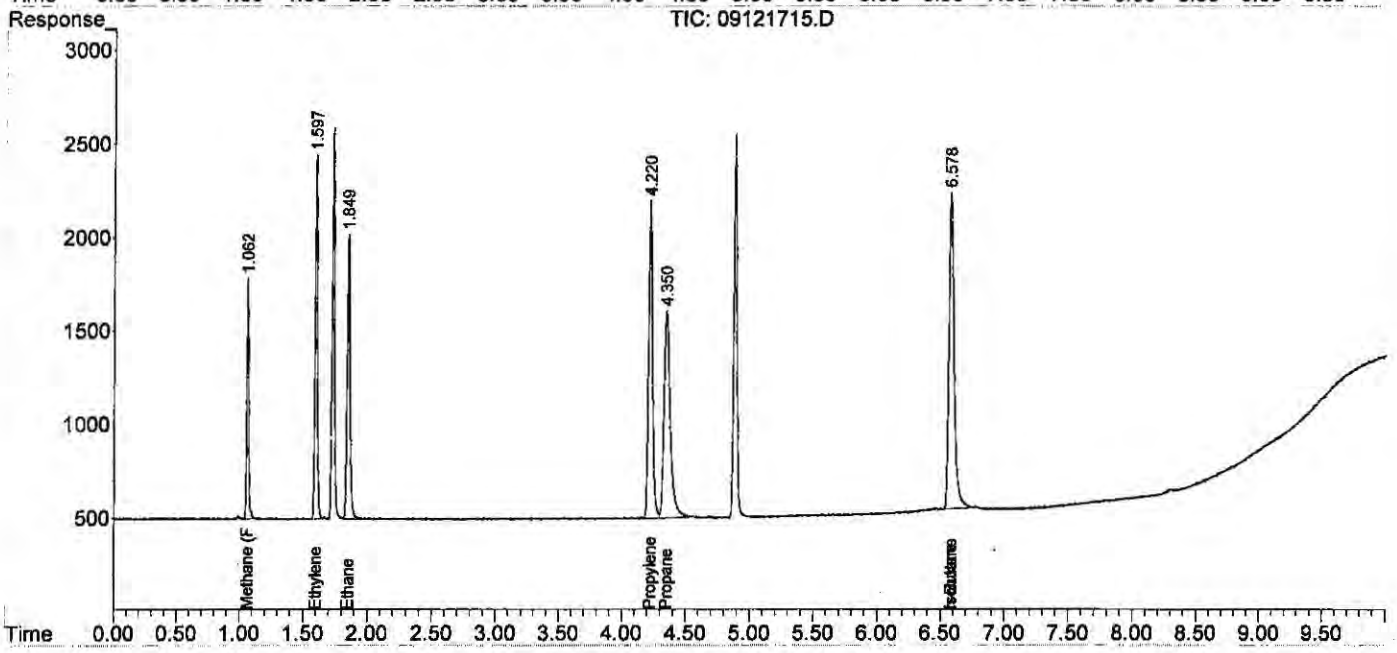
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121715.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 16:15
Operator : MC
Sample : icv s30-05241604
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:15:11 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:13:29 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Dissolved Gases by RSK175

ALS Environmental

Method : RSK175 Headspace Method for Dissolved Hydrocarbon in Water by FID/TCD
Client : ALS Laboratory Group
Service Request: P1906981
Sample Vol. (ml) : 32.00 ml
Analyst : WH/LD
Date Analysis : 11/18/19
Head Space Vol.(ml) : 8.00 ml
Instrument : GC#10
Detector : FID#10, TCD#10
Gas Constant : 24.05684 (20°C)

HEAD SPACE RESULT (ppm)

Sample ID	Inj. Vol.	Methane	Ethylene	Ethane
STD S32-05221901	0.100	89.511	94.682	93.891
ACTUAL		101.50	100.90	101.40
%Difference		11.8%	6.2%	7.4%
MCS 0.1ml	0.100	0.186	0.000	0.000
RB 0.1ml	0.100	0.000	0.000	0.000
LCS FID 0.1ml	0.100	1.381	0.965	1.165
LCSD FID 0.1ml	0.100	1.365	0.955	1.157
p1906981-001 0.1ml	0.100	0.288	0.000	0.000
p1906981-002 0.1ml	0.100	1.590	0.000	0.000
p1906981-003 0.1ml	0.100	0.560	0.000	0.000
p1906981-004 0.1ml	0.100	3.596	0.000	0.000
p1906981-005 0.1ml	0.100	0.786	0.000	0.000
p1906981-006 0.1ml	0.100	0.855	0.000	0.000

FINAL HEAD SPACE RESULT (ppm)

	Methane	Ethylene	Ethane
WWt.	16.04	28.05	30.07
HENRY'S CONSTANT	3.76E+04	1.02E+04	2.63E+04
RL	1.30	1.00	0.60
MCS 0.1ml	1.860	0.000	0.000
LCS FID 0.1ml	13.810	9.650	11.650
LCSD FID 0.1ml	13.650	9.550	11.570
p1906981-001 0.1ml	2.880	0.000	0.000
p1906981-002 0.1ml	15.900	0.000	0.000
p1906981-003 0.1ml	5.600	0.000	0.000
p1906981-004 0.1ml	35.960	0.000	0.000
p1906981-005 0.1ml	7.860	0.000	0.000
p1906981-006 0.1ml	8.550	0.000	0.000

250 of 364

LD
11/19

STD S32-05221901		91.347	96.683	95.996	15:55:33	0.86	0.00	0.00	0.00	0.00
ACTUAL		101.50	100.90	101.40						
%Difference		10.0%	4.2%	5.3%						

Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2019_11\18\
Data File : 11181901.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 18-Nov-2019, 13:04:17
Operator : WH/LD
Sample : STD S32-05221901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 18 12:18:23 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

LD
11/19

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

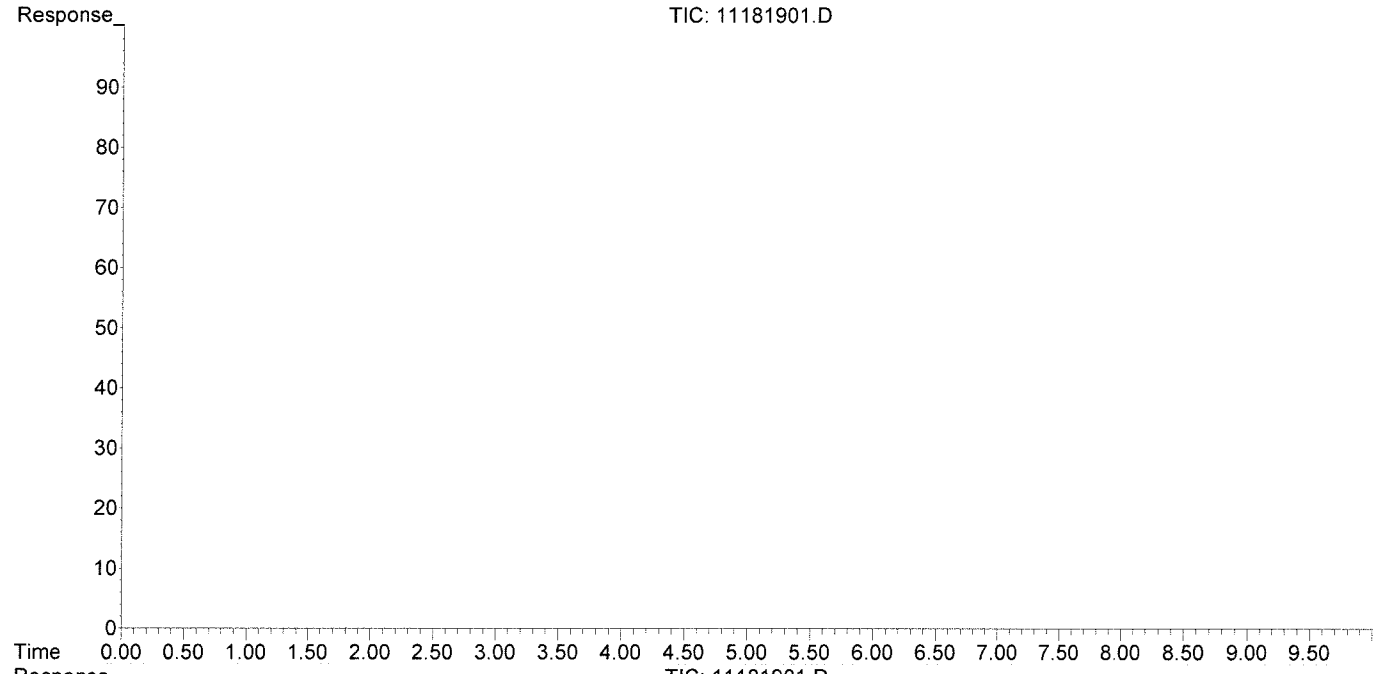
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.109	811925	89.511	ppm
7)	Ethylene	1.682	1584438	94.682	ppm
8)	Ethane	1.948	1591472	93.891	ppm
9)	Propylene	4.324	2313117	98.718	ppm
10)	Propane	4.447	2376077	95.501	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	0.000	0	N.D.	ppm
13)	n-Butane	0.000	0	N.D.	ppm

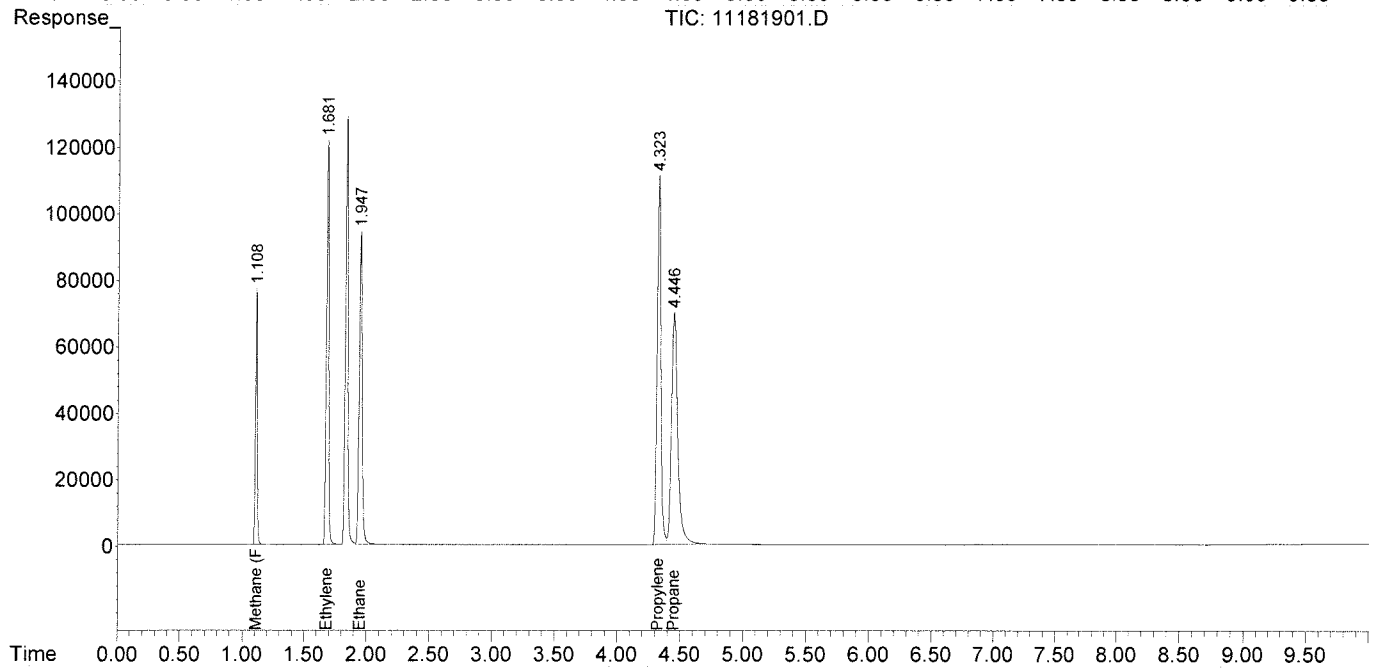
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2019_11\18\
Data File : 11181901.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 18-Nov-2019, 13:04:17
Operator : WH/LD
Sample : STD S32-05221901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 18 12:18:23 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Data Path : J:\GC10\DATA\RSK_FID\2019_11\18\
Data File : 11181914.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 18-Nov-2019, 16:08:30
Operator : WH/LD
Sample : STD S32-05221901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 18 15:17:30 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

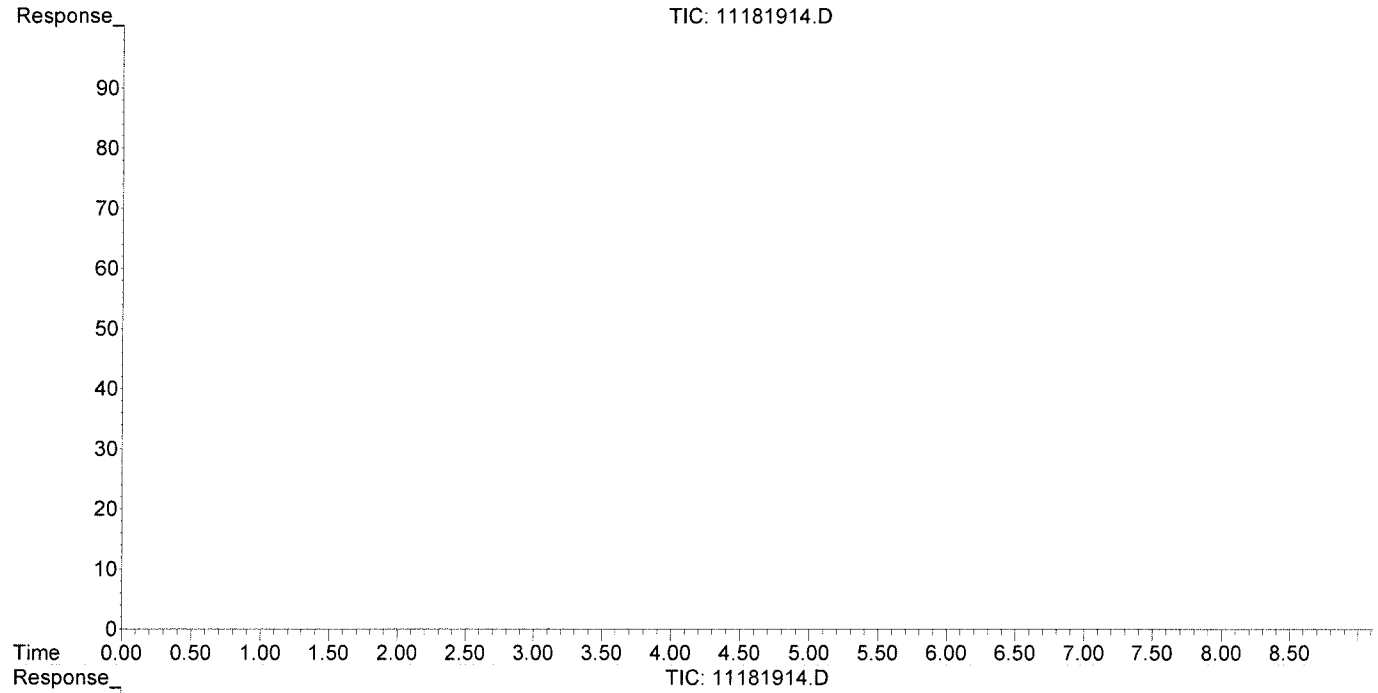
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.118	828575	91.347	ppm
7)	Ethylene	1.686	1617930	96.683	ppm
8)	Ethane	1.951	1627156	95.996	ppm
9)	Propylene	4.331	2359771	100.709	ppm
10)	Propane	4.454	2427573	97.570	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	0.000	0	N.D.	ppm
13)	n-Butane	0.000	0	N.D.	ppm

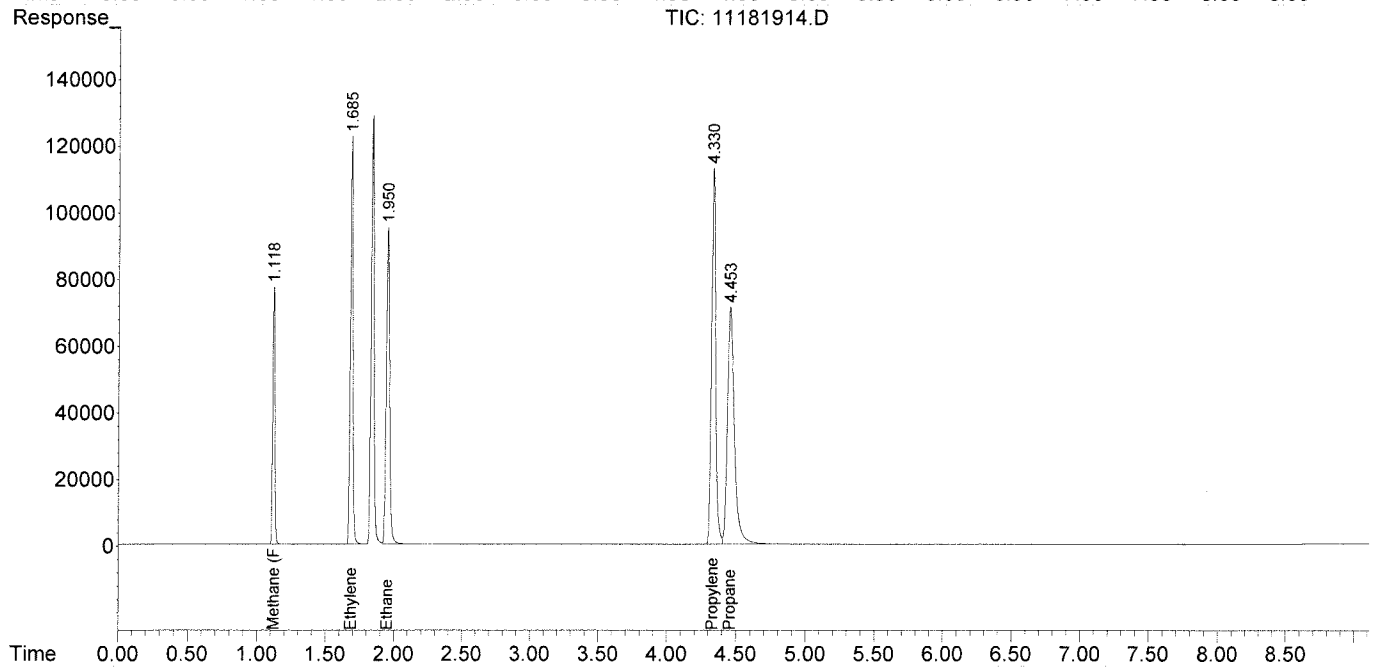
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2019_11\18\
Data File : 11181914.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 18-Nov-2019, 16:08:30
Operator : WH/LD
Sample : STD S32-05221901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 18 15:17:30 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Injection Log

Directory: I:\GC10\DATA\RSK_FID\2017_09\12\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Acquisition Method	Comments
1	12-Sep-17, 08:38:08	09121701.D	test		MC	RSKBOTH.M	
2	12-Sep-17, 10:52:40	09121702.D	0.151ppm 0.250ml s32-09121702		MC	RSKBOTH.M	Curve
3	12-Sep-17, 11:05:49	09121703.D	0.302ppm 0.5ml s32-09121702		MC	RSKBOTH.M	Curve
4	12-Sep-17, 11:45:34	09121704.D	1.51ppm 0.1ml s32-09051701		MC	RSKBOTH.M	Curve
5	12-Sep-17, 12:09:33	09121705.D	4.53ppm 0.3ml s32-09051701		MC	RSKBOTH.M	Curve
6	12-Sep-17, 12:30:23	09121706.D	10.57ppm 0.7ml s32-09051701		MC	RSKBOTH.M	Curve
7	12-Sep-17, 12:47:18	09121707.D	200ppm 0.1ml s32-09121701		MC	RSKBOTH.M	Curve
8	12-Sep-17, 13:00:22	09121708.D	600ppm 0.3ml s32-09121701		MC	RSKBOTH.M	Curve
9	12-Sep-17, 13:47:48	09121709.D	1000ppm 0.5ml s32-09121701		MC	RSKBOTH.M	Curve
10	12-Sep-17, 14:07:58	09121710.D	2000ppm 1ml s32-09121701		MC	RSKBOTH.M	Curve
11	12-Sep-17, 14:48:48	09121711.D	4000ppm 0.1ml s32-08231701		MC	RSKBOTH.M	Curve
12	12-Sep-17, 15:21:51	09121712.D	20000ppm 0.5ml s32-08231701		MC	RSKBOTH.M	Curve
13	12-Sep-17, 15:38:59	09121713.D	mb 0.5ml		MC	RSKBOTH.M	Pass
14	12-Sep-17, 15:55:35	09121714.D	mb 0.1ml		MC	RSKBOTH.M	Pass
15	12-Sep-17, 16:15:26	09121715.D	icv s30-05241604		MC	RSKBOTH.M	Pass

Injection Log

Directory: I:\GC10\DATA\RSK_FID\2019_11\18\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Acquisition Method	Comments
1	18-Nov-19, 13:04:17	11181901.D	STD S32-05221901		WH/LD	RSKBOTH.M	pass
2	18-Nov-19, 13:23:09	11181902.D	RB 0.1ml		WH/LD	RSKBOTH.M	pass
3	18-Nov-19, 13:36:03	11181903.D	MCS 0.1ml		WH/LD	RSKBOTH.M	pass
4	18-Nov-19, 13:52:11	11181904.D	LCS FID 0.1ml		WH/LD	RSKBOTH.M	pass
5	18-Nov-19, 14:05:22	11181905.D	LCSD FID 0.1ml		WH/LD	RSKBOTH.M	pass
6	18-Nov-19, 14:18:19	11181906.D	p1907035-001 0.1ml		WH/LD	RSKBOTH.M	
7	18-Nov-19, 14:31:17	11181907.D	p1907035-002 0.1ml		WH/LD	RSKBOTH.M	
8	18-Nov-19, 14:48:34	11181908.D	p1906981-001 0.1ml		WH/LD	RSKBOTH.M	
9	18-Nov-19, 15:01:59	11181909.D	p1906981-002 0.1ml		WH/LD	RSKBOTH.M	
10	18-Nov-19, 15:15:50	11181910.D	p1906981-003 0.1ml		WH/LD	RSKBOTH.M	
11	18-Nov-19, 15:28:41	11181911.D	p1906981-004 0.1ml		WH/LD	RSKBOTH.M	
12	18-Nov-19, 15:42:36	11181912.D	p1906981-005 0.1ml		WH/LD	RSKBOTH.M	
13	18-Nov-19, 15:55:33	11181913.D	p1906981-006 0.1ml		WH/LD	RSKBOTH.M	
14	18-Nov-19, 16:08:30	11181914.D	STD S32-05221901		WH/LD	RSKBOTH.M	pass

Case Narrative

Method: 6850
Analysis: Perchlorate
Analysis SOP: LC-MS-CLO4
ALS WO ID(s): 1932283; 1932284; 1932352

Client: ALS Laboratories (Houston, TX)
Matrix: Water
ELMS Batch (HBN): 2320 (252432)

General Set Information: There were seventeen field samples in these Work Orders. The samples were analyzed for perchlorate.

Method Summary: Each sample was prepared as noted below and analyzed using an Agilent 1100 LC/MSD system in select ion monitoring (SIM) mode at m/z 83 and 85, which corresponds to the loss of one oxygen atom from the perchlorate molecule. ChemStation software was used for instrument control and data analysis. The ion ratio of m/z 83 to 85 was used to positively identify the response peak as perchlorate. Quantitation was performed using the m/z 83 peak area. An internal standard (ISTD) of ^{18}O labeled perchlorate was added to each sample to establish the perchlorate peak retention time and used in quantitation.

Sample Preparation: A 10.0mL aliquot of each sample was transferred into a 15-mL centrifuge tube. 50µL of an ^{18}O labeled perchlorate solution was added to each sample as an internal standard. The samples were then capped, vortexed, and filtered into autosampler vial using Phenex PES membrane 0.45µm Syringe filters.

Holding Times: Holding times were met for all analyses.

Dilutions: Field sample 1932284006 was analyzed and reported from a 1:10 dilution. Field sample 1932284007 was analyzed and reported from a 1:100 dilution. Field samples 1932284008/09/10 and 1932352003 were analyzed and reported from 1:1,000 dilutions. The reporting limits have been adjusted accordingly.

Method QC data: The method blank (LMB 685442) was less than 1/2 the CRDL. The recovery for the LCS (685439) was within acceptable parameters.

MS/MSD Analysis: MS/MSD was performed on samples 1932352005/06 (Client ID: 50WW23-191113). 3.0µL of Working Standard Solution Horizon ID 49947 was added to 10.0mL of sample preparation. The spike target was 3.µg/L. The MS/MSD percent recoveries and relative percent difference (RPD) were within the performance limits.

Instrument QC: Instrument initial and continuing calibrations were performed in accordance with published procedures.

NC/CAR(s): NA

Sample Calculation: Samples were reported in µg/L. Results were calculated in µg/L by the equation (A)x(B),

where: A = Analyte concentration from the standard curve (µg/L)
B = Dilution performed at time of analysis

Miscellaneous Comments: These samples were analyzed in accordance with the requirements found in the DOD QSM Version 5.1.1. The Reporting Limit Verification Standard (RLVS – 685440) is reported from the analysis of the Laboratory Control Sample (LCS – 685439) at a level of 3.0µg/L. Due to limitations of the Chemstation Software, some of the chromatographic peaks may require manual integrations. A manual integration was performed for one of the Initial Calibration analyses (datafile: 20SEPI03) along with datafile 22NOV19D07.

Thomas Bosch — Analyst
November 25, 2019 — Date

ANALYTICAL REPORT

Report Date: November 26, 2019

RJ Modashia
ALS Environmental (Houston)
10450 Stancliff Road
Suite 210
Houston, TX 77099

Phone: 281 530-5656

E-mail: RJ.Modashia@ALSGlobal.com

Workorder: **34-1932284**
Project ID: HS19110644
Purchase Order: HS19110644
Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
50WW29-191111	1932284001	11/11/19	11/14/19	HS19110644-01
50WW10-191111	1932284002	11/11/19	11/14/19	HS19110644-01
50WW09-191111	1932284003	11/11/19	11/14/19	HS19110644-01
50WW09-191111-FD	1932284004	11/11/19	11/14/19	HS19110644-01
50WW22-191112	1932284005	11/12/19	11/14/19	HS19110644-01
50WW08-191112	1932284006	11/12/19	11/14/19	HS19110644-01
50WW06-191112	1932284007	11/12/19	11/14/19	HS19110644-01
50WW11-191112	1932284008	11/12/19	11/14/19	HS19110644-01
50WW12-191112	1932284009	11/12/19	11/14/19	HS19110644-01
50WW12-191112-FD	1932284010	11/12/19	11/14/19	HS19110644-01

ANALYTICAL REPORT

Workorder: 34-1932284
Client: ALS Environmental (Houston)
Project Manager: Kevin W. Griffiths

Analytical Results

Sample ID: **50WW29-191111** | Sampling Site: HS19110644-01 | Collected: 11/11/2019
Lab ID: 1932284001 | Media: 125 mL Nalgene | Received: 11/14/2019
Matrix: Water | Sampling Parameter: NA

Analysis Method - EPA 6850, DoD QSM

Preparation: Not Applicable
Analysis: EPA 6850, DoD QSM Water | **Instrument ID:** LCMS04
Batch: ELMS/2320 (HBN: 252432) | **%Solids:** NA
Analyzed: 11/22/2019 09:26 | **Report Basis:** Wet

Analyte	Result (ug/L)	DL (ug/L)	LOD (ug/L)	LOQ (ug/L)	Dilution	Qual
Perchlorate	ND	1.0	2.0	4.0	1	U

Sample ID: **50WW10-191111** | Sampling Site: HS19110644-01 | Collected: 11/11/2019
Lab ID: 1932284002 | Media: 125 mL Nalgene | Received: 11/14/2019
Matrix: Water | Sampling Parameter: NA

Analysis Method - EPA 6850, DoD QSM

Preparation: Not Applicable
Analysis: EPA 6850, DoD QSM Water | **Instrument ID:** LCMS04
Batch: ELMS/2320 (HBN: 252432) | **%Solids:** NA
Analyzed: 11/22/2019 09:55 | **Report Basis:** Wet

Analyte	Result (ug/L)	DL (ug/L)	LOD (ug/L)	LOQ (ug/L)	Dilution	Qual
Perchlorate	ND	1.0	2.0	4.0	1	U

Sample ID: **50WW09-191111** | Sampling Site: HS19110644-01 | Collected: 11/11/2019
Lab ID: 1932284003 | Media: 125 mL Nalgene | Received: 11/14/2019
Matrix: Water | Sampling Parameter: NA

Analysis Method - EPA 6850, DoD QSM

Preparation: Not Applicable
Analysis: EPA 6850, DoD QSM Water | **Instrument ID:** LCMS04
Batch: ELMS/2320 (HBN: 252432) | **%Solids:** NA
Analyzed: 11/22/2019 10:08 | **Report Basis:** Wet

Analyte	Result (ug/L)	DL (ug/L)	LOD (ug/L)	LOQ (ug/L)	Dilution	Qual
Perchlorate	**6.6**	1.0	2.0	4.0	1	

Sample ID: **50WW09-191111-FD** | Sampling Site: HS19110644-01 | Collected: 11/11/2019
Lab ID: 1932284004 | Media: 125 mL Nalgene | Received: 11/14/2019
Matrix: Water | Sampling Parameter: NA

Analysis Method - EPA 6850, DoD QSM

Preparation: Not Applicable
Analysis: EPA 6850, DoD QSM Water | **Instrument ID:** LCMS04
Batch: ELMS/2320 (HBN: 252432) | **%Solids:** NA
Analyzed: 11/22/2019 10:22 | **Report Basis:** Wet

Analyte	Result (ug/L)	DL (ug/L)	LOD (ug/L)	LOQ (ug/L)	Dilution	Qual
Perchlorate	**7.4**	1.0	2.0	4.0	1	

ANALYTICAL REPORT

Workorder: 34-1932284
Client: ALS Environmental (Houston)
Project Manager: Kevin W. Griffiths

Analytical Results

Sample ID: **50WW22-191112** | Sampling Site: HS19110644-01 | Collected: 11/12/2019
Lab ID: 1932284005 | Media: 125 mL Nalgene | Received: 11/14/2019
Matrix: Water | Sampling Parameter: NA

Analysis Method - EPA 6850, DoD QSM

Preparation: Not Applicable
Analysis: EPA 6850, DoD QSM Water | **Instrument ID:** LCMS04
Batch: ELMS/2320 (HBN: 252432) | **%Solids:** NA
Analyzed: 11/22/2019 10:36 | **Report Basis:** Wet

Analyte	Result (ug/L)	DL (ug/L)	LOD (ug/L)	LOQ (ug/L)	Dilution	Qual
Perchlorate	ND	1.0	2.0	4.0	1	U

Sample ID: **50WW08-191112** | Sampling Site: HS19110644-01 | Collected: 11/12/2019
Lab ID: 1932284006 | Media: 125 mL Nalgene | Received: 11/14/2019
Matrix: Water | Sampling Parameter: NA

Analysis Method - EPA 6850, DoD QSM

Preparation: Not Applicable
Analysis: EPA 6850, DoD QSM Water | **Instrument ID:** LCMS04
Batch: ELMS/2320 (HBN: 252432) | **%Solids:** NA
Analyzed: 11/22/2019 10:50 | **Report Basis:** Wet

Analyte	Result (ug/L)	DL (ug/L)	LOD (ug/L)	LOQ (ug/L)	Dilution	Qual
Perchlorate	**83**	10	20	40	10	

Sample ID: **50WW06-191112** | Sampling Site: HS19110644-01 | Collected: 11/12/2019
Lab ID: 1932284007 | Media: 125 mL Nalgene | Received: 11/14/2019
Matrix: Water | Sampling Parameter: NA

Analysis Method - EPA 6850, DoD QSM

Preparation: Not Applicable
Analysis: EPA 6850, DoD QSM Water | **Instrument ID:** LCMS04
Batch: ELMS/2320 (HBN: 252432) | **%Solids:** NA
Analyzed: 11/22/2019 13:39 | **Report Basis:** Wet

Analyte	Result (ug/L)	DL (ug/L)	LOD (ug/L)	LOQ (ug/L)	Dilution	Qual
Perchlorate	**4300**	100	200	400	100	

Sample ID: **50WW11-191112** | Sampling Site: HS19110644-01 | Collected: 11/12/2019
Lab ID: 1932284008 | Media: 125 mL Nalgene | Received: 11/14/2019
Matrix: Water | Sampling Parameter: NA

Analysis Method - EPA 6850, DoD QSM

Preparation: Not Applicable
Analysis: EPA 6850, DoD QSM Water | **Instrument ID:** LCMS04
Batch: ELMS/2320 (HBN: 252432) | **%Solids:** NA
Analyzed: 11/22/2019 11:18 | **Report Basis:** Wet

Analyte	Result (ug/L)	DL (ug/L)	LOD (ug/L)	LOQ (ug/L)	Dilution	Qual
Perchlorate	**8000**	1000	2000	4000	1000	

ANALYTICAL REPORT

Workorder: 34-1932284
Client: ALS Environmental (Houston)
Project Manager: Kevin W. Griffiths

Analytical Results

Sample ID: **50WW12-191112** | Sampling Site: HS19110644-01 | Collected: 11/12/2019
Lab ID: 1932284009 | Media: 125 mL Nalgene | Received: 11/14/2019
Matrix: Water | Sampling Parameter: NA

Analysis Method - EPA 6850, DoD QSM

Preparation: Not Applicable
Analysis: EPA 6850, DoD QSM Water | **Instrument ID:** LCMS04
Batch: ELMS/2320 (HBN: 252432) | **%Solids:** NA
Analyzed: 11/22/2019 11:32 | **Report Basis:** Wet

Analyte	Result (ug/L)	DL (ug/L)	LOD (ug/L)	LOQ (ug/L)	Dilution	Qual
Perchlorate	**47000**	1000	2000	4000	1000	

Sample ID: **50WW12-191112-FD** | Sampling Site: HS19110644-01 | Collected: 11/12/2019
Lab ID: 1932284010 | Media: 125 mL Nalgene | Received: 11/14/2019
Matrix: Water | Sampling Parameter: NA

Analysis Method - EPA 6850, DoD QSM

Preparation: Not Applicable
Analysis: EPA 6850, DoD QSM Water | **Instrument ID:** LCMS04
Batch: ELMS/2320 (HBN: 252432) | **%Solids:** NA
Analyzed: 11/22/2019 11:59 | **Report Basis:** Wet

Analyte	Result (ug/L)	DL (ug/L)	LOD (ug/L)	LOQ (ug/L)	Dilution	Qual
Perchlorate	**43000**	1000	2000	4000	1000	

Comments

Quality Control: **EPA 6850, DoD QSM - (HBN: 252432)**

Field sample 1932284006 was analyzed and reported from a 1:10 dilution. Field sample 1932284007 was analyzed and reported from a 1:100 dilution. Field samples 1932284008/09/10 and 1932352003 were analyzed and reported from 1:1,000 dilutions. The reporting limits have been adjusted accordingly.

Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

Method	Analyst	Peer Review
EPA 6850, DoD QSM	/S/ Thomas Bosch 11/25/2019 12:25	/S/ Stephen Brose 11/26/2019 07:45

Laboratory Contact Information

ALS Environmental
960 W Levoy Drive
Salt Lake City, Utah 84123

Phone: (801) 266-7700
Email: alslt.lab@ALSGlobal.com
Web: www.alsslc.com

ANALYTICAL REPORT

Workorder: 34-1932284
Client: ALS Environmental (Houston)
Project Manager: Kevin W. Griffiths

General Lab Comments

The results provided in this report relate only to the items tested.
Samples were received in acceptable condition unless otherwise noted.
Samples have not been blank corrected unless otherwise noted.
This test report shall not be reproduced, except in full, without written approval of ALS.

ALS provides professional analytical services for all samples submitted. ALS is not in a position to interpret the data and assumes no responsibility for the quality of the samples submitted.

All quality control samples processed with the samples in this report yielded acceptable results unless otherwise noted.

ALS is accredited for specific fields of testing (scopes) in the following testing sectors. The quality system implemented at ALS conforms to accreditation requirements and is applied to all analytical testing performed by ALS. The following table lists testing sector, accreditation body, accreditation number and website. Please contact these accrediting bodies or your ALS project manager for the current scope of accreditation that applies to your analytical testing.

Testing Sector	Accreditation Body (Standard)	Certificate Number	Website
Environmental	PJLA (DoD ELAP)	L17-506	http://www.pjlabs.com
	PJLA (ISO 17025)	L17-507-R1	http://www.pjlabs.com
	Utah (TNI)	UT00953	http://lams.nelac-institute.org/search
	Iowa (TNI)	IA# 376	http://www.shl.uiowa.edu/labcert/idnr/
	Kansas	E-10416	http://www.kdheks.gov/envlab/disclaimer.html
Industrial Hygiene	AIHA (ISO 17025 & AIHA IHLAP)	101574	http://www.aihaaccreditedlabs.org
	DOECAP-AP	L18-606	http://www.pjlabs.com
	Washington	C596	https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation
Dietary Supplements	PJLA (ISO 17025)	L17-507-R1	http://www.pjlabs.com

Result Symbol Definitions

MDL = Method Detection Limit, a statistical estimate of method/media/instrument sensitivity.
RL = Reporting Limit, a verified value of method/media/instrument sensitivity.
CRDL = Contract Required Detection Limit
Reg. Limit = Regulatory Limit.
ND = Not Detected, testing result not detected above the MDL or RL.
< Means this testing result is less than the numerical value.
** No result could be reported, see sample comments for details.

Qualifier Symbol Definitions

U = Qualifier indicates that the analyte was not detected above the MDL.
J = Qualifier Indicates that the analyte value is between the MDL and the RL. It is also used to indicate an estimated value for tentatively identified compounds in mass spectrometry where a 1:1 response is assumed.
B = Qualifier indicates that the analyte was detected in the blank.
E = Qualifier indicates that the analyte result exceeds calibration range.
P = Qualifier indicates that the RPD between the two columns is greater than 40%.

Quality Control Sample Batch Report

Analysis Information

Workorder: 1932284

Limits:	Client SOW/Contract Specified	**Preparation:**	NA	**Analysis:**	EPA 6850, DoD QSM
Basis:	DoD QSM	**Batch:**	NA	**Batch:**	ELMS/2320 (HBN: 252432)
		Prepared By:	NA	**Analyzed By:**	Thomas Bosch

Blank

LMB: 685442
Analyzed: 11/22/2019 08:51
Units: ug/L

Analyte	Result	MDL	RL
Perchlorate	ND	1	2.00

Laboratory Control Sample

LCS: 685439
Analyzed: 11/22/2019 08:23
Dilution: 1
Units: ug/L

Analyte	Result	Target	% Rec	QC Limits	
Perchlorate	2.92	3.00	97.3	78.8	123.8

Matrix Spike - Matrix Spike Duplicate

Sample:	1932352004	**MS:**	1932352005	**MSD:**	1932352006
Analyzed:	11/22/2019 12:55	**Analyzed:**	11/22/2019 13:09	**Analyzed:**	11/22/2019 13:23
Dilution:	1	**Dilution:**	1	**Dilution:**	1
Units:	ug/L	**Units:**	ug/L	**Units:**	ug/L

Analyte	Result	Result	Target	% Rec	QC Limits		Result	% Rec	RPD	QC Limits	
Perchlorate	ND	3.29	3	110	78.8	123.8	3.05	102	7.54	0.0	20.0

Comments

Field sample 1932284006 was analyzed and reported from a 1:10 dilution. Field sample 1932284007 was analyzed and reported from a 1:100 dilution. Field samples 1932284008/09/10 and 1932352003 were analyzed and reported from 1:1,000 dilutions. The reporting limits have been adjusted accordingly.

QC Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

Analyst	Peer Review
/S/ Thomas Bosch	/S/ Stephen Brose
11/25/2019 12:27	11/26/2019 07:45

Symbols and Definitions

- * - Analyte above reporting limit or outside of control limits
- ▲ - Sample result is greater than 4 times the spike added
- ◆ - Sample and Matrix Duplicate less than 5 times the reporting limit
- ● - Result is above the calibration range
- # - The Matrix Spike, Matrix Spike duplicate or Matrix Duplicate is reported for your information only. The sample matrix may be inappropriate for the method selected.

RPD - Relative % Difference (Spike / Spike Duplicate)
ND - Not Detected (U - Qualifier also flags analyte as not detected)
NA - Not Applicable
QC results are not adjusted for moisture correction, where applicable

1932284



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

1932284

Subcontract Chain of Custody

18698/#2

SAMPLING STATE: **Texas** **COC ID:** **12623**

SUBCONTRACT TO:

ALS Laboratory Group
960 LeVoy Dr
Salt Lake City, UT 84123

Phone: +1 801 266 7700

CUSTOMER INFORMATION:

Company:	ALS Houston
Contact:	RJ Modashia
Address:	10450 Stancliff Rd, Ste 210
Phone:	+1 281 530 5656
Email:	RJ.Modashia@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:	HS19110644
TSR:	Sonia West

	LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
	ANALYSIS REQUESTED			DUE DATE
1.	**HS19110644-01**	**50WW29-191111**	**Groundwater**	**11 Nov 2019 09:20**
	SUB_Perch-6850			27 Nov 2019
2.	**HS19110644-02**	**50WW10-191111**	**Groundwater**	**11 Nov 2019 10:15**
	SUB_Perch-6850			27 Nov 2019
3.	**HS19110644-03**	**50WW09-191111**	**Groundwater**	**11 Nov 2019 11:05**
	SUB_Perch-6850			27 Nov 2019
4.	**HS19110644-04**	**50WW09-191111-FD**	**Groundwater**	**11 Nov 2019 11:05**
	SUB_Perch-6850			27 Nov 2019
5.	**HS19110644-05**	**50WW22-191112**	**Groundwater**	**12 Nov 2019 08:30**
	SUB_Perch-6850			27 Nov 2019
6.	**HS19110644-06**	**50WW08-191112**	**Groundwater**	**12 Nov 2019 09:30**
	SUB_Perch-6850			27 Nov 2019
7.	**HS19110644-07**	**50WW06-191112**	**Groundwater**	**12 Nov 2019 10:30**
	SUB_Perch-6850			27 Nov 2019
8.	**HS19110644-08**	**50WW11-191112**	**Groundwater**	**12 Nov 2019 11:30**
	SUB_Perch-6850			27 Nov 2019
9.	**HS19110644-09**	**50WW12-191112**	**Groundwater**	**12 Nov 2019 12:30**

Subcontract Chain of Custody

SAMPLING STATE: **Texas** **COC ID:** **12623**

	LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
	ANALYSIS REQUESTED			DUE DATE
		SUB_Perch-6850		27 Nov 2019
10.	**HS19110644-10**	**50WW12-191112-FD**	**Groundwater**	**12 Nov 2019 12:30**
	SUB_Perch-6850			27 Nov 2019

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: 11/13/19 1800

Received By: Jaylynn J Date/Time: 11/14/19 09:08

Cooler ID(s): _____ Temperature(s): _____

ALS Environmental

CHAIN-OF-CUSTODY

Project / Job / Task: HS19110644-01	***Split:***	**Workorder ID:** 1932284	**Level:** ENV_LVL4
Client: ALS Environmental (Houston)		**Account:** 8101	**Type:** 125Poly
Comments:			**Preservatives**

Item	Collect Date/Time	Sample ID	Lab ID	QC	Matrix	Containers ID(s)	Containers Count	COOL	Requested Analysis: EPA 6850, DoD QSM
1	11/11/2019 09:20	50WW29-191111	1932284001		Water	A	1		A
2	11/11/2019 10:15	50WW10-191111	1932284002		Water	A	1		A
3	11/11/2019 11:05	50WW09-191111	1932284003		Water	A	1		A
4	11/11/2019 11:05	50WW09-191111-FD	1932284004		Water	A	1		A
5	11/12/2019 08:30	50WW22-191112	1932284005		Water	A	1		A
6	11/12/2019 09:30	50WW08-191112	1932284006		Water	A	1		A
7	11/12/2019 10:30	50WW06-191112	1932284007		Water	A	1		A
8	11/12/2019 11:30	50WW11-191112	1932284008		Water	A	1		A
9	11/12/2019 12:30	50WW12-191112	1932284009		Water	A	1		A
10	11/12/2019 12:30	50WW12-191112-FD	1932284010		Water	A	1		A

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Reason for Transfer / Storage Location
VanTassell, Tami	11/14/2019 09:08	ALS Sample Receiving	Sample Login
Tami VanTassell R.331	11/14/19 14:55	BB	Storage
	11.20 19/14:00	T.Bash	clay analysis

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep / Analysis for: _____ Lab Notebook No.: _____

Prepared / Analyzed by: _____ Date / Time: _____

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Reason for Transfer / Storage Location

ALS-SALT LAKE CITY-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: ALS Houston

Project/Task/Site: _____

Date/Time of Receipt: 11/14/19 09:08

Number of Coolers Received: 1

Condition of Coolers:	Acceptable/Unacceptable	Temperature Control:	Present/Not Included
Cooler Custody Seals:	Present/Absent/NA		
	Intact/Broken/NA	Location Temp Taken:	Control/Between Samples
Container Custody Seals:	Present/Absent/NA		
	Intact/Broken/NA	Are all temperatures within project specific guidelines?	Yes/No/NA
Ice Present:	Yes/No/NA		
	Frozen/Melted/NA	VOA Headspace Present?	Yes/No/NA

pH Check Performed:							
	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA

Cooler Received	Cooler Condition	Temp.	Cooler Received	Cooler Condition	Temp.	Cooler Received	Cooler Condition	Temp.
1	Great	2 °C	4		°C	7		°C
2		°C	5		°C	8		°C
3		°C	6		°C	9		°C

Taken By: JayLynn Signature JayLynn Johnson Printed Name 11/14/19 Date

CLIENT-RELATED INFORMATION

☐ Missing Cooler	☐ Missing Samples/Bottles	☐ Incorrect Preservation	☐ Insufficient Sample Volume
☐ Cooler Conditions	☐ Broken/Leaking Samples	☐ pH Criteria Not Met	☐ Chain of Custody Problems
☐ Missing Paperwork	☐ Incorrect Bottle Type	☐ Residual Chlorine Present	☐ Other:
☐ Missing/Incorrect Bottle Labels	☐ Cooler Temperatures Out of Range	☐ Head Space in Bottles	

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

Client Notified? YES ☐ NO ☐

Response Required Within 24 Hours

PROJECT MANAGEMENT

PROJECT MANAGER COMMENTS:

ALS Project Manager: _____ (Printed Name) Returned to Sample Receipt by: _____ (Signature) Date: _____



ORIGIN ID:SGRA (281) 530-5656
SHIPPING DEPT
ALS LABORATORY GROUP
10450 STANCLIFF RD
SUITE 210
HOUSTON, TX 77099
UNITED STATES US

SHIP DATE: 13NOV19
ACTWGT: 18.95 LB
CAD: 300130/CAFE3211
DIMS: 14x11x10 IN

BILL THIRD PARTY

TO SAMPLE RECEIVING
ALS ENVIRONMENTAL
960 W. LEVOY DRIVE

SALT LAKE CITY UT 84123
(801) 266-7700
REF: HS19110615/644/646 - RJ

FedEx Express

TRK# 0201 1251 0291 7712

THU - 14 NOV 3:00P
STANDARD OVERNIGHT

AX BTFA

84123
UT-US SLC

Batch Worklist

Batch: ELMS/ 2320 Created: 11/22/2019 07:40 Instrument:

Rule: EPA 6850, DoD QSM Water Analyst: T. Bosch Status: WP

HBN: 252432

Workorder: 1932283 [ENV_LVL4]
Workorder: 1932284 [ENV_LVL4]
Workorder: 1932352 [ENV_LVL4]

Pos	Lab ID	Sample ID	Prep Initial	Prep Final	Dust Weight	Type	Mx	Container	Procedure	Mgr	Expire Date	Due Date	Run Date
1	685438	CCV for HBN 252432 [ELMS/2320]				CCV	3		E685041C3Q	5311		11/27/2019	
2	685439	LCS for HBN 252432 [ELMS/2320]				LCS	3		E6850Q413Q	5311		11/27/2019	
3	685440	RLVS for HBN 252432 [ELMS/2320				RLVS	3		E685041C3Q	5311		11/27/2019	
4	685441	ICS for HBN 252432 [ELMS/2320]				ICS	3		E6850..D3Q	5311		11/27/2019	
5	685442	LMB for HBN 252432 [ELMS/2320]				LMB	3		E6850Q413Q	5311		11/27/2019	
6	1932283001	LH18/24-SP650_111219_AIX				SAMPLE	3	1932283001-A	E6850Q41.3	5480	12/10/2019	11/27/2019	
7	1932284001	50WW29-191111				SAMPLE	3	1932284001-A	E6850Q41.3	5480	12/9/2019	11/27/2019	
8	1932284002	50WW10-191111				SAMPLE	3	1932284002-A	E6850Q41.3	5480	12/9/2019	11/27/2019	
9	1932284003	50WW09-191111				SAMPLE	3	1932284003-A	E6850Q41.3	5480	12/9/2019	11/27/2019	
10	1932284004	50WW09-191111-FD				SAMPLE	3	1932284004-A	E6850Q41.3	5480	12/9/2019	11/27/2019	
11	1932284005	50WW22-191112				SAMPLE	3	1932284005-A	E6850Q41.3	5480	12/10/2019	11/27/2019	
12	1932284006	50WW08-191112				SAMPLE	3	1932284006-A	E6850Q41.3	5480	12/10/2019	11/27/2019	
13	1932284007	50WW06-191112				SAMPLE	3	1932284007-A	E6850Q41.3	5480	12/10/2019	11/27/2019	
14	1932284008	50WW11-191112				SAMPLE	3	1932284008-A	E6850Q41.3	5480	12/10/2019	11/27/2019	
15	1932284009	50WW12-191112				SAMPLE	3	1932284009-A	E6850Q41.3	5480	12/10/2019	11/27/2019	
16	685443	CCV for HBN 252432 [ELMS/2320]				CCV	3		E685041C3Q	5311		11/27/2019	
17	1932284010	50WW12-191112-FD				SAMPLE	3	1932284010-A	E6850Q41.3	5480	12/10/2019	11/27/2019	
18	1932352001	50WW16-191113				SAMPLE	3	1932352001-A	E6850Q41.3	5480	12/11/2019	12/2/2019	
19	1932352002	50WW14-191113				SAMPLE	3	1932352002-A	E6850Q41.3	5480	12/11/2019	12/2/2019	
20	1932352003	50WW13-191113				SAMPLE	3	1932352003-A	E6850Q41.3	5480	12/11/2019	12/2/2019	
21	1932352004	50WW23-191113				SAMPLE	3	1932352004-A	E6850Q41.3	5480	12/11/2019	12/2/2019	
22	1932352005	50WW23-191113 MS				MS	3	1932352005-A	E6850Q413Q	5480		11/27/2019	
23	1932352006	50WW23-191113 MSD				MSD	3	1932352006-A	E6850Q413Q	5480		11/27/2019	
24	685444	CCV for HBN 252432 [ELMS/2320]				CCV	3		E685041C3Q	5311		11/27/2019	

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Analytical Documentation

Analyst Write-up

ALS Work Order #'s & Sample #( )'s: 1932283 (001); 1932284 (001-10); 1932352 (001-06)
ELMS Batch/HBN ID: 2320 (252432)
Prep Date: 11/20/2019 Analysis Date: 11/22/2019 Analyst: Tom Bosch
Analyte: **Perchlorate** Matrix: **Water** Method: **6850**
Sequence: \\HPCHEM\1\SEQUENCE\CLO4\2019\NOV\22NOV19D.s
Reported DL: **1.0µg/L** Reported LOD: **2.0µg/L** Reported LOQ: **4.0µg/L**

SAMPLE PREPARATION/ANALYSIS:

Water: Samples were prepared by Tom Bosch. 10.0mL of each sample was pipetted into a 15-mL centrifuge tube, and 50µL of an oxygen-18 labeled perchlorate solution was added as an internal standard. The samples were capped, vortexed, and filtered with Phenex PES membrane 0.45µm Syringe filters prior to analysis.

REAGENTS: Eluent A1: 95% ASTM Type II water (ALS)/5%ACN (B&J Lot DU461-US)/0.1% glacial acetic acid (JT-Baker Lot 122550).
Eluent B1: 95% ACN (B&J Lot DU461-US)/5% ASTM Type II water (ALS)/0.1% glacial acetic acid (JT-Baker Lot 122550).

STANDARDS: Internal Standard Spiking Solution Horizon# 47863. Dilutions of Working Standards (Horizon: 49947/48) used for ICAL, CCV's, RLVS and ICS.

CALIBRATION CURVE: Used curve from 09/20/2019, sequence 20SEP19D.s Offline Quantitation Method: CLO4-DP3.M

INSTRUMENT CONDITIONS: Samples were analyzed with an Agilent 1100 LC/MSD system, in negative SIM mode, monitoring m/z 83, 85, and 89.
Instrument ID: **LCMS04** Online Acquisition Method: CLO4-AQN.M Fragmentor: 160 Output Gain: 8 Injection Volume: 35µL
Column: KP-RPPX C8 separator, 250mm Mobile Phase: 70% Eluent A1; 30% Eluent B1 Run time: 12.0min.

FLOW GRADIENT:

Time (min.)	Flow (mL/min)
0	0.65
5.8	0.65
5.9	0.25
10.3	0.25
10.5	0.65
12.0	0.65

QC DATA: 3.0µL of QC Solution Horizon ID 47516 was used for LCS 685439; Target = 3.0µg/L. ASTM type II water was used for LMB 685442.

MS/MSD: The Matrix Spike and duplicate (MS/MSD) was performed on samples 1932352005/06 (Client ID's: 50WW23-191113. 3.0µl of Working Standard Solution Horizon ID 49947 was added to 10.0mL of sample preparation. Spike target = 3.0µg/L.

COMMENTS:

1) Results reported in µg/L. Field sample 1932284006 was analyzed and reported from a 1:10 dilution. Field sample 1932284007 was analyzed and reported from a 1:100 dilution. Field samples 1932284008/09/10 and 1932352003 were analyzed and reported from 1:1,000 dilutions. The reporting limits have been adjusted accordingly.
2) All QC, Blank, CCV, and MS/MSD results were within method parameters.
3) Sample data can be viewed at two directories within the ALS system: \\ALSLTWS013\LCMS\LCMS04\2019\NOV\HBN# or through NuGenesis\Tree\PrintData\LCMS\DefaultView.
4) Notebook: \\alsltws013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\252432-DoD-ALS-Hstn LCMS4 or through \\ALSLTWS013\DATAREVIEW\HBN#
5) The Reporting Limit Verification Standard (RLVS – 685440) is reported from the analysis of the Laboratory Control Sample (LCS – 685439) at a level of 3.0µg/L.
6) Due to limitations of the Chemstation Software, some of the chromatographic peaks require manual integration. Manual Integrations were performed for one of the Initial Calibration analyses (datafile: 20SEPI03) along with datafile 22NOV19D07.

5.5 Chromatography (GC, HPLC and LC/MS) Technical Review

Note: It is the peer reviewer's responsibility to ensure that appropriate criteria are used as defined in the HORIZON PROFILE. The evaluation criteria are prioritized as per Section 2.2 of this SOP. These items must be checked for all projects. The following checklist will be completed by both the analyst and the peer reviewer and scanned into the HBN folder with the raw data.

Chromatography (GC, HPLC, LC/MS) Technical Review Criteria **Batch(es)/SDG:** ELMS 2320 HBN: 252432 **Sample Set IDs if Applicable:** 1932283/1932284/1932352	**Analyst Initials**	**Reviewer Initials**
Sample positions on autosampler verified against instrument sequence	TB	NA
Calibration standards analyzed and meets criteria	TB	SB
Standards traceability checked and meets criteria	TB	SB
Standard curve coefficients evaluated and meet criteria	TB	SB
ICVs analyzed and meet acceptance criteria	TB	SB
CCVs analyzed and meet acceptance criteria	TB	SB
Retention Time Windows checked	TB	SB
For method 8081A, Endrin/DDT Breakdown is checked for compliance	—	—
Surrogate recoveries checked and appropriately addressed	—	—
Method Preparation Blanks analyzed and meet acceptance criteria	TB	SB
MSs, MSDs, and/or MDs analyzed and calculations checked; applicable	TB	SB
RLVS analyzed	TB	SB
Preparation and analysis hold times met	TB	SB
Preparation deviations and re-preparations noted when performed	TB	SB
Analysis deviations and re-analyses noted when performed	TB	SB
Sample dilution factors noted on reports	TB	SB
Electronic records in HBN transcription accuracy and completeness	TB	SB
Preparation and analysis calculations checked	TB	SB
NCRs are completed as necessary NC/CAR#_____	TB	SB
Report forms are complete and accurate	TB	SB
Manual integrations checked	TB	SB

STANDARD REPORT

Working Standard - CLO4ISTDWRK

CLO4ISTDWRK		Description - Perchlorate ISTD Wrk 1,000ug/L
Standard: 49946	**Created By:** Thomas Bosch	**Amount:** 25 mL
MFG: ALS/SLC	**Create Date:** 09/23/2019 03:09PM	**Expires:** 09/19/2020
MFG Lot: TNB: 09/20/2019	**Verified By:** Thomas Bosch	**Usable:** Yes
Pipette ID: Not Provided	**Verify Date:**	**Lab Lot:** CLO4ISTDWRK

Pos.	Analyte	Name	Concentration
1	14797-73-0-8385	Perchlorate 83:85 Ratio	1000 ug/L
2	14797-73-0-89	Perchlorate 89	1000 ug/L

Composition

Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
47863	CLO4ISTDSTK	Perchlorate ISTD Stock	CLO4ISTDSTK	0.25 mL	12/05/2028

STANDARD REPORT

Constituent

Stock Standard - CLO4ISTDSTK

CLO4ISTDSTK		Description - Perchlorate ISTD Stock
Standard: 47863	**Created By:** Thomas Bosch	**Amount:** 1 mL
MFG: Cambridge Isotope	**Create Date:** 05/23/2019 10:05AM	**Expires:** 12/05/2028
MFG Lot: SDIH-016	**Verified By:** Thomas Bosch	**Usable:** Yes
Part ID: OLM-7310-S	**Verify Date:**	**Lab Lot:** CLO4ISTDSTK

Pos.	Analyte	Name	Concentration
1	14797-73-0-8385	Perchlorate 83:85 Ratio	100 ug/mL
2	14797-73-0-89	Perchlorate 89	100 ug/mL

STANDARD REPORT

Working Standard - CLO4 WRK

CLO4 WRK		Description - 6850 WKG Std 100.ug/L
Standard: 49948	**Created By:** Thomas Bosch	**Amount:** 10 mL
MFG: ALS/SLC	**Create Date:** 09/20/2019 03:09PM	**Expires:** 07/25/2020
MFG Lot: TNB: 09/20/2019		**Usable:** Yes
Pipette ID: Not Provided		**Lab Lot:** CLO4 WRK

Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	0.1 ug/mL
2	14797-73-0-8385	Perchlorate 83:85 Ratio	0.1 ug/mL

Composition

Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
49947	CLO4 INT	6850 Intermdt AccStd 10.ug/mL	CLO4 INT	0.1 mL	07/25/2020

STANDARD REPORT

Constituent

Stock Standard - CLO4 STOCK

CLO4 STOCK		Description - 6850 Stock AccStd 1,000ug/mL
Standard: 43659	**Created By:** Thomas Bosch	**Amount:** 100 mL
MFG: AccuStandard	**Create Date:** 09/17/2018 09:09AM	**Expires:** 07/25/2020
MFG Lot: 218065075		**Usable:** Yes
Part ID: IC-PER-10X-1		**Lab Lot:** CLO4 STOCK

Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	1000 ug/mL
2	14797-73-0-8385	Perchlorate 83:85 Ratio	1000 ug/mL

STANDARD REPORT

Constituent

Solvent Standard - ASTM H2O

ASTM H2O			Description - ASTM Type II Water
Standard: 109	**Created By:** ALS Support (Lims)	**Amount:** 1000 L	
MFG: DCL In House	**Create Date:** 10/06/2005 09:10AM	**Expires:** 11/07/2025	
MFG Lot: Not Provided		**Usable:** Yes	
Part ID: Not Provided		**Lab Lot:** LAB 109	

Pos.	Analyte	Name	Concentration
Solvent - Analyte(s) not applicable			

STANDARD REPORT

Constituent

Working Standard - CLO4 INT

CLO4 INT		Description - 6850 Intermdt AccStd 10.ug/mL
Standard: 49947	**Created By:** Thomas Bosch	**Amount:** 10 mL
MFG: ALS/SLC	**Create Date:** 09/23/2019 03:09PM	**Expires:** 07/25/2020
MFG Lot: TNB: 09/20/2019		**Usable:** Yes
Pipette ID: Not Provided		**Lab Lot:** CLO4 INT

Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	10 ug/mL
2	14797-73-0-8385	Perchlorate 83:85 Ratio	10 ug/mL

Composition

Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
43659	CLO4 STOCK	6850 Stock AccStd 1,000ug/mL	CLO4 STOCK	0.1 mL	07/25/2020

STANDARD REPORT

Working Standard - CLO4 QC WRK

CLO4 QC WRK		Description - 6850 QC WKG STD 100ug/L
Standard: 47516	**Created By:** Thomas Bosch	**Amount:** 10 mL
MFG: ALS/SLC	**Create Date:** 05/06/2019 03:05PM	**Expires:** 03/31/2020
MFG Lot: TNB: 05/06/2019		**Usable:** Yes
Pipette ID: Not Provided		**Lab Lot:** CLO4 QC WRK 100.ug/L

Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	100 ug/L

Composition

Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
47515	CLO4 QC INT	6850 QC Intrmdt Std-QC 10ug/mL	CLO4 QC INT 10.ug/mL	0.1 mL	03/31/2020

STANDARD REPORT

Constituent

Solvent Standard - ASTM H2O

ASTM H2O		**Description - ASTM Type II Water**
Standard: 109	**Created By:** ALS Support (Lims)	**Amount:** 1000 L
MFG: DCL In House	**Create Date:** 10/06/2005 09:10AM	**Expires:** 11/07/2025
MFG Lot: Not Provided		**Usable:** Yes
Part ID: Not Provided		**Lab Lot:** LAB 109

Pos.	Analyte	Name	Concentration
Solvent - Analyte(s) not applicable			

STANDARD REPORT

Constituent

Stock Standard - CLO4 QCSTOCK

CLO4 QCSTOCK		**Description - 6850 QC Stock STD 1,000ug/mL**
Standard: 36748	**Created By:** Thomas Bosch	**Amount:** 100 mL
MFG: Ultra Scientific	**Create Date:** 05/11/2017 01:05PM	**Expires:** 03/31/2020
MFG Lot: CP-0860		**Usable:** Yes
Part ID: ICC-013		**Lab Lot:** CLO4 QC STOCK

Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	1000 ug/mL

STANDARD REPORT

Constituent

Working Standard - CLO4 QC INT

CLO4 QC INT	Description - 6850 QC Intrmdt Std-QC 10ug/mL

Standard: 47515 **Created By:** Thomas Bosch **Amount:** 10 mL
MFG: ALS/SLC **Create Date:** 05/06/2019 03:05PM **Expires:** 03/31/2020
MFG Lot: TNB: 05/06/2019 **Usable:** Yes
Pipette ID: Not Provided **Lab Lot:** CLO4 QC INT 10.ug/mL

Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	10 ug/mL

Composition

Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
36748	CLO4 QCSTOCK	6850 QC Stock STD 1,000ug/mL	CLO4 QC STOCK	0.1 mL	03/31/2020

125 Market Street
New Haven, CT 06513
USA

AccuStandard®

Tel (203)786-5290
Fax (203)786-5287
www.AccuStandard.com

CERTIFICATE OF ANALYSIS

S 43659

AccuTrace™ Reference Standard

Catalog No: IC-PER-10X-1
Description: Perchlorate Standard
Element: Perchlorate (ClO_4)
SRM: Ind. Std.
Lot: 218065075
Matrix: Water
Hazards: *Refer to SDS for complete safety information*

Signal Word: None

Date Certified: Jun 25, 2018
Expiration: Jul 25, 2020
Sample Size: 100 mL
Components: 1
Storage Condition: Ambient (>5 °C)

Included on ISO/IEC 17025 Scope of Accreditation: Yes

Included on ISO 17034 Scope of Accreditation: Yes

Component		SRM #	Prepared Concentration (µg/mL)
ClO_4	Perchlorate	Ind. Std.	1000

The gravimetric uncertainty for this product is ±0.24%.

The final solution was checked against an independent standard to verify its concentration.

We use the highest purity raw materials available to minimize impurity levels in the final solution. Typically 99.999%+ pure starting materials are used as well as ASTM Type I 18 megohm deionized water.

All solutions are filtered through a 0.2 µm filter prior to being bottled.

All glassware used in preparation is Class A and calibrated regularly.

All weights are traceable through NIST, Test No. 822-275872-11

All bottles are triple rinsed with deionized water prior to use.

Shake bottle prior to use and do not pipette directly out of the bottle. Use only cleaned Class A volumetric glassware.

We certify the accuracy of this standard to be ±0.5% of the stated value until its expiration date provided it is kept tightly capped and stored under the conditions stated above.

Certified By: Meigan O'Leary

Meigan O'Leary, Inorganic QC Manager

For use in routine laboratory analysis.

AccuStandard is accredited to ISO 17034, ISO/IEC 17025 and certified to ISO 9001:2015

QR-ORG/INO-001
Rev. 5/18

ULTRA SCIENTIFIC
Analytical Solutions

Certificate of Analysis

TRIPLE ISO CERTIFICATION ISO 9001 ISO 17025 ISO GUIDE 34 ULTRA

ISO Guide 34 Reference Material

Product Number: ICC-013
Lot Number: CP-0860

S 36748

Lot Issue Date: 29-Feb 2016
Expiration Date: 31-Mar 2020

Product Name: Perchlorate IC Standard

Description:
This Reference Material (RM) was gravimetrically prepared in accordance with ISO Guide 34 and under ULTRA Scientific's ISO 9001 registered quality system. The neat materials used for this product have been verified by ULTRA's ISO 17025 laboratory and under ULTRA's ISO Guide 34 accreditation. The analyte concentrations were verified by ULTRA's ISO 17025 accredited laboratory. For each analyte, the true value, with its uncertainty value calculated at the 95% confidence level, is reported below.

Analyte	Starting Material	Lot Number	Purity (%)	Calculated Value	True Value	Traceability & Method
perchlorate	potassium perchlorate	RM07987	100	1001 ± 5 µg/mL	976 ± 6 µg/mL	NIST SRM 3141A; ICP-OES

Solvent: water (low TOC, < 50 ppb)

Storage: Store at Room Temperature (15° to 30°C).

Traceability:
Traceability has been established through an unbroken chain of comparisons, each having stated uncertainties. Comparisons are based on appropriate physical or chemical measurements, including gravimetric or volumetric dilution, where the mass or volume of a solution before and after dilution is measured. The balances used for these measurements are calibrated with weights traceable to NIST in compliance with ANSI/NCSL Z-540-1, ISO 9001, ISO 17025, and ISO Guide 34. Calibrated Class A glassware is used for volumetric measurements. Thermometers are calibrated against a NIST traceable thermometer in accordance with NIST Special Publication 819.

Estimation of Uncertainties:
The true value is reported, with its uncertainty value calculated at the 95% confidence level.

Homogeneity:
This RM was formulated and unitized according to an in-house procedure and is guaranteed to be homogeneous. There is no minimum sub-sample size required.

Intended Use:
This RM is intended for the preparation of working reference samples for use in routine laboratory analyses, calibration of instruments, validation of analytical methods, assessments of measurement methods and continuing calibration verification.

Instructions for Use:
Sample aliquots for analysis should be withdrawn at 20°C to 25°C immediately after opening and should be processed without delay for the true value to be valid within the stated uncertainties. Do not pipet from the bottle. Do not return any material removed for pipetting to the bottle. Tightly cap the bottle after removing any material and store according to the instructions noted above.

Hazards:
Refer to the Safety Data Sheet for information regarding this RM.

Expiration of Certification:
The certification of this RM is valid, within the measurement uncertainty specified, until the expiration date specified above, provided the RM is handled and stored in accordance with the instructions given in this certificate. This certification is nullified if the RM is damaged, contaminated, or otherwise modified.

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER
ANAB ACCREDITED ISO/IEC 17025 TESTING LABORATORY

ISO 9001 Registered Quality System – TUV USA

ULTRA SCIENTIFIC
Analytical Solutions

Certificate of Analysis

ISO Guide 34 Reference Material

Product Number: ICC-013
Lot Number: CP-0860

Lot Issue Date: 29-Feb 2016
Expiration Date: 31-Mar 2020

Maintenance of Certification:
The real-time, long term stability of the RM may be monitored over the lifetime of the certification. If substantive changes occur that affect the certification before the expiration of this certificate, ULTRA Scientific will notify the purchaser.

Peter A. King, Ph.D.
VP, Technical Operations

Daniel J. Lamendola
Director of QA/RA

ANAB ACCREDITED ISO17034 REFERENCE MATERIAL PRODUCER

ANAB ACCREDITED ISO/IEC 17025 TESTING LABORATORY

ISO 9001 Registered Quality System – TUV USA

250 SMITH STREET • NORTH KINGSTOWN, RHODE ISLAND 02852 • WWW.ULTRASCI.COM

Cambridge Isotope Laboratories, Inc.

Certificate of Analysis

S 47863

Product Name: PERCHLORIC ACID, SODIUM SALT
(Isotopic Label & Enrichment Specification) (18O4, 90%+) 100 UG/ML IN WATER

Lot Number: SDIH-016

Catalog Number: OLM-7310-S

Product Information

Chemical Purity Specification:	≥ 98%
MW*: ** For isotopically labeled compounds, MW listed is for the fully enriched product.*	130.44
Labeled CAS Number:	NA
Unlabeled CAS Number:	7601-89-0
Chemical Formula:	NaCl*O4
Storage:	Store at room temperature away from light and moisture.
Stability:	See storage and expiration date.

$NaCl^{18}O_4$

Certification

Cambridge Isotope Laboratories, Inc. guarantees that this material meets or exceeds the specifications stated. Absolute identity as well as chemical and isotopic purities are assured by the use of unambiguous synthetic routes and multiple chemical analyses whenever possible. Results are representative of QC testing at time of release from Quality Control unless otherwise stated. CIL Certificates of Analysis are occasionally updated with new data following recertification. We recommend checking the website for the latest version.

Volumetric measurements were made with Class A glassware. Gravimetry is traceable to the NIST through calibrated balances and certified, calibrated, standard weights. The calibrations are traceable to the NIST under Test No. 822/270236-04. The calibrations also meet specifications outlined in ISO 9001, ISO/IEC 17025, ANSI/NSCL Z540-1-1994, NCR Document 10CFR50 Appendix B, and applicable subdocuments.

This COA references the bulk catalog number before packaging. The COA also applies to the CIL finished good catalog number . Some possible packaging sizes and their corresponding suffix are -1.2, -1, -0.5, -10, or -0.1.

Approved by: Sashi Sivendran-Basak

Sashi Sivendran-Basak, Ph.D., Quality Review

Quality Control Tests and Results

QC Release Date	12/05/2018
Expiration Date	12/05/2028
Concentration Based on Gravimetry	100.0 ± 1.0 µg/mL (k=2)
Chemical Purity of Neat Material(s)	98%
LC/MS for Concentration	105.4 ± 1.1 µg/mL (k=2)



ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Raw Data

Batch Report: C:\HPCHEM\1\DATA\22NOV19D\22NOV19S.B

Batch Review Method:
C:\HPCHEM\1\METHODS\CLO4-DP3.M

['#' ==> Run has not been reprocessed with Batch Review Method
'*' ==> Run has been saved with batch file]

#*	Sample	Location	Inj	SampleType	Run	Perchlorate Area	Perchlorat RT	Perchlorate Amount
*	685438 CCV@25	Vial 71	1	Control	1	1.18387e6	7.449	24.67940
*	685439 QC@3.0	Vial 72	1	Control	2	1.54064e5	7.386	2.91840
*	685441 ICS@3.0	Vial 73	1	Control	3	8.60264e4	7.254	2.21034
*	685442 LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1932283001	Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	1932284001	Vial 76	1	Sample	6	0.00000	0.000	0.00000
*	1932284002	Vial 77	1	Sample	7	0.00000	0.000	0.00000
*	1932284003	Vial 78	1	Sample	8	3.39907e5	7.111	6.60218
*	1932284004	Vial 79	1	Sample	9	3.51318e5	7.127	7.40859
*	1932284005	Vial 80	1	Sample	10	0.00000	0.000	0.00000
*	1932284006 10X	Vial 81	1	Sample	11	3.45930e5	7.327	83.07076
*	1932284008 1K	Vial 83	1	Sample	13	3.33136e5	7.511	7986.47256
*	1932284009 1K	Vial 84	1	Sample	14	2.24426e6	7.566	4.73695e4
*	685443 CCV@25	Vial 71	1	Control	15	1.08713e6	7.452	23.36377
*	1932284010 1K	Vial 85	1	Sample	16	2.57913e6	7.503	4.25987e4
*	1932352001	Vial 86	1	Sample	17	8.45132e4	7.334	1.64039
*	1932352002	Vial 87	1	Sample	18	0.00000	0.000	0.00000
*	1932352003 1K	Vial 88	1	Sample	19	2.46586e5	7.620	4887.02652
*	1932352004	Vial 89	1	Sample	20	0.00000	0.000	0.00000
*	1932352005 MS	Vial 90	1	Sample	21	1.31208e5	7.056	3.28992
*	1932352006 MSD	Vial 91	1	Sample	22	1.21739e5	6.973	3.05088
*	1932284007 100	Vial 92	1	Sample	23	2.00097e6	7.508	4344.98594
*	685444 CCV@25	Vial 71	1	Control	24	1.01321e6	7.528	23.41845

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount
*	685438 CCV@25	Vial 71	1	Control	1	1.64125e5	7.468	5.00000
*	685439 QC@3.0	Vial 72	1	Control	2	1.94166e5	7.409	5.00000
*	685441 ICS@3.0	Vial 73	1	Control	3	1.42348e5	7.286	5.00000
*	685442 LMB	Vial 74	1	Control	4	1.76890e5	7.423	5.00000
*	1932283001	Vial 75	1	Sample	5	1.50033e5	7.238	5.00000
*	1932284001	Vial 76	1	Sample	6	1.75095e5	7.088	5.00000
*	1932284002	Vial 77	1	Sample	7	1.69527e5	7.355	5.00000
*	1932284003	Vial 78	1	Sample	8	1.89098e5	7.138	5.00000
*	1932284004	Vial 79	1	Sample	9	1.73764e5	7.145	5.00000
*	1932284005	Vial 80	1	Sample	10	1.68474e5	7.001	5.00000
*	1932284006 10X	Vial 81	1	Sample	11	1.52150e5	7.348	50.00000
*	1932284008 1K	Vial 83	1	Sample	13	1.52567e5	7.535	5000.00000
*	1932284009 1K	Vial 84	1	Sample	14	1.48043e5	7.591	5000.00000
*	685443 CCV@25	Vial 71	1	Control	15	1.60069e5	7.476	5.00000
*	1932284010 1K	Vial 85	1	Sample	16	1.92723e5	7.534	5000.00000
*	1932352001	Vial 86	1	Sample	17	1.86562e5	7.360	5.00000
*	1932352002	Vial 87	1	Sample	18	1.64477e5	7.141	5.00000
*	1932352003 1K	Vial 88	1	Sample	19	1.85984e5	7.653	5000.00000
*	1932352004	Vial 89	1	Sample	20	1.67521e5	7.041	5.00000
*	1932352005 MS	Vial 90	1	Sample	21	1.46896e5	7.077	5.00000
*	1932352006 MSD	Vial 91	1	Sample	22	1.46852e5	6.990	5.00000
*	1932284007 100	Vial 92	1	Sample	23	1.46105e5	7.536	500.00000
*	685444 CCV@25	Vial 71	1	Control	24	1.48803e5	7.553	5.00000

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
*	685438 CCV@25	Vial 71	1	Control	1	3.62557e5	7.464	24.77392
*	685439 QC@3.0	Vial 72	1	Control	2	4.98007e4	7.424	3.00461

Batch Report: C:\HPCHEM\1\DATA\22NOV19D\22NOV19S.B

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
*	685441 ICS@3.0	Vial 73	1	Control	3	3.55197e4	7.263	2.91970
*	685442 LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1932283001	Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	1932284001	Vial 76	1	Sample	6	0.00000	0.000	0.00000
*	1932284002	Vial 77	1	Sample	7	0.00000	0.000	0.00000
*	1932284003	Vial 78	1	Sample	8	1.13127e5	7.120	7.10077
*	1932284004	Vial 79	1	Sample	9	1.17024e5	7.135	7.98367
*	1932284005	Vial 80	1	Sample	10	0.00000	0.000	0.00000
*	1932284006 10X	Vial 81	1	Sample	11	1.11676e5	7.348	86.89341
*	1932284008 1K	Vial 83	1	Sample	13	1.02889e5	7.529	7994.43215
*	1932284009 1K	Vial 84	1	Sample	14	6.95779e5	7.584	4.83298e4
*	685443 CCV@25	Vial 71	1	Control	15	3.40343e5	7.472	23.92121
*	1932284010 1K	Vial 85	1	Sample	16	7.87731e5	7.521	4.28684e4
*	1932352001	Vial 86	1	Sample	17	2.73332e4	7.346	1.65533
*	1932352002	Vial 87	1	Sample	18	0.00000	0.000	0.00000
*	1932352003 1K	Vial 88	1	Sample	19	7.88807e4	7.651	5031.65245
*	1932352004	Vial 89	1	Sample	20	0.00000	0.000	0.00000
*	1932352005 MS	Vial 90	1	Sample	21	4.82831e4	7.074	3.88198
*	1932352006 MSD	Vial 91	1	Sample	22	4.25685e4	6.990	3.41115
*	1932284007 100	Vial 92	1	Sample	23	6.21132e5	7.526	4434.86232
*	685444 CCV@25	Vial 71	1	Control	24	3.26599e5	7.551	24.62821

*** End of Report ***

Sequence: C:\HPCHEM\1\SEQUENCE\CLO4\2019\NOV\22NOV19D.S

Sequence Table:

Method and Injection Info Part:

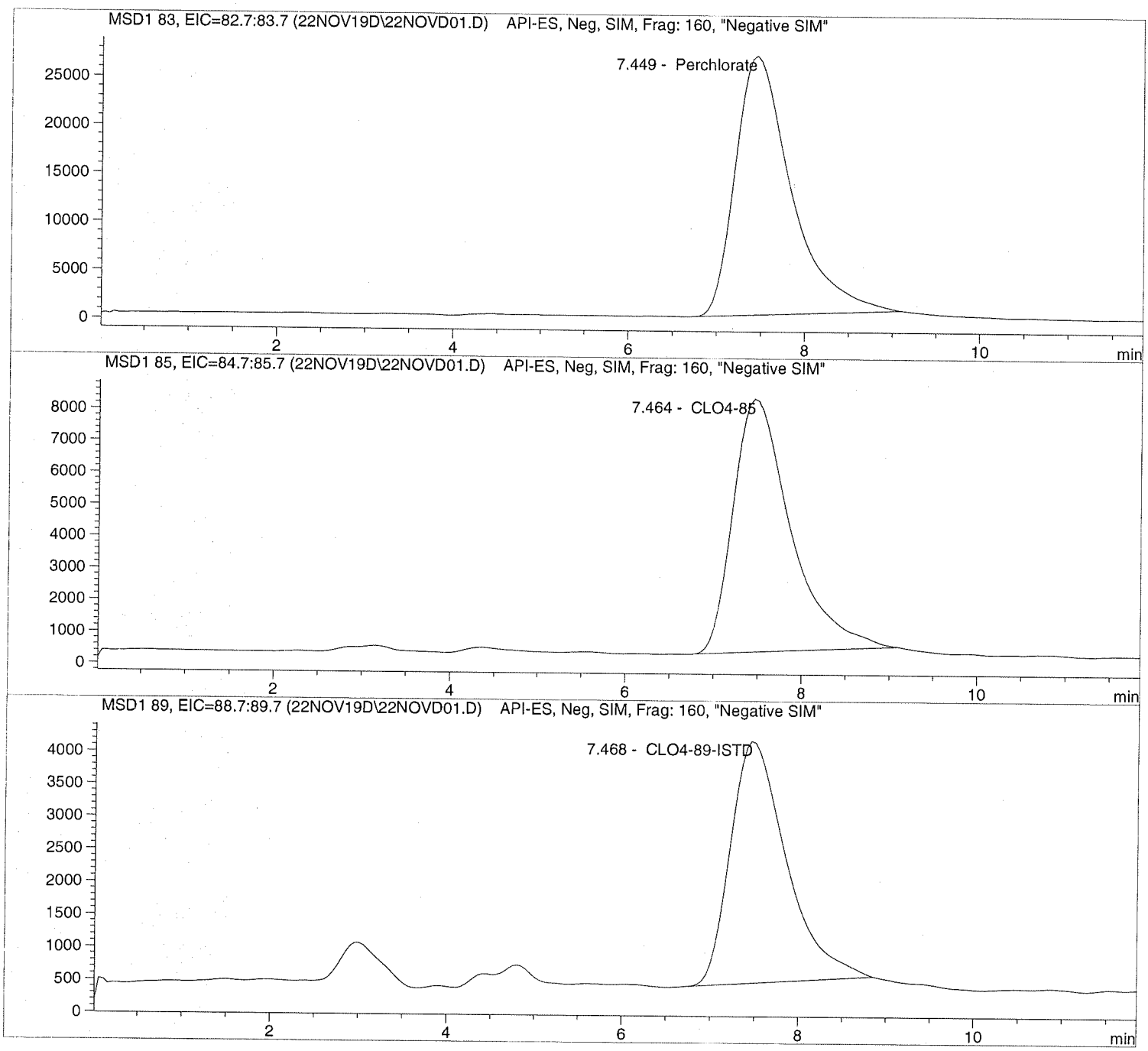
Line	Location	SampleName		Method	Inj	SampleType	InjVolume	DataFile
1	Vial 71	685438	CCV@25	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	685439	QC@3.0	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	685441	ICS@3.0	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	685442	LMB	CLO4-AQN	1	Ctrl Samp		
5	Vial 75	1932283001		CLO4-AQN	1	Sample		
6	Vial 76	1932284001		CLO4-AQN	1	Sample		
7	Vial 77	1932284002		CLO4-AQN	1	Sample		
8	Vial 78	1932284003		CLO4-AQN	1	Sample		
9	Vial 79	1932284004		CLO4-AQN	1	Sample		
10	Vial 80	1932284005		CLO4-AQN	1	Sample		
11	Vial 81	1932284006	10X	CLO4-AQN	1	Sample		
12	Vial 82	1932284007	1K	CLO4-AQN	1	Sample		
13	Vial 83	1932284008	1K	CLO4-AQN	1	Sample		
14	Vial 84	1932284009	1K	CLO4-AQN	1	Sample		
15	Vial 71	685443	CCV@25	CLO4-AQN	1	Ctrl Samp		
16	Vial 85	1932284010	1K	CLO4-AQN	1	Sample		
17	Vial 86	1932352001		CLO4-AQN	1	Sample		
18	Vial 87	1932352002		CLO4-AQN	1	Sample		
19	Vial 88	1932352003	1K	CLO4-AQN	1	Sample		
20	Vial 89	1932352004		CLO4-AQN	1	Sample		
21	Vial 90	1932352005	MS	CLO4-AQN	1	Sample		
22	Vial 91	1932352006	MSD	CLO4-AQN	1	Sample		
23	Vial 92	1932284007	100	CLO4-AQN	1	Sample		
24	Vial 71	685444	CCV@25	CLO4-AQN	1	Ctrl Samp		

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD01.D Sample Name: 685438 CCV@25

Injection Date:	11/22/2019 08:07:39	Seq Line:	1
Sample Name:	685438 CCV@25	Location:	Vial 71
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD01.D Sample Name: 685438 CCV@25

Injection Date:	11/22/2019 08:07:39	Seq Line:	1
Sample Name:	685438 CCV@25	Location:	Vial 71
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method:	CLO4-AQN.M
Analysis Method:	C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed:	11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	25.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.449	PBA	1183865.7	24.6794	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.464	PBA	362557.4	24.7739	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.468	PBA	164125.4	5.0000	CLO4-89-ISTD

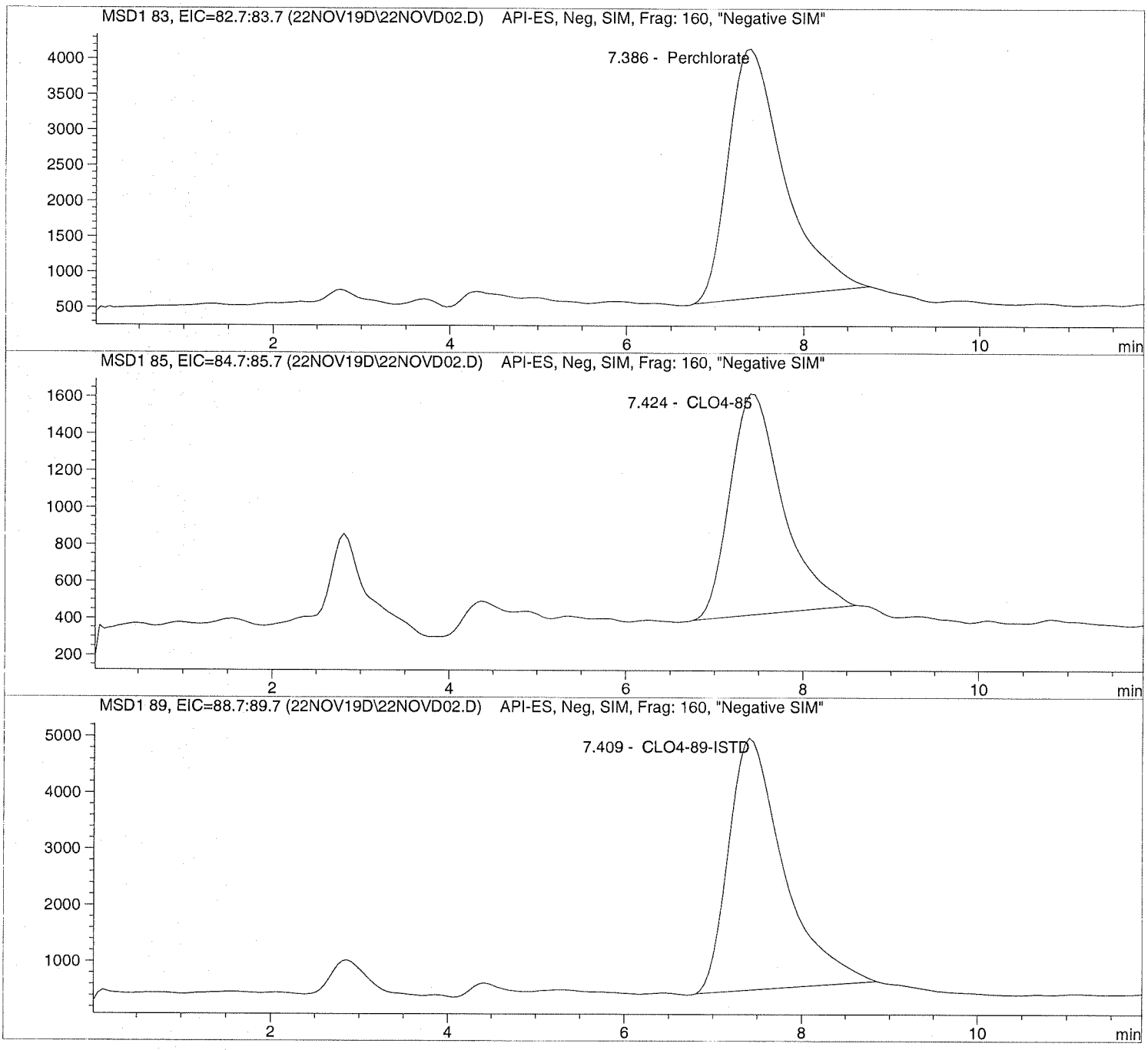
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD02.D Sample Name: 685439 QC@3.0

Injection Date:	11/22/2019 08:23:13	Seq Line:	2
Sample Name:	685439 QC@3.0	Location:	Vial 72
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD02.D Sample Name: 685439 QC@3.0

Injection Date:	11/22/2019 08:23:13	Seq Line:	2
Sample Name:	685439 QC@3.0	Location:	Vial 72
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Mon, 23. Sep. 2019,00:20:59 pm
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 3.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.386	PBA	154063.9	2.9184	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.424	PBA	49800.7	3.0046	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.409	PBA	194166.2	5.0000	CLO4-89-ISTD

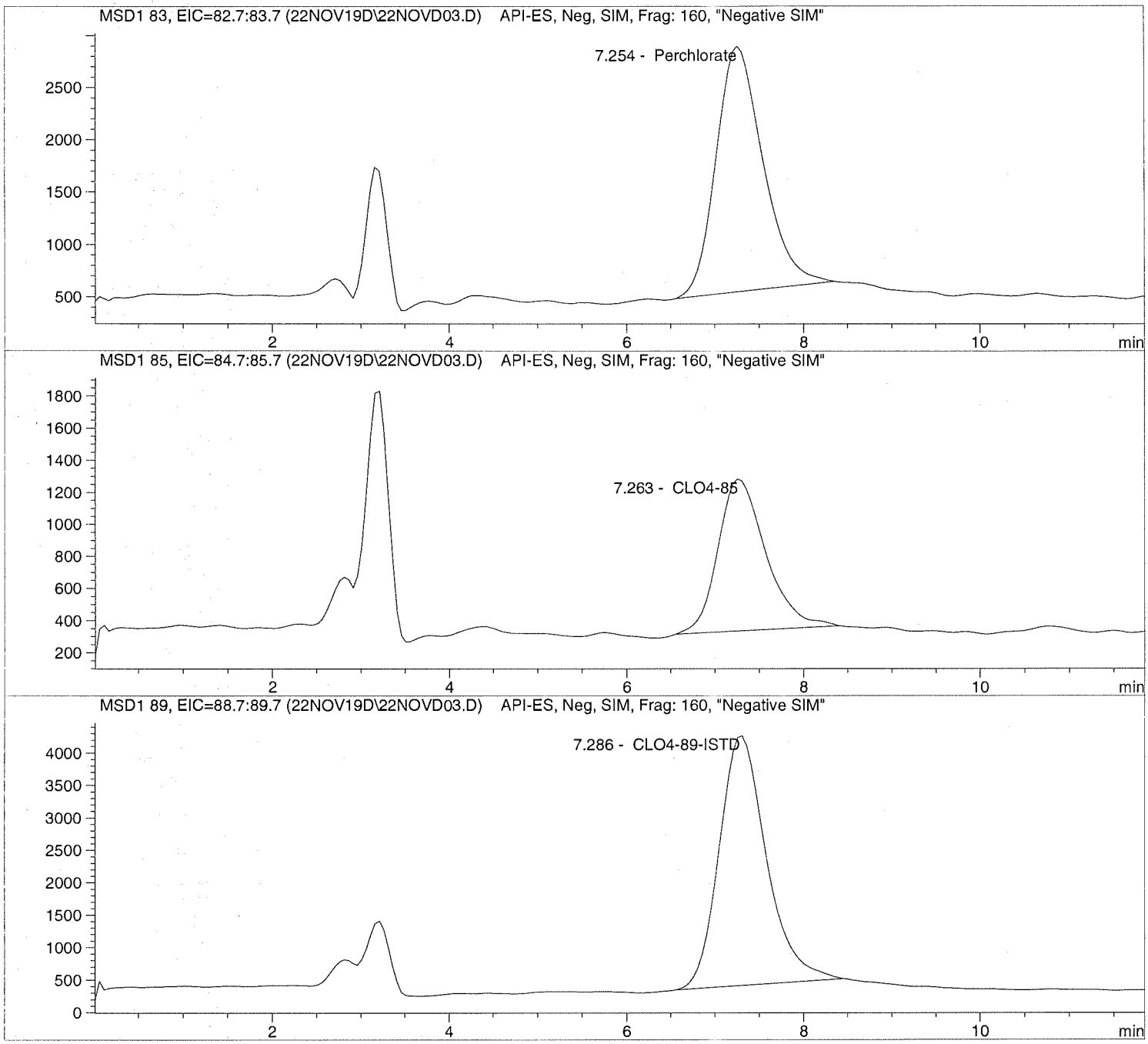
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD03.D Sample Name: 685441 ICS@3.0

Injection Date:	11/22/2019 08:37:06	Seq Line:	3
Sample Name:	685441 ICS@3.0	Location:	Vial 73
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD03.D Sample Name: 685441 ICS@3.0

Injection Date:	11/22/2019 08:37:06	Seq Line:	3
Sample Name:	685441 ICS@3.0	Location:	Vial 73
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	3.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.254	PBA	86026.4	2.2103	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.263	BBA	35519.7	2.9197	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.286	PBA	142348.3	5.0000	CLO4-89-ISTD

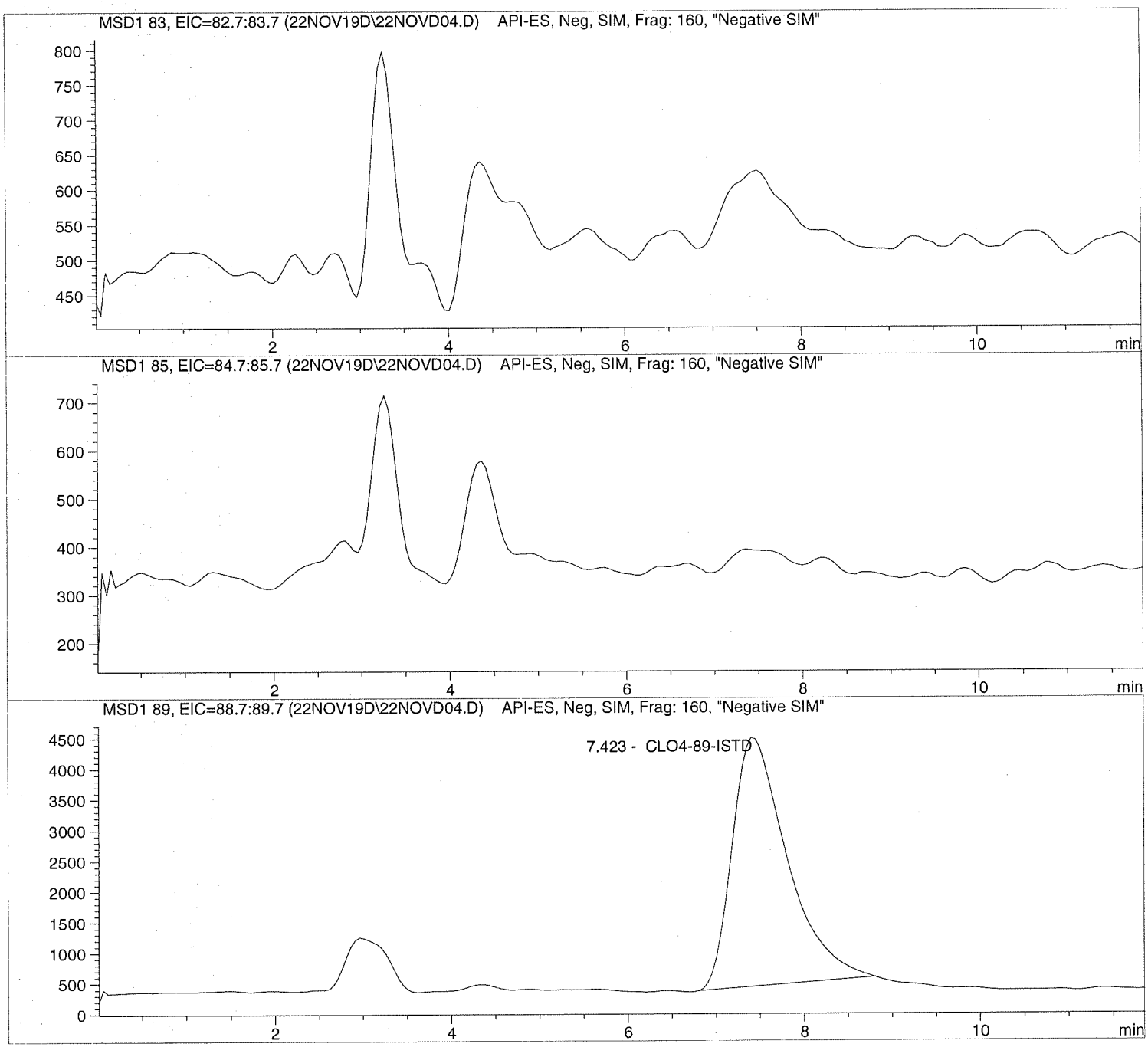
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD04.D Sample Name: 685442 LMB

Injection Date:	11/22/2019 08:51:01	Seq Line:	4
Sample Name:	685442 LMB	Location:	Vial 74
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD04.D Sample Name: 685442 LMB

Injection Date:	11/22/2019 08:51:01	Seq Line:	4
Sample Name:	685442 LMB	Location:	Vial 74
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.423	PBA	176890.3	5.0000	CLO4-89-ISTD

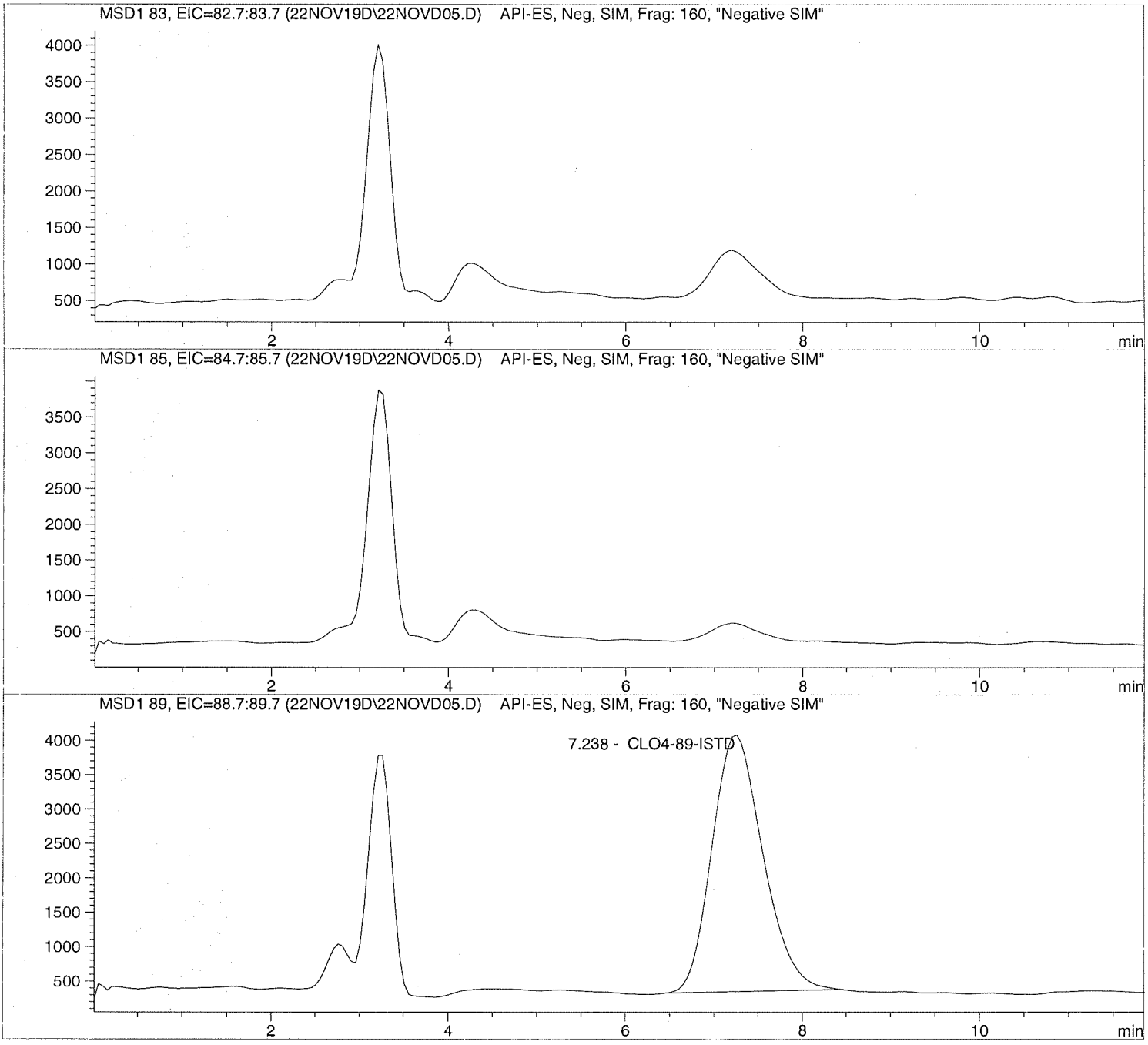
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Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD05.D Sample Name: 1932283001

Injection Date:	11/22/2019 09:12:41	Seq Line:	5
Sample Name:	1932283001	Location:	Vial 75
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD05.D Sample Name: 1932283001

Injection Date:	11/22/2019 09:12:41	Seq Line:	5
Sample Name:	1932283001	Location:	Vial 75
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.238	PBA	150033.3	5.0000	CLO4-89-ISTD

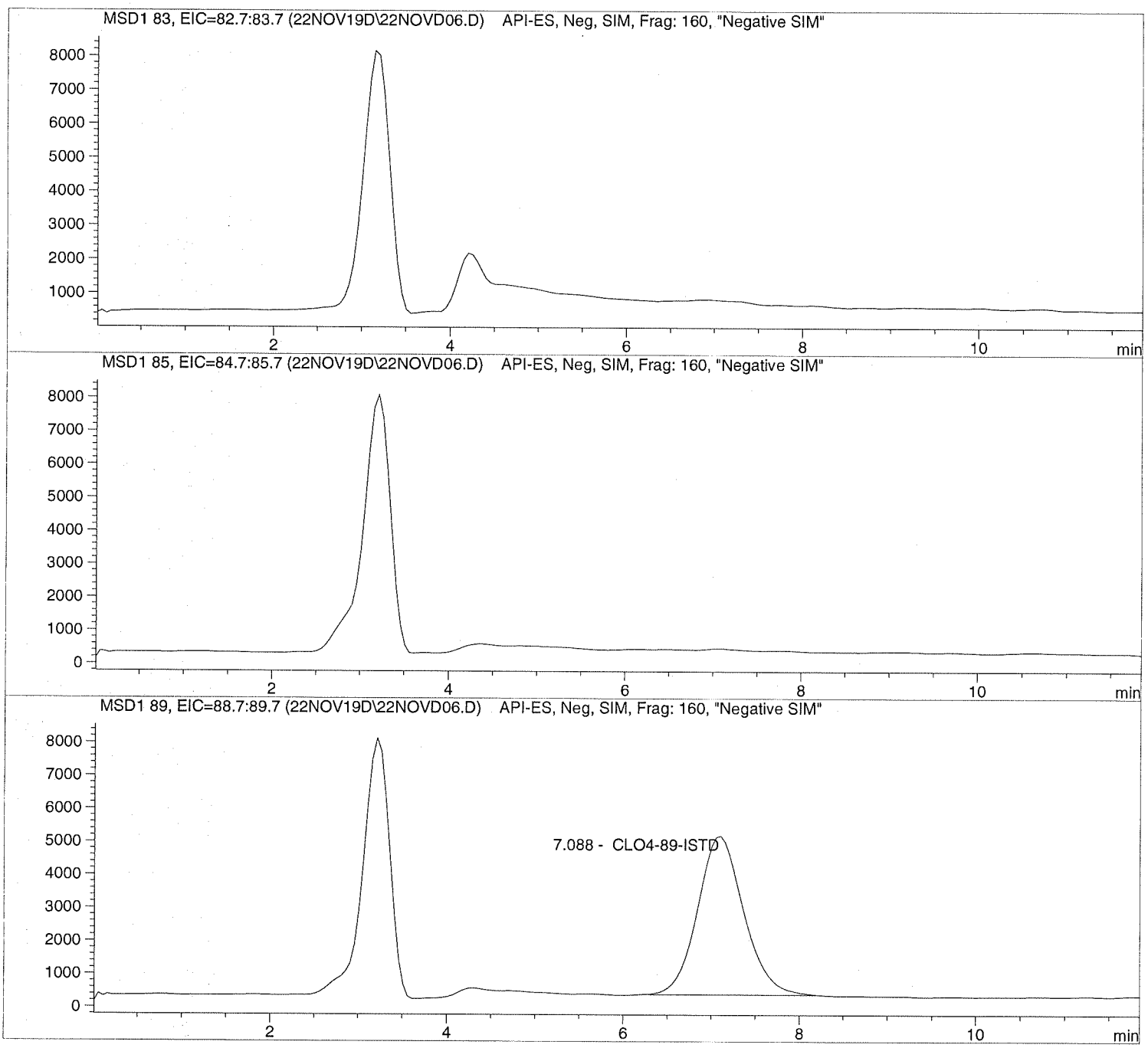
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD06.D Sample Name: 1932284001

Injection Date:	11/22/2019 09:26:34	Seq Line:	6
Sample Name:	1932284001	Location:	Vial 76
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD06.D Sample Name: 1932284001

Injection Date:	11/22/2019 09:26:34	Seq Line:	6
Sample Name:	1932284001	Location:	Vial 76
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method:	CLO4-AQN.M
Analysis Method:	C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed:	11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.088	BBA	175095.0	5.0000	CLO4-89-ISTD

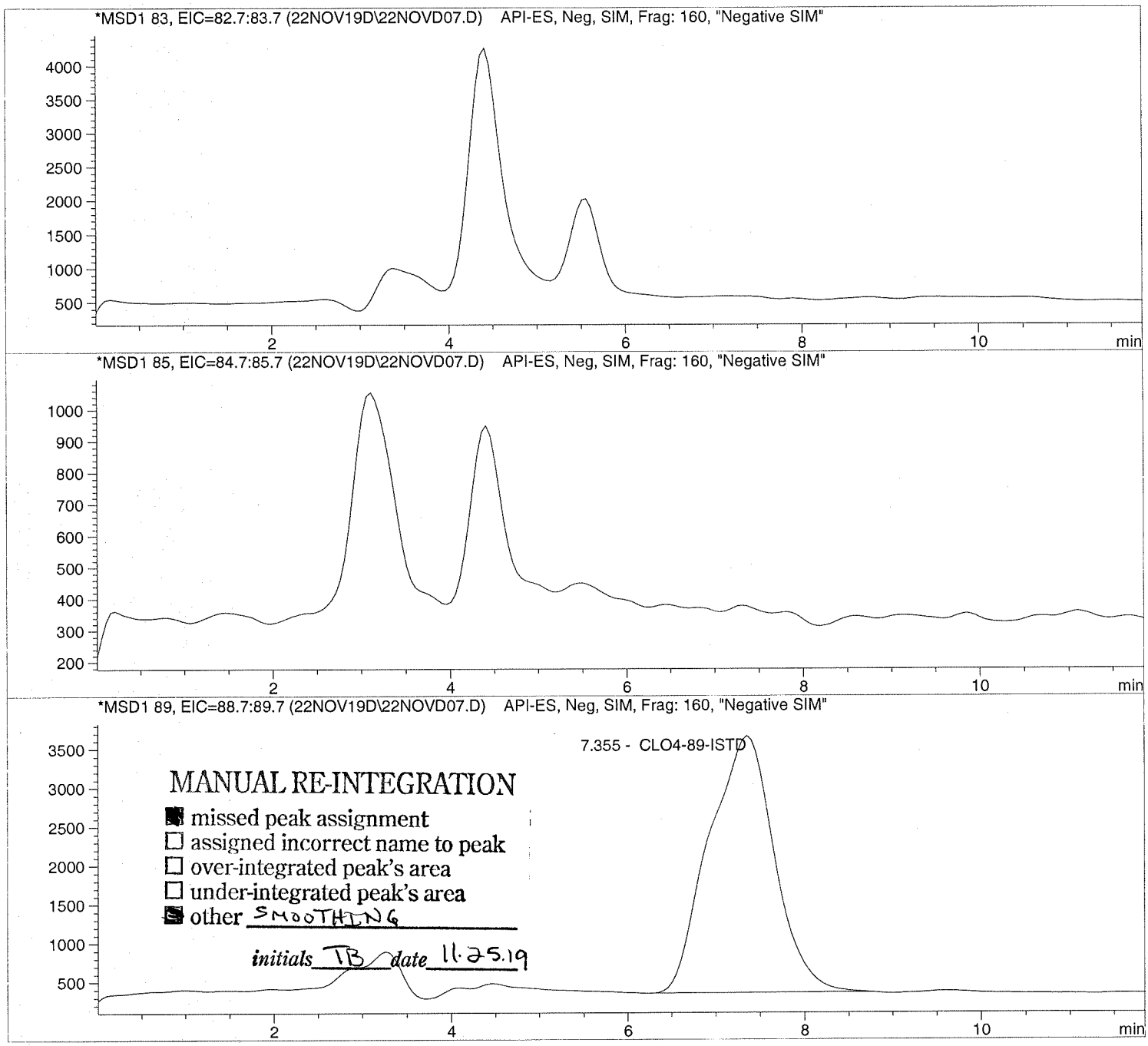
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Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD07.D Sample Name: 1932284002

Injection Date:	11/22/2019 09:55:02	Seq Line:	7
Sample Name:	1932284002	Location:	Vial 77
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD07.D Sample Name: 1932284002

Injection Date:	11/22/2019 09:55:02	Seq Line:	7
Sample Name:	1932284002	Location:	Vial 77
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.355	PBA	169526.6	5.0000	CLO4-89-ISTD

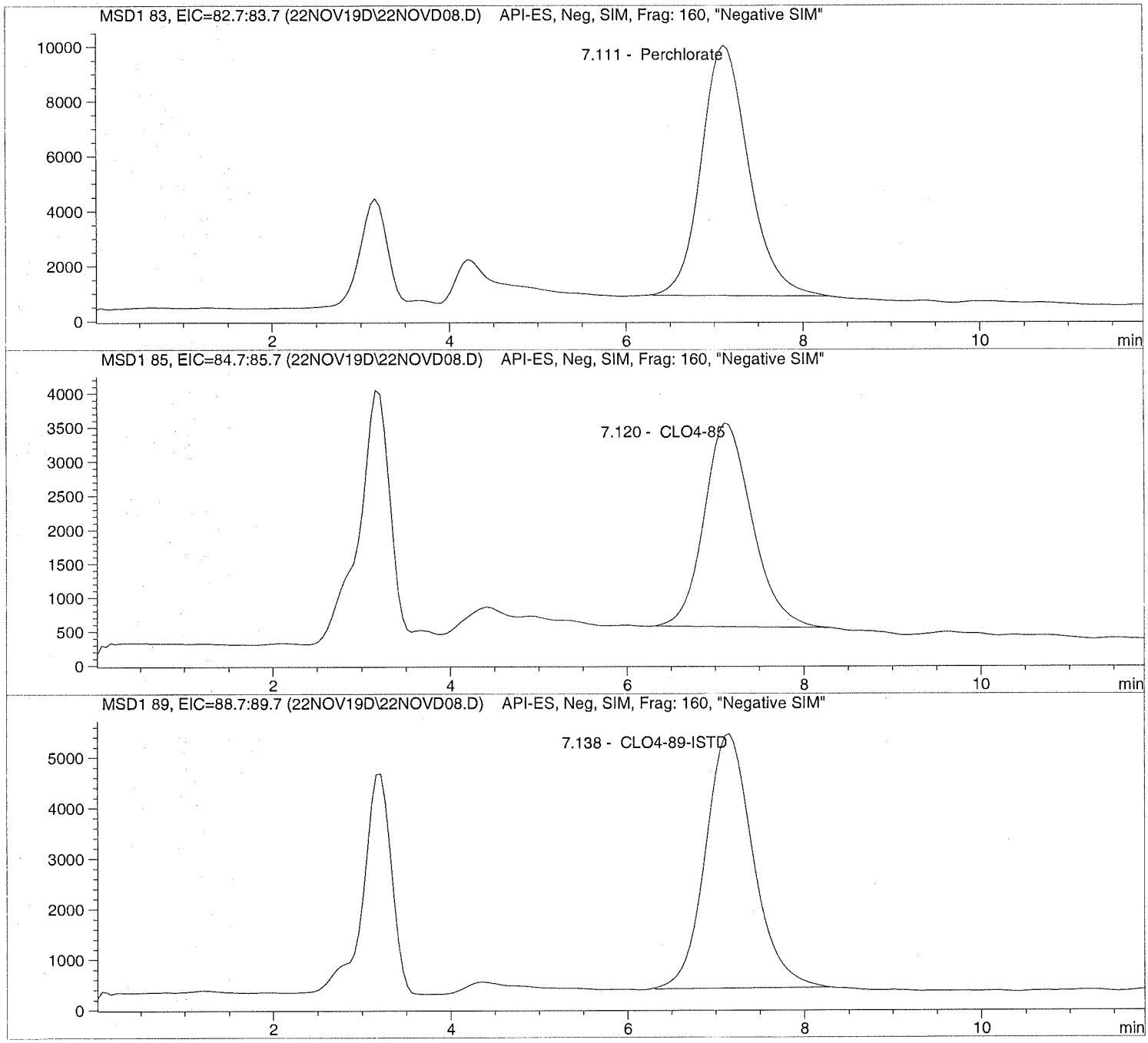
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD08.D Sample Name: 1932284003

Injection Date:	11/22/2019 10:08:56	Seq Line:	8
Sample Name:	1932284003	Location:	Vial 78
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD08.D Sample Name: 1932284003

Injection Date:	11/22/2019 10:08:56	Seq Line:	8
Sample Name:	1932284003	Location:	Vial 78
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.111	BBA	339906.7	6.6022	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.120	PBA	113127.0	7.1008	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.138	PBA	189097.7	5.0000	CLO4-89-ISTD

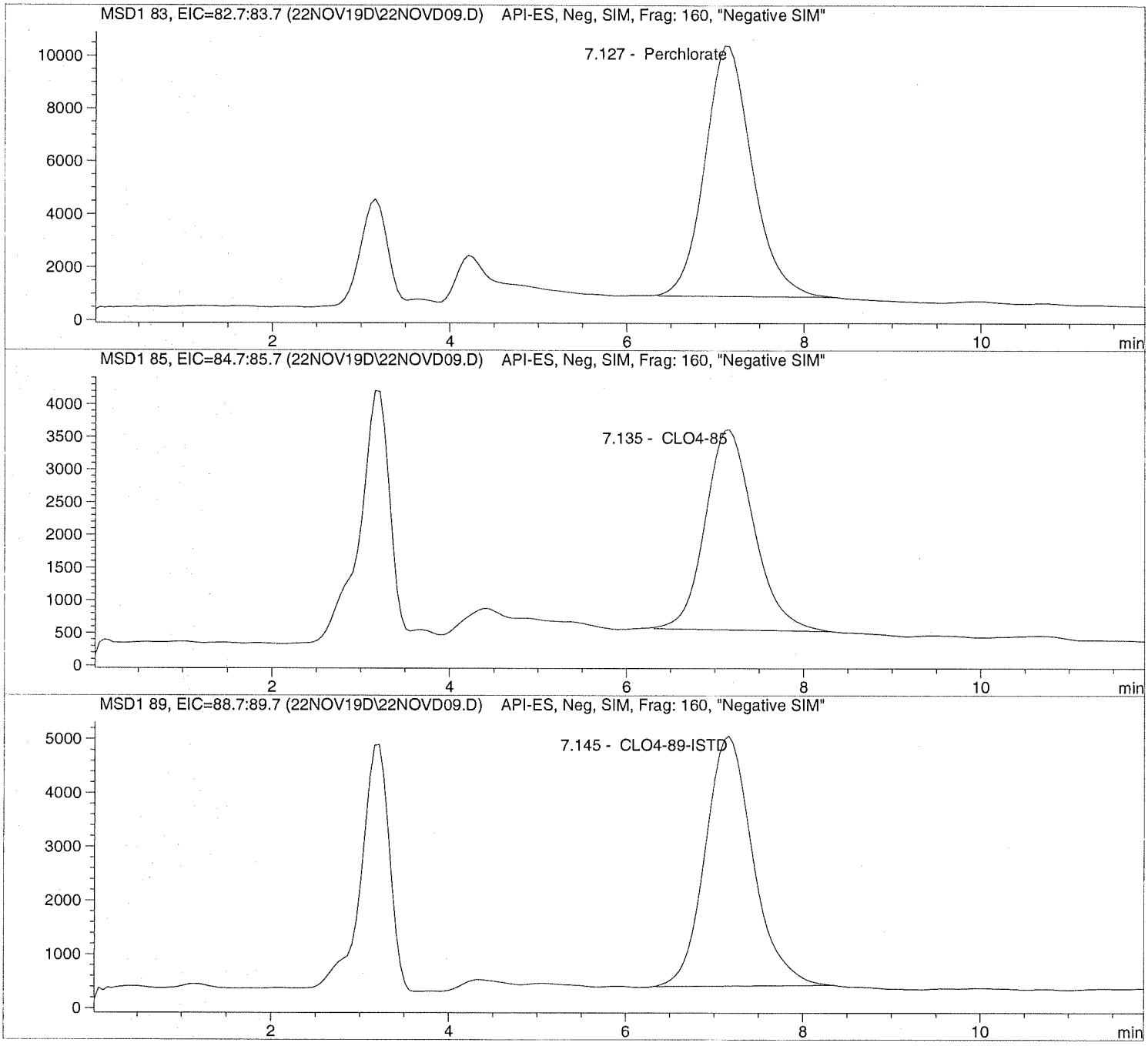
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD09.D Sample Name: 1932284004

Injection Date:	11/22/2019 10:22:49	Seq Line:	9
Sample Name:	1932284004	Location:	Vial 79
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD09.D Sample Name: 1932284004

Injection Date:	11/22/2019 10:22:49	Seq Line:	9
Sample Name:	1932284004	Location:	Vial 79
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.127	BBA	351317.6	7.4086	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.135	BBA	117024.3	7.9837	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.145	PBA	173763.9	5.0000	CLO4-89-ISTD

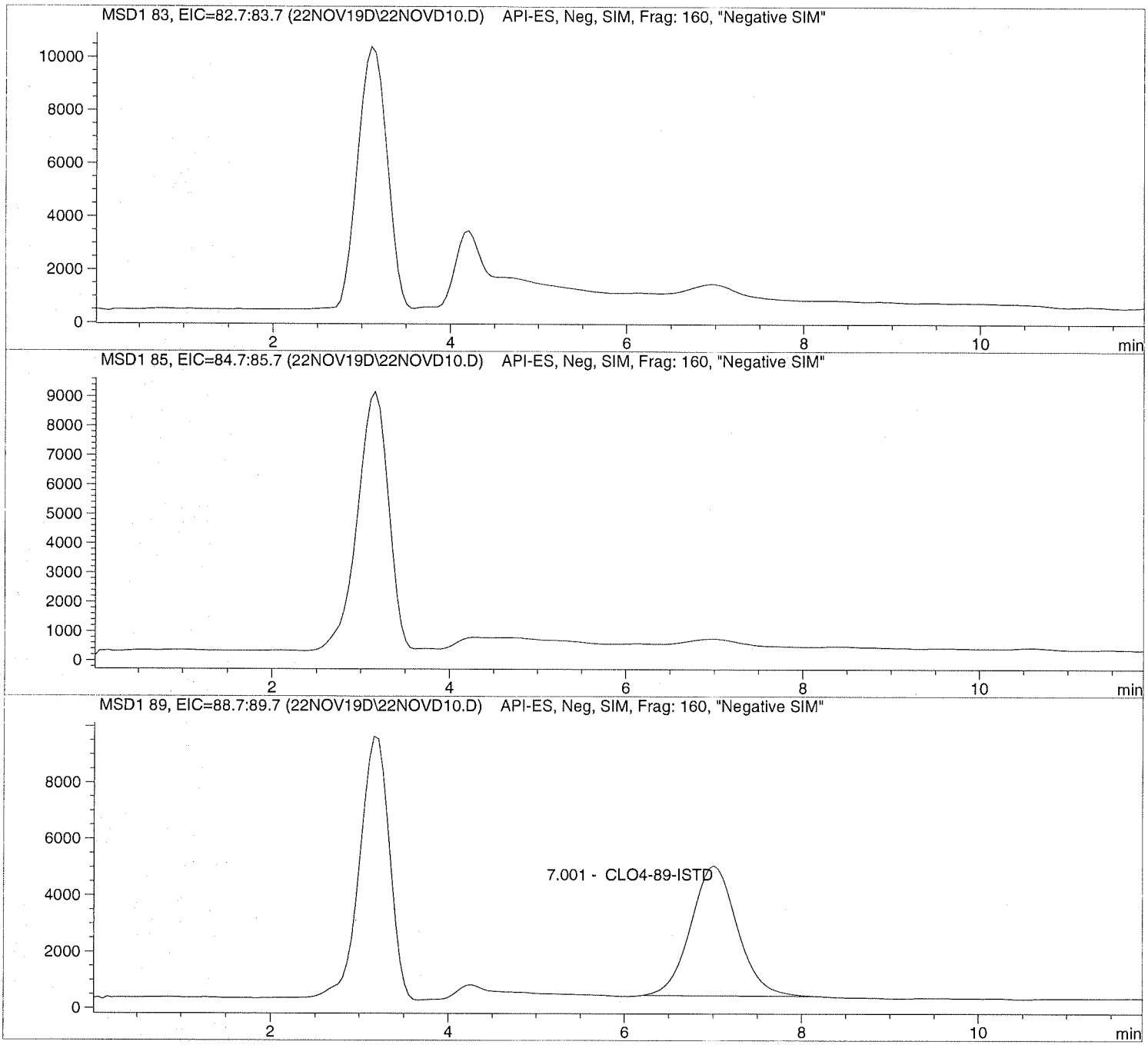
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD10.D Sample Name: 1932284005

Injection Date:	11/22/2019 10:36:43	Seq Line:	10
Sample Name:	1932284005	Location:	Vial 80
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD10.D Sample Name: 1932284005

Injection Date:	11/22/2019 10:36:43	Seq Line:	10
Sample Name:	1932284005	Location:	Vial 80
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.001	BBA	168474.5	5.0000	CLO4-89-ISTD

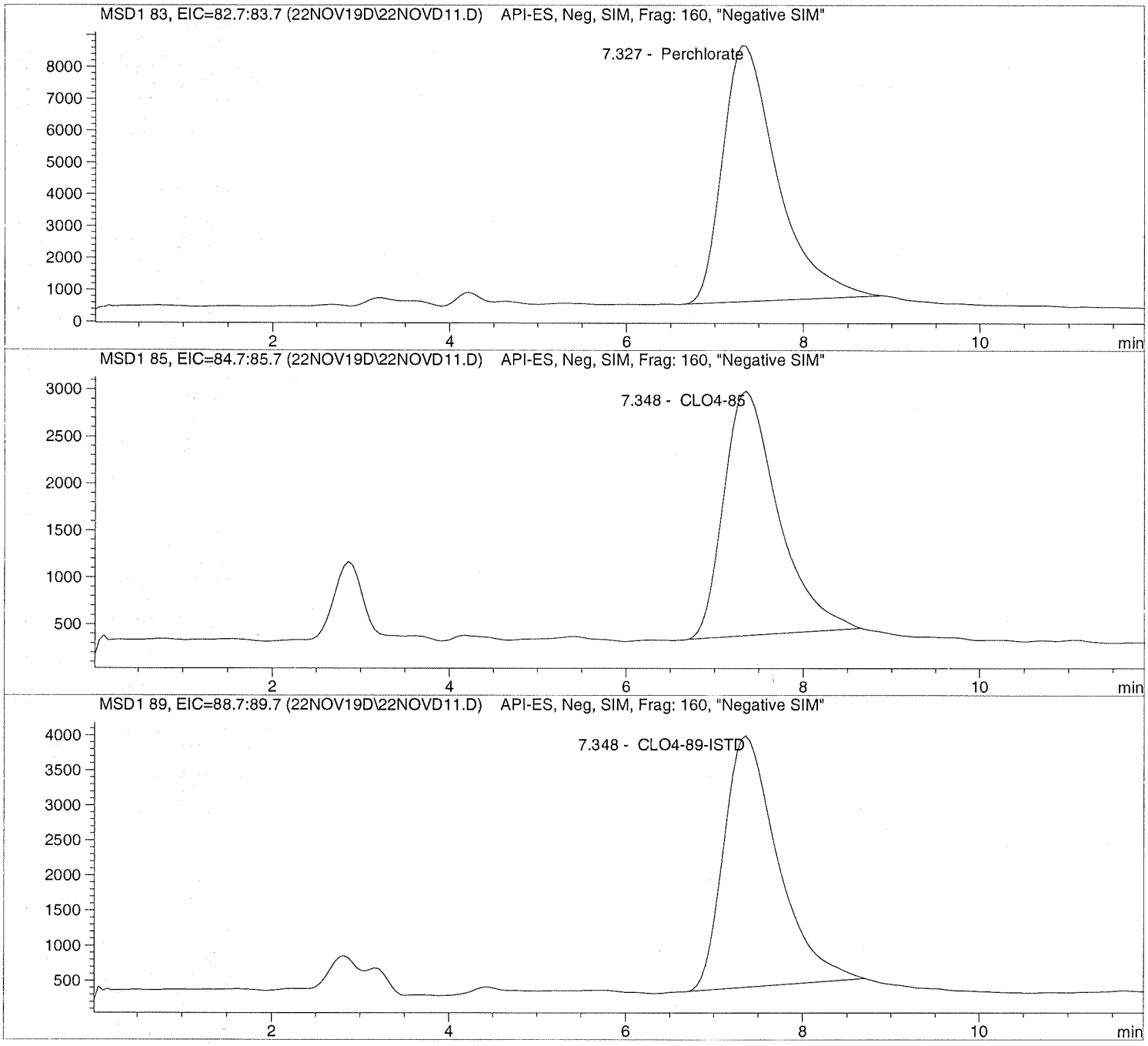
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD11.D Sample Name: 1932284006 10X

Injection Date:	11/22/2019 10:50:36	Seq Line:	11
Sample Name:	1932284006 10X	Location:	Vial 81
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD11.D Sample Name: 1932284006 10X

Injection Date:	11/22/2019 10:50:36	Seq Line:	11
Sample Name:	1932284006 10X	Location:	Vial 81
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method:	CLO4-AQN.M
Analysis Method:	C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed:	11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	10.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.327	PBA	345930.0	83.0708	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.348	PBA	111675.8	86.8934	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.348	PBA	152149.8	50.0000	CLO4-89-ISTD

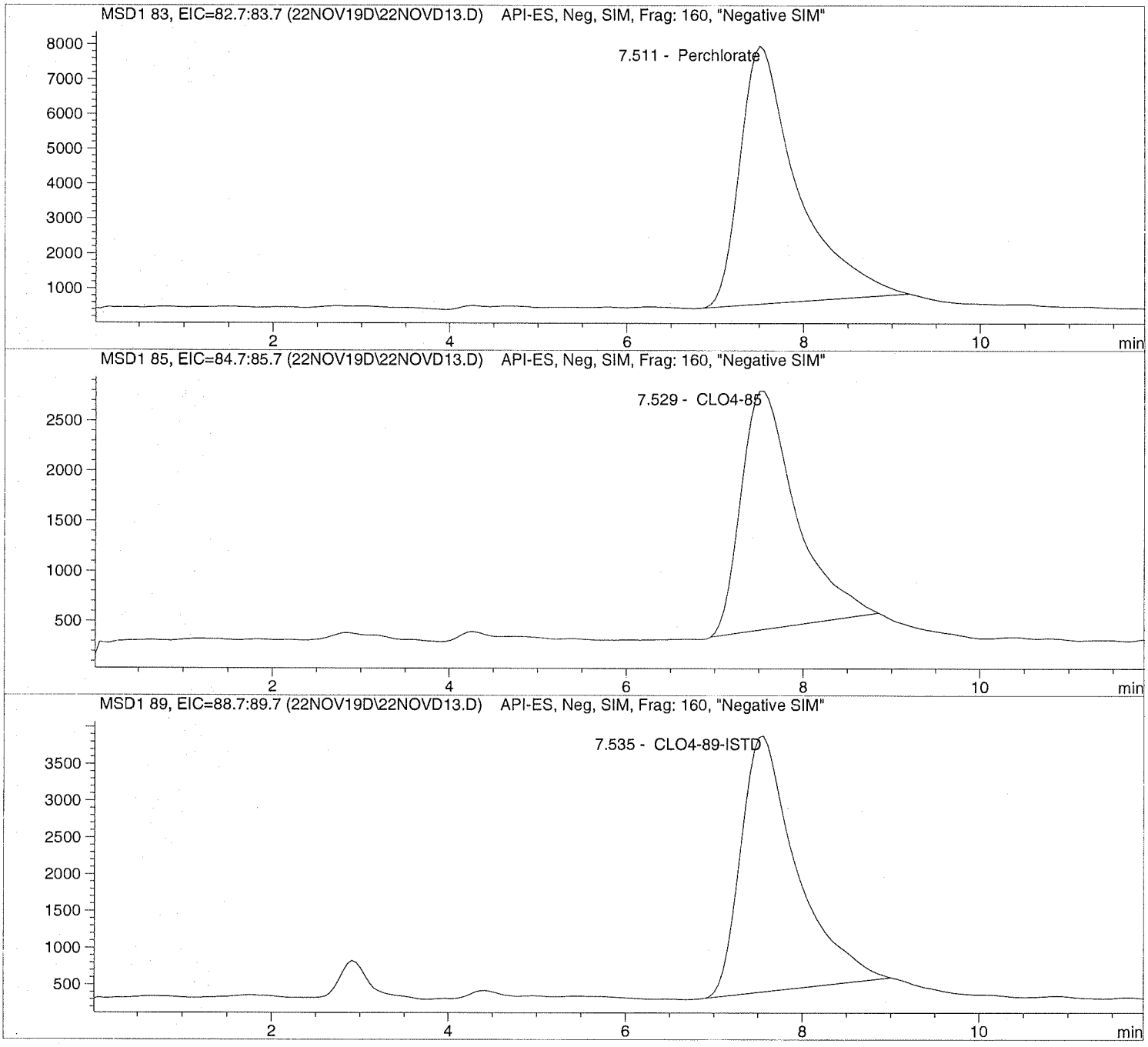
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD13.D Sample Name: 1932284008 1K

Injection Date:	11/22/2019 11:18:19	Seq Line:	13
Sample Name:	1932284008 1K	Location:	Vial 83
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD13.D Sample Name: 1932284008 1K

Injection Date:	11/22/2019 11:18:19	Seq Line:	13
Sample Name:	1932284008 1K	Location:	Vial 83
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1000.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.511	PBA	333135.6	7986.4726	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.529	PBA	102889.4	7994.4321	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.535	PBA	152567.1	5000.0000	CLO4-89-ISTD

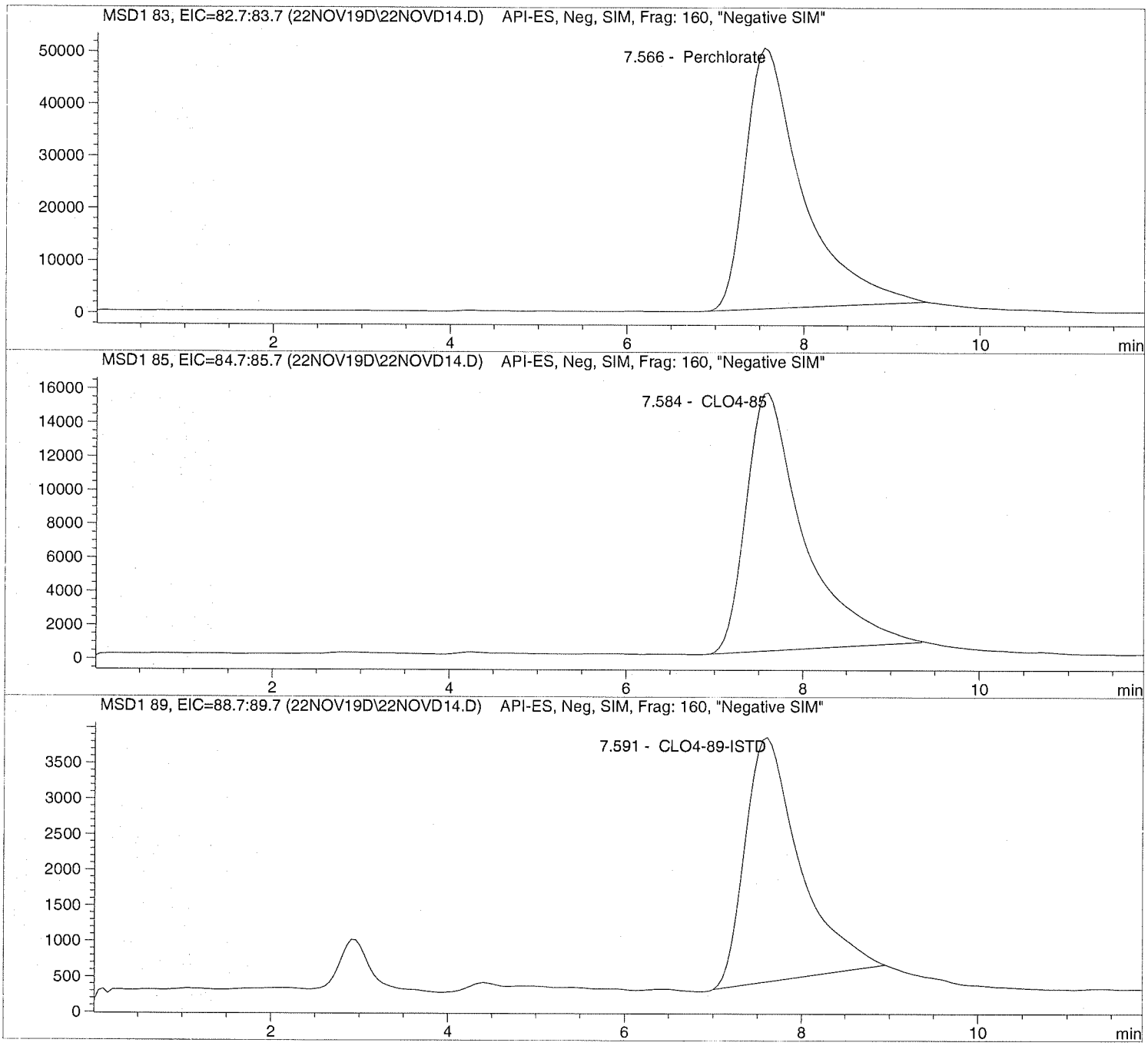
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD14.D Sample Name: 1932284009 1K

Injection Date:	11/22/2019 11:32:09	Seq Line:	14
Sample Name:	1932284009 1K	Location:	Vial 84
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD14.D Sample Name: 1932284009 1K

Injection Date:	11/22/2019 11:32:09	Seq Line:	14
Sample Name:	1932284009 1K	Location:	Vial 84
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1000.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.566	PBA	2244256.0	47369.5432	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.584	PBA	695778.6	48329.8011	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.591	PBA	148042.5	5000.0000	CLO4-89-ISTD

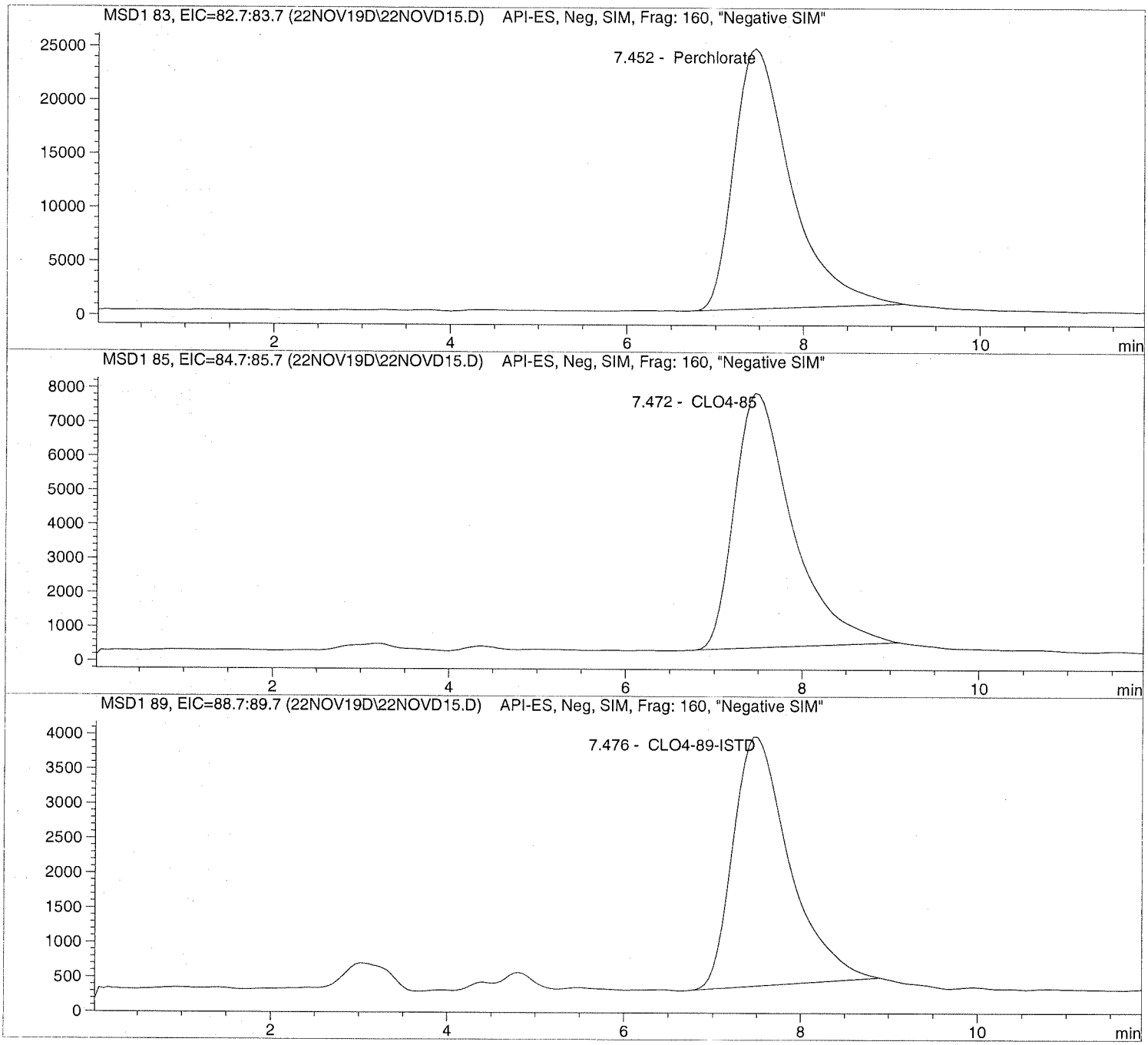
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD15.D Sample Name: 685443 CCV@25

Injection Date:	11/22/2019 11:46:00	Seq Line:	15
Sample Name:	685443 CCV@25	Location:	Vial 71
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD15.D Sample Name: 685443 CCV@25

Injection Date:	11/22/2019 11:46:00	Seq Line:	15
Sample Name:	685443 CCV@25	Location:	Vial 71
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	25.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.452	PBA	1087130.5	23.3638	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.472	PBA	340342.8	23.9212	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.476	PBA	160068.6	5.0000	CLO4-89-ISTD

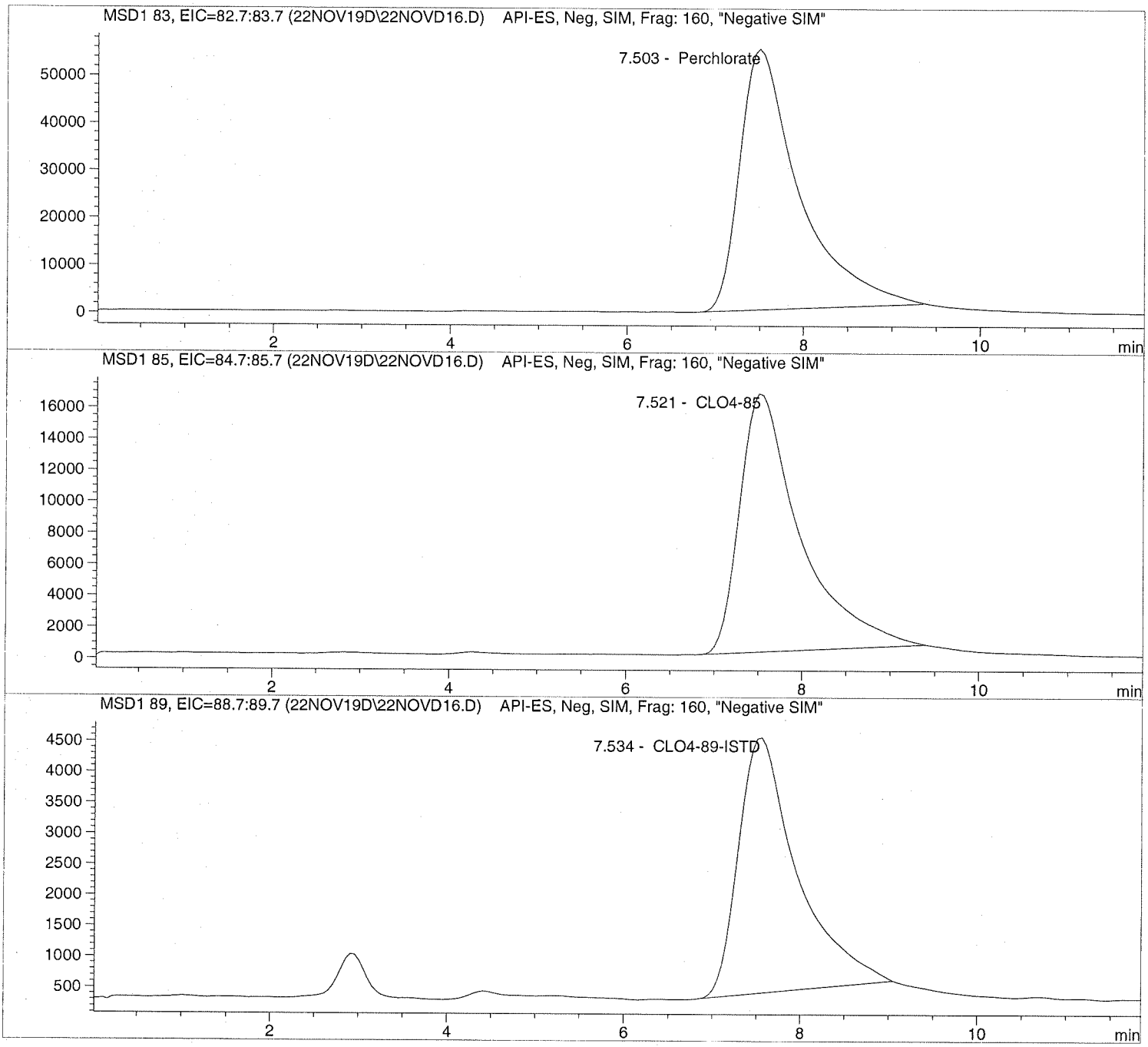
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD16.D Sample Name: 1932284010 1K

Injection Date:	11/22/2019 11:59:50	Seq Line:	16
Sample Name:	1932284010 1K	Location:	Vial 85
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD16.D Sample Name: 1932284010 1K

Injection Date:	11/22/2019 11:59:50	Seq Line:	16
Sample Name:	1932284010 1K	Location:	Vial 85
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1000.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.503	PBA	2579132.0	42598.6907	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.521	PBA	787731.0	42868.3703	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.534	PBA	192723.4	5000.0000	CLO4-89-ISTD

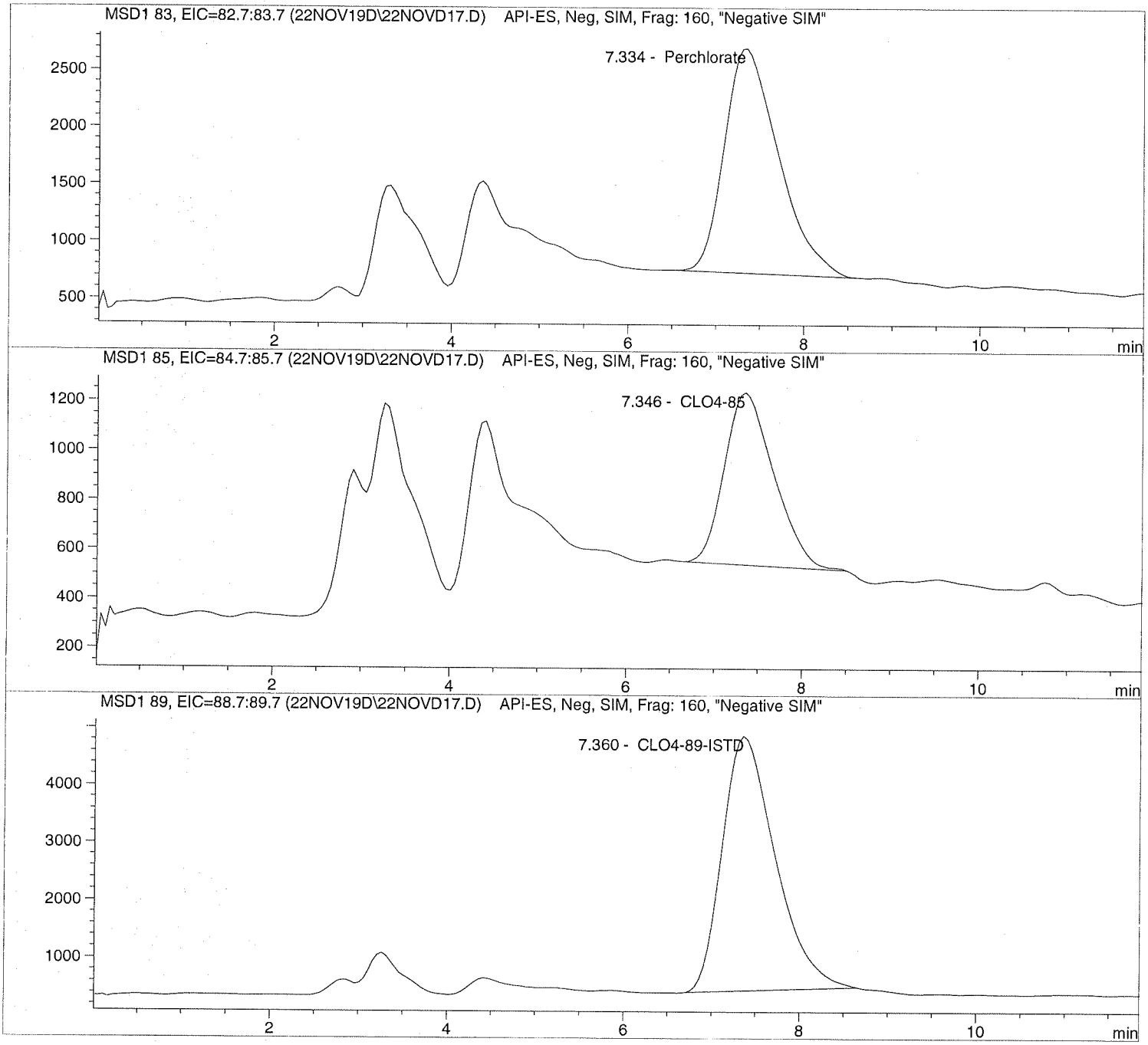
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD17.D Sample Name: 1932352001

Injection Date:	11/22/2019 12:13:41	Seq Line:	17
Sample Name:	1932352001	Location:	Vial 86
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD17.D Sample Name: 1932352001

Injection Date:	11/22/2019 12:13:41	Seq Line:	17
Sample Name:	1932352001	Location:	Vial 86
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.334	PBA	84513.2	1.6404	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.346	PBA	27333.2	1.6553	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.360	PBA	186562.4	5.0000	CLO4-89-ISTD

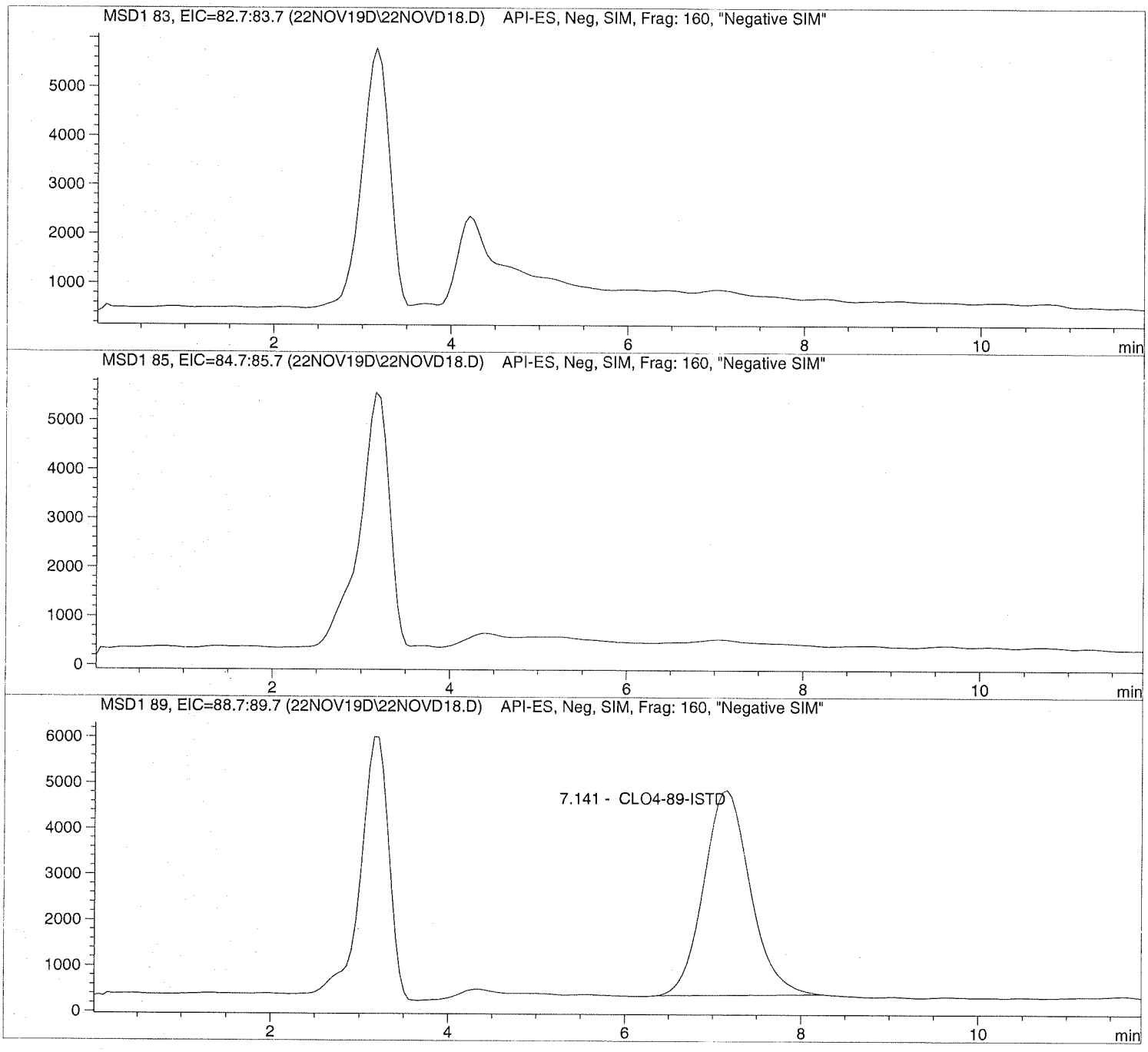
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD18.D Sample Name: 1932352002

Injection Date:	11/22/2019 12:27:35	Seq Line:	18
Sample Name:	1932352002	Location:	Vial 87
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD18.D Sample Name: 1932352002

Injection Date:	11/22/2019 12:27:35	Seq Line:	18
Sample Name:	1932352002	Location:	Vial 87
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.141	PBA	164476.7	5.0000	CLO4-89-ISTD

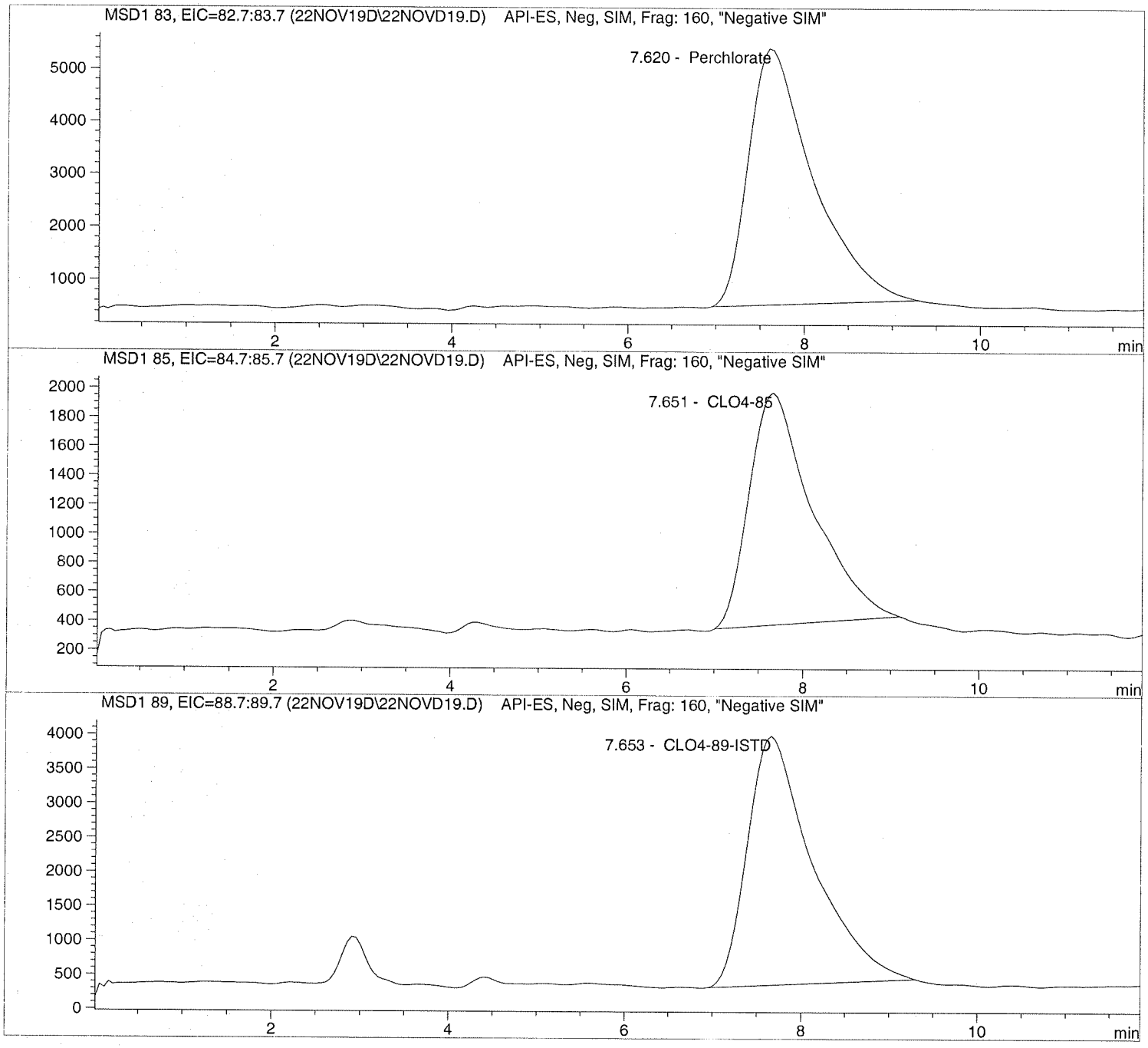
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD19.D Sample Name: 1932352003 1K

Injection Date:	11/22/2019 12:41:26	Seq Line:	19
Sample Name:	1932352003 1K	Location:	Vial 88
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD19.D Sample Name: 1932352003 1K

Injection Date:	11/22/2019 12:41:26	Seq Line:	19
Sample Name:	1932352003 1K	Location:	Vial 88
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1000.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.620	PBA	246585.9	4887.0265	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.651	PBA	78880.7	5031.6524	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.653	PBA	185984.5	5000.0000	CLO4-89-ISTD

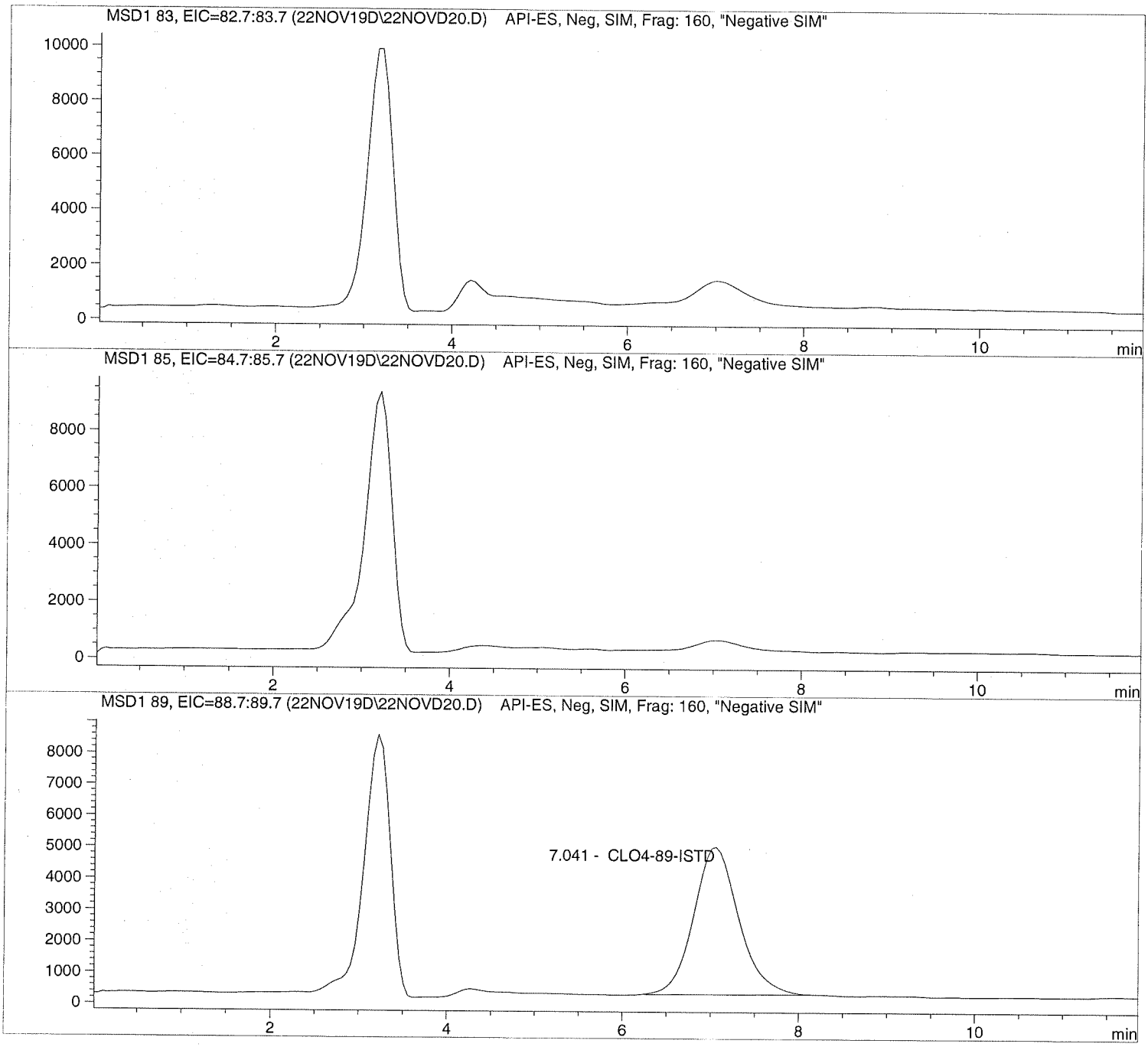
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD20.D Sample Name: 1932352004

Injection Date:	11/22/2019 12:55:21	Seq Line:	20
Sample Name:	1932352004	Location:	Vial 89
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD20.D Sample Name: 1932352004

Injection Date:	11/22/2019 12:55:21	Seq Line:	20
Sample Name:	1932352004	Location:	Vial 89
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.041	BBA	167521.2	5.0000	CLO4-89-ISTD

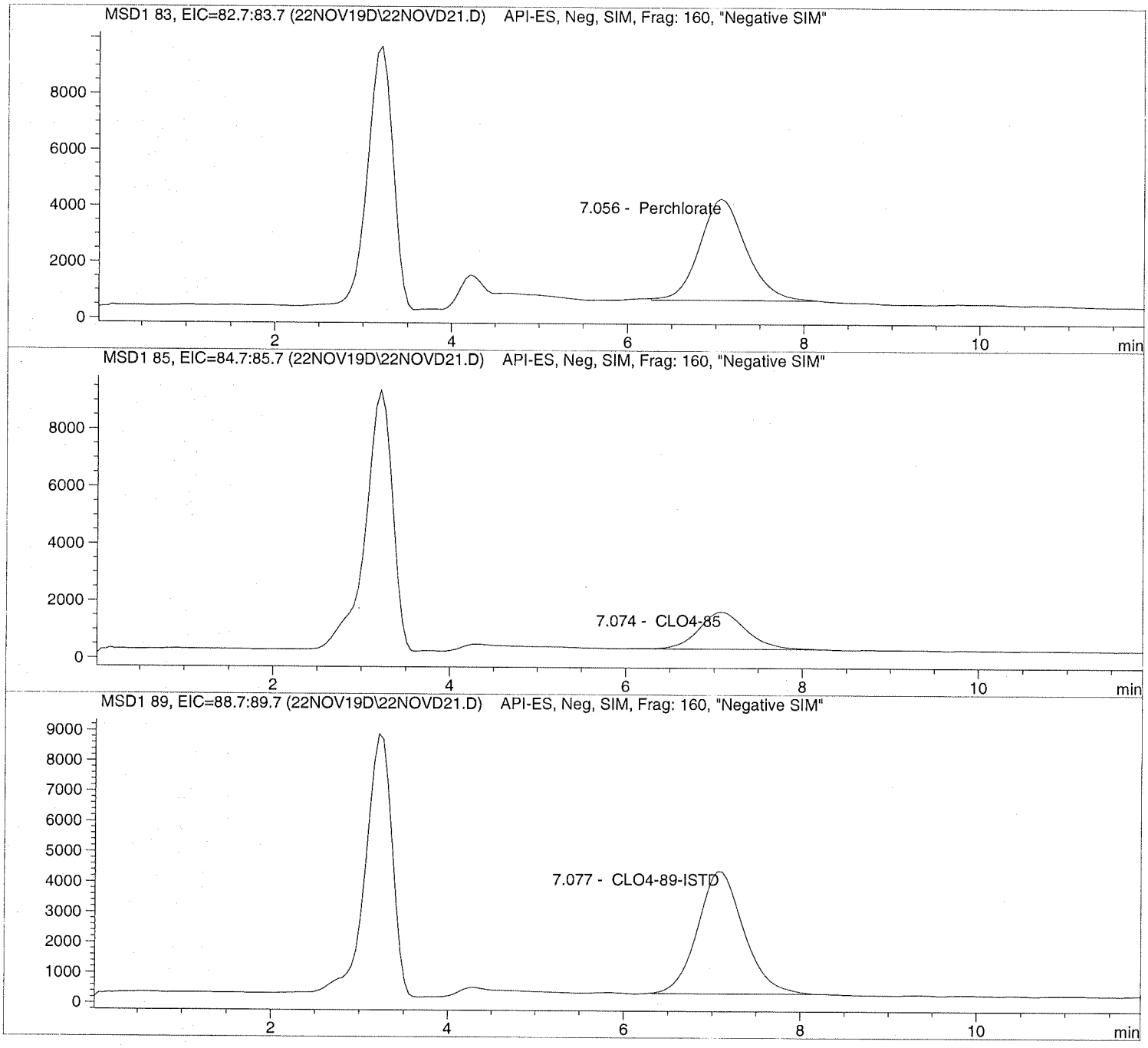
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD21.D Sample Name: 1932352005 MS

Injection Date:	11/22/2019 13:09:17	Seq Line:	21
Sample Name:	1932352005 MS	Location:	Vial 90
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD21.D Sample Name: 1932352005 MS

Injection Date:	11/22/2019 13:09:17	Seq Line:	21
Sample Name:	1932352005 MS	Location:	Vial 90
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.056	BBA	131207.6	3.2899	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.074	BBA	48283.1	3.8820	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.077	PBA	146896.4	5.0000	CLO4-89-ISTD

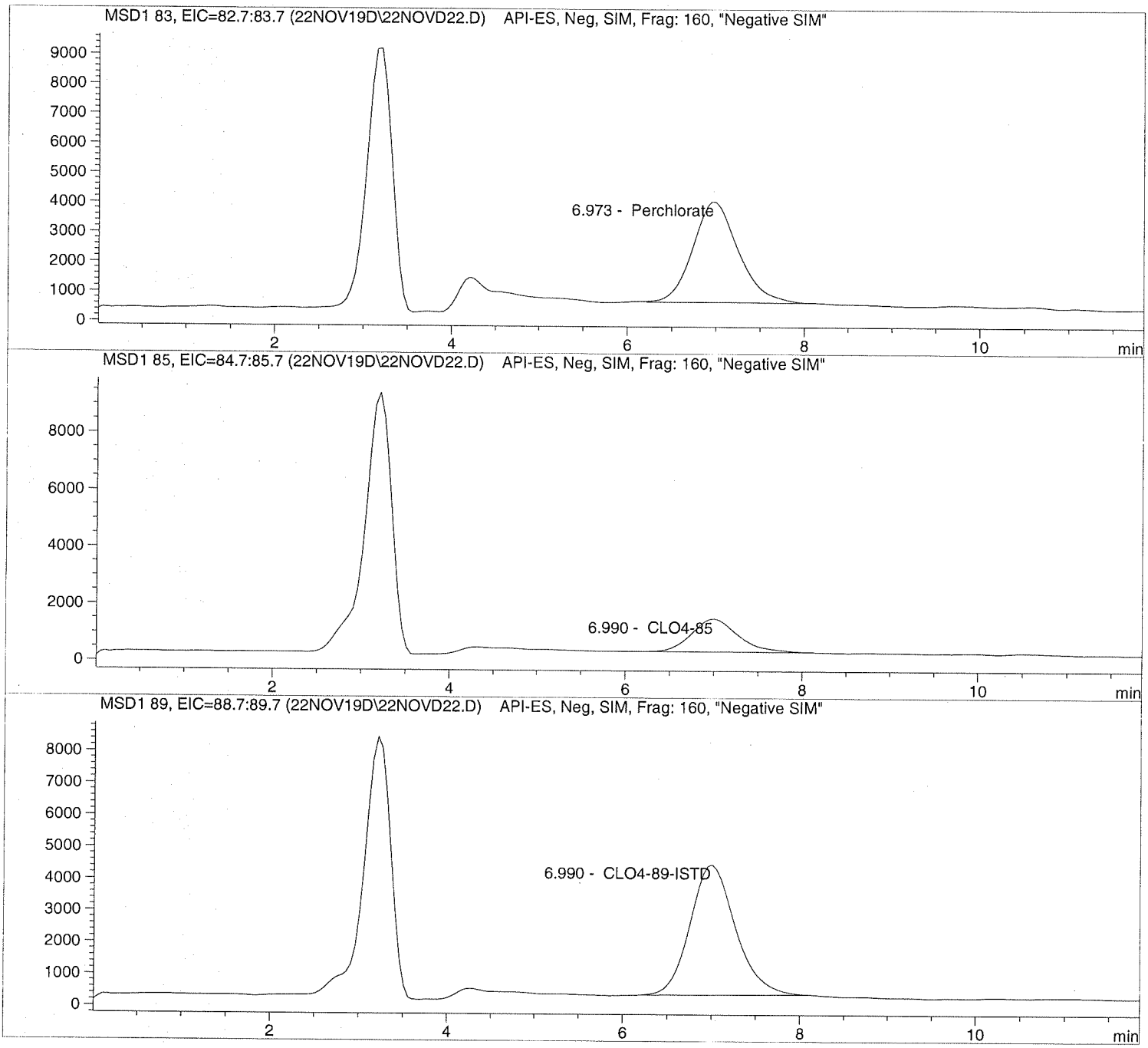
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD22.D Sample Name: 1932352006 MSD

Injection Date:	11/22/2019 13:23:12	Seq Line:	22
Sample Name:	1932352006 MSD	Location:	Vial 91
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD22.D Sample Name: 1932352006 MSD

Injection Date:	11/22/2019 13:23:12	Seq Line:	22
Sample Name:	1932352006 MSD	Location:	Vial 91
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method:	CLO4-AQN.M
Analysis Method:	C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed:	11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.973	BBA	121738.6	3.0509	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.990	BBA	42568.5	3.4112	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.990	BBA	146852.0	5.0000	CLO4-89-ISTD

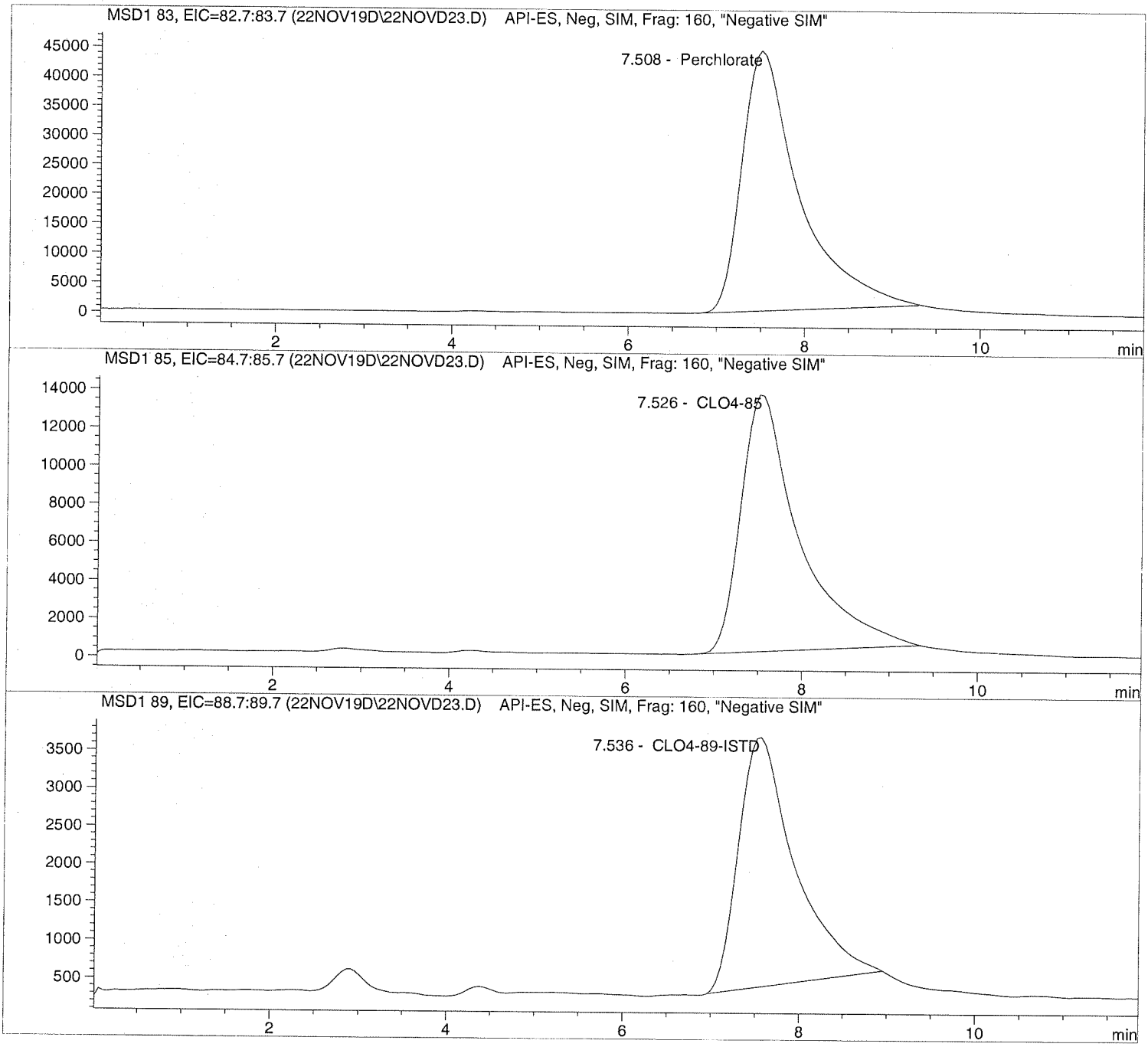
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD23.D Sample Name: 1932284007 100

Injection Date:	11/22/2019 13:39:02	Seq Line:	23
Sample Name:	1932284007 100	Location:	Vial 92
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD23.D Sample Name: 1932284007 100

Injection Date:	11/22/2019 13:39:02	Seq Line:	23
Sample Name:	1932284007 100	Location:	Vial 92
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	100.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.508	PBA	2000966.8	4344.9859	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.526	PBA	621132.3	4434.8623	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.536	PBA	146104.5	500.0000	CLO4-89-ISTD

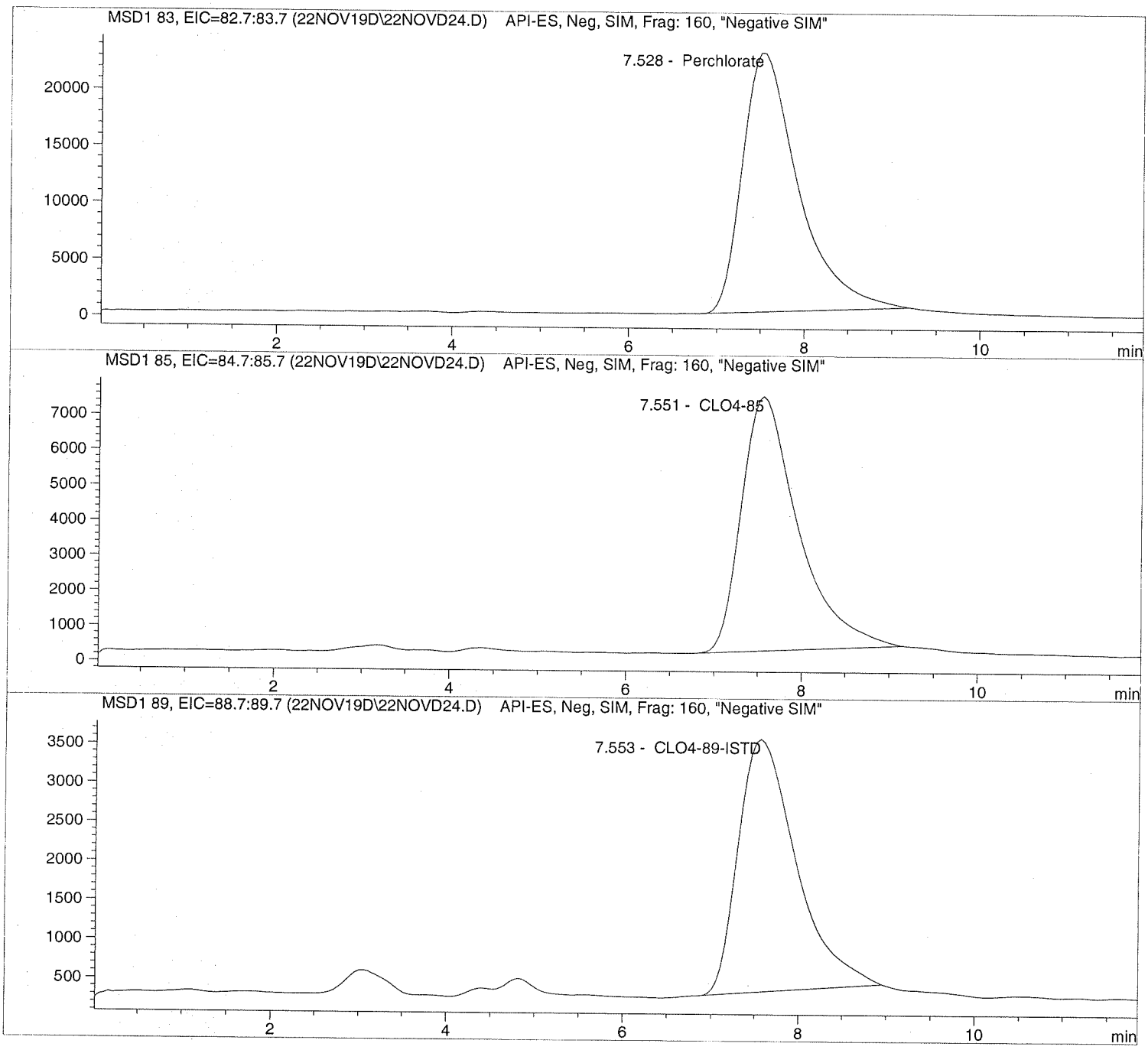
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD24.D Sample Name: 685444 CCV@25

Injection Date:	11/22/2019 13:54:23	Seq Line:	24
Sample Name:	685444 CCV@25	Location:	Vial 71
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD24.D Sample Name: 685444 CCV@25

Injection Date:	11/22/2019 13:54:23	Seq Line:	24
Sample Name:	685444 CCV@25	Location:	Vial 71
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	25.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.528	PBA	1013210.4	23.4184	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.551	PBA	326598.5	24.6282	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.553	PBA	148802.7	5.0000	CLO4-89-ISTD

*** End of Report ***

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Raw Data

Initial Calibration

Method C:\HPCHEM\1\METHODS\CLO4-DP3.M

Calibration Table

Perchlorate

Calib. Data Modified : 9/23/2019 12:20:59 PM

Calculate : Internal Standard
Based on : Peak Area

Rel. Reference Window : 20.000 %
Abs. Reference Window : 0.000 min
Rel. Non-ref. Window : 20.000 %
Abs. Non-ref. Window : 0.000 min
Use Multiplier & Dilution Factor with ISTDs
Uncalibrated Peaks : not reported
Partial Calibration : No recalibration if peaks missing

Curve Type : Quadratic (some peaks differ, see below)
Origin : Ignored (some peaks differ, see below)
Weight : Linear (Amnt) (some peaks differ, see below)

Recalibration Settings:
Average Response : Average all calibrations
Average Retention Time: Floating Average New 75%

Calibration Report Options :
Printout of recalibrations within a sequence:
Calibration Table after Recalibration
Normal Report after Recalibration
If the sequence is done with bracketing:
Results of first cycle (ending previous bracket)

Default Sample ISTD Information (if not set in sample table):

ISTD #	ISTD Amount	Name
1	5.00000	CLO4-89-ISTD

Signal 1: MSD1 83, EIC=82.7:83.7
Signal 2: MSD1 85, EIC=84.7:85.7
Signal 3: MSD1 89, EIC=88.7:89.7

RetTime [min]	Sig	Lvl	Amount	Area	Amt/Area	Ref	Grp	Name
7.750	1	3	1.00000	5.39218e4	1.85454e-5		1	Perchlorate
		4	2.00000	1.32825e5	1.50574e-5			
		5	5.00000	2.76271e5	1.80982e-5			
		6	10.00000	5.61298e5	1.78159e-5			
		7	25.00000	1.51820e6	1.64669e-5			
		8	50.00000	3.31156e6	1.50986e-5			
		9	75.00000	5.23914e6	1.43153e-5			
7.767	3	3	5.00000	2.14568e5	2.33026e-5	+I1		CLO4-89-ISTD
		4	5.00000	2.04758e5	2.44190e-5			
		5	5.00000	2.13407e5	2.34294e-5			
		6	5.00000	2.09246e5	2.38953e-5			
		7	5.00000	2.07403e5	2.41077e-5			
		8	5.00000	2.02929e5	2.46391e-5			
		9	5.00000	1.97933e5	2.52611e-5			
7.778	2	3	1.00000	1.70436e4	5.86732e-5		1	CLO4-85
		4	2.00000	4.20754e4	4.75337e-5			
		5	5.00000	9.24707e4	5.40712e-5			
		6	10.00000	1.68622e5	5.93041e-5			
		7	25.00000	4.63724e5	5.39114e-5			
		8	50.00000	9.95933e5	5.02042e-5			

Method C:\HPCHEM\1\METHODS\CLO4-DP3.M

RetTime [min]	Sig	Lvl	Amount	Area	Amt/Area	Ref	Grp	Name
		9	75.00000	1.58066e6	4.74484e-5			

More compound-specific settings:

Compound: Perchlorate
- Time Window : From 3.581 min To 11.899 min
- Curve Type : Quadratic
- Origin : Ignored
- Calibration Level Weights:/
  - Level 3 : 1
  - Level 4 : 0.5
  - Level 5 : 0.2
  - Level 6 : 0.1
  - Level 7 : 0.04
  - Level 8 : 0.02
  - Level 9 : 0.013333

Compound: CLO4-89-ISTD
- Time Window : From 3.581 min To 11.896 min
- Curve Type : Linear
- Origin : Included
- Calibration Level Weights:/
  - Level 3 : 1
  - Level 4 : 1
  - Level 5 : 1
  - Level 6 : 1
  - Level 7 : 1
  - Level 8 : 1
  - Level 9 : 1

Compound: CLO4-85
- Time Window : From 3.601 min To 11.913 min
- Curve Type : Quadratic
- Origin : Ignored
- Calibration Level Weights:/
  - Level 3 : 1
  - Level 4 : 0.5
  - Level 5 : 0.2
  - Level 6 : 0.1
  - Level 7 : 0.04
  - Level 8 : 0.02
  - Level 9 : 0.013333

Peak Sum Table

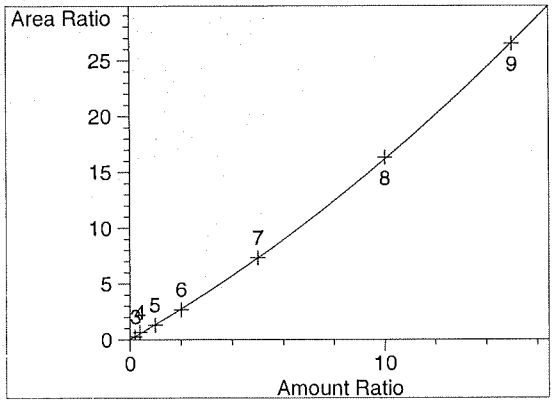
No Entries in table

Method C:\HPCHEM\1\METHODS\CLO4-DP3.M

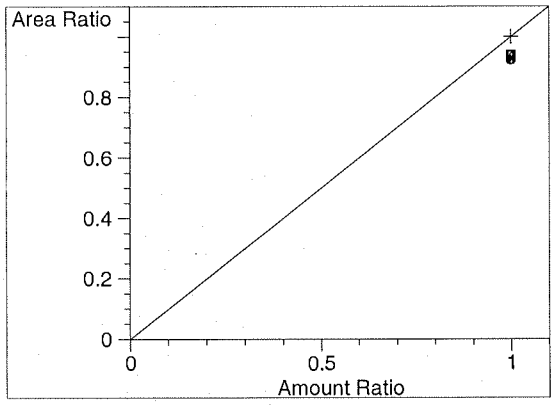
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Calibration Curves

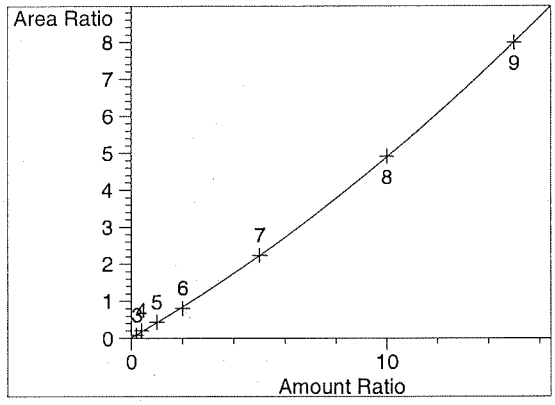
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Perchlorate at exp. RT: 7.750
MSD1 83, EIC=82.7:83.7
Correlation: 0.99975
Residual Std. Dev.: 0.10284
Formula: $y = ax^2 + bx + c$
a: 3.10463e-2
b: 1.30369
c: 2.19496e-2
x: Amount Ratio
y: Area Ratio
Calibration Level Weights:
Level 3 : 1
Level 4 : 0.5
Level 5 : 0.2
Level 6 : 0.1
Level 7 : 0.04
Level 8 : 0.02
Level 9 : 0.013333



CLO4-89-ISTD at exp. RT: 7.767
MSD1 89, EIC=88.7:89.7
Correlation: 1.00000
Residual Std. Dev.: 0.00000
Formula: $y = mx + b$
m: 1.00000
b: 0.00000
x: Amount Ratio
y: Area Ratio
Calibration Level Weights:
Level 3 : 1
Level 4 : 1
Level 5 : 1
Level 6 : 1
Level 7 : 1
Level 8 : 1
Level 9 : 1



CLO4-85 at exp. RT: 7.778
MSD1 85, EIC=84.7:85.7
Correlation: 0.99969
Residual Std. Dev.: 0.02601
Formula: $y = ax^2 + bx + c$
a: 8.85207e-3
b: 3.99283e-1
c: 1.33505e-2
x: Amount Ratio
y: Area Ratio
Calibration Level Weights:
Level 3 : 1
Level 4 : 0.5
Level 5 : 0.2
Level 6 : 0.1
Level 7 : 0.04
Level 8 : 0.02
Level 9 : 0.013333

==========

Batch Report: C:\HPCHEM\1\DATA\20SEP19I\20SEP19D.B

Batch Review Method:
C:\HPCHEM\1\METHODS\CLO4-DP3.M

['#' ==> Run has not been reprocessed with Batch Review Method
'*' ==> Run has been saved with batch file]

#	Sample	Location	Inj	SampleType	Run	Perchlorate Area	Perchlorat RT	Perchlorate Amount
#*	CLO4@ 1.0ug/L	Vial 73	1	Control	3	5.39218e4	7.750	8.75982e-1
#*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	1.32825e5	7.797	2.37682
#*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	2.76271e5	7.770	4.77237
#*	CLO4@ 10.ug/L	Vial 76	1	Control	6	5.61298e5	7.785	9.75097
#*	CLO4@ 25.ug/L	Vial 77	1	Control	7	1.51820e6	7.741	25.01082
#*	CLO4@ 50.ug/L	Vial 78	1	Control	8	3.31156e6	7.775	50.40300
#*	CLO4@ 75.ug/L	Vial 79	1	Control	9	5.23914e6	7.736	74.79107
#*	ICAL Verf@10ug/L	Vial 80	1	Control	11	5.74879e5	7.756	10.11855

#	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount
#*	CLO4@ 1.0ug/L	Vial 73	1	Control	3	2.14568e5	7.767	5.00000
#*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	2.04758e5	7.816	5.00000
#*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	2.13407e5	7.793	5.00000
#*	CLO4@ 10.ug/L	Vial 76	1	Control	6	2.09246e5	7.798	5.00000
#*	CLO4@ 25.ug/L	Vial 77	1	Control	7	2.07403e5	7.763	5.00000
#*	CLO4@ 50.ug/L	Vial 78	1	Control	8	2.02929e5	7.800	5.00000
#*	CLO4@ 75.ug/L	Vial 79	1	Control	9	1.97933e5	7.765	5.00000
#*	ICAL Verf@10ug/L	Vial 80	1	Control	11	2.06243e5	7.776	5.00000

#	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
#*	CLO4@ 1.0ug/L	Vial 73	1	Control	3	1.70436e4	7.778	8.24488e-1
#*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	4.20754e4	7.805	2.38090
#*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	9.24707e4	7.787	5.14166
#*	CLO4@ 10.ug/L	Vial 76	1	Control	6	1.68622e5	7.781	9.52209
#*	CLO4@ 25.ug/L	Vial 77	1	Control	7	4.63724e5	7.760	25.04916
#*	CLO4@ 50.ug/L	Vial 78	1	Control	8	9.95933e5	7.793	50.14223
#*	CLO4@ 75.ug/L	Vial 79	1	Control	9	1.58066e6	7.758	74.93659
#*	ICAL Verf@10ug/L	Vial 80	1	Control	11	1.71000e5	7.760	9.79043

*** End of Report ***

Sequence Table:

Method and Injection Info Part:

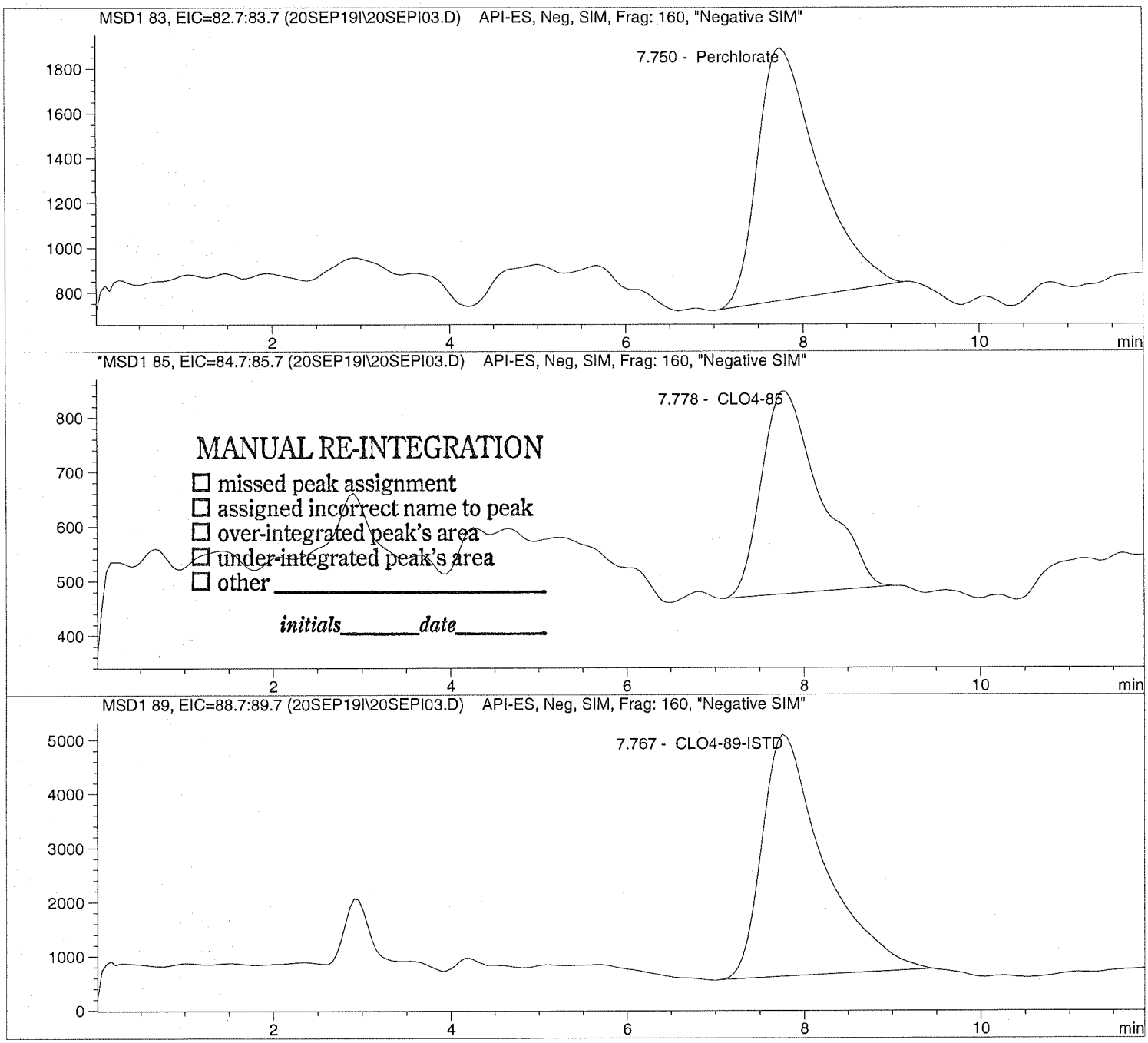
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
1	Vial 71	CLO4@ 0.2ug/L	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	CLO4@ 0.5ug/L	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	CLO4@ 1.0ug/L	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	CLO4@ 2.0ug/L	CLO4-AQN	1	Ctrl Samp		
5	Vial 75	CLO4@ 5.0ug/L	CLO4-AQN	1	Ctrl Samp		
6	Vial 76	CLO4@ 10.ug/L	CLO4-AQN	1	Ctrl Samp		
7	Vial 77	CLO4@ 25.ug/L	CLO4-AQN	1	Ctrl Samp		
8	Vial 78	CLO4@ 50.ug/L	CLO4-AQN	1	Ctrl Samp		
9	Vial 79	CLO4@ 75.ug/L	CLO4-AQN	1	Ctrl Samp		
10	Vial 71	CLO4@ 0.2ug/L	CLO4-AQN	1	Ctrl Samp		
11	Vial 80	ICAL Verf@10ug/L	CLO4-AQN	1	Ctrl Samp		

Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI03.D Sample Name: CLO4@ 1.0ug/L

Injection Date:	9/20/2019 09:24:05	Seq Line:	3
Sample Name:	CLO4@ 1.0ug/L	Location:	Vial 73
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI03.D Sample Name: CLO4@ 1.0ug/L

Injection Date:	9/20/2019 09:24:05	Seq Line:	3
Sample Name:	CLO4@ 1.0ug/L	Location:	Vial 73
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method:	CLO4-AQN.M
Analysis Method:	C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed:	9/23/2019 12:21:47

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	1.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.750	PBA	53921.8	0.8760	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.778	MM	17043.6	0.8245	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.767	PBA	214568.1	5.0000	CLO4-89-ISTD

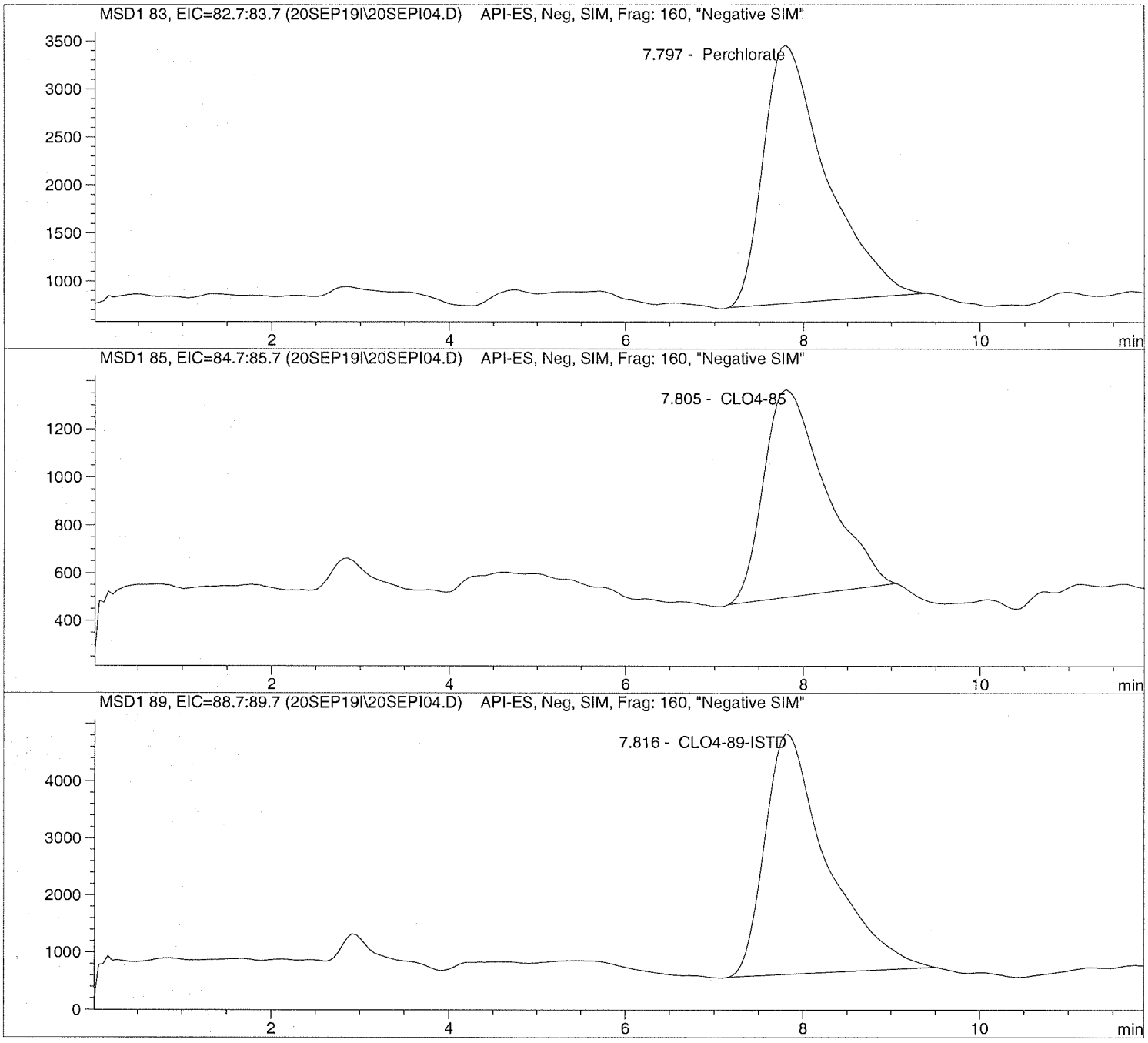
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI04.D Sample Name: CLO4@ 2.0ug/L

Injection Date:	9/20/2019 09:37:58	Seq Line:	4
Sample Name:	CLO4@ 2.0ug/L	Location:	Vial 74
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI04.D Sample Name: CLO4@ 2.0ug/L

Injection Date:	9/20/2019 09:37:58	Seq Line:	4
Sample Name:	CLO4@ 2.0ug/L	Location:	Vial 74
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	2.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.797	PBA	132825.2	2.3768	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.805	PBA	42075.4	2.3809	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.816	PBA	204758.3	5.0000	CLO4-89-ISTD

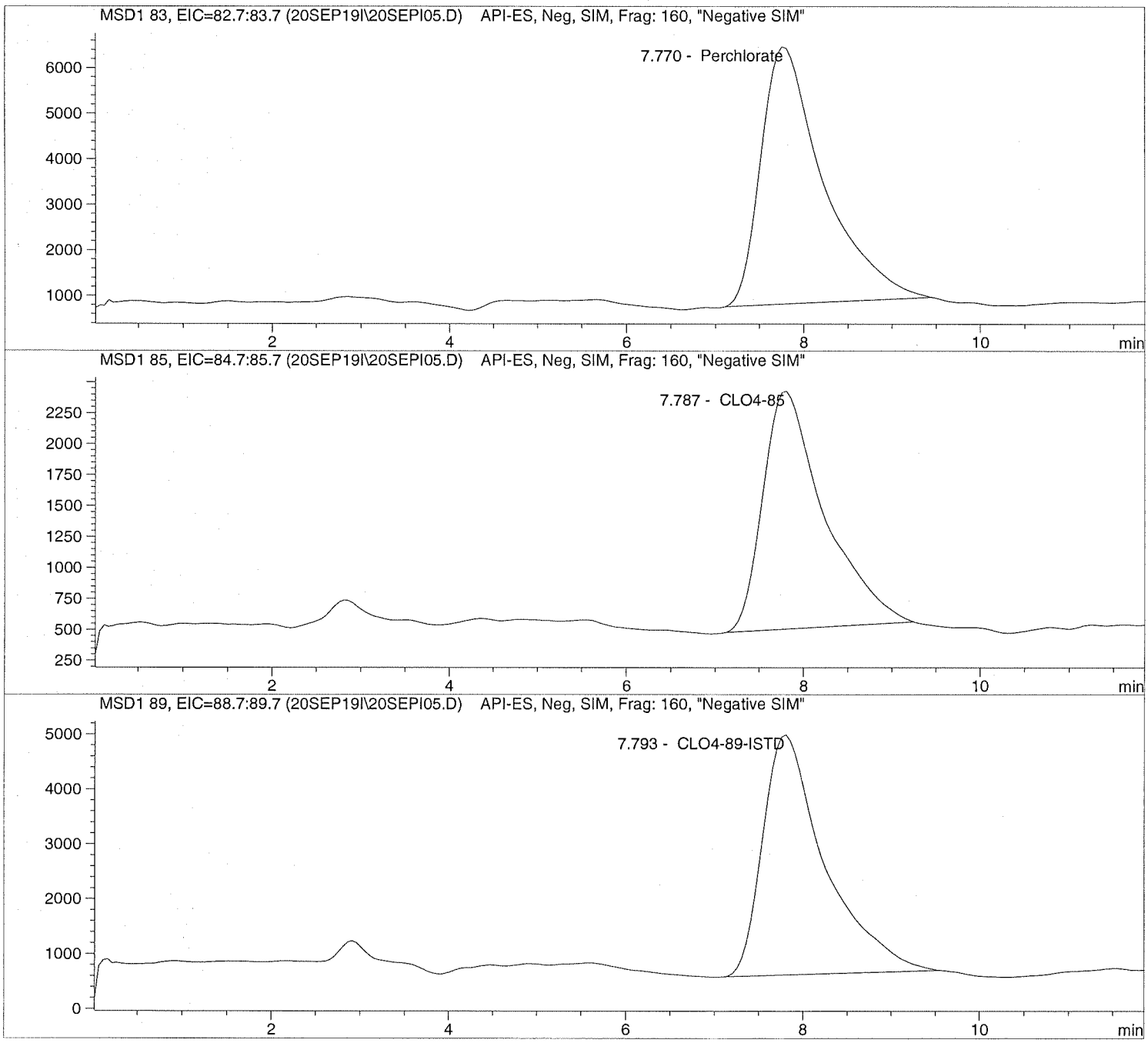
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI05.D Sample Name: CLO4@ 5.0ug/L

Injection Date:	9/20/2019 09:51:49	Seq Line:	5
Sample Name:	CLO4@ 5.0ug/L	Location:	Vial 75
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI05.D Sample Name: CLO4@ 5.0ug/L

Injection Date:	9/20/2019 09:51:49	Seq Line:	5
Sample Name:	CLO4@ 5.0ug/L	Location:	Vial 75
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	5.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.770	PBA	276270.7	4.7724	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.787	PBA	92470.7	5.1417	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.793	PBA	213407.0	5.0000	CLO4-89-ISTD

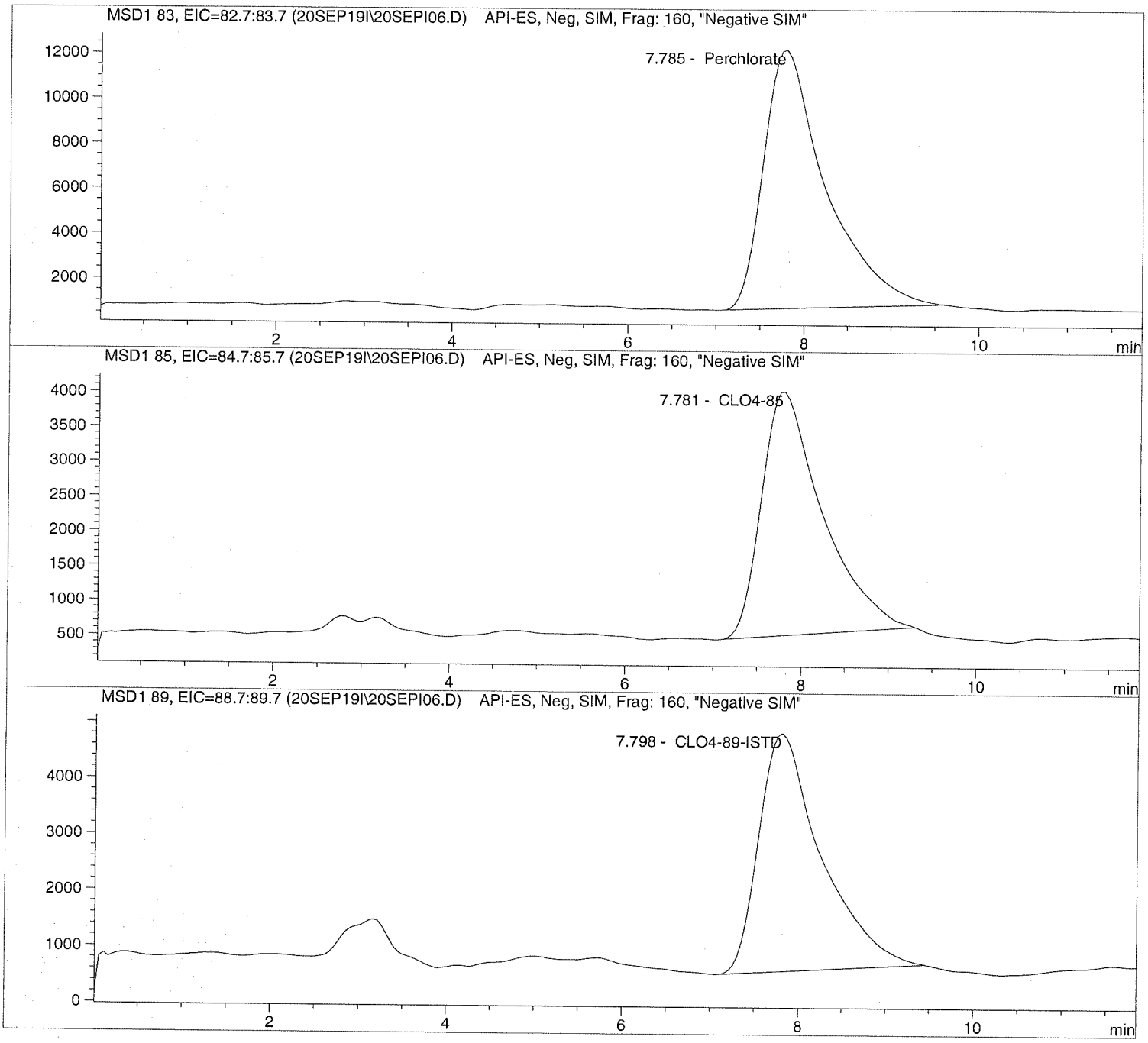
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI06.D Sample Name: CLO4@ 10.ug/L

Injection Date:	9/20/2019 10:05:36	Seq Line:	6
Sample Name:	CLO4@ 10.ug/L	Location:	Vial 76
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI06.D Sample Name: CLO4@ 10.ug/L

Injection Date:	9/20/2019 10:05:36	Seq Line:	6
Sample Name:	CLO4@ 10.ug/L	Location:	Vial 76
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	10.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.785	PBA	561297.7	9.7510	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.781	PBA	168622.4	9.5221	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.798	PBA	209246.3	5.0000	CLO4-89-ISTD

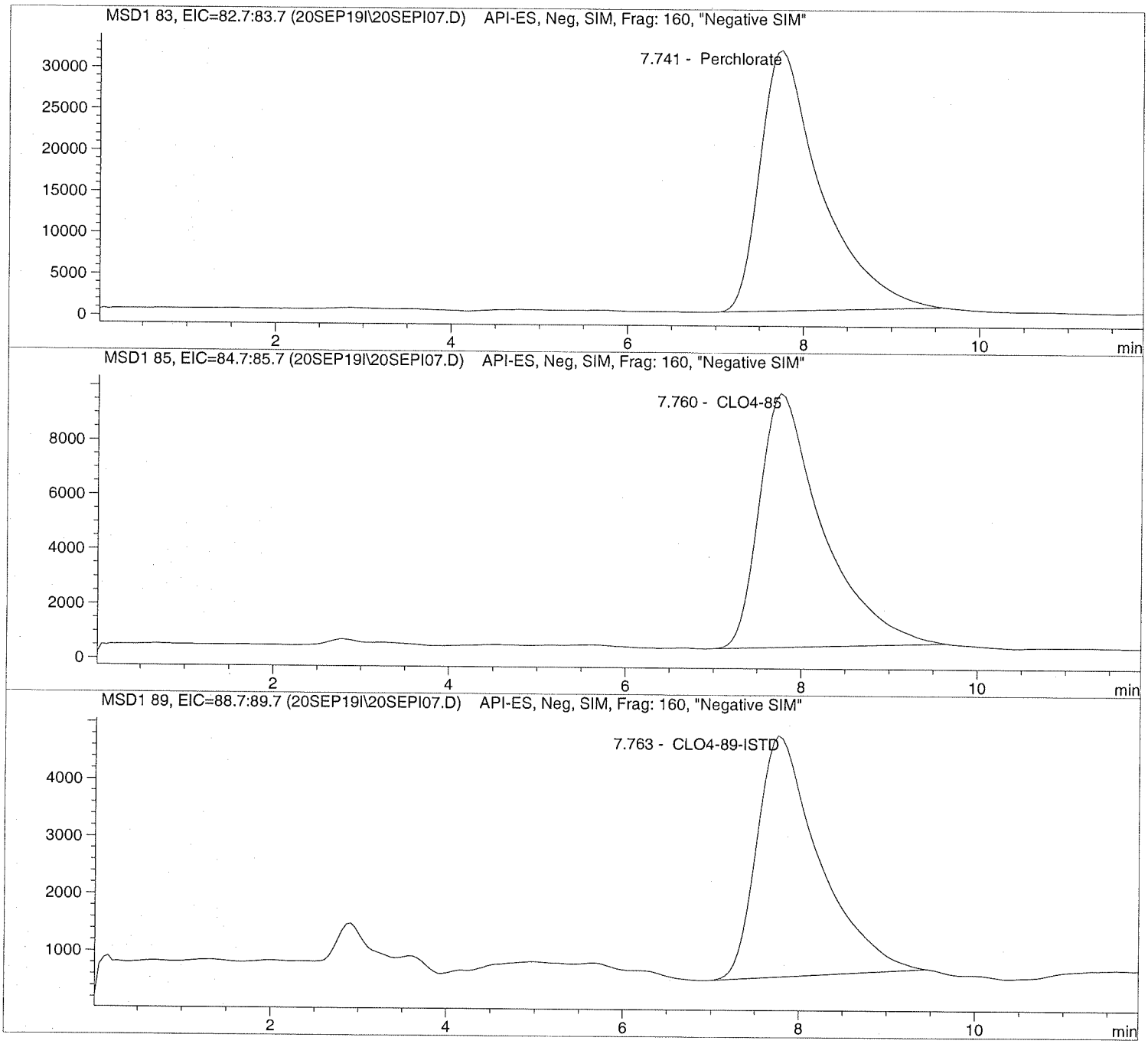
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI07.D Sample Name: CLO4@ 25.ug/L

Injection Date:	9/20/2019 10:19:23	Seq Line:	7
Sample Name:	CLO4@ 25.ug/L	Location:	Vial 77
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI07.D Sample Name: CLO4@ 25.ug/L

Injection Date:	9/20/2019 10:19:23	Seq Line:	7
Sample Name:	CLO4@ 25.ug/L	Location:	Vial 77
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	25.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.741	PBA	1518197.9	25.0108	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.760	PBA	463724.0	25.0492	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.763	PBA	207402.8	5.0000	CLO4-89-ISTD

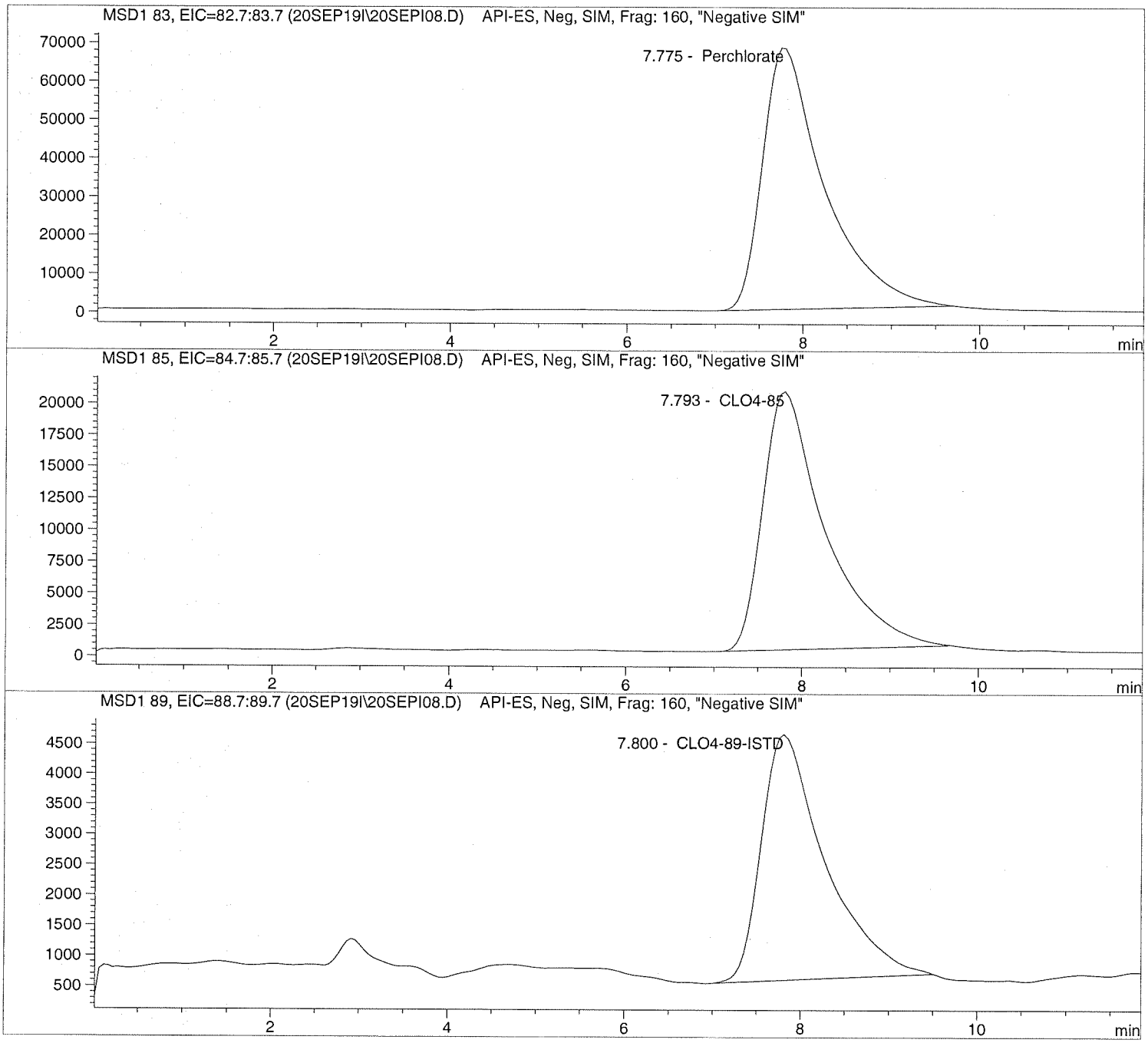
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI08.D Sample Name: CLO4@ 50.ug/L

Injection Date:	9/20/2019 10:33:18	Seq Line:	8
Sample Name:	CLO4@ 50.ug/L	Location:	Vial 78
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI08.D Sample Name: CLO4@ 50.ug/L

Injection Date:	9/20/2019 10:33:18	Seq Line:	8
Sample Name:	CLO4@ 50.ug/L	Location:	Vial 78
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	50.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.775	PBA	3311559.2	50.4030	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.793	PBA	995933.0	50.1422	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.800	PBA	202929.2	5.0000	CLO4-89-ISTD

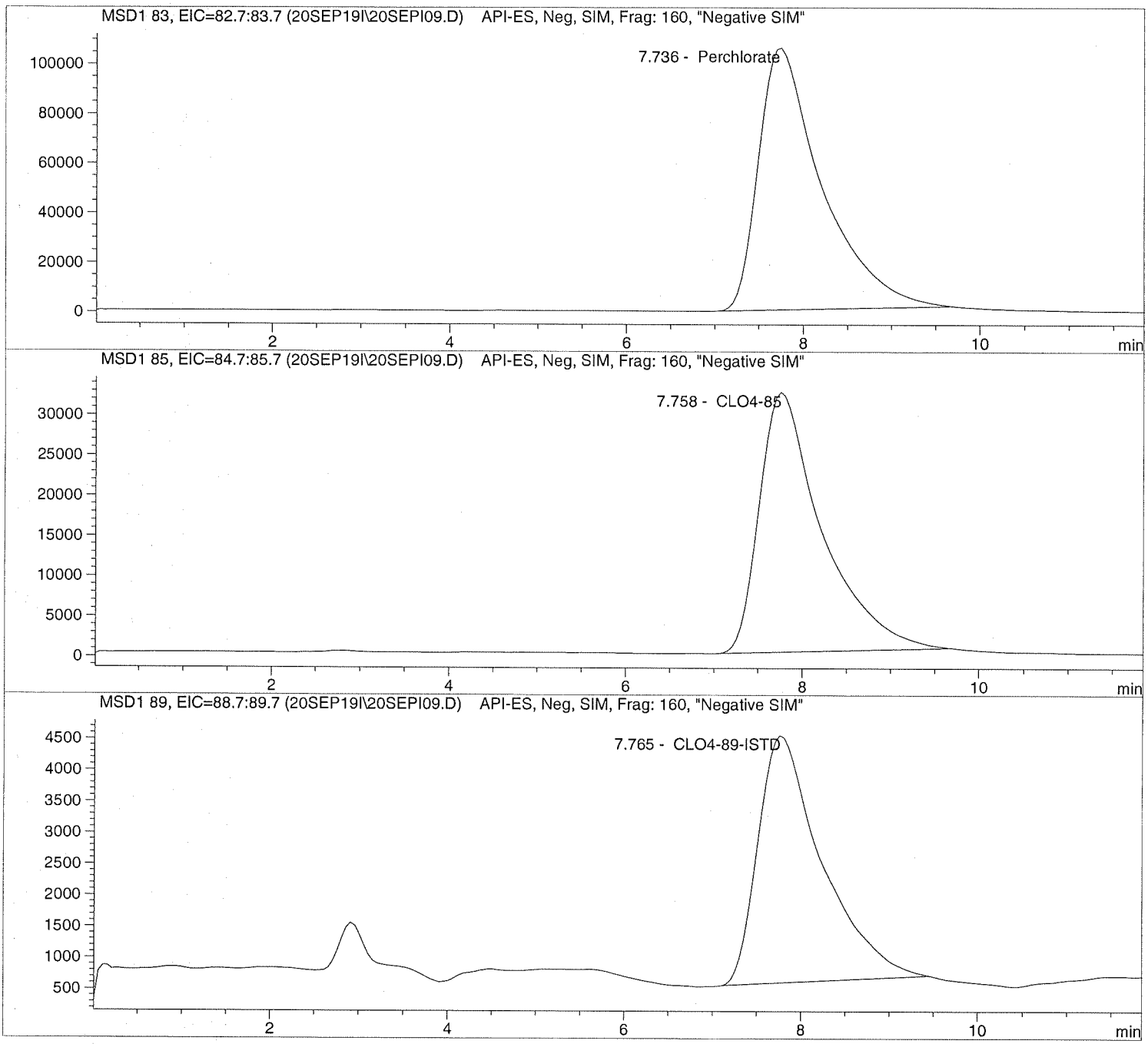
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI09.D Sample Name: CLO4@ 75.ug/L

Injection Date:	9/20/2019 10:47:05	Seq Line:	9
Sample Name:	CLO4@ 75.ug/L	Location:	Vial 79
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI09.D Sample Name: CLO4@ 75.ug/L

Injection Date:	9/20/2019 10:47:05	Seq Line:	9
Sample Name:	CLO4@ 75.ug/L	Location:	Vial 79
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	75.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.736	PBA	5239145.0	74.7911	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.758	PBA	1580664.2	74.9366	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.765	PBA	197932.5	5.0000	CLO4-89-ISTD

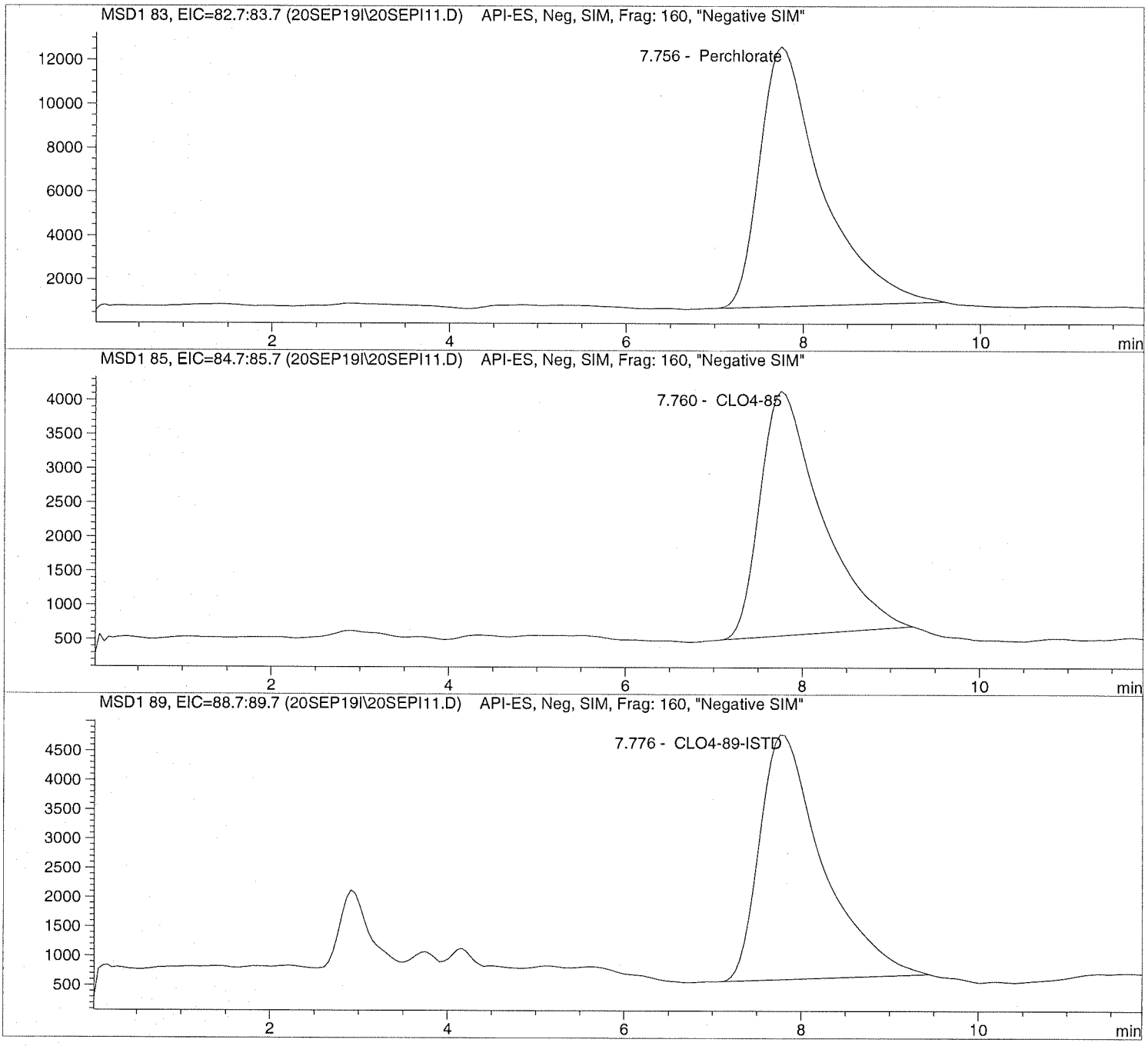
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI11.D Sample Name: ICAL Verf@10ug/L

Injection Date:	9/20/2019 11:14:45	Seq Line:	11
Sample Name:	ICAL Verf@10ug/L	Location:	Vial 80
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI11.D Sample Name: ICAL Verf@10ug/L

Injection Date:	9/20/2019 11:14:45	Seq Line:	11
Sample Name:	ICAL Verf@10ug/L	Location:	Vial 80
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method:	CLO4-AQN.M
Analysis Method:	C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed:	9/23/2019 12:21:47

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	10.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.756	PBA	574879.4	10.1185	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.760	PBA	171000.4	9.7904	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.776	PBA	206243.3	5.0000	CLO4-89-ISTD

*** End of Report ***

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Raw Data

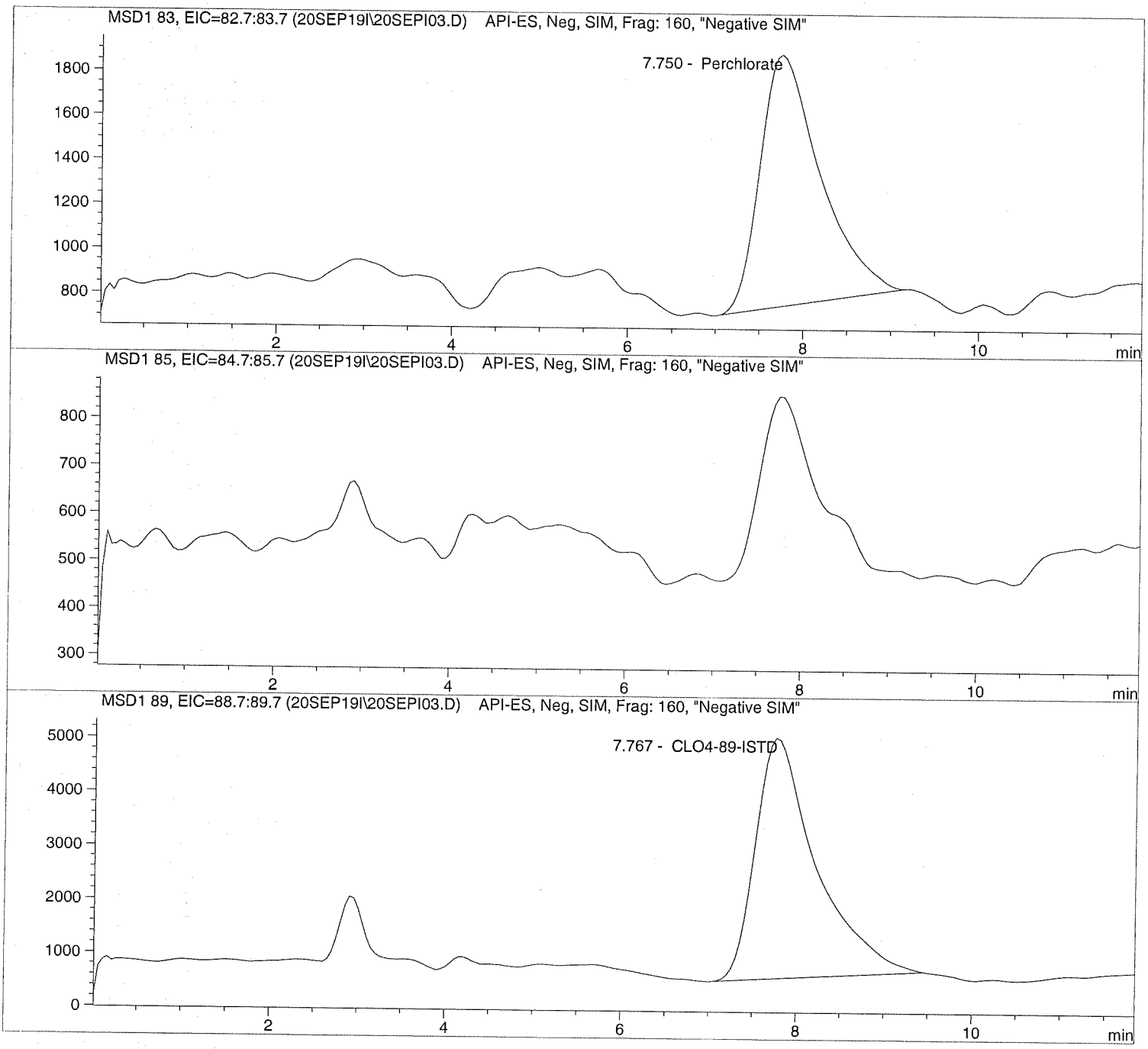
Unmodified

Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI03.D Sample Name: CLO4@ 1.0ug/L

Injection Date:	9/20/2019 09:24:05	Seq Line:	3
Sample Name:	CLO4@ 1.0ug/L	Location:	Vial 73
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:27:11

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI03.D Sample Name: CLO4@ 1.0ug/L

Injection Date:	9/20/2019 09:24:05	Seq Line:	3
Sample Name:	CLO4@ 1.0ug/L	Location:	Vial 73
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method:	CLO4-AQN.M
Analysis Method:	C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed:	9/23/2019 12:27:11

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	1.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.750	PBA	53921.8	0.8760	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.767	PBA	214568.1	5.0000	CLO4-89-ISTD

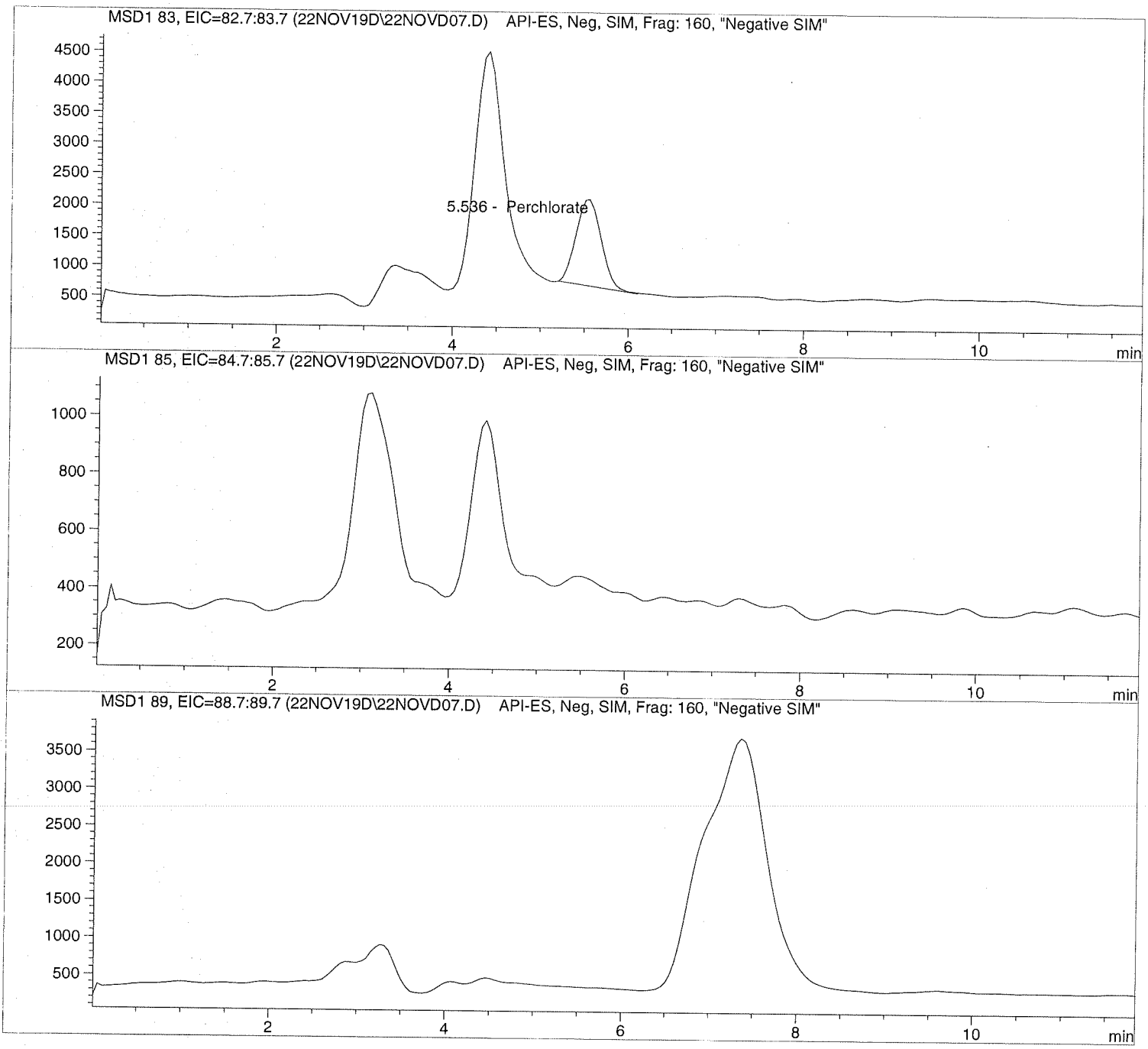
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD07.D Sample Name: 1932284002

Injection Date:	11/22/2019 09:55:02	Seq Line:	7
Sample Name:	1932284002	Location:	Vial 77
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD07.D Sample Name: 1932284002

Injection Date:	11/22/2019 09:55:02	Seq Line:	7
Sample Name:	1932284002	Location:	Vial 77
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method:	CLO4-AQN.M
Analysis Method:	C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed:	11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
5.536	PBA	27611.0	0.0000	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-89-ISTD

*** End of Report ***

10450 Stancliff Rd. Suite 210
Houston, TX 77099
T: +1 281 530 5656
F: +1 281 530 5887

December 05, 2019

Susan Huang
Aptim Environmental & Infrastucture, Inc.
2500 City West Blvd., Suite 1700
Houston, TX 77042

Work Order: **HS19110684**

Laboratory Results for: **LHAAP-50 501032**

Dear Susan,

ALS Environmental received 5 sample(s) on Nov 14, 2019 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
RJ Modashia
Project Manager

ALS Houston, US Date: 05-Dec-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Work Order: HS19110684

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19110684-01	50WW16-191113	Groundwater		13-Nov-2019 08:35	14-Nov-2019 09:05	☐
HS19110684-02	50WW14-191113	Groundwater		13-Nov-2019 09:45	14-Nov-2019 09:05	☐
HS19110684-03	50WW13-191113	Groundwater		13-Nov-2019 10:35	14-Nov-2019 09:05	☐
HS19110684-04	50WW23-191113	Groundwater		13-Nov-2019 11:40	14-Nov-2019 09:05	☐
HS19110684-05	Trip Blank	Water	CG 101419 -03	13-Nov-2019 00:00	14-Nov-2019 09:05	☐

ALS Houston, US Date: 05-Dec-19

Client: Aptim Environmental & Infrastucture, Inc. **CASE NARRATIVE**
Project: LHAAP-50 501032
Work Order: HS19110684

Work Order Comments

- The analysis for Methane, Methene, Ethane and CO2 by RSK175 was subcontracted to ALS Simi Valley, CA. Final report attached.
- The analysis for Perchlorate was subcontracted to ALS Salt Lake City, UT. Final report attached.

Work Order Comments

- The analysis for TOC was subcontracted to ALS Environmental in Kelso, WA. Final Report attached.

GCMS Volatiles by Method SW8260

Batch ID: R350853

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

WetChemistry by Method SW9056

Batch ID: R350580

Sample ID: 50WW23-191113 (HS19110684-04MS)

- 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,Sulfate)

ALS Houston, US Date: 05-Dec-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Sample ID: 50WW16-191113
Collection Date: 13-Nov-2019 08:35

ANALYTICAL REPORT
WorkOrder:HS19110684
Lab ID:HS19110684-01
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C	**Method:SW8260**							Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:49
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:49
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	19-Nov-2019 12:49
1,1,2-Trichlor-1,2,2-trifluoroethane	0.50	U	0.50	0.50	1.0	UG/L	1	19-Nov-2019 12:49
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:49
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:49
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:49
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:49
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	19-Nov-2019 12:49
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	19-Nov-2019 12:49
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	19-Nov-2019 12:49
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:49
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:49
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:49
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	19-Nov-2019 12:49
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:49
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	19-Nov-2019 12:49
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:49
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	19-Nov-2019 12:49
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:49
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	19-Nov-2019 12:49
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:49
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	19-Nov-2019 12:49
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:49
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	19-Nov-2019 12:49
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	19-Nov-2019 12:49
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:49
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	19-Nov-2019 12:49
Acetone	1.0	U	0.40	1.0	2.0	UG/L	1	19-Nov-2019 12:49
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:49
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	19-Nov-2019 12:49
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:49
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:49
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	19-Nov-2019 12:49
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	19-Nov-2019 12:49
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	19-Nov-2019 12:49
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	19-Nov-2019 12:49
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:49
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:49

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

ALS Houston, US Date: 05-Dec-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Sample ID: 50WW16-191113
Collection Date: 13-Nov-2019 08:35

ANALYTICAL REPORT
WorkOrder:HS19110684
Lab ID:HS19110684-01
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:49
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:49
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:49
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	19-Nov-2019 12:49
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:49
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:49
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:49
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:49
Hexachlorobutadiene	0.50	U	1.0	0.50	1.0	UG/L	1	19-Nov-2019 12:49
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:49
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	19-Nov-2019 12:49
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	19-Nov-2019 12:49
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	19-Nov-2019 12:49
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:49
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:49
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:49
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:49
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:49
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:49
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:49
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:49
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:49
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:49
Trichloroethene	**1.5**		**0.20**	**0.50**	**1.0**	**UG/L**	1	19-Nov-2019 12:49
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:49
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:49
Surr: 1,2-Dichloroethane-d4	*87.7*			**0**	*81-118*	*%REC*	*1*	*19-Nov-2019 12:49*
Surr: 4-Bromofluorobenzene	*91.7*			**0**	*85-114*	*%REC*	*1*	*19-Nov-2019 12:49*
Surr: Dibromofluoromethane	*93.8*			**0**	*80-119*	*%REC*	*1*	*19-Nov-2019 12:49*
Surr: Toluene-d8	*96.2*			**0**	*89-112*	*%REC*	*1*	*19-Nov-2019 12:49*
ANIONS BY SW9056A		**Method:SW9056**						Analyst: KMU
Chloride	**6.07**		**0.200**	**0.500**	**0.500**	**mg/L**	1	14-Nov-2019 19:07
Nitrogen, Nitrate (As N)	0.100	U	0.0300	0.100	0.100	mg/L	1	14-Nov-2019 19:07
Sulfate	**28.7**		**0.200**	**0.500**	**0.500**	**mg/L**	1	14-Nov-2019 19:07
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		**Method:NA**						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	27-Nov-2019 17:54
SUBCONTRACT ANALYSIS - RSK		**Method:NA**						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	05-Dec-2019 09:28

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

ALS Houston, US Date: 05-Dec-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Sample ID: 50WW16-191113
Collection Date: 13-Nov-2019 08:35

ANALYTICAL REPORT
WorkOrder:HS19110684
Lab ID:HS19110684-01
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
SUBCONTRACT ANALYSIS - TOC ANALYSIS		**Method:NA**						Analyst: SUBK
Subcontract Analysis	See Attached		0	0		NA	1	27-Nov-2019 09:14

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

ALS Houston, US Date: 05-Dec-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Sample ID: 50WW14-191113
Collection Date: 13-Nov-2019 09:45

ANALYTICAL REPORT
WorkOrder:HS19110684
Lab ID:HS19110684-02
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C	**Method:SW8260**							Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:37
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:37
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	19-Nov-2019 13:37
1,1,2-Trichlor-1,2,2-trifluoroethane	0.50	U	0.50	0.50	1.0	UG/L	1	19-Nov-2019 13:37
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:37
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:37
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:37
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:37
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	19-Nov-2019 13:37
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	19-Nov-2019 13:37
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	19-Nov-2019 13:37
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:37
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:37
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:37
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	19-Nov-2019 13:37
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:37
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	19-Nov-2019 13:37
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:37
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	19-Nov-2019 13:37
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:37
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	19-Nov-2019 13:37
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:37
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	19-Nov-2019 13:37
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:37
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	19-Nov-2019 13:37
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	19-Nov-2019 13:37
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:37
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	19-Nov-2019 13:37
Acetone	1.0	U	0.40	1.0	2.0	UG/L	1	19-Nov-2019 13:37
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:37
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	19-Nov-2019 13:37
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:37
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:37
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	19-Nov-2019 13:37
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	19-Nov-2019 13:37
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	19-Nov-2019 13:37
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	19-Nov-2019 13:37
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:37
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:37

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

ALS Houston, US Date: 05-Dec-19

Client: Aptim Environmental & Infrastructure, Inc.
Project: LHAAP-50 501032
Sample ID: 50WW14-191113
Collection Date: 13-Nov-2019 09:45

ANALYTICAL REPORT
WorkOrder:HS19110684
Lab ID:HS19110684-02
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:37
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:37
cis-1,2-Dichloroethene	**1.7**		**0.20**	**0.50**	**1.0**	**UG/L**	1	19-Nov-2019 13:37
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	19-Nov-2019 13:37
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:37
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:37
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:37
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:37
Hexachlorobutadiene	0.50	U	1.0	0.50	1.0	UG/L	1	19-Nov-2019 13:37
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:37
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	19-Nov-2019 13:37
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	19-Nov-2019 13:37
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	19-Nov-2019 13:37
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:37
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:37
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:37
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:37
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:37
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:37
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:37
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:37
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:37
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:37
Trichloroethene	**37**		**0.20**	**0.50**	**1.0**	**UG/L**	1	19-Nov-2019 13:37
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:37
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:37
Surr: 1,2-Dichloroethane-d4	*89.6*			**0**	*81-118*	*%REC*	*1*	*19-Nov-2019 13:37*
Surr: 4-Bromofluorobenzene	*93.1*			**0**	*85-114*	*%REC*	*1*	*19-Nov-2019 13:37*
Surr: Dibromofluoromethane	*95.3*			**0**	*80-119*	*%REC*	*1*	*19-Nov-2019 13:37*
Surr: Toluene-d8	*98.3*			**0**	*89-112*	*%REC*	*1*	*19-Nov-2019 13:37*
ANIONS BY SW9056A		**Method:SW9056**						Analyst: KMU
Chloride	**395**		**2.00**	**5.00**	**5.00**	**mg/L**	10	14-Nov-2019 20:13
Nitrogen, Nitrate (As N)	0.100	U	0.0300	0.100	0.100	mg/L	1	14-Nov-2019 19:57
Sulfate	**357**		**2.00**	**5.00**	**5.00**	**mg/L**	10	14-Nov-2019 20:13
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		**Method:NA**						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	27-Nov-2019 17:54
SUBCONTRACT ANALYSIS - RSK		**Method:NA**						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	05-Dec-2019 09:28

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

ALS Houston, US Date: 05-Dec-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Sample ID: 50WW14-191113
Collection Date: 13-Nov-2019 09:45

ANALYTICAL REPORT
WorkOrder:HS19110684
Lab ID:HS19110684-02
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
SUBCONTRACT ANALYSIS - TOC ANALYSIS		**Method:NA**						Analyst: SUBK
Subcontract Analysis	See Attached		0	0		NA	1	27-Nov-2019 09:14

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

ALS Houston, US Date: 05-Dec-19

Client: Aptim Environmental & Infrastucture, Inc. **ANALYTICAL REPORT**
Project: LHAAP-50 501032 WorkOrder:HS19110684
Sample ID: 50WW13-191113 Lab ID:HS19110684-03
Collection Date: 13-Nov-2019 10:35 Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C	**Method:SW8260**							Analyst: PC
1,1,1,2-Tetrachloroethane	12	U	7.5	12	25	UG/L	25	19-Nov-2019 14:01
1,1,1-Trichloroethane	12	U	5.0	12	25	UG/L	25	19-Nov-2019 14:01
1,1,2,2-Tetrachloroethane	12	U	12	12	25	UG/L	25	19-Nov-2019 14:01
1,1,2-Trichlor-1,2,2-trifluoroethane	12	U	12	12	25	UG/L	25	19-Nov-2019 14:01
1,1,2-Trichloroethane	12	U	7.5	12	25	UG/L	25	19-Nov-2019 14:01
1,1-Dichloroethane	12	U	5.0	12	25	UG/L	25	19-Nov-2019 14:01
1,1-Dichloroethene	**17**	J	**5.0**	**12**	**25**	**UG/L**	25	19-Nov-2019 14:01
1,1-Dichloropropene	12	U	7.5	12	25	UG/L	25	19-Nov-2019 14:01
1,2,3-Trichlorobenzene	12	U	10	12	25	UG/L	25	19-Nov-2019 14:01
1,2,3-Trichloropropane	12	U	12	12	25	UG/L	25	19-Nov-2019 14:01
1,2,4-Trichlorobenzene	12	U	12	12	25	UG/L	25	19-Nov-2019 14:01
1,2,4-Trimethylbenzene	12	U	7.5	12	25	UG/L	25	19-Nov-2019 14:01
1,2-Dibromo-3-chloropropane	12	U	5.0	12	25	UG/L	25	19-Nov-2019 14:01
1,2-Dibromoethane	12	U	5.0	12	25	UG/L	25	19-Nov-2019 14:01
1,2-Dichlorobenzene	12	U	12	12	25	UG/L	25	19-Nov-2019 14:01
1,2-Dichloroethane	**39**		**5.0**	**12**	**25**	**UG/L**	25	19-Nov-2019 14:01
1,2-Dichloropropane	12	U	12	12	25	UG/L	25	19-Nov-2019 14:01
1,3,5-Trimethylbenzene	12	U	7.5	12	25	UG/L	25	19-Nov-2019 14:01
1,3-Dichlorobenzene	12	U	10	12	25	UG/L	25	19-Nov-2019 14:01
1,3-Dichloropropane	12	U	7.5	12	25	UG/L	25	19-Nov-2019 14:01
1,4-Dichlorobenzene	12	U	10	12	25	UG/L	25	19-Nov-2019 14:01
2,2-Dichloropropane	12	U	5.0	12	25	UG/L	25	19-Nov-2019 14:01
2-Butanone	25	U	12	25	50	UG/L	25	19-Nov-2019 14:01
2-Chlorotoluene	12	U	7.5	12	25	UG/L	25	19-Nov-2019 14:01
2-Hexanone	25	U	25	25	50	UG/L	25	19-Nov-2019 14:01
4-Chlorotoluene	12	U	10	12	25	UG/L	25	19-Nov-2019 14:01
4-Isopropyltoluene	12	U	7.5	12	25	UG/L	25	19-Nov-2019 14:01
4-Methyl-2-pentanone	25	U	18	25	50	UG/L	25	19-Nov-2019 14:01
Acetone	25	U	10	25	50	UG/L	25	19-Nov-2019 14:01
Benzene	12	U	5.0	12	25	UG/L	25	19-Nov-2019 14:01
Bromobenzene	12	U	10	12	25	UG/L	25	19-Nov-2019 14:01
Bromochloromethane	12	U	5.0	12	25	UG/L	25	19-Nov-2019 14:01
Bromodichloromethane	12	U	5.0	12	25	UG/L	25	19-Nov-2019 14:01
Bromoform	12	U	10	12	25	UG/L	25	19-Nov-2019 14:01
Bromomethane	12	U	10	12	25	UG/L	25	19-Nov-2019 14:01
Carbon disulfide	25	U	15	25	50	UG/L	25	19-Nov-2019 14:01
Carbon tetrachloride	12	U	12	12	25	UG/L	25	19-Nov-2019 14:01
Chlorobenzene	12	U	7.5	12	25	UG/L	25	19-Nov-2019 14:01
Chloroethane	12	U	7.5	12	25	UG/L	25	19-Nov-2019 14:01

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

ALS Houston, US Date: 05-Dec-19

Client: Aptim Environmental & Infrastucture, Inc. **ANALYTICAL REPORT**
Project: LHAAP-50 501032 WorkOrder:HS19110684
Sample ID: 50WW13-191113 Lab ID:HS19110684-03
Collection Date: 13-Nov-2019 10:35 Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
Chloroform	12	U	5.0	12	25	UG/L	25	19-Nov-2019 14:01
Chloromethane	12	U	5.0	12	25	UG/L	25	19-Nov-2019 14:01
cis-1,2-Dichloroethene	**230**		**5.0**	**12**	**25**	**UG/L**	25	19-Nov-2019 14:01
cis-1,3-Dichloropropene	12	U	2.5	12	25	UG/L	25	19-Nov-2019 14:01
Dibromochloromethane	12	U	7.5	12	25	UG/L	25	19-Nov-2019 14:01
Dibromomethane	12	U	5.0	12	25	UG/L	25	19-Nov-2019 14:01
Dichlorodifluoromethane	12	U	7.5	12	25	UG/L	25	19-Nov-2019 14:01
Ethylbenzene	12	U	7.5	12	25	UG/L	25	19-Nov-2019 14:01
Hexachlorobutadiene	12	U	25	12	25	UG/L	25	19-Nov-2019 14:01
Isopropylbenzene	12	U	7.5	12	25	UG/L	25	19-Nov-2019 14:01
m,p-Xylene	25	U	12	25	50	UG/L	25	19-Nov-2019 14:01
Methylene chloride	25	U	10	25	50	UG/L	25	19-Nov-2019 14:01
n-Butylbenzene	12	U	10	12	25	UG/L	25	19-Nov-2019 14:01
n-Propylbenzene	12	U	7.5	12	25	UG/L	25	19-Nov-2019 14:01
Naphthalene	12	U	7.5	12	25	UG/L	25	19-Nov-2019 14:01
o-Xylene	12	U	7.5	12	25	UG/L	25	19-Nov-2019 14:01
sec-Butylbenzene	12	U	7.5	12	25	UG/L	25	19-Nov-2019 14:01
Styrene	12	U	7.5	12	25	UG/L	25	19-Nov-2019 14:01
tert-Butylbenzene	12	U	7.5	12	25	UG/L	25	19-Nov-2019 14:01
Tetrachloroethene	12	U	7.5	12	25	UG/L	25	19-Nov-2019 14:01
Toluene	12	U	5.0	12	25	UG/L	25	19-Nov-2019 14:01
trans-1,2-Dichloroethene	12	U	5.0	12	25	UG/L	25	19-Nov-2019 14:01
trans-1,3-Dichloropropene	12	U	5.0	12	25	UG/L	25	19-Nov-2019 14:01
Trichloroethene	**7,300**		**50**	**120**	**250**	**UG/L**	250	19-Nov-2019 15:13
Trichlorofluoromethane	12	U	7.5	12	25	UG/L	25	19-Nov-2019 14:01
Vinyl chloride	12	U	5.0	12	25	UG/L	25	19-Nov-2019 14:01
Surr: 1,2-Dichloroethane-d4	*88.2*			**0**	*81-118*	*%REC*	*250*	*19-Nov-2019 15:13*
Surr: 1,2-Dichloroethane-d4	*87.8*			**0**	*81-118*	*%REC*	*25*	*19-Nov-2019 14:01*
Surr: 4-Bromofluorobenzene	*91.9*			**0**	*85-114*	*%REC*	*25*	*19-Nov-2019 14:01*
Surr: 4-Bromofluorobenzene	*93.0*			**0**	*85-114*	*%REC*	*250*	*19-Nov-2019 15:13*
Surr: Dibromofluoromethane	*93.7*			**0**	*80-119*	*%REC*	*250*	*19-Nov-2019 15:13*
Surr: Dibromofluoromethane	*94.3*			**0**	*80-119*	*%REC*	*25*	*19-Nov-2019 14:01*
Surr: Toluene-d8	*96.3*			**0**	*89-112*	*%REC*	*25*	*19-Nov-2019 14:01*
Surr: Toluene-d8	*95.1*			**0**	*89-112*	*%REC*	*250*	*19-Nov-2019 15:13*
ANIONS BY SW9056A		**Method:SW9056**						Analyst: KMU
Chloride	**308**		**2.00**	**5.00**	**5.00**	**mg/L**	10	14-Nov-2019 20:47
Nitrogen, Nitrate (As N)	0.100	U	0.0300	0.100	0.100	mg/L	1	14-Nov-2019 20:30
Sulfate	**316**		**2.00**	**5.00**	**5.00**	**mg/L**	10	14-Nov-2019 20:47

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

ALS Houston, US Date: 05-Dec-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Sample ID: 50WW13-191113
Collection Date: 13-Nov-2019 10:35

ANALYTICAL REPORT
WorkOrder:HS19110684
Lab ID:HS19110684-03
Matrix:Groundwater

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	27-Nov-2019 17:54
SUBCONTRACT ANALYSIS - RSK		**Method:NA**						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	05-Dec-2019 09:28
SUBCONTRACT ANALYSIS - TOC ANALYSIS		**Method:NA**						Analyst: SUBK
Subcontract Analysis	See Attached		0	0		NA	1	27-Nov-2019 09:14

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

ALS Houston, US Date: 05-Dec-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Sample ID: 50WW23-191113
Collection Date: 13-Nov-2019 11:40

ANALYTICAL REPORT
WorkOrder:HS19110684
Lab ID:HS19110684-04
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C	**Method:SW8260**							Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:13
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:13
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	19-Nov-2019 13:13
1,1,2-Trichlor-1,2,2-trifluoroethane	0.50	U	0.50	0.50	1.0	UG/L	1	19-Nov-2019 13:13
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:13
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:13
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:13
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:13
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	19-Nov-2019 13:13
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	19-Nov-2019 13:13
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	19-Nov-2019 13:13
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:13
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:13
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:13
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	19-Nov-2019 13:13
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:13
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	19-Nov-2019 13:13
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:13
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	19-Nov-2019 13:13
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:13
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	19-Nov-2019 13:13
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:13
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	19-Nov-2019 13:13
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:13
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	19-Nov-2019 13:13
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	19-Nov-2019 13:13
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:13
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	19-Nov-2019 13:13
Acetone	1.0	U	0.40	1.0	2.0	UG/L	1	19-Nov-2019 13:13
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:13
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	19-Nov-2019 13:13
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:13
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:13
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	19-Nov-2019 13:13
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	19-Nov-2019 13:13
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	19-Nov-2019 13:13
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	19-Nov-2019 13:13
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:13
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:13

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

ALS Houston, US Date: 05-Dec-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Sample ID: 50WW23-191113
Collection Date: 13-Nov-2019 11:40

ANALYTICAL REPORT
WorkOrder:HS19110684
Lab ID:HS19110684-04
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:13
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:13
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:13
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	19-Nov-2019 13:13
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:13
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:13
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:13
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:13
Hexachlorobutadiene	0.50	U	1.0	0.50	1.0	UG/L	1	19-Nov-2019 13:13
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:13
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	19-Nov-2019 13:13
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	19-Nov-2019 13:13
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	19-Nov-2019 13:13
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:13
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:13
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:13
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:13
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:13
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:13
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:13
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:13
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:13
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:13
Trichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:13
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 13:13
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 13:13
Surr: 1,2-Dichloroethane-d4	*88.6*			**0**	*81-118*	*%REC*	*1*	*19-Nov-2019 13:13*
Surr: 4-Bromofluorobenzene	*93.9*			**0**	*85-114*	*%REC*	*1*	*19-Nov-2019 13:13*
Surr: Dibromofluoromethane	*93.0*			**0**	*80-119*	*%REC*	*1*	*19-Nov-2019 13:13*
Surr: Toluene-d8	*95.1*			**0**	*89-112*	*%REC*	*1*	*19-Nov-2019 13:13*
ANIONS BY SW9056A		**Method:SW9056**						Analyst: KMU
Chloride	**1,290**		**4.00**	**10.0**	**10.0**	**mg/L**	20	14-Nov-2019 21:53
Nitrogen, Nitrate (As N)	**0.104**		**0.0300**	**0.100**	**0.100**	**mg/L**	1	14-Nov-2019 21:03
Sulfate	**181**		**4.00**	**10.0**	**10.0**	**mg/L**	20	14-Nov-2019 21:53
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		**Method:NA**						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	27-Nov-2019 17:54
SUBCONTRACT ANALYSIS - RSK		**Method:NA**						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	05-Dec-2019 09:28

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

ALS Houston, US Date: 05-Dec-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Sample ID: 50WW23-191113
Collection Date: 13-Nov-2019 11:40

ANALYTICAL REPORT
WorkOrder:HS19110684
Lab ID:HS19110684-04
Matrix:Groundwater

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
SUBCONTRACT ANALYSIS - TOC ANALYSIS		**Method:NA**						Analyst: SUBK
Subcontract Analysis	See Attached		0	0		NA	1	27-Nov-2019 09:14

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

ALS Houston, US Date: 05-Dec-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Sample ID: Trip Blank
Collection Date: 13-Nov-2019 00:00

ANALYTICAL REPORT
WorkOrder:HS19110684
Lab ID:HS19110684-05
Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C	**Method:SW8260**							Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:25
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:25
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	19-Nov-2019 12:25
1,1,2-Trichlor-1,2,2-trifluoroethane	0.50	U	0.50	0.50	1.0	UG/L	1	19-Nov-2019 12:25
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:25
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:25
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:25
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:25
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	19-Nov-2019 12:25
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	19-Nov-2019 12:25
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	19-Nov-2019 12:25
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:25
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:25
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:25
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	19-Nov-2019 12:25
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:25
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	19-Nov-2019 12:25
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:25
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	19-Nov-2019 12:25
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:25
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	19-Nov-2019 12:25
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:25
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	19-Nov-2019 12:25
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:25
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	19-Nov-2019 12:25
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	19-Nov-2019 12:25
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:25
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	19-Nov-2019 12:25
Acetone	1.0	U	0.40	1.0	2.0	UG/L	1	19-Nov-2019 12:25
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:25
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	19-Nov-2019 12:25
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:25
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:25
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	19-Nov-2019 12:25
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	19-Nov-2019 12:25
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	19-Nov-2019 12:25
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	19-Nov-2019 12:25
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:25
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:25

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

ALS Houston, US Date: 05-Dec-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Sample ID: Trip Blank
Collection Date: 13-Nov-2019 00:00

ANALYTICAL REPORT
WorkOrder:HS19110684
Lab ID:HS19110684-05
Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C	**Method:SW8260**							Analyst: PC
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:25
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:25
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:25
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	19-Nov-2019 12:25
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:25
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:25
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:25
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:25
Hexachlorobutadiene	0.50	U	1.0	0.50	1.0	UG/L	1	19-Nov-2019 12:25
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:25
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	19-Nov-2019 12:25
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	19-Nov-2019 12:25
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	19-Nov-2019 12:25
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:25
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:25
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:25
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:25
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:25
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:25
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:25
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:25
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:25
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:25
Trichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:25
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	19-Nov-2019 12:25
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	19-Nov-2019 12:25
Surr: 1,2-Dichloroethane-d4	*88.5*			**0**	*81-118*	*%REC*	*1*	*19-Nov-2019 12:25*
Surr: 4-Bromofluorobenzene	*90.8*			**0**	*85-114*	*%REC*	*1*	*19-Nov-2019 12:25*
Surr: Dibromofluoromethane	*93.8*			**0**	*80-119*	*%REC*	*1*	*19-Nov-2019 12:25*
Surr: Toluene-d8	*96.5*			**0**	*89-112*	*%REC*	*1*	*19-Nov-2019 12:25*

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

ALS Houston, US Date: 05-Dec-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
WorkOrder: HS19110684

DATES REPORT

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
Batch ID: R350580 (0)	**Test Name :** ANIONS BY SW9056A				**Matrix:** Groundwater	
HS19110684-01	50WW16-191113	13 Nov 2019 08:35			14 Nov 2019 19:07	1
HS19110684-02	50WW14-191113	13 Nov 2019 09:45			14 Nov 2019 20:13	10
HS19110684-02	50WW14-191113	13 Nov 2019 09:45			14 Nov 2019 19:57	1
HS19110684-03	50WW13-191113	13 Nov 2019 10:35			14 Nov 2019 20:47	10
HS19110684-03	50WW13-191113	13 Nov 2019 10:35			14 Nov 2019 20:30	1
HS19110684-04	50WW23-191113	13 Nov 2019 11:40			14 Nov 2019 21:53	20
HS19110684-04	50WW23-191113	13 Nov 2019 11:40			14 Nov 2019 21:03	1
Batch ID: R350853 (0)	**Test Name :** VOLATILES ORGANICS BY METHOD 8260C				**Matrix:** Water	
HS19110684-05	Trip Blank	13 Nov 2019 00:00			19 Nov 2019 12:25	1
Batch ID: R350853 (0)	**Test Name :** VOLATILES ORGANICS BY METHOD 8260C				**Matrix:** Groundwater	
HS19110684-01	50WW16-191113	13 Nov 2019 08:35			19 Nov 2019 12:49	1
HS19110684-02	50WW14-191113	13 Nov 2019 09:45			19 Nov 2019 13:37	1
HS19110684-03	50WW13-191113	13 Nov 2019 10:35			19 Nov 2019 15:13	250
HS19110684-03	50WW13-191113	13 Nov 2019 10:35			19 Nov 2019 14:01	25
HS19110684-04	50WW23-191113	13 Nov 2019 11:40			19 Nov 2019 13:13	1
Batch ID: R351402 (0)	**Test Name :** SUBCONTRACT ANALYSIS - TOC ANALYSIS				**Matrix:** Groundwater	
HS19110684-01	50WW16-191113	13 Nov 2019 08:35			27 Nov 2019 09:14	1
HS19110684-02	50WW14-191113	13 Nov 2019 09:45			27 Nov 2019 09:14	1
HS19110684-03	50WW13-191113	13 Nov 2019 10:35			27 Nov 2019 09:14	1
HS19110684-04	50WW23-191113	13 Nov 2019 11:40			27 Nov 2019 09:14	1
Batch ID: R351504 (0)	**Test Name :** SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)				**Matrix:** Groundwater	
HS19110684-01	50WW16-191113	13 Nov 2019 08:35			27 Nov 2019 17:54	1
HS19110684-02	50WW14-191113	13 Nov 2019 09:45			27 Nov 2019 17:54	1
HS19110684-03	50WW13-191113	13 Nov 2019 10:35			27 Nov 2019 17:54	1
HS19110684-04	50WW23-191113	13 Nov 2019 11:40			27 Nov 2019 17:54	1
Batch ID: R351815 (0)	**Test Name :** SUBCONTRACT ANALYSIS - RSK				**Matrix:** Groundwater	
HS19110684-01	50WW16-191113	13 Nov 2019 08:35			05 Dec 2019 09:28	1
HS19110684-02	50WW14-191113	13 Nov 2019 09:45			05 Dec 2019 09:28	1
HS19110684-03	50WW13-191113	13 Nov 2019 10:35			05 Dec 2019 09:28	1
HS19110684-04	50WW23-191113	13 Nov 2019 11:40			05 Dec 2019 09:28	1

ALS Houston, US Date: 05-Dec-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
WorkOrder: HS19110684

QC BATCH REPORT

Batch ID: R350853 (0) **Instrument: VOA6** **Method: VOLATILES ORGANICS BY METHOD 8260C**

MBLK Sample ID: **VBLKW-191119** Units: **UG/L** Analysis Date: **19-Nov-2019 12:01**
Client ID: Run ID: **VOA6_350853** SeqNo: **5351465** 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-Trichlor-1,2,2-trifluoroethane	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	0.50	1.0								U
1,2,3-Trichloropropane	0.50	1.0								U
1,2,4-Trichlorobenzene	0.50	1.0								U
1,2,4-Trimethylbenzene	0.50	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	0.50	1.0								U
1,3-Dichlorobenzene	0.50	1.0								U
1,3-Dichloropropane	0.50	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	0.50	1.0								U
2-Hexanone	1.0	2.0								U
4-Chlorotoluene	0.50	1.0								U
4-Isopropyltoluene	0.50	1.0								U
4-Methyl-2-pentanone	1.0	2.0								U
Acetone	1.0	2.0								U
Benzene	0.50	1.0								U
Bromobenzene	0.50	1.0								U
Bromochloromethane	0.50	1.0								U
Bromodichloromethane	0.50	1.0								U
Bromoform	0.50	1.0								U

ALS Houston, US Date: 05-Dec-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
WorkOrder: HS19110684

QC BATCH REPORT

Batch ID: R350853 (0) **Instrument: VOA6** **Method: VOLATILES ORGANICS BY METHOD 8260C**

MBLK Sample ID: **VBLKW-191119** Units: **UG/L** Analysis Date: **19-Nov-2019 12:01**
Client ID: Run ID: **VOA6_350853** SeqNo: **5351465** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Bromomethane	0.50	1.0								U
Carbon disulfide	1.0	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	0.50	1.0								U
Isopropylbenzene	0.50	1.0								U
m,p-Xylene	1.0	2.0								U
Methylene chloride	1.0	2.0								U
Naphthalene	0.50	1.0								U
n-Butylbenzene	0.50	1.0								U
n-Propylbenzene	0.50	1.0								U
o-Xylene	0.50	1.0								U
sec-Butylbenzene	0.50	1.0								U
Styrene	0.50	1.0								U
tert-Butylbenzene	0.50	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	*44.04*	*1.0*	*50*	*0*	*88.1*	*81 - 118*				
Surr: 4-Bromofluorobenzene	*45.89*	*1.0*	*50*	*0*	*91.8*	*85 - 114*				
Surr: Dibromofluoromethane	*46.85*	*1.0*	*50*	*0*	*93.7*	*80 - 119*				

ALS Houston, US Date: 05-Dec-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
WorkOrder: HS19110684

QC BATCH REPORT

Batch ID: R350853 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MBLK Sample ID: **VBLKW-191119** Units: **UG/L** Analysis Date: **19-Nov-2019 12:01**
Client ID: Run ID: **VOA6_350853** SeqNo: **5351465** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Surr: Toluene-d8	*47.73*	*1.0*	*50*	*0*	*95.5*	*89 - 112*				

ALS Houston, US Date: 05-Dec-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
WorkOrder: HS19110684

QC BATCH REPORT

Batch ID: R350853 (0) **Instrument: VOA6** **Method: VOLATILES ORGANICS BY METHOD 8260C**

LCS Sample ID: **VLCSW-191119** Units: **UG/L** Analysis Date: **19-Nov-2019 11:13**
Client ID: Run ID: **VOA6_350853** SeqNo: **5351464** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	19.92	1.0	20	0	99.6	78 - 124				
1,1,1-Trichloroethane	19.09	1.0	20	0	95.4	74 - 131				
1,1,2,2-Tetrachloroethane	18.89	1.0	20	0	94.5	71 - 121				
1,1,2-Trichlor-1,2,2-trifluoroethane	18.75	1.0	20	0	93.7	70 - 136				
1,1,2-Trichloroethane	19.59	1.0	20	0	97.9	80 - 119				
1,1-Dichloroethane	18.69	1.0	20	0	93.4	77 - 125				
1,1-Dichloroethene	19.41	1.0	20	0	97.1	71 - 131				
1,1-Dichloropropene	18.75	1.0	20	0	93.8	78 - 125				
1,2,3-Trichlorobenzene	25.58	1.0	20	0	128	69 - 129				
1,2,3-Trichloropropane	18.93	1.0	20	0	94.6	73 - 122				
1,2,4-Trichlorobenzene	23.15	1.0	20	0	116	69 - 130				
1,2,4-Trimethylbenzene	18.02	1.0	20	0	90.1	76 - 124				
1,2-Dibromo-3-chloropropane	21.26	1.0	20	0	106	62 - 128				
1,2-Dibromoethane	19.79	1.0	20	0	98.9	77 - 121				
1,2-Dichlorobenzene	19.05	1.0	20	0	95.3	80 - 119				
1,2-Dichloroethane	19.34	1.0	20	0	96.7	73 - 128				
1,2-Dichloropropane	19.06	1.0	20	0	95.3	78 - 122				
1,3,5-Trimethylbenzene	18.26	1.0	20	0	91.3	75 - 124				
1,3-Dichlorobenzene	19.14	1.0	20	0	95.7	80 - 119				
1,3-Dichloropropane	19.12	1.0	20	0	95.6	80 - 119				
1,4-Dichlorobenzene	19.16	1.0	20	0	95.8	79 - 118				
2,2-Dichloropropane	18.78	1.0	20	0	93.9	60 - 139				
2-Butanone	37.95	2.0	40	0	94.9	56 - 143				
2-Chlorotoluene	18.77	1.0	20	0	93.9	79 - 122				
2-Hexanone	38.68	2.0	40	0	96.7	57 - 139				
4-Chlorotoluene	18.19	1.0	20	0	91.0	78 - 122				
4-Isopropyltoluene	17.83	1.0	20	0	89.2	77 - 127				
4-Methyl-2-pentanone	37.45	2.0	40	0	93.6	67 - 130				
Acetone	44.32	2.0	40	0	111	39 - 160				
Benzene	19.82	1.0	20	0	99.1	79 - 120				
Bromobenzene	19.81	1.0	20	0	99.1	80 - 120				
Bromochloromethane	19.98	1.0	20	0	99.9	78 - 123				
Bromodichloromethane	19.49	1.0	20	0	97.4	79 - 125				
Bromoform	20.66	1.0	20	0	103	66 - 130				

ALS Houston, US Date: 05-Dec-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
WorkOrder: HS19110684

QC BATCH REPORT

Batch ID: R350853 (0) **Instrument: VOA6** **Method: VOLATILES ORGANICS BY METHOD 8260C**

LCS Sample ID: **VLCSW-191119** Units: **UG/L** Analysis Date: **19-Nov-2019 11:13**
Client ID: Run ID: **VOA6_350853** SeqNo: **5351464** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Bromomethane	20.64	1.0	20	0	103	53 - 141				
Carbon disulfide	39.04	2.0	40	0	97.6	64 - 133				
Carbon tetrachloride	19.26	1.0	20	0	96.3	72 - 136				
Chlorobenzene	19.07	1.0	20	0	95.4	82 - 118				
Chloroethane	18.65	1.0	20	0	93.2	60 - 138				
Chloroform	18.5	1.0	20	0	92.5	79 - 124				
Chloromethane	18.02	1.0	20	0	90.1	50 - 139				
cis-1,2-Dichloroethene	19.82	1.0	20	0	99.1	78 - 123				
cis-1,3-Dichloropropene	19.88	1.0	20	0	99.4	75 - 124				
Dibromochloromethane	19.94	1.0	20	0	99.7	74 - 126				
Dibromomethane	20.13	1.0	20	0	101	79 - 123				
Dichlorodifluoromethane	18.2	1.0	20	0	91.0	32 - 152				
Ethylbenzene	18.46	1.0	20	0	92.3	79 - 121				
Hexachlorobutadiene	20.08	1.0	20	0	100	66 - 134				
Isopropylbenzene	18.18	1.0	20	0	90.9	72 - 131				
m,p-Xylene	37.55	2.0	40	0	93.9	80 - 121				
Methylene chloride	18.48	2.0	20	0	92.4	74 - 124				
Naphthalene	21.27	1.0	20	0	106	61 - 128				
n-Butylbenzene	17.77	1.0	20	0	88.8	75 - 128				
n-Propylbenzene	18.12	1.0	20	0	90.6	76 - 126				
o-Xylene	18.7	1.0	20	0	93.5	78 - 122				
sec-Butylbenzene	17.7	1.0	20	0	88.5	77 - 126				
Styrene	18.98	1.0	20	0	94.9	78 - 123				
tert-Butylbenzene	18.1	1.0	20	0	90.5	78 - 124				
Tetrachloroethene	19.06	1.0	20	0	95.3	74 - 129				
Toluene	19	1.0	20	0	95.0	80 - 121				
trans-1,2-Dichloroethene	19.23	1.0	20	0	96.2	75 - 124				
trans-1,3-Dichloropropene	19.55	1.0	20	0	97.8	73 - 127				
Trichloroethene	20.12	1.0	20	0	101	79 - 123				
Trichlorofluoromethane	19.58	1.0	20	0	97.9	65 - 141				
Vinyl chloride	18.38	1.0	20	0	91.9	58 - 137				
Surr: 1,2-Dichloroethane-d4	*49.44*	*1.0*	*50*	*0*	*98.9*	*81 - 118*				
Surr: 4-Bromofluorobenzene	*47.61*	*1.0*	*50*	*0*	*95.2*	*85 - 114*				
Surr: Dibromofluoromethane	*50.9*	*1.0*	*50*	*0*	*102*	*80 - 119*				

ALS Houston, US Date: 05-Dec-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
WorkOrder: HS19110684

QC BATCH REPORT

Batch ID: R350853 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

LCS Sample ID: **VLCSW-191119** Units: **UG/L** Analysis Date: **19-Nov-2019 11:13**
Client ID: Run ID: **VOA6_350853** SeqNo: **5351464** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Surr: Toluene-d8	*46.86*	*1.0*	*50*	*0*	*93.7*	*89 - 112*				

ALS Houston, US Date: 05-Dec-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
WorkOrder: HS19110684

QC BATCH REPORT

Batch ID: R350853 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MS Sample ID: **HS19110684-04MS** Units: **UG/L** Analysis Date: **19-Nov-2019 14:25**
Client ID: **50WW23-191113** Run ID: **VOA6_350853** SeqNo: **5351471** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	19.81	1.0	20	0	99.1	78 - 124				
1,1,1-Trichloroethane	18.6	1.0	20	0	93.0	74 - 131				
1,1,2,2-Tetrachloroethane	18.11	1.0	20	0	90.5	71 - 121				
1,1,2-Trichlor-1,2,2-trifluoroethane	18.73	1.0	20	0	93.6	70 - 136				
1,1,2-Trichloroethane	18.96	1.0	20	0	94.8	80 - 119				
1,1-Dichloroethane	17.54	1.0	20	0	87.7	77 - 125				
1,1-Dichloroethene	18.9	1.0	20	0	94.5	71 - 131				
1,1-Dichloropropene	19.23	1.0	20	0	96.2	78 - 125				
1,2,3-Trichlorobenzene	19.94	1.0	20	0	99.7	69 - 129				
1,2,3-Trichloropropane	17.88	1.0	20	0	89.4	73 - 122				
1,2,4-Trichlorobenzene	19.72	1.0	20	0	98.6	69 - 130				
1,2,4-Trimethylbenzene	19.29	1.0	20	0	96.4	76 - 124				
1,2-Dibromo-3-chloropropane	18.08	1.0	20	0	90.4	62 - 128				
1,2-Dibromoethane	18.79	1.0	20	0	93.9	77 - 121				
1,2-Dichlorobenzene	19.56	1.0	20	0	97.8	80 - 119				
1,2-Dichloroethane	18.14	1.0	20	0	90.7	73 - 128				
1,2-Dichloropropane	18.07	1.0	20	0	90.3	78 - 122				
1,3,5-Trimethylbenzene	19.83	1.0	20	0	99.1	75 - 124				
1,3-Dichlorobenzene	19.91	1.0	20	0	99.6	80 - 119				
1,3-Dichloropropane	18.28	1.0	20	0	91.4	80 - 119				
1,4-Dichlorobenzene	19.5	1.0	20	0	97.5	79 - 118				
2,2-Dichloropropane	17.64	1.0	20	0	88.2	60 - 139				
2-Butanone	28.68	2.0	40	0	71.7	56 - 143				
2-Chlorotoluene	20.15	1.0	20	0	101	79 - 122				
2-Hexanone	33.48	2.0	40	0	83.7	57 - 139				
4-Chlorotoluene	19.15	1.0	20	0	95.8	78 - 122				
4-Isopropyltoluene	19.55	1.0	20	0	97.7	77 - 127				
4-Methyl-2-pentanone	34.17	2.0	40	0	85.4	67 - 130				
Acetone	26.63	2.0	40	0	66.6	39 - 160				
Benzene	19.15	1.0	20	0	95.7	79 - 120				
Bromobenzene	20.35	1.0	20	0	102	80 - 120				
Bromochloromethane	17.61	1.0	20	0	88.0	78 - 123				
Bromodichloromethane	18.48	1.0	20	0	92.4	79 - 125				
Bromoform	19.3	1.0	20	0	96.5	66 - 130				

ALS Houston, US Date: 05-Dec-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
WorkOrder: HS19110684

QC BATCH REPORT

Batch ID: R350853 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MS Sample ID: **HS19110684-04MS** Units: **UG/L** Analysis Date: **19-Nov-2019 14:25**
Client ID: **50WW23-191113** Run ID: **VOA6_350853** SeqNo: **5351471** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Bromomethane	20.03	1.0	20	0	100	53 - 141				
Carbon disulfide	37.43	2.0	40	0	93.6	64 - 133				
Carbon tetrachloride	20.23	1.0	20	0	101	72 - 136				
Chlorobenzene	19.02	1.0	20	0	95.1	82 - 118				
Chloroethane	17.72	1.0	20	0	88.6	60 - 138				
Chloroform	16.83	1.0	20	0	84.2	79 - 124				
Chloromethane	17.12	1.0	20	0	85.6	50 - 139				
cis-1,2-Dichloroethene	18.29	1.0	20	0	91.5	78 - 123				
cis-1,3-Dichloropropene	18.73	1.0	20	0	93.6	75 - 124				
Dibromochloromethane	19.48	1.0	20	0	97.4	74 - 126				
Dibromomethane	18.6	1.0	20	0	93.0	79 - 123				
Dichlorodifluoromethane	18.24	1.0	20	0	91.2	32 - 152				
Ethylbenzene	19.77	1.0	20	0	98.9	79 - 121				
Hexachlorobutadiene	17.54	1.0	20	0	87.7	66 - 134				
Isopropylbenzene	19.78	1.0	20	0	98.9	72 - 131				
m,p-Xylene	39.22	2.0	40	0	98.0	80 - 121				
Methylene chloride	16.66	2.0	20	0	83.3	74 - 124				
Naphthalene	16.9	1.0	20	0	84.5	61 - 128				
n-Butylbenzene	19.12	1.0	20	0	95.6	75 - 128				
n-Propylbenzene	20.33	1.0	20	0	102	76 - 126				
o-Xylene	19.21	1.0	20	0	96.1	78 - 122				
sec-Butylbenzene	19.9	1.0	20	0	99.5	77 - 126				
Styrene	18.96	1.0	20	0	94.8	78 - 123				
tert-Butylbenzene	20.39	1.0	20	0	102	78 - 124				
Tetrachloroethene	20.5	1.0	20	0	103	74 - 129				
Toluene	19.44	1.0	20	0	97.2	80 - 121				
trans-1,2-Dichloroethene	18.28	1.0	20	0	91.4	75 - 124				
trans-1,3-Dichloropropene	17.95	1.0	20	0	89.8	73 - 127				
Trichloroethene	21.07	1.0	20	0	105	79 - 123				
Trichlorofluoromethane	19.69	1.0	20	0	98.4	65 - 141				
Vinyl chloride	17.94	1.0	20	0	89.7	58 - 137				
Surr: 1,2-Dichloroethane-d4	*43.75*	*1.0*	*50*	*0*	*87.5*	*81 - 118*				
Surr: 4-Bromofluorobenzene	*46.39*	*1.0*	*50*	*0*	*92.8*	*85 - 114*				
Surr: Dibromofluoromethane	*46.61*	*1.0*	*50*	*0*	*93.2*	*80 - 119*				

ALS Houston, US Date: 05-Dec-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
WorkOrder: HS19110684

QC BATCH REPORT

Batch ID: R350853 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MS Sample ID: **HS19110684-04MS** Units: **UG/L** Analysis Date: **19-Nov-2019 14:25**
Client ID: **50WW23-191113** Run ID: **VOA6_350853** SeqNo: **5351471** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Surr: Toluene-d8	*47.97*	*1.0*	*50*	*0*	*95.9*	*89 - 112*				

ALS Houston, US Date: 05-Dec-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
WorkOrder: HS19110684

QC BATCH REPORT

Batch ID: R350853 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MSD Sample ID: **HS19110684-04MSD** Units: **UG/L** Analysis Date: **19-Nov-2019 14:49**
Client ID: **50WW23-191113** Run ID: **VOA6_350853** SeqNo: **5351472** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	19.6	1.0	20	0	98.0	78 - 124	19.81	1.08	20	
1,1,1-Trichloroethane	18.12	1.0	20	0	90.6	74 - 131	18.6	2.63	20	
1,1,2,2-Tetrachloroethane	18.46	1.0	20	0	92.3	71 - 121	18.11	1.93	20	
1,1,2-Trichlor-1,2,2-trifluoroethane	18.04	1.0	20	0	90.2	70 - 136	18.73	3.72	20	
1,1,2-Trichloroethane	18.85	1.0	20	0	94.3	80 - 119	18.96	0.555	20	
1,1-Dichloroethane	17.12	1.0	20	0	85.6	77 - 125	17.54	2.42	20	
1,1-Dichloroethene	18.15	1.0	20	0	90.7	71 - 131	18.9	4.05	20	
1,1-Dichloropropene	18.51	1.0	20	0	92.5	78 - 125	19.23	3.87	20	
1,2,3-Trichlorobenzene	23.4	1.0	20	0	117	69 - 129	19.94	16	20	
1,2,3-Trichloropropane	18.4	1.0	20	0	92.0	73 - 122	17.88	2.84	20	
1,2,4-Trichlorobenzene	21.65	1.0	20	0	108	69 - 130	19.72	9.33	20	
1,2,4-Trimethylbenzene	19.16	1.0	20	0	95.8	76 - 124	19.29	0.664	20	
1,2-Dibromo-3-chloropropane	20.12	1.0	20	0	101	62 - 128	18.08	10.7	20	
1,2-Dibromoethane	19.01	1.0	20	0	95.1	77 - 121	18.79	1.19	20	
1,2-Dichlorobenzene	19.39	1.0	20	0	96.9	80 - 119	19.56	0.903	20	
1,2-Dichloroethane	18.11	1.0	20	0	90.5	73 - 128	18.14	0.189	20	
1,2-Dichloropropane	17.85	1.0	20	0	89.3	78 - 122	18.07	1.21	20	
1,3,5-Trimethylbenzene	19.47	1.0	20	0	97.3	75 - 124	19.83	1.82	20	
1,3-Dichlorobenzene	19.81	1.0	20	0	99.0	80 - 119	19.91	0.54	20	
1,3-Dichloropropane	18.36	1.0	20	0	91.8	80 - 119	18.28	0.406	20	
1,4-Dichlorobenzene	19.54	1.0	20	0	97.7	79 - 118	19.5	0.193	20	
2,2-Dichloropropane	16.84	1.0	20	0	84.2	60 - 139	17.64	4.59	20	
2-Butanone	30.32	2.0	40	0	75.8	56 - 143	28.68	5.54	20	
2-Chlorotoluene	19.56	1.0	20	0	97.8	79 - 122	20.15	2.97	20	
2-Hexanone	33.58	2.0	40	0	84.0	57 - 139	33.48	0.3	20	
4-Chlorotoluene	18.73	1.0	20	0	93.7	78 - 122	19.15	2.2	20	
4-Isopropyltoluene	19.22	1.0	20	0	96.1	77 - 127	19.55	1.71	20	
4-Methyl-2-pentanone	34.54	2.0	40	0	86.3	67 - 130	34.17	1.06	20	
Acetone	28.33	2.0	40	0	70.8	39 - 160	26.63	6.2	20	
Benzene	18.59	1.0	20	0	92.9	79 - 120	19.15	2.96	20	
Bromobenzene	20.17	1.0	20	0	101	80 - 120	20.35	0.887	20	
Bromochloromethane	17.91	1.0	20	0	89.6	78 - 123	17.61	1.73	20	
Bromodichloromethane	18.7	1.0	20	0	93.5	79 - 125	18.48	1.16	20	
Bromoform	19.71	1.0	20	0	98.5	66 - 130	19.3	2.09	20	

ALS Houston, US Date: 05-Dec-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
WorkOrder: HS19110684

QC BATCH REPORT

Batch ID: R350853 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MSD Sample ID: **HS19110684-04MSD** Units: **UG/L** Analysis Date: **19-Nov-2019 14:49**
Client ID: **50WW23-191113** Run ID: **VOA6_350853** SeqNo: **5351472** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual
Bromomethane	19.44	1.0	20	0	97.2	53 - 141	20.03	2.97	20	
Carbon disulfide	35.96	2.0	40	0	89.9	64 - 133	37.43	4.02	20	
Carbon tetrachloride	19.37	1.0	20	0	96.9	72 - 136	20.23	4.31	20	
Chlorobenzene	18.71	1.0	20	0	93.6	82 - 118	19.02	1.63	20	
Chloroethane	17.34	1.0	20	0	86.7	60 - 138	17.72	2.2	20	
Chloroform	16.6	1.0	20	0	83.0	79 - 124	16.83	1.41	20	
Chloromethane	16.62	1.0	20	0	83.1	50 - 139	17.12	2.94	20	
cis-1,2-Dichloroethene	17.69	1.0	20	0	88.5	78 - 123	18.29	3.33	20	
cis-1,3-Dichloropropene	18.32	1.0	20	0	91.6	75 - 124	18.73	2.21	20	
Dibromochloromethane	19.22	1.0	20	0	96.1	74 - 126	19.48	1.36	20	
Dibromomethane	18.85	1.0	20	0	94.2	79 - 123	18.6	1.32	20	
Dichlorodifluoromethane	17.46	1.0	20	0	87.3	32 - 152	18.24	4.34	20	
Ethylbenzene	19.28	1.0	20	0	96.4	79 - 121	19.77	2.55	20	
Hexachlorobutadiene	18.32	1.0	20	0	91.6	66 - 134	17.54	4.32	20	
Isopropylbenzene	19.09	1.0	20	0	95.5	72 - 131	19.78	3.52	20	
m,p-Xylene	38.44	2.0	40	0	96.1	80 - 121	39.22	1.99	20	
Methylene chloride	16.67	2.0	20	0	83.4	74 - 124	16.66	0.0776	20	
Naphthalene	19.65	1.0	20	0	98.3	61 - 128	16.9	15.1	20	
n-Butylbenzene	18.79	1.0	20	0	94.0	75 - 128	19.12	1.73	20	
n-Propylbenzene	19.52	1.0	20	0	97.6	76 - 126	20.33	4.05	20	
o-Xylene	18.85	1.0	20	0	94.2	78 - 122	19.21	1.93	20	
sec-Butylbenzene	19.38	1.0	20	0	96.9	77 - 126	19.9	2.66	20	
Styrene	18.76	1.0	20	0	93.8	78 - 123	18.96	1.08	20	
tert-Butylbenzene	19.77	1.0	20	0	98.8	78 - 124	20.39	3.12	20	
Tetrachloroethene	19.74	1.0	20	0	98.7	74 - 129	20.5	3.79	20	
Toluene	18.94	1.0	20	0	94.7	80 - 121	19.44	2.58	20	
trans-1,2-Dichloroethene	17.8	1.0	20	0	89.0	75 - 124	18.28	2.66	20	
trans-1,3-Dichloropropene	18.18	1.0	20	0	90.9	73 - 127	17.95	1.29	20	
Trichloroethene	20.24	1.0	20	0	101	79 - 123	21.07	4.02	20	
Trichlorofluoromethane	18.72	1.0	20	0	93.6	65 - 141	19.69	5.04	20	
Vinyl chloride	16.92	1.0	20	0	84.6	58 - 137	17.94	5.86	20	
Surr: 1,2-Dichloroethane-d4	*43.66*	*1.0*	*50*	*0*	*87.3*	*81 - 118*	*43.75*	*0.193*	*20*	
Surr: 4-Bromofluorobenzene	*46.75*	*1.0*	*50*	*0*	*93.5*	*85 - 114*	*46.39*	*0.767*	*20*	
Surr: Dibromofluoromethane	*46.68*	*1.0*	*50*	*0*	*93.4*	*80 - 119*	*46.61*	*0.147*	*20*	

ALS Houston, US Date: 05-Dec-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
WorkOrder: HS19110684

QC BATCH REPORT

Batch ID: R350853 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MSD Sample ID: **HS19110684-04MSD** Units: **UG/L** Analysis Date: **19-Nov-2019 14:49**
Client ID: **50WW23-191113** Run ID: **VOA6_350853** SeqNo: **5351472** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Surr: Toluene-d8	*47.96*	*1.0*	*50*	*0*	*95.9*	*89 - 112*	*47.97*	*0.0235*	*20*	

The following samples were analyzed in this batch: HS19110684-01 HS19110684-02 HS19110684-03 HS19110684-04 HS19110684-05

ALS Houston, US Date: 05-Dec-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
WorkOrder: HS19110684

QC BATCH REPORT

Batch ID: R350580 (0) **Instrument: ICS-Integrion** **Method: ANIONS BY SW9056A**

MBLK Sample ID: **WBLKW1-111419** Units: **mg/L** Analysis Date: **14-Nov-2019 15:22**
Client ID: Run ID: **ICS-Integrion_350580** SeqNo: **5346117** 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
Nitrogen, Nitrate (As N)	0.100	0.100								U
Sulfate	0.500	0.500								U

LCS Sample ID: **WLCSW1-111419** Units: **mg/L** Analysis Date: **14-Nov-2019 15:39**
Client ID: Run ID: **ICS-Integrion_350580** SeqNo: **5346118** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	20.14	0.500	20	0	101	80 - 120				
Nitrogen, Nitrate (As N)	4.066	0.100	4	0	102	80 - 120				
Sulfate	19.78	0.500	20	0	98.9	80 - 120				

LCSD Sample ID: **WLCSDW1-111419** Units: **mg/L** Analysis Date: **14-Nov-2019 15:56**
Client ID: Run ID: **ICS-Integrion_350580** SeqNo: **5346119** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	20.1	0.500	20	0	100	80 - 120	20.14	0.204	20	
Nitrogen, Nitrate (As N)	4.065	0.100	4	0	102	80 - 120	4.066	0.0221	20	
Sulfate	19.79	0.500	20	0	98.9	80 - 120	19.78	0.0263	20	

MS Sample ID: **HS19110684-04MS** Units: **mg/L** Analysis Date: **14-Nov-2019 21:20**
Client ID: **50WW23-191113** Run ID: **ICS-Integrion_350580** SeqNo: **5346128** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	1245	0.500	10	1262	-164	80 - 120				SEO
Nitrogen, Nitrate (As N)	2.158	0.100	2	0.1042	103	80 - 120				
Sulfate	186.3	0.500	10	180.5	57.4	80 - 120				SEO

ALS Houston, US Date: 05-Dec-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
WorkOrder: HS19110684

QC BATCH REPORT

Batch ID: R350580 (0) **Instrument: ICS-Integrion** **Method: ANIONS BY SW9056A**

MS Sample ID: **HS19110684-04MS** Units: **mg/L** Analysis Date: **14-Nov-2019 22:10**
Client ID: **50WW23-191113** Run ID: **ICS-Integrion_350580** SeqNo: **5346131** PrepDate: DF: **20**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	1453	10.0	200	1288	82.4	80 - 120				O
Nitrogen, Nitrate (As N)	39.1	2.00	40	0	97.7	80 - 120				
Sulfate	367.5	10.0	200	181.5	93.0	80 - 120				

MSD Sample ID: **HS19110684-04MSD** Units: **mg/L** Analysis Date: **14-Nov-2019 21:36**
Client ID: **50WW23-191113** Run ID: **ICS-Integrion_350580** SeqNo: **5346129** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	1246	0.500	10	1262	-159	80 - 120	1245	0.0444	20	SEO
Nitrogen, Nitrate (As N)	2.117	0.100	2	0.1042	101	80 - 120	2.158	1.92	20	
Sulfate	186.3	0.500	10	180.5	58.2	80 - 120	186.3	0.0432	20	SEO

MSD Sample ID: **HS19110684-04MSD** Units: **mg/L** Analysis Date: **14-Nov-2019 22:26**
Client ID: **50WW23-191113** Run ID: **ICS-Integrion_350580** SeqNo: **5346132** PrepDate: DF: **20**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	1452	10.0	200	1288	81.6	80 - 120	1453	0.109	20	O
Nitrogen, Nitrate (As N)	39.2	2.00	40	0	98.0	80 - 120	39.1	0.271	20	
Sulfate	367.6	10.0	200	181.5	93.1	80 - 120	367.5	0.0397	20	

The following samples were analyzed in this batch: HS19110684-01 HS19110684-02 HS19110684-03 HS19110684-04

ALS Houston, US Date: 05-Dec-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
WorkOrder: **HS19110684**

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	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

Acronym	Description
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 Quantitaion Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Arkansas	19-028-0	27-Mar-2020
California	2919, 2019-2020	30-Apr-2020
Dept of Defense	ANAB L2231	20-Dec-2021
Florida	E87611-28	30-Jun-2020
Illinois	2000322019-2	09-May-2020
Kansas	E-10352 2019-2020	31-Jul-2020
Kentucky	123043, 2019-2020	30-Apr-2020
Louisiana	03087, 2019-2020	30-Jun-2020
Maryland	343, 2019-2020	30-Jun-2020
North Carolina	624-2019	31-Dec-2019
North Dakota	R-193 2019-2020	30-Apr-2020
Oklahoma	2019-067	31-Aug-2020
Texas	TX104704231-19-23	30-Apr-2020

ALS Houston, US Date: 05-Dec-19

Client: Aptim Environmental & Infrastucture, Inc.
Project: LHAAP-50 501032
Work Order: HS19110684

SAMPLE TRACKING

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19110684-01	50WW16-191113	Login	11/14/2019 10:12:04 AM	JRM	Sub
HS19110684-01	50WW16-191113	Login	11/14/2019 10:12:04 AM	JRM	WET118
HS19110684-01	50WW16-191113	Login	11/14/2019 10:12:04 AM	JRM	VOA135
HS19110684-01	50WW16-191113	Login	11/14/2019 10:12:04 AM	JRM	Sub
HS19110684-01	50WW16-191113	Login	11/14/2019 10:12:04 AM	JRM	Sub
HS19110684-01	50WW16-191113	Login	11/14/2019 10:12:04 AM	JRM	Sub

ALS Houston, US Date: 05-Dec-19

Sample Receipt Checklist

Client Name: CBI-Houston
Work Order: HS19110684
Date/Time Received: **14-Nov-2019 09:05**
Received by: **JRM**

Checklist completed by: *Jared R. Makan* eSignature 14-Nov-2019 Date
Reviewed by: *RJ Modashia* eSignature 14-Nov-2019 Date

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:N/A
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):	1.3°C / 1.3°C UC/C	IR11	
Cooler(s)/Kit(s):	24602		
Date/Time sample(s) sent to storage:	11/14/2019 10:20		
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:

APTIM

COC ID: 50NOV2019-1911_-ALS

TURNAROUND TIME:

RUSH:

Page 1 of

PROJECT/CLIENT INFO

Facility Name	Longhorn AAP
Project Number	501032
	LHAAP-50
Address	1203-B East Grand Avenue
	PMB 202
City	Marshall
State	TX
Postal Code	75670
Country	USA
Phone Number	713.243.7264
Project Manager	Praveen Srivastav

LABORATORY

Lab Name	ALS Laboratories
Lab Contact	RJ Modashia
Email	RJ.Modashia@alsglobal.com
Address	10450 Stancliff Rd., Suite 210
City	Houston
State	TX
Postal Code	77099
Country	USA
Phone Number	281.575.2279 or 281.530.5656

OTHER INFO

Email Invoice To	FedInvoices@aptim.com
Email Report To	Susan.Huang@aptim.com
Mail Reports To	Susan Huang
Address	4005 Port Chicago Highway, Suite 200
City	Concord
State	CA
Postal Code	94520
Country	USA
Shipping Company	

SAMPLE DETAILS

ANALYSIS REQUESTED

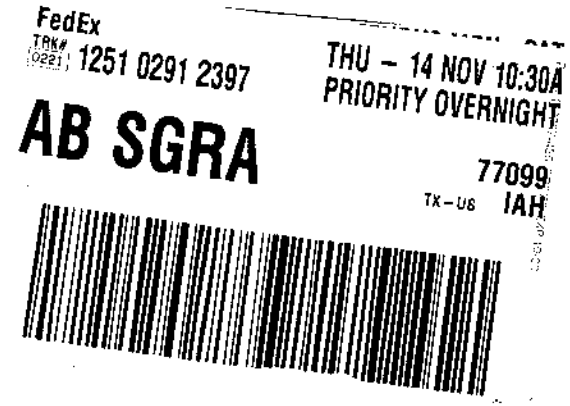
Sample ID	Location	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	# Of Cont.	Sample Container and Preservatives	3-40 ml VOA/HCL	3-40 ml VOA/HCL	3-40 ml VOA/Cool to 6 deg C	2-40ml Amber/H2SO4	1-250ml /Cool to 6 deg C	1-125ml /Cool to 6 deg C
									ANALYSIS	Vocs by 8260B	MEE by RSK175	CO2 by RSK175	TOC by Sm5310C	Anions (chloride/sulfite/nitrate) by 9056	Perchlorate by 6850
SDWW16-191113	LHAAP 50				WG	11/13/19	0835	13		X	X	X	X	X	X
SD WW14-191113	LHAAP50				WG	11/13/19	0945	13		X	X	X	X	X	X
SDWW13-191113	LHAAP50				WG	11/13/19	1035	13		X	X	X	X	X	X
SDWW23-191113	LHAAP50				WG	11/13/19	1140	13		X	X	X	X	X	X
SDWW23-191113-MS	LHAAP50				WG	11/13/19	1140	13		X	X	X	X	X	X
SDWW23 191113-MSD	LHAAP50				WG	11/13/19	1140	13		X	X	X	X	X	X
TRIP BLANK	LHAAP50				WO	11/13/19		2		X					

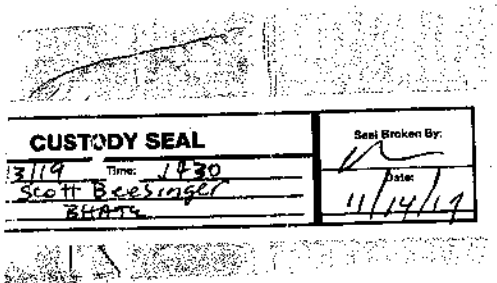
HS19110684

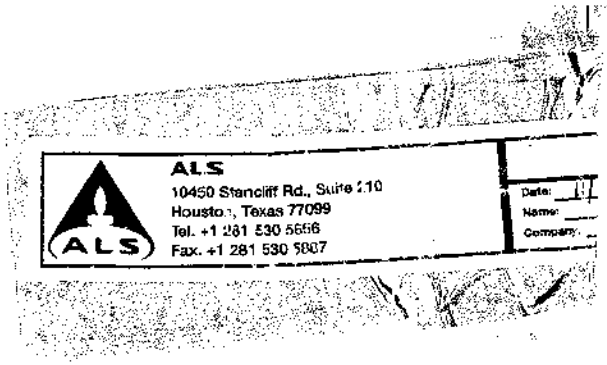
Aptim Environmental & Infrastucture, Inc.

LHAAP-50 501032

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Cooler - 24602 Temp 1.3 1N2S CFOO	BHATT	11/13/19 1430	J. mmmm	11/14/19 09:05


FedEx
TRK# 0221 1251 0291 2397
THU – 14 NOV 10:30A
PRIORITY OVERNIGHT
AB SGRA
77099
TX-US IAH


CUSTODY SEAL
Seal Broken By:
Time: 1430
Scott Beesinger
BHATS
Date: 11/14/19


ALS
10450 Stancliff Rd., Suite 210
Houston, Texas 77099
Tel. +1 281 530 5656
Fax. +1 281 530 5887
ALS
Date:
Name:
Company:

ALS Environmental
ALS Group USA, Corp
1317 South 13th Avenue
Kelso, WA 98626
T : +1 360 577 7222
F : +1 360 636 1068
www.alsglobal.com

November 26, 2019

Analytical Report for Service Request No: K1910796

RJ Modashia
ALS Laboratory Group
10450 Stancliff Road
Suite 210
Houston, TX 77099-4338

RE: HS19110684

Dear RJ,

Enclosed are the results of the sample(s) submitted to our laboratory November 15, 2019
For your reference, these analyses have been assigned our service request number **K1910796.**

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3350. You may also contact me via email at Kelley.Lovejoy@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Kelley Lovejoy

Kelley Lovejoy
Project Manager

RIGHT SOLUTIONS | RIGHT PARTNER

ALS Environmental
ALS Group USA, Corp
1317 South 13th Avenue
Kelso, WA 98626
T : +1 360 577 7222
F : +1 360 636 1068
www.alsglobal.com

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Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimated value.
J	The result is an estimated value.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
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.
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.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L16-58-R4
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjlabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water-	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

Case Narrative

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

1317 South 13th Ave, Kelso, WA 98626 | 1-360-577-7222 | www.alsglobal.com

Client: ALS Environmental - US
Project: HS19110684
Sample Matrix: Ground Water

Service Request: K1910796
Date Received: 11/15/2019

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier level IV requested by the client.

Sample Receipt:

Four ground water samples were received for analysis at ALS Environmental on 11/15/2019. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

General Chemistry:

Method SM 5310 C, 11/23/2019: The Relative Percent Difference (RPD) criterion for the replicate analysis of Total Organic Carbon in sample 50WW14-191113 was not applicable because the analyte concentration was not significantly greater than the Method Reporting Limit (MRL). Analytical values derived from measurements close to the detection limit are not subject to the same accuracy and precision criteria as results derived from measurements higher on the calibration range for the method.

Approved by Kelley Lovejoy Date 11/26/2019

Chain of Custody

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

K1910796

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: **Texas** **COC ID:** **12632**

SUBCONTRACT TO:

ALS Environmental Kelso
1317 S. 13th Avenue
Kelso, WA 98626

Phone: +1 360 501 3312

CUSTOMER INFORMATION:

Company:	ALS Houston
Contact:	RJ Modashia
Address:	10450 Stancliff Rd, Ste 210
Phone:	+1 281 530 5656
Email:	RJ.Modashia@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:	HS19110684
TSR:	Sonia West

	LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
	ANALYSIS REQUESTED			DUE DATE
1.	**HS19110684-01**	**50WW16-191113**	**Groundwater**	**13 Nov 2019 08:35**
	TOC Analysis with DOD Level IV/EQuIS APTIM EDD			02 Dec 2019
2.	**HS19110684-02**	**50WW14-191113**	**Groundwater**	**13 Nov 2019 09:45**
	TOC Analysis with DOD Level IV/EQuIS APTIM EDD			02 Dec 2019
3.	**HS19110684-03**	**50WW13-191113**	**Groundwater**	**13 Nov 2019 10:35**
	TOC Analysis with DOD Level IV/EQuIS APTIM EDD			02 Dec 2019
4.	**HS19110684-04**	**50WW23-191113**	**Groundwater**	**13 Nov 2019 11:40**
	TOC Analysis with DOD Level IV/EQuIS APTIM EDD			02 Dec 2019

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

HS19110684-04 MS/MSD

QC Level: DOD IV (DoD Data Package)

Relinquished By: _____ Date/Time: 11/14/19 1800.

Received By: _____ Date/Time: 11/15/19 0950

Cooler ID(s): _____ Temperature(s): _____

PC KL

Cooler Receipt and Preservation Form

Client ACS Houston Service Request K19 10791p

Received: 11/15/2019 Opened: 11/15/19 By: MM Unloaded: 11/15/19 By: MM

1. Samples were received via? *USPS* (*Fed Ex*) *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) (*Cooler*) *Box* *Envelope* *Other* _____ *NA*
3. Were custody seals on coolers? NA (Y) N If yes, how many and where? 2 front
   If present, were custody seals intact? (Y) N If present, were they signed and dated? (Y) N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID NA	Tracking Number NA	Filed
-0.3	-0.4	1.7	1.6	-0.1	381	12632	1251 0291 8270	

4. Packing material: *Inserts* (*Baggies*) (*Bubble Wrap*) *Gel Packs* (*Wet Ice*) *Dry Ice* *Sleeves* _____
5. Were custody papers properly filled out (ink, signed, etc.)? NA (Y) N
6. Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.* NA (Y) N
   If applicable, tissue samples were received: ***Frozen*** ***Partially Thawed*** ***Thawed***
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA (Y) N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA (Y) N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA (Y) N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA (Y) N
11. Were VOA vials received without headspace? *Indicate in the table below.* (NA) Y N
12. Was C12/Res negative? (NA) Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

General Chemistry

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	ALS Environmental - US	**Service Request:**	K1910796
Project:	HS19110684	**Date Collected:**	11/13/19
Sample Matrix:	Ground Water	**Date Received:**	11/15/19
Analysis Method:	SM 5310 C	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA

Carbon, Total Organic

Sample Name	Lab Code	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
50WW16-191113	K1910796-001	**1.05**	0.50	0.20	0.07	1	11/23/19 21:30	
50WW14-191113	K1910796-002	**0.88**	0.50	0.20	0.07	1	11/23/19 21:59	
50WW13-191113	K1910796-003	**1.78**	0.50	0.20	0.07	1	11/23/19 22:27	
50WW23-191113	K1910796-004	**0.20 J**	0.50	0.20	0.07	1	11/23/19 20:18	
Method Blank	K1910796-MB	ND U	0.50	0.20	0.07	1	11/23/19 17:14	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	K1910796
Project	HS19110684	**Date Collected:**	11/13/19
Sample Matrix:	Ground Water	**Date Received:**	11/15/19
Analysis Method:	SM 5310 C	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA

Replicate Sample Summary
Carbon, Total Organic

Sample Name:	Lab Code:	LOQ	LOD	MDL	Sample Result	Duplicate Result	Average	RPD	RPD Limit	Date Analyzed
50WW16-191113	K1910796-001DUP	0.50	0.20	0.07	1.05	1.14	1.09	8	10	11/23/19
50WW14-191113	K1910796-002DUP	0.50	0.20	0.07	0.88	0.77	0.823	14 *	10	11/23/19
50WW13-191113	K1910796-003DUP	0.50	0.20	0.07	1.78	1.75	1.77	1	10	11/23/19
50WW23-191113	K1910796-004DUP	0.50	0.20	0.07	0.20 J	0.21 J	0.204	6	10	11/23/19

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

Results flagged with a pound (#) indicate the control criteria is not applicable.

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

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	K1910796
Project:	HS19110684	**Date Collected:**	11/13/19
Sample Matrix:	Ground Water	**Date Received:**	11/15/19
		Date Analyzed:	11/23/19
		Date Extracted:	NA

Matrix Spike Summary
Carbon, Total Organic

Sample Name:	50WW23-191113	**Units:**	mg/L
Lab Code:	K1910796-004	**Basis:**	NA
Analysis Method:	SM 5310 C		
Prep Method:	None		

Matrix Spike
K1910796-004MS

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Carbon, Total Organic	0.20 J	22.5	25.0	89	83-117

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

Results flagged with a pound (#) indicate the control criteria is not applicable.

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

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	K1910796
Project:	HS19110684	**Date Analyzed:**	11/23/19
Sample Matrix:	Ground Water	**Date Extracted:**	NA

Lab Control Sample Summary
Carbon, Total Organic

Analysis Method:	SM 5310 C	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	661076

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1910796-LCS	24.7	25.0	99	83-117

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US **Service Request:** K1910796
Project: HS19110684

Continuing Calibration Verification (CCV) Summary

Carbon, Total Organic

Analysis Method: SM 5310 C **Units:** mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance Limits
CCV1	661076	KQ1917446-01	11/23/19 16:45	25.0	24.5	98	90-110
CCV2	661076	KQ1917446-02	11/23/19 21:01	25.0	24.6	98	90-110
CCV3	661076	KQ1917446-03	11/24/19 02:11	25.0	24.6	98	90-110
CCV4	661076	KQ1917446-04	11/24/19 06:54	25.0	24.2	97	90-110

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US **Service Request:**K1910796
Project: HS19110684

Continuing Calibration Blank (CCB) Summary
Carbon, Total Organic

Analysis Method: SM 5310 C **Units:**mg/L

	Analysis Lot	Lab Code	Date Analyzed	LOQ	LOD	MDL	Result	Q
CCB1	661076	KQ1917446-05	11/23/19 16:59	0.50	0.20	0.07	ND	U
CCB2	661076	KQ1917446-06	11/23/19 21:15	0.50	0.20	0.07	ND	U
CCB3	661076	KQ1917446-07	11/24/19 02:26	0.50	0.20	0.07	ND	U
CCB4	661076	KQ1917446-08	11/24/19 07:09	0.50	0.20	0.07	ND	U

Raw Data

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

General Chemistry

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

Work Request # Original ( ) K1910680, 796, 847, 861, 929, 969, 11031, 11032, 11033, 10803, 11028, 11032, 11047, 11049, 975, 11043

Tier: II IV IV II II I IV IV IV IV V IV II II I II

Date Analyzed: 11/23/19

Analyst: BCP

Run # TOC: 661076, 661077, 661078 DOC: 661079

Analysis: TOC/DOC

DATA QUALITY REPORT
INORGANICS

Explain any "no" responses to questions below, and any corrective actions in the comments section below.

1.	Is the method name and number correct and appropriate?	yes/no/NA
2.	Holding times met for all analyses and for all samples?	yes/no/NA
3.	Are calculations correct?	yes/no/NA
4.	Is the reporting basis correct? (Dry Weight)	yes/no/NA
5.	All quality control criteria met?	yes/no
6.	Is the calibration curve correlation coefficient ≥ 0.995?	yes/no/NA
7.	MBs, CCVs, CCBs, LCSs, Dups, and Spikes, analyzed at proper frequency?	yes/no/NA
8.	Are ICVs, CCVs, and CCBs all within acceptance limits?	yes/no/NA
9.	Are results for methods blanks all ND?	yes/no/NA
10.	Are all QC samples within acceptance criteria? (LCS % rec, MS/DMS % rec, DUP or MS/DMS RPDs, etc.)	yes/no/NA
11.	Are all exceptions explained?	yes/no/NA
12.	Have all applicable service requests been reviewed?	yes/no/NA
13.	Are all samples labeled correctly?	yes/no/NA
14.	Have all instructions on the service request been followed? (e.g. Special MRLs, QC on a specific sample, Form V)	yes/no/NA
15.	Are detection limits and units reported correctly?	yes/no/NA
16.	Is the unused space on the benchsheet crossed out?	yes/no/NA
17.	Was analysis turned in by the due date? (n-2) (If not record SR#)	yes/no/NA

COMMENTS: K1910847-4/4d, K1910803-2/2d, 803-4/4d sent for CA due to being above calibration curve.
K1910803-3/3d, 803-5/5d sent for CA due to sample carry over.
K1911043-2 sent for CA due to being overdiluted.
K1910680-2/2d, 680-4/4d, 680-5/5d, 796-2/2d, 929-2/2d, 11031-1/1d, 11028-3/3d, and 10975-1/1d report a high %RSD. However these samples are less than 5x the MRL.
K1911033-6/6d, 11033-7/7d, 10803-3, 10803-5, 11047-1/1d report a high %RSD due to suspected non-homogenous samples

Final Approved by: _____ Date: 11/26/19

DQREPORT

Analytical Results Summary

Instrument Name: K-TOC-03 **Analyst:** BDITZLER **Analysis Lot:** 661076 **Method/Testcode:** SM 5310 C/TOC T

Lab Code	Target Analytes	QC	Parent Sample	Matrix	Raw Result	Sample Amt.	Final Result	Dil	MDL	PQL	% Rec	% RSD	Date Analyzed	QC?	Tier
K1910680-001	Carbon, Total Organic	N/A		Water	0.36 mg/L	10 ml	0.36 mg/L J	1	0.07	0.50			11/23/19 17:58	N	II
K1910680-002	Carbon, Total Organic	N/A		Water	0.30 mg/L	10 ml	0.30 mg/L J	1	0.07	0.50			11/23/19 18:26	N	II
K1910680-003	Carbon, Total Organic	N/A		Water	0.63 mg/L	10 ml	0.63 mg/L	1	0.07	0.50			11/23/19 18:54	N	II
K1910680-004	Carbon, Total Organic	N/A		Water	0.56 mg/L	10 ml	0.56 mg/L	1	0.07	0.50			11/23/19 19:22	N	II
K1910680-005	Carbon, Total Organic	N/A		Water	0.17 mg/L	10 ml	0.17 mg/L J	1	0.07	0.50			11/23/19 19:50	N	II
K1910796-001	Carbon, Total Organic	N/A		Ground Water	1.05 mg/L	10 ml	1.05 mg/L	1	0.07	0.50			11/23/19 21:30	N	IV
K1910796-002	Carbon, Total Organic	N/A		Ground Water	0.88 mg/L	10 ml	0.88 mg/L	1	0.07	0.50			11/23/19 21:59	N	IV
K1910796-003	Carbon, Total Organic	N/A		Ground Water	1.78 mg/L	10 ml	1.78 mg/L	1	0.07	0.50			11/23/19 22:27	N	IV
K1910796-004	Carbon, Total Organic	N/A		Ground Water	0.20 mg/L	10 ml	0.20 mg/L J	1	0.07	0.50			11/23/19 20:18	Y	IV
K1910847-001	Carbon, Total Organic	N/A		Ground Water	34.01 mg/L	10 ml	680 mg/L	20	2	10			11/23/19 22:55	N	IV
K1910847-002	Carbon, Total Organic	N/A		Ground Water	32.82 mg/L	10 ml	32.8 mg/L	1	0.07	0.50			11/23/19 23:23	N	IV
K1910847-003	Carbon, Total Organic	N/A		Ground Water	35.27 mg/L	10 ml	35.3 mg/L	1	0.07	0.50			11/23/19 23:51	N	IV
K1910847-004	Carbon, Total Organic	N/A		Ground Water	61.27 mg/L	10 ml	61.3 mg/L	1	0.07	0.50			11/24/19 00:19	N	IV
K1910861-001	Carbon, Total Organic	N/A		Water	7.26 mg/L	10 ml	726 mg/L	100	7	50			11/24/19 00:47	N	II
K1910861-002	Carbon, Total Organic	N/A		Water	5.98 mg/L	10 ml	598 mg/L	100	7	50			11/24/19 01:15	N	II
K1910861-003	Carbon, Total Organic	N/A		Water	5.96 mg/L	10 ml	596 mg/L	100	7	50			11/24/19 01:43	N	II
K1910861-004	Carbon, Total Organic	N/A		Water	7.78 mg/L	10 ml	778 mg/L	100	7	50			11/24/19 03:10	N	II
K1910861-005	Carbon, Total Organic	N/A		Water	7.46 mg/L	10 ml	746 mg/L	100	7	50			11/24/19 03:38	N	II
K1910861-006	Carbon, Total Organic	N/A		Water	10.75 mg/L	10 ml	1080 mg/L	100	7	50			11/24/19 04:06	N	II
K1910861-007	Carbon, Total Organic	N/A		Water	8.35 mg/L	10 ml	835 mg/L	100	7	50			11/24/19 04:34	N	II
KQ1917446-01	Carbon, Total Organic	CCV		Water	24.53 mg/L	10 ml	24.5 mg/L	1					11/23/19 16:45	N	II
KQ1917446-02	Carbon, Total Organic	CCV		Water	24.61 mg/L	10 ml	24.6 mg/L	1					11/23/19 21:01	N	II
KQ1917446-03	Carbon, Total Organic	CCV		Water	24.56 mg/L	10 ml	24.6 mg/L	1					11/24/19 02:11	N	II
KQ1917446-04	Carbon, Total Organic	CCV		Water	24.22 mg/L	10 ml	24.2 mg/L	1					11/24/19 06:54	N	II
KQ1917446-05	Carbon, Total Organic	CCB		Water	-0.04 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			11/23/19 16:59	N	II
KQ1917446-06	Carbon, Total Organic	CCB		Water	-0.04 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			11/23/19 21:15	N	II
KQ1917446-07	Carbon, Total Organic	CCB		Water	-0.01 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			11/24/19 02:26	N	II
KQ1917446-08	Carbon, Total Organic	CCB		Water	-0.04 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			11/24/19 07:09	N	II
KQ1917446-09	Carbon, Total Organic	MB		Water	-0.04 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			11/23/19 17:14	N	II
KQ1917446-10	Carbon, Total Organic	LCS		Water	24.74 mg/L	10 ml	24.7 mg/L	1	0.07	0.50	99		11/23/19 17:29	N	II
KQ1917446-11	Carbon, Total Organic	MS	K1910796-004	Ground Water	22.48 mg/L	10 ml	22.5 mg/L	1	0.07	0.50	89		11/23/19 20:46	N	IV

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

11/26/19

Analytical Results Summary

Instrument Name: K-TOC-03 **Analyst:** BDITZLER **Analysis Lot:** 661076 **Method/Testcode:** SM 5310 C/TOC T

Lab Code	Target Analytes	QC	Parent Sample	Matrix	Raw Result	Sample Amt.	Final Result	Dil	MDL	PQL	% Rec	% RSD	Date Analyzed	QC?	Tier
KQ1917446-12	Carbon, Total Organic	DUP	K1910680-001	Water	0.36 mg/L	10 ml	0.36 mg/L J	1	0.07	0.50		2	11/23/19 17:58	N	II
KQ1917446-13	Carbon, Total Organic	DUP	K1910680-002	Water	0.26 mg/L	10 ml	0.26 mg/L J	1	0.07	0.50		13*	11/23/19 18:26	N	II
KQ1917446-14	Carbon, Total Organic	DUP	K1910680-003	Water	0.61 mg/L	10 ml	0.61 mg/L	1	0.07	0.50		3	11/23/19 18:54	N	II
KQ1917446-15	Carbon, Total Organic	DUP	K1910680-004	Water	0.67 mg/L	10 ml	0.67 mg/L	1	0.07	0.50		17*	11/23/19 19:22	N	II
KQ1917446-16	Carbon, Total Organic	DUP	K1910680-005	Water	0.20 mg/L	10 ml	0.20 mg/L J	1	0.07	0.50		15*	11/23/19 19:50	N	II
KQ1917446-17	Carbon, Total Organic	DUP	K1910796-002	Ground Water	0.77 mg/L	10 ml	0.77 mg/L	1	0.07	0.50		14*	11/23/19 21:59	N	IV
KQ1917446-18	Carbon, Total Organic	DUP	K1910796-001	Ground Water	1.14 mg/L	10 ml	1.14 mg/L	1	0.07	0.50		8	11/23/19 21:30	N	IV
KQ1917446-19	Carbon, Total Organic	DUP	K1910796-003	Ground Water	1.75 mg/L	10 ml	1.75 mg/L	1	0.07	0.50		1	11/23/19 22:27	N	IV
KQ1917446-20	Carbon, Total Organic	DUP	K1910796-004	Ground Water	0.21 mg/L	10 ml	0.21 mg/L J	1	0.07	0.50		6	11/23/19 20:18	N	IV
KQ1917446-21	Carbon, Total Organic	DUP	K1910847-002	Ground Water	32.44 mg/L	10 ml	32.4 mg/L	1	0.07	0.50		1	11/23/19 23:23	N	IV
KQ1917446-22	Carbon, Total Organic	DUP	K1910847-001	Ground Water	33.78 mg/L	10 ml	676 mg/L	20	2	10		<1	11/23/19 22:55	N	IV
KQ1917446-23	Carbon, Total Organic	DUP	K1910847-003	Ground Water	34.76 mg/L	10 ml	34.8 mg/L	1	0.07	0.50		1	11/23/19 23:51	N	IV
KQ1917446-24	Carbon, Total Organic	DUP	K1910847-004	Ground Water	60.91 mg/L	10 ml	60.9 mg/L	1	0.07	0.50		<1	11/24/19 00:19	N	IV
KQ1917446-25	Carbon, Total Organic	DUP	K1910861-001	Water	6.74 mg/L	10 ml	674 mg/L	100	7	50		7	11/24/19 00:47	N	II
KQ1917446-26	Carbon, Total Organic	DUP	K1910861-002	Water	5.82 mg/L	10 ml	582 mg/L	100	7	50		3	11/24/19 01:15	N	II
KQ1917446-27	Carbon, Total Organic	DUP	K1910861-003	Water	5.90 mg/L	10 ml	590 mg/L	100	7	50		1	11/24/19 01:43	N	II
KQ1917446-28	Carbon, Total Organic	DUP	K1910861-004	Water	7.76 mg/L	10 ml	776 mg/L	100	7	50		<1	11/24/19 03:10	N	II
KQ1917446-29	Carbon, Total Organic	DUP	K1910861-005	Water	7.41 mg/L	10 ml	741 mg/L	100	7	50		<1	11/24/19 03:38	N	II
KQ1917446-30	Carbon, Total Organic	DUP	K1910861-006	Water	10.62 mg/L	10 ml	1060 mg/L	100	7	50		1	11/24/19 04:06	N	II
KQ1917446-31	Carbon, Total Organic	DUP	K1910861-007	Water	8.16 mg/L	10 ml	816 mg/L	100	7	50		2	11/24/19 04:34	N	II

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

Analytical Results Summary

Instrument Name: K-TOC-03 **Analyst:** BDITZLER **Analysis Lot:** 661077 **Method/Testcode:** SM 5310 C/TOC T

Lab Code	Target Analytes	QC	Parent Sample	Matrix	Raw Result	Sample Amt.	Final Result	Dil	MDL	PQL	% Rec	% RSD	Date Analyzed	QC?	Tier
K1910929-001	Carbon, Total Organic	N/A		Water	1.49 mg/L	10 ml	1.49 mg/L	1	0.07	0.50			11/24/19 05:02	N	II
K1910929-002	Carbon, Total Organic	N/A		Water	0.79 mg/L	10 ml	0.79 mg/L	1	0.07	0.50			11/24/19 05:30	N	II
K1910929-003	Carbon, Total Organic	N/A		Water	1.91 mg/L	10 ml	1.91 mg/L	1	0.07	0.50			11/24/19 05:58	N	II
K1910969-002	Carbon, Total Organic	N/A		Drinking Water	1.16 mg/L	10 ml	1.16 mg/L	1	0.07	0.50			11/24/19 06:26	N	I
K1911031-001	Carbon, Total Organic	N/A		Water	0.90 mg/L	10 ml	0.90 mg/L	1	0.07	0.50			11/24/19 12:50	N	IV
K1911032-001	Carbon, Total Organic	N/A		Ground Water	1.54 mg/L	10 ml	1.54 mg/L	1	0.07	0.50			11/24/19 13:19	N	IV
K1911032-002	Carbon, Total Organic	N/A		Ground Water	1.55 mg/L	10 ml	1.55 mg/L	1	0.07	0.50			11/24/19 13:47	N	IV
K1911032-003	Carbon, Total Organic	N/A		Ground Water	1.59 mg/L	10 ml	1.59 mg/L	1	0.07	0.50			11/24/19 14:15	N	IV
K1911032-004	Carbon, Total Organic	N/A		Ground Water	2.02 mg/L	10 ml	2.02 mg/L	1	0.07	0.50			11/24/19 14:43	N	IV
K1911032-005	Carbon, Total Organic	N/A		Ground Water	4.63 mg/L	10 ml	1850 mg/L	400	30	200			11/24/19 15:11	N	IV
K1911032-006	Carbon, Total Organic	N/A		Ground Water	1.99 mg/L	10 ml	1.99 mg/L	1	0.07	0.50			11/24/19 15:39	N	IV
K1911033-001	Carbon, Total Organic	N/A		Ground Water	3.66 mg/L	10 ml	3.66 mg/L	1	0.07	0.50			11/24/19 07:24	N	IV
K1911033-002	Carbon, Total Organic	N/A		Ground Water	2.81 mg/L	10 ml	2.81 mg/L	1	0.07	0.50			11/24/19 07:52	N	IV
K1911033-003	Carbon, Total Organic	N/A		Ground Water	2.80 mg/L	10 ml	2.80 mg/L	1	0.07	0.50			11/24/19 08:20	N	IV
K1911033-004	Carbon, Total Organic	N/A		Ground Water	2.38 mg/L	10 ml	2.38 mg/L	1	0.07	0.50			11/24/19 08:48	N	IV
K1911033-005	Carbon, Total Organic	N/A		Ground Water	39.57 mg/L	10 ml	791 mg/L	20	2	10			11/24/19 09:16	N	IV
K1911033-006	Carbon, Total Organic	N/A		Ground Water	4.37 mg/L	10 ml	4.37 mg/L	1	0.07	0.50			11/24/19 09:44	N	IV
K1911033-007	Carbon, Total Organic	N/A		Ground Water	2.51 mg/L	10 ml	2.51 mg/L	1	0.07	0.50			11/24/19 10:12	N	IV
K1911033-008	Carbon, Total Organic	N/A		Ground Water	7.82 mg/L	10 ml	7820 mg/L	1000	70	500			11/24/19 10:41	N	IV
K1911033-009	Carbon, Total Organic	N/A		Ground Water	3.94 mg/L	10 ml	3.94 mg/L	1	0.07	0.50			11/24/19 11:09	Y	IV
KQ1917447-01	Carbon, Total Organic	CCV		Water	24.56 mg/L	10 ml	24.6 mg/L	1					11/24/19 02:11	N	II
KQ1917447-02	Carbon, Total Organic	CCV		Water	24.22 mg/L	10 ml	24.2 mg/L	1					11/24/19 06:54	N	II
KQ1917447-03	Carbon, Total Organic	CCV		Water	24.73 mg/L	10 ml	24.7 mg/L	1					11/24/19 11:51	N	II
KQ1917447-04	Carbon, Total Organic	CCV		Water	24.32 mg/L	10 ml	24.3 mg/L	1					11/24/19 16:22	N	II
KQ1917447-05	Carbon, Total Organic	CCB		Water	-0.01 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			11/24/19 02:26	N	II
KQ1917447-06	Carbon, Total Organic	CCB		Water	-0.04 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			11/24/19 07:09	N	II
KQ1917447-07	Carbon, Total Organic	CCB		Water	0.23 mg/L	10 ml	0.23 mg/L J	1	0.07	0.50			11/24/19 12:06	N	II
KQ1917447-08	Carbon, Total Organic	CCB		Water	-0.04 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			11/24/19 16:36	N	II

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

Analytical Results Summary

Instrument Name: K-TOC-03 **Analyst:** BDITZLER **Analysis Lot:** 661077 **Method/Testcode:** SM 5310 C/TOC T

Lab Code	Target Analytes	QC	Parent Sample	Matrix	Raw Result	Sample Amt.	Final Result	Dil	MDL	PQL	% Rec	% RSD	Date Analyzed	QC?	Tier
KQ1917447-09	Carbon, Total Organic	MB		Water	-0.04 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			11/24/19 02:41	N	II
KQ1917447-10	Carbon, Total Organic	LCS		Water	25.09 mg/L	10 ml	25.1 mg/L	1	0.07	0.50	100		11/24/19 02:55	N	II
KQ1917447-11	Carbon, Total Organic	MS	K1911033-009	Ground Water	26.11 mg/L	10 ml	52.2 mg/L	2	0.2	1.0	97		11/24/19 11:37	N	IV
KQ1917447-12	Carbon, Total Organic	DUP	K1910929-001	Water	1.39 mg/L	10 ml	1.39 mg/L	1	0.07	0.50		7	11/24/19 05:02	N	II
KQ1917447-13	Carbon, Total Organic	DUP	K1910929-002	Water	0.88 mg/L	10 ml	0.88 mg/L	1	0.07	0.50		11*	11/24/19 05:30	N	II
KQ1917447-14	Carbon, Total Organic	DUP	K1910929-003	Water	1.94 mg/L	10 ml	1.94 mg/L	1	0.07	0.50		2	11/24/19 05:58	N	II
KQ1917447-15	Carbon, Total Organic	DUP	K1910969-002	Drinking Water	1.11 mg/L	10 ml	1.11 mg/L	1	0.07	0.50		5	11/24/19 06:26	N	I
KQ1917447-16	Carbon, Total Organic	DUP	K1911031-001	Water	0.79 mg/L	10 ml	0.79 mg/L	1	0.07	0.50		13*	11/24/19 12:50	N	IV
KQ1917447-17	Carbon, Total Organic	DUP	K1911032-002	Ground Water	1.60 mg/L	10 ml	1.60 mg/L	1	0.07	0.50		3	11/24/19 13:47	N	IV
KQ1917447-18	Carbon, Total Organic	DUP	K1911032-001	Ground Water	1.42 mg/L	10 ml	1.42 mg/L	1	0.07	0.50		8	11/24/19 13:19	N	IV
KQ1917447-19	Carbon, Total Organic	DUP	K1911032-003	Ground Water	1.50 mg/L	10 ml	1.50 mg/L	1	0.07	0.50		5	11/24/19 14:15	N	IV
KQ1917447-20	Carbon, Total Organic	DUP	K1911032-004	Ground Water	1.87 mg/L	10 ml	1.87 mg/L	1	0.07	0.50		8	11/24/19 14:43	N	IV
KQ1917447-21	Carbon, Total Organic	DUP	K1911032-005	Ground Water	4.83 mg/L	10 ml	1930 mg/L	400	30	200		4	11/24/19 15:11	N	IV
KQ1917447-22	Carbon, Total Organic	DUP	K1911032-006	Ground Water	1.82 mg/L	10 ml	1.82 mg/L	1	0.07	0.50		9	11/24/19 15:39	N	IV
KQ1917447-23	Carbon, Total Organic	DUP	K1911033-001	Ground Water	3.65 mg/L	10 ml	3.65 mg/L	1	0.07	0.50		<1	11/24/19 07:24	N	IV
KQ1917447-24	Carbon, Total Organic	DUP	K1911033-002	Ground Water	2.74 mg/L	10 ml	2.74 mg/L	1	0.07	0.50		3	11/24/19 07:52	N	IV
KQ1917447-25	Carbon, Total Organic	DUP	K1911033-003	Ground Water	2.76 mg/L	10 ml	2.76 mg/L	1	0.07	0.50		1	11/24/19 08:20	N	IV
KQ1917447-26	Carbon, Total Organic	DUP	K1911033-004	Ground Water	2.31 mg/L	10 ml	2.31 mg/L	1	0.07	0.50		3	11/24/19 08:48	N	IV
KQ1917447-27	Carbon, Total Organic	DUP	K1911033-005	Ground Water	38.77 mg/L	10 ml	775 mg/L	20	2	10		2	11/24/19 09:16	N	IV
KQ1917447-28	Carbon, Total Organic	DUP	K1911033-006	Ground Water	3.18 mg/L	10 ml	3.18 mg/L	1	0.07	0.50		31*	11/24/19 09:44	N	IV
KQ1917447-29	Carbon, Total Organic	DUP	K1911033-007	Ground Water	2.24 mg/L	10 ml	2.24 mg/L	1	0.07	0.50		11*	11/24/19 10:12	N	IV
KQ1917447-30	Carbon, Total Organic	DUP	K1911033-008	Ground Water	8.01 mg/L	10 ml	8010 mg/L	1000	70	500		2	11/24/19 10:41	N	IV
KQ1917447-31	Carbon, Total Organic	DUP	K1911033-009	Ground Water	3.61 mg/L	10 ml	3.61 mg/L	1	0.07	0.50		9	11/24/19 11:09	N	IV

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

Analytical Results Summary

Instrument Name: K-TOC-03 **Analyst:** BDITZLER **Analysis Lot:** 661078 **Method/Testcode:** SM 5310 C/TOC T

Lab Code	Target Analytes	QC	Parent Sample	Matrix	Raw Result	Sample Amt.	Final Result	Dil	MDL	PQL	% Rec	% RSD	Date Analyzed	QC?	Tier
K1910803-001	Carbon, Total Organic	N/A		Water	43.43 mg/L	10 ml	43.4 mg/L	1	0.07	0.50			11/24/19 17:19	N	IV
K1910803-002	Carbon, Total Organic	N/A		Water	119.98 mg/L	10 ml	120 mg/L	1	0.07	0.50			11/24/19 17:47	N	IV
K1910803-003	Carbon, Total Organic	N/A		Water	21.79 mg/L	10 ml	21.8 mg/L	1	0.07	0.50			11/24/19 18:15	N	IV
K1910803-004	Carbon, Total Organic	N/A		Water	67.32 mg/L	10 ml	67.3 mg/L	1	0.07	0.50			11/24/19 18:43	N	IV
K1910803-005	Carbon, Total Organic	N/A		Water	39.95 mg/L	10 ml	39.9 mg/L	1	0.07	0.50			11/24/19 19:11	N	IV
K1910803-006	Carbon, Total Organic	N/A		Water	14.93 mg/L	10 ml	14.9 mg/L	1	0.07	0.50			11/24/19 19:40	N	IV
K1911028-001	Carbon, Total Organic	N/A		Water	0.89 mg/L	10 ml	0.89 mg/L	1	0.07	0.50			11/25/19 00:24	N	V
K1911028-002	Carbon, Total Organic	N/A		Water	22.10 mg/L	10 ml	22.1 mg/L	1	0.07	0.50			11/25/19 00:52	N	V
K1911028-003	Carbon, Total Organic	N/A		Water	0.73 mg/L	10 ml	0.73 mg/L	1	0.07	0.50			11/25/19 01:21	N	V
K1911028-004	Carbon, Total Organic	N/A		Water	1.41 mg/L	10 ml	1.41 mg/L	1	0.07	0.50			11/25/19 02:18	N	V
K1911028-005	Carbon, Total Organic	N/A		Water	1.44 mg/L	10 ml	1.44 mg/L	1	0.07	0.50			11/25/19 02:47	N	V
K1911032-007	Carbon, Total Organic	N/A		Ground Water	4.08 mg/L	10 ml	4.08 mg/L	1	0.07	0.50			11/24/19 16:51	Y	IV
K1911047-001	Carbon, Total Organic	N/A		Water	3.61 mg/L	10 ml	361 mg/L	100	7	50			11/24/19 20:08	N	II
K1911047-002	Carbon, Total Organic	N/A		Water	26.84 mg/L	10 ml	2680 mg/L	100	7	50			11/24/19 20:36	N	II
K1911049-001	Carbon, Total Organic	N/A		Water	4.21 mg/L	10 ml	84 mg/L	20	2	10			11/24/19 21:04	N	II
K1911049-002	Carbon, Total Organic	N/A		Water	9.04 mg/L	10 ml	181 mg/L	20	2	10			11/24/19 22:31	Y	II
K1911049-003	Carbon, Total Organic	N/A		Water	11.75 mg/L	10 ml	11.7 mg/L	1	0.07	0.50			11/24/19 23:28	N	II
K1911049-004	Carbon, Total Organic	N/A		Water	1.62 mg/L	10 ml	1.62 mg/L	1	0.07	0.50			11/24/19 23:56	N	II
KQ1917448-01	Carbon, Total Organic	CCV		Ground Water	24.73 mg/L	10 ml	24.7 mg/L	1					11/24/19 11:51	N	IV
KQ1917448-02	Carbon, Total Organic	CCV		Ground Water	24.32 mg/L	10 ml	24.3 mg/L	1					11/24/19 16:22	N	IV
KQ1917448-03	Carbon, Total Organic	CCV		Ground Water	24.63 mg/L	10 ml	24.6 mg/L	1					11/24/19 21:32	N	IV
KQ1917448-04	Carbon, Total Organic	CCV		Ground Water	24.22 mg/L	10 ml	24.2 mg/L	1					11/25/19 01:49	N	IV
KQ1917448-05	Carbon, Total Organic	CCV		Ground Water	24.12 mg/L	10 ml	24.1 mg/L	1					11/25/19 06:19	N	IV
KQ1917448-06	Carbon, Total Organic	CCB		Ground Water	0.23 mg/L	10 ml	0.23 mg/L J	1	0.07	0.50			11/24/19 12:06	N	IV
KQ1917448-07	Carbon, Total Organic	CCB		Ground Water	-0.04 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			11/24/19 16:36	N	IV
KQ1917448-08	Carbon, Total Organic	CCB		Ground Water	-0.04 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			11/24/19 21:47	N	IV
KQ1917448-09	Carbon, Total Organic	CCB		Ground Water	-0.04 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			11/25/19 02:04	N	IV
KQ1917448-10	Carbon, Total Organic	CCB		Ground Water	-0.04 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			11/25/19 06:34	N	IV
KQ1917448-11	Carbon, Total Organic	MB		Ground Water	0.14 mg/L	10 ml	0.14 mg/L J	1	0.07	0.50			11/24/19 12:21	N	IV

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

Printed 11/26/19 13:39

Results Summary

11/26/19

Analytical Results Summary

Instrument Name: K-TOC-03 **Analyst:** BDITZLER **Analysis Lot:** 661078 **Method/Testcode:** SM 5310 C/TOC T

Lab Code	Target Analytes	QC	Parent Sample	Matrix	Raw Result	Sample Amt.	Final Result	Dil	MDL	PQL	% Rec	% RSD	Date Analyzed	QC?	Tier
KQ1917448-12	Carbon, Total Organic	LCS		Ground Water	24.93 mg/L	10 ml	24.9 mg/L	1	0.07	0.50	100		11/24/19 12:36	N	IV
KQ1917448-13	Carbon, Total Organic	MS	K1911032-007	Ground Water	26.35 mg/L	10 ml	52.7 mg/L	2	0.2	1.0	97		11/24/19 16:07	N	IV
KQ1917448-14	Carbon, Total Organic	MS	K1911049-002	Water	29.03 mg/L	10 ml	2900 mg/L	100	7	50	109		11/24/19 22:59	N	II
KQ1917448-15	Carbon, Total Organic	DUP	K1910803-002	Water	122.07 mg/L	10 ml	122 mg/L	1	0.07	0.50		2	11/24/19 17:47	N	IV
KQ1917448-16	Carbon, Total Organic	DUP	K1910803-003	Water	18.16 mg/L	10 ml	18.2 mg/L	1	0.07	0.50		18*	11/24/19 18:15	N	IV
KQ1917448-17	Carbon, Total Organic	DUP	K1910803-004	Water	69.64 mg/L	10 ml	69.6 mg/L	1	0.07	0.50		3	11/24/19 18:43	N	IV
KQ1917448-18	Carbon, Total Organic	DUP	K1910803-005	Water	22.58 mg/L	10 ml	22.6 mg/L	1	0.07	0.50		56*	11/24/19 19:11	N	IV
KQ1917448-19	Carbon, Total Organic	DUP	K1910803-006	Water	13.68 mg/L	10 ml	13.7 mg/L	1	0.07	0.50		9	11/24/19 19:40	N	IV
KQ1917448-20	Carbon, Total Organic	DUP	K1910803-001	Water	44.82 mg/L	10 ml	44.8 mg/L	1	0.07	0.50		3	11/24/19 17:19	N	IV
KQ1917448-21	Carbon, Total Organic	DUP	K1911028-003	Water	0.66 mg/L	10 ml	0.66 mg/L	1	0.07	0.50		11*	11/25/19 01:21	N	V
KQ1917448-22	Carbon, Total Organic	DUP	K1911028-004	Water	1.38 mg/L	10 ml	1.38 mg/L	1	0.07	0.50		2	11/25/19 02:18	N	V
KQ1917448-23	Carbon, Total Organic	DUP	K1911028-005	Water	1.42 mg/L	10 ml	1.42 mg/L	1	0.07	0.50		1	11/25/19 02:47	N	V
KQ1917448-24	Carbon, Total Organic	DUP	K1911028-001	Water	0.82 mg/L	10 ml	0.82 mg/L	1	0.07	0.50		9	11/25/19 00:24	N	V
KQ1917448-25	Carbon, Total Organic	DUP	K1911028-002	Water	21.52 mg/L	10 ml	21.5 mg/L	1	0.07	0.50		3	11/25/19 00:52	N	V
KQ1917448-26	Carbon, Total Organic	DUP	K1911032-007	Ground Water	4.18 mg/L	10 ml	4.18 mg/L	1	0.07	0.50		2	11/24/19 16:51	N	IV
KQ1917448-27	Carbon, Total Organic	DUP	K1911047-001	Water	3.03 mg/L	10 ml	303 mg/L	100	7	50		18*	11/24/19 20:08	N	II
KQ1917448-28	Carbon, Total Organic	DUP	K1911047-002	Water	26.76 mg/L	10 ml	2680 mg/L	100	7	50		<1	11/24/19 20:36	N	II
KQ1917448-29	Carbon, Total Organic	DUP	K1911049-001	Water	3.99 mg/L	10 ml	80 mg/L	20	2	10		5	11/24/19 21:04	N	II
KQ1917448-30	Carbon, Total Organic	DUP	K1911049-002	Water	8.98 mg/L	10 ml	179 mg/L	20	2	10		<1	11/24/19 22:31	N	II
KQ1917448-31	Carbon, Total Organic	DUP	K1911049-003	Water	11.81 mg/L	10 ml	11.8 mg/L	1	0.07	0.50		<1	11/24/19 23:28	N	II
KQ1917448-32	Carbon, Total Organic	DUP	K1911049-004	Water	1.50 mg/L	10 ml	1.50 mg/L	1	0.07	0.50		8	11/24/19 23:56	N	II

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

Analytical Results Summary

Instrument Name: K-TOC-03 **Analyst:** BDITZLER **Analysis Lot:** 661079 **Method/Testcode:** SM 5310 C/TOC D

Lab Code	Target Analytes	QC	Parent Sample	Matrix	Raw Result	Sample Amt.	Final Result	Dil	MDL	PQL	% Rec	% RSD	Date Analyzed	QC?	Tier
K1910975-001	Carbon, Dissolved Organic (DOC)	N/A		Water	0.89 mg/L	10 ml	0.89 mg/L	1	0.07	0.50			11/25/19 05:08	N	I
K1910975-002	Carbon, Dissolved Organic (DOC)	N/A		Water	7.97 mg/L	10 ml	79.7 mg/L	10	0.7	5.0			11/25/19 04:40	N	I
K1911043-001	Carbon, Dissolved Organic (DOC)	N/A		Water	11.72 mg/L	10 ml	11700 mg/L	1000	70	500			11/25/19 03:44	N	II
K1911043-002.R01	Carbon, Dissolved Organic (DOC)	N/A		Water	-0.04 mg/L	10 ml	500 mg/L U	1000	70	500			11/25/19 04:12	N	II
KQ1917449-01	Carbon, Dissolved Organic (DOC)	CCV		Water	-0.04 mg/L	10 ml	-0.0368 mg/L	1					11/24/19 22:01	N	II
KQ1917449-02	Carbon, Dissolved Organic (DOC)	CCV		Water	24.12 mg/L	10 ml	24.1 mg/L	1					11/25/19 06:19	N	II
KQ1917449-03	Carbon, Dissolved Organic (DOC)	CCB		Water	24.68 mg/L	10 ml	24.7 mg/L	1	0.07	0.50			11/24/19 22:16	N	II
KQ1917449-04	Carbon, Dissolved Organic (DOC)	CCB		Water	-0.04 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			11/25/19 06:34	N	II
KQ1917449-05	Carbon, Dissolved Organic (DOC)	MB		Water	-0.04 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			11/25/19 01:49	N	II
KQ1917449-06	Carbon, Dissolved Organic (DOC)	LCS		Water	24.22 mg/L	10 ml	24.2 mg/L	1	0.07	0.50	97		11/25/19 02:04	N	II
KQ1917449-07	Carbon, Dissolved Organic (DOC)	MS	K1910975-001	Water	26.58 mg/L	10 ml	26.6 mg/L	1	0.07	0.50	103		11/25/19 05:36	N	I
KQ1917449-08	Carbon, Dissolved Organic (DOC)	DUP	K1910975-001	Water	0.72 mg/L	10 ml	0.72 mg/L	1	0.07	0.50		21*	11/25/19 05:08	N	I
KQ1917449-09	Carbon, Dissolved Organic (DOC)	DUP	K1910975-002	Water	8.27 mg/L	10 ml	82.7 mg/L	10	0.7	5.0		4	11/25/19 04:40	N	I
KQ1917449-10	Carbon, Dissolved Organic (DOC)	DUP	K1911043-001	Water	11.71 mg/L	10 ml	11700 mg/L	1000	70	500		<1	11/25/19 03:44	N	II
KQ1917449-11	Carbon, Dissolved Organic (DOC)	DUP	K1911043-002	Water	-0.04 mg/L	10 ml	500 mg/L U	1000	70	500		NC	11/25/19 04:12	N	II

11/26/19

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

0.031	0.031	#DIV/0!	#DIV/0!	OBSERVATIONS 13	0.031
0.000				STD Deviation 0.08537	0
0.000				AVERAGE 0.03675	0
0.000				UCL 0.12213	0
0.000				LCL -0.04862	0
0.000					0
0.270					ABOVE
0.177				OBSERVATIONS 1	ABOVE
0.000				STD Deviation #DIV/0!	0
0.000				AVERAGE 0.03100	0
0.000				UCL #DIV/0!	0
0.000				LCL #DIV/0!	0
0.000					0
					0
				OBSERVATIONS 0	0
				STD Deviation #DIV/0!	0
				AVERAGE #DIV/0!	0
				UCL #DIV/0!	0
				LCL #DIV/0!	0
					0
					0
				OBSERVATIONS 0	0
				STD Deviation #DIV/0!	0
				AVERAGE #DIV/0!	0
					0
					0
					0
					0
					0
					0

11/26/19

ALS ENVIRONMENTAL

Matrix: WATER

Analysis: Total Organic Carbon (WATER) Method:Oxidation EPA 415.1/9060/5310C

Printout	Sample #	Dil. Factor	Solution Conc.,mg/L	Blank Correction, mg/L	Net mg/L	TOC mg/L	Reported TOC mg/L	
CBA	RB	1			0.0000	0	<0.5	
2	ccv	1	24.567	0.0368	24.5300	24.52995	24.5	11/23/2019
3	ccb	1	0.000	0.0368	-0.0368	-0.03675	<0.5	11/23/2019
4	mb	1	0.000	0.0368	-0.0368	-0.03675	<0.5	11/23/2019
5	lcs	1	24.774	0.0368	24.7370	24.73695	24.7	11/23/2019
6	K1910680-001	1	0.394	0.0368	0.3575	0.35745	<0.5	11/23/2019
7	K1910680-001	1	0.400	0.0368	0.3632	0.36315	<0.5	11/23/2019
8	K1910680-002	1	0.336	0.0368	0.2995	0.29945	<0.5	11/23/2019
9	K1910680-002	1	0.301	0.0368	0.2638	0.26375	<0.5	11/23/2019
10	K1910680-003	1	0.665	0.0368	0.6281	0.62805	0.63	11/23/2019
11	K1910680-003	1	0.645	0.0368	0.6085	0.60845	0.6	11/23/2019
12	K1910680-004	1	0.598	0.0368	0.5611	0.56105	0.56	11/23/2019
13	K1910680-004	1	0.704	0.0368	0.6673	0.66725	0.67	11/23/2019
14	K1910680-005	1	0.209	0.0368	0.1722	0.17215	<0.5	11/23/2019
15	K1910680-005	1	0.237	0.0368	0.1999	0.19985	<0.5	11/23/2019
16	K1910796-004	1	0.235	0.0368	0.1982	0.19815	<0.5	11/23/2019
17	K1910796-004	1	0.247	0.0368	0.2103	0.21025	<0.5	11/23/2019
18	KQ1917446-11	1	22.520	0.0368	22.4829	22.48285	22.5	11/23/2019
19	ccv	1	24.651	0.0368	24.6140	24.61395	24.6	11/23/2019
20	ccb	1	0.000	0.0368	-0.0368	-0.03675	<0.5	11/23/2019
21	K1910796-001	1	1.085	0.0368	1.0481	1.04805	1.05	11/23/2019
22	K1910796-001	1	1.173	0.0368	1.1367	1.13665	1.1	11/23/2019
23	K1910796-002	1	0.917	0.0368	0.8806	0.88055	0.9	11/23/2019
24	K1910796-002	1	0.803	0.0368	0.7659	0.76585	0.77	11/23/2019
25	K1910796-003	1	1.814	0.0368	1.7772	1.77715	1.78	11/23/2019

ICAL Date 10/20/16 ICAL ID#:11-GEN-05-51A

LCS =24.0 ppm APG 4013 Lot #010615 (REF# 11-GEN-05-50N)

CCV = 25.0 ppm (Ref.#11-GEN-05-52E)

Spike: 0.05 ml of 5000 ppm stock ----> 10.0 ml =25.0 ppm x Dilution Factor (Ref.# 11-GEN-05-51M)

23 BKP 11/26/19 date time

Analyzed By: BKP	Date Analyzed 11/26/19
Reviewed By:	Date Reviewed 11/26/19

ALS ENVIRONMENTAL

Matrix: WATER

Analysis: Total Organic Carbon (WATER) Method:Oxidation EPA 415.1/9060/5310C

Printout	Sample #	Dil. Factor	Solution Conc.,mg/L	Blank Correction, mg/L	Net mg/L	TOC mg/L	Reported TOC mg/L	
26	K1910796-003	1	1.791	0.0368	1.7545	1.75445	1.75	11/23/2019
27	K1910847-001	20	34.048	0.0368	34.0116	680.231	680.23	11/23/2019
28	K1910847-001	20	33.816	0.0368	33.7788	675.575	675.6	11/23/2019
29	K1910847-002	1	32.858	0.0368	32.8211	32.82105	32.8	11/23/2019
30	K1910847-002	1	32.481	0.0368	32.4447	32.44465	32.4	11/23/2019
31	K1910847-003	1	35.302	0.0368	35.2656	35.26555	35.3	11/23/2019
32	K1910847-003	1	34.801	0.0368	34.7641	34.76405	34.8	11/23/2019
33	K1910847-004	1	61.309	0.0368	61.2726	61.27255	61.3	11/24/2019
34	K1910847-004	1	60.948	0.0368	60.9109	60.91085	60.9	11/24/2019
35	K1910861-001	100	7.292	0.0368	7.2555	725.545	725.5	11/24/2019
36	K1910861-001	100	6.781	0.0368	6.7447	674.465	674.5	11/24/2019
37	K1910861-002	100	6.013	0.0368	5.9758	597.575	597.6	11/24/2019
38	K1910861-002	100	5.852	0.0368	5.8151	581.505	581.5	11/24/2019
39	K1910861-003	100	5.998	0.0368	5.9616	596.155	596.2	11/24/2019
40	K1910861-003	100	5.934	0.0368	5.8973	589.725	589.7	11/24/2019
41	ccv	1	24.592	0.0368	24.5555	24.55545	24.6	11/24/2019
42	ccb	1	0.031	0.0368	-0.0058	-0.00575	<0.5	11/24/2019
43	K1910861-004	100	7.819	0.0368	7.7823	778.225	778.2	11/24/2019
44	K1910861-004	100	7.801	0.0368	7.7640	776.395	776.4	11/24/2019
45	K1910861-005	100	7.497	0.0368	7.4601	746.005	746.0	11/24/2019
46	K1910861-005	100	7.442	0.0368	7.4053	740.525	740.5	11/24/2019
47	K1910861-006	100	10.791	0.0368	10.7546	1075.455	1075.5	11/24/2019
48	K1910861-006	100	10.652	0.0368	10.6153	1061.525	1061.5	11/24/2019
49	K1910861-007	100	8.384	0.0368	8.3476	834.755	834.8	11/24/2019
50	K1910861-007	100	8.194	0.0368	8.1568	815.675	815.7	11/24/2019

Analyzed By: BCD	Date Analyzed 11/23/19
Reviewed By:	Date Reviewed 11/26/19

ALS ENVIRONMENTAL

Matrix: WATER

Analysis: Total Organic Carbon (WATER) Method:Oxidation EPA 415.1/9060/5310C

Printout	Sample #	Dil. Factor	Solution Conc.,mg/L	Blank Correction, mg/L	Net mg/L	TOC mg/L	Reported TOC mg/L	
51	ccv	1	24.259	0.0368	24.2227	24.22265	24.22	11/24/2019
52	ccb	1	0.000	0.0368	-0.0368	-0.03675	<0.5	11/24/2019
53		1		0.0000	0.0000	0	<0.5	
54		1		0.0000	0.0000	0	<0.5	
55		1		0.0000	0.0000	0	<0.5	
56		1		0.0000	0.0000	0	<0.5	
57		1		0.0000	0.0000	0	<0.5	
58		1		0.0000	0.0000	0	<0.5	
59		1		0.0000	0.0000	0	<0.5	
60		1		0.0000	0.0000	0	<0.5	
61		1		0.0000	0.0000	0	<0.5	
62		1		0.0000	0.0000	0	<0.5	
63		1		0.0000	0.0000	0	<0.5	
64		1		0.0000	0.0000	0	<0.5	
65		1		0.0000	0.0000	0	<0.5	
66		1		0.0000	0.0000	0	<0.5	
67		1		0.0000	0.0000	0	<0.5	
68		1		0.0000	0.0000	0	<0.5	
69		1		0.0000	0.0000	0	<0.5	
70		1		0.0000	0.0000	0	<0.5	
71		1		0.0000	0.0000	0	<0.5	
72		1		0.0000	0.0000	0	<0.5	
73		1		0.0000	0.0000	0	<0.5	
74		1		0.0000	0.0000	0	<0.5	
75		1		0.0000	0.0000	0	<0.5	

Analyzed By:	BCP	Date Analyzed	11/25/19
Reviewed By:	[signature]	Date Reviewed	11/26/19

ALS ENVIRONMENTAL

Matrix: WATER

Analysis: Total Organic Carbon (WATER) Method:Oxidation EPA 415.1/9060/5310C

Printout	Sample #	Dil. Factor	Solution Conc.,mg/L	Blank Correction, mg/L	Net mg/L	TOC mg/L	Reported TOC mg/L	
CBA	RB	1			0.0000	0	<0.5	
2	ccv	1	24.592	0.0368	24.5555	24.55545	24.6	11/24/2019
3	ccb	1	0.031	0.0368	-0.0058	-0.00575	<0.5	11/24/2019
4	mb	1	0.000	0.0368	-0.0368	-0.03675	<0.5	11/24/2019
5	lcs	1	25.123	0.0368	25.0866	25.08655	25.1	11/24/2019
6	K1910929-001	1	1.527	0.0368	1.4898	1.48975	1.49	11/24/2019
7	K1910929-001	1	1.429	0.0368	1.3918	1.39175	1.4	11/24/2019
8	K1910929-002	1	0.827	0.0368	0.7902	0.79015	1	11/24/2019
9	K1910929-002	1	0.919	0.0368	0.8820	0.88195	0.88	11/24/2019
10	K1910929-003	1	1.943	0.0368	1.9064	1.90635	1.91	11/24/2019
11	K1910929-003	1	1.976	0.0368	1.9391	1.93905	1.9	11/24/2019
12	K1910969-002	1	1.201	0.0368	1.1638	1.16375	1.16	11/24/2019
13	K1910969-002	1	1.147	0.0368	1.1100	1.10995	1.11	11/24/2019
14	ccv	1	24.259	0.0368	24.2227	24.22265	24.22	11/24/2019
15	ccb	1	0.000	0.0368	-0.0368	-0.03675	<0.5	11/24/2019
16	K1911033-001	1	3.696	0.0368	3.6588	3.65875	3.7	11/24/2019
17	K1911033-001	1	3.684	0.0368	3.6472	3.64715	3.65	11/24/2019
18	K1911033-002	1	2.845	0.0368	2.8083	2.80825	2.8	11/24/2019
19	K1911033-002	1	2.775	0.0368	2.7385	2.73845	2.7	11/24/2019
20	K1911033-003	1	2.836	0.0368	2.7992	2.79915	2.80	11/24/2019
21	K1911033-003	1	2.795	0.0368	2.7582	2.75815	2.76	11/24/2019
22	K1911033-004	1	2.422	0.0368	2.3849	2.38485	2.4	11/24/2019
23	K1911033-004	1	2.347	0.0368	2.3104	2.31035	2.3	11/24/2019
24	K1911033-005	20	39.603	0.0368	39.5660	791.319	791.32	11/24/2019
25	K1911033-005	20	38.802	0.0368	38.7653	775.305	775.31	11/24/2019

ICAL Date 10/20/16 ICAL ID#:11-GEN-05-51A

LCS =24.0 ppm APG 4013 Lot #010615 (REF# 11-GEN-05-50N)

CCV = 25.0 ppm (Ref.#11-GEN-05-52E)

Spike: 0.05 ml of 5000 ppm stock ----> 10.0 ml =25.0 ppm x Dilution Factor (Ref.# 11-GEN-05-51M)

		date	time
Analyzed By: BCP		Date Analyzed 11/23/19	
Reviewed By: [signature]		Date Reviewed 11/26/19	

Revision 1, 2010 R:\WET\ANALYSES\TOC\TEMPLATE\TOCwaterLIMS

ALS ENVIRONMENTAL

Matrix: WATER

Analysis: Total Organic Carbon (WATER) Method:Oxidation EPA 415.1/9060/5310C

Printout	Sample #	Dil. Factor	Solution Conc.,mg/L	Blank Correction, mg/L	Net mg/L	TOC mg/L	Reported TOC mg/L	
26	K1911033-006	1	4.402	0.0368	4.3652	4.36515	4.37	11/24/2019
27	K1911033-006	1	3.221	0.0368	3.1843	3.18425	3.18	11/24/2019
28	K1911033-007	1	2.543	0.0368	2.5060	2.50595	2.5	11/24/2019
29	K1911033-007	1	2.273	0.0368	2.2363	2.23625	2.2	11/24/2019
30	K1911033-008	1000	7.861	0.0368	7.8241	7824.05	7824.1	11/24/2019
31	K1911033-008	1000	8.044	0.0368	8.0074	8007.35	8007.4	11/24/2019
32	K1911033-009	1	3.972	0.0368	3.9355	3.93545	3.9	11/24/2019
33	K1911033-009	1	3.647	0.0368	3.6099	3.60985	3.6	11/24/2019
34	KQ1917447-11	2	26.144	0.0368	26.1076	52.2151	52.2	11/24/2019
35	ccv	1	24.762	0.0368	24.7255	24.72545	24.7	11/24/2019
36	ccb	1	0.270	0.0368	0.2328	0.23275	<0.5	11/24/2019
37	K1911031-001	1	0.934	0.0368	0.8970	0.89695	0.9	11/24/2019
38	K1911031-001	1	0.826	0.0368	0.7890	0.78895	0.8	11/24/2019
39	K1911032-001	1	1.580	0.0368	1.5437	1.54365	1.5	11/24/2019
40	K1911032-001	1	1.458	0.0368	1.4216	1.42155	1.4	11/24/2019
41	K1911032-002	1	1.585	0.0368	1.5487	1.54865	1.5	11/24/2019
42	K1911032-002	1	1.638	0.0368	1.6012	1.60115	1.6	11/24/2019
43	K1911032-003	1	1.623	0.0368	1.5864	1.58635	1.6	11/24/2019
44	K1911032-003	1	1.541	0.0368	1.5038	1.50375	1.5	11/24/2019
45	K1911032-004	1	2.055	0.0368	2.0187	2.01865	2.0	11/24/2019
46	K1911032-004	1	1.904	0.0368	1.8668	1.86675	1.9	11/24/2019
47	K1911032-005	400	4.671	0.0368	4.6341	1853.62	1853.6	11/24/2019
48	K1911032-005	400	4.867	0.0368	4.8300	1931.98	1932.0	11/24/2019
49	K1911032-006	1	2.028	0.0368	1.9917	1.99165	2.0	11/24/2019
50	K1911032-006	1	1.861	0.0368	1.8238	1.82375	1.8	11/24/2019

Analyzed By:	BCD	Date Analyzed	11/23/19
Reviewed By:		Date Reviewed	11/26/19

ALS ENVIRONMENTAL

Matrix: WATER

Analysis: Total Organic Carbon (WATER) Method:Oxidation EPA 415.1/9060/5310C

Printout	Sample #	Dil. Factor	Solution Conc.,mg/L	Blank Correction, mg/L	Net mg/L	TOC mg/L	Reported TOC mg/L	
51	ccv	1	24.356	0.0368	24.3194	24.31935	24.32	11/24/2019
52	ccb	1	0.000	0.0368	-0.0368	-0.03675	<0.5	11/24/2019
53		1		0.0000	0.0000	0	<0.5	
54		1		0.0000	0.0000	0	<0.5	
55		1		0.0000	0.0000	0	<0.5	
56		1		0.0000	0.0000	0	<0.5	
57		1		0.0000	0.0000	0	<0.5	
58		1		0.0000	0.0000	0	<0.5	
59		1		0.0000	0.0000	0	<0.5	
60		1		0.0000	0.0000	0	<0.5	
61		1		0.0000	0.0000	0	<0.5	
62		1		0.0000	0.0000	0	<0.5	
63		1		0.0000	0.0000	0	<0.5	
64		1		0.0000	0.0000	0	<0.5	
65		1		0.0000	0.0000	0	<0.5	
66		1		0.0000	0.0000	0	<0.5	
67		1		0.0000	0.0000	0	<0.5	
68		1		0.0000	0.0000	0	<0.5	
69		1		0.0000	0.0000	0	<0.5	
70		1		0.0000	0.0000	0	<0.5	
71		1		0.0000	0.0000	0	<0.5	
72		1		0.0000	0.0000	0	<0.5	
73		1		0.0000	0.0000	0	<0.5	
74		1		0.0000	0.0000	0	<0.5	
75		1		0.0000	0.0000	0	<0.5	

Analyzed By: BM	Date Analyzed 11/23/19
Reviewed By:	Date Reviewed 11/26/19

ALS ENVIRONMENTAL

Matrix: WATER

Analysis: Total Organic Carbon (WATER) Method:Oxidation EPA 415.1/9060/5310C

Printout	Sample #	Dil. Factor	Solution Conc.,mg/L	Blank Correction, mg/L	Net mg/L	TOC mg/L	Reported TOC mg/L	
CBA	RB	1			0.0000	0	<0.5	
2	ccv	1	24.762	0.0368	24.7255	24.72545	24.7	11/24/2019
3	ccb	1	0.270	0.0368	0.2328	0.23275	<0.5	11/24/2019
4	mb	1	0.177	0.0368	0.1406	0.14055	<0.5	11/24/2019
5	lcs	1	24.962	0.0368	24.9254	24.92535	24.9	11/24/2019
6	KQ1917448-13	2	26.387	0.0368	26.3507	52.7013	52.70	11/24/2019
7	ccv	1	24.356	0.0368	24.3194	24.31935	24.3	11/24/2019
8	ccb	1	0.000	0.0368	-0.0368	-0.03675	<0.5	11/24/2019
9	K1911032-007	1	4.121	0.0368	4.0838	4.08375	4.08	11/24/2019
10	K1911032-007	1	4.215	0.0368	4.1781	4.17805	4.18	11/24/2019
11	K1910803-001	1	43.462	0.0368	43.4256	43.42555	43.4	11/24/2019
12	K1910803-001	1	44.855	0.0368	44.8186	44.81855	44.82	11/24/2019
13	K1910803-002	1	120.019	0.0368	119.9820	119.98195	119.98	11/24/2019
14	K1910803-002	1	122.103	0.0368	122.0664	122.06635	122.07	11/24/2019
15	K1910803-003	1	21.826	0.0368	21.7893	21.78925	21.8	11/24/2019
16	K1910803-003	1	18.201	0.0368	18.1638	18.16375	18.2	11/24/2019
17	K1910803-004	1	67.352	0.0368	67.3154	67.31535	67.32	11/24/2019
18	K1910803-004	1	69.680	0.0368	69.6435	69.64345	69.6	11/24/2019
19	K1910803-005	1	39.984	0.0368	39.9477	39.94765	39.9	11/24/2019
20	K1910803-005	1	22.612	0.0368	22.5756	22.57555	22.58	11/24/2019
21	K1910803-006	1	14.967	0.0368	14.9307	14.93065	14.93	11/24/2019
22	K1910803-006	1	13.722	0.0368	13.6848	13.68475	13.7	11/24/2019
23	K1911047-001	100	3.650	0.0368	3.6131	361.305	361.3	11/24/2019
24	K1911047-001	100	3.066	0.0368	3.0297	302.965	302.97	11/24/2019
25	K1911047-002	100	26.873	0.0368	26.8364	2683.635	2683.64	11/24/2019

ICAL Date 10/20/16 ICAL ID#:11-GEN-05-51A

LCS =24.0 ppm APG 4013 Lot #010615 (REF# 11-GEN-05-50N)

CCV = 25.0 ppm (Ref.#11-GEN-05-52E)

Spike: 0.05 ml of 5000 ppm stock ----> 10.0 ml =25.0 ppm x Dilution Factor (Ref.# 11-GEN-05-51M)

		date time
Analyzed By: BOB	Date Analyzed	11/23/19
Reviewed By:	Date Reviewed	11/26/19

ALS ENVIRONMENTAL

Matrix: WATER

Analysis: Total Organic Carbon (WATER) Method:Oxidation EPA 415.1/9060/5310C

Printout	Sample #	Dil. Factor	Solution Conc.,mg/L	Blank Correction, mg/L	Net mg/L	TOC mg/L	Reported TOC mg/L	
26	K1911047-002	100	26.799	0.0368	26.7618	2676.175	2676.18	11/24/2019
27	K1911049-001	20	4.249	0.0368	4.2124	84.247	84.25	11/24/2019
28	K1911049-001	20	4.029	0.0368	3.9925	79.849	79.8	11/24/2019
29	ccv	1	24.669	0.0368	24.6320	24.63195	24.6	11/24/2019
30	ccb	1	0.000	0.0368	-0.0368	-0.03675	<0.5	11/24/2019
31	K1911049-002	20	9.079	0.0368	9.0426	180.851	180.9	11/24/2019
32	K1911049-002	20	9.012	0.0368	8.9750	179.499	179.5	11/24/2019
33	KQ1917448-14	100	29.072	0.0368	29.0348	2903.475	2903.5	11/24/2019
34	K1911049-003	1	11.784	0.0368	11.7471	11.74705	11.7	11/24/2019
35	K1911049-003	1	11.848	0.0368	11.8116	11.81155	11.8	11/24/2019
36	K1911049-004	1	1.659	0.0368	1.6225	1.62245	1.6	11/24/2019
37	K1911049-004	1	1.541	0.0368	1.5039	1.50385	1.5	11/24/2019
38	K1911028-001	1	0.932	0.0368	0.8949	0.89485	0.9	11/25/2019
39	K1911028-001	1	0.858	0.0368	0.8217	0.82165	0.8	11/25/2019
40	K1911028-002	1	22.140	0.0368	22.1030	22.10295	22.1	11/25/2019
41	K1911028-002	1	21.561	0.0368	21.5239	21.52385	21.5	11/25/2019
42	K1911028-003	1	0.771	0.0368	0.7346	0.73455	0.7	11/25/2019
43	K1911028-003	1	0.696	0.0368	0.6592	0.65915	0.7	11/25/2019
44	ccv	1	24.254	0.0368	24.2171	24.21705	24.2	11/25/2019
45	ccb	1	0.000	0.0368	-0.0368	-0.03675	<0.5	11/25/2019
46	K1911028-004	1	1.442	0.0368	1.4057	1.40565	1.4	11/25/2019
47	K1911028-004	1	1.412	0.0368	1.3753	1.37525	1.4	11/25/2019
48	K1911028-005	1	1.478	0.0368	1.4409	1.44085	1.4	11/25/2019
49	K1911028-005	1	1.461	0.0368	1.4244	1.42435	1.4	11/25/2019
50	ccv	1	24.161	0.0368	24.1246	24.12455	24.1	11/25/2019

Analyzed By: BH	Date Analyzed 11/23/19
Reviewed By: [signature]	Date Reviewed 11/26/19

ALS ENVIRONMENTAL

Matrix: WATER

Analysis: Total Organic Carbon (WATER) Method:Oxidation EPA 415.1/9060/5310C

Printout	Sample #	Dil. Factor	Solution Conc.,mg/L	Blank Correction, mg/L	Net mg/L	TOC mg/L	Reported TOC mg/L	
51	ccb	1	0.000	0.0368	-0.0368	-0.03675	<0.5	11/25/2019
52		1		0.0000	0.0000	0	<0.5	
53		1		0.0000	0.0000	0	<0.5	
54		1		0.0000	0.0000	0	<0.5	
55		1		0.0000	0.0000	0	<0.5	
56		1		0.0000	0.0000	0	<0.5	
57		1		0.0000	0.0000	0	<0.5	
58		1		0.0000	0.0000	0	<0.5	
59		1		0.0000	0.0000	0	<0.5	
60		1		0.0000	0.0000	0	<0.5	
61		1		0.0000	0.0000	0	<0.5	
62		1		0.0000	0.0000	0	<0.5	
63		1		0.0000	0.0000	0	<0.5	
64		1		0.0000	0.0000	0	<0.5	
65		1		0.0000	0.0000	0	<0.5	
66		1		0.0000	0.0000	0	<0.5	
67		1		0.0000	0.0000	0	<0.5	
68		1		0.0000	0.0000	0	<0.5	
69		1		0.0000	0.0000	0	<0.5	
70		1		0.0000	0.0000	0	<0.5	
71		1		0.0000	0.0000	0	<0.5	
72		1		0.0000	0.0000	0	<0.5	
73		1		0.0000	0.0000	0	<0.5	
74		1		0.0000	0.0000	0	<0.5	
75		1		0.0000	0.0000	0	<0.5	

Analyzed By: BKP	Date Analyzed 11/27/19
Reviewed By:	Date Reviewed 11/26/19

ALS ENVIRONMENTAL

Matrix: WATER

Analysis: Total Organic Carbon (WATER) Method:Oxidation EPA 415.1/9060/5310C

Printout	Sample #	Dil. Factor	Solution Conc.,mg/L	Blank Correction, mg/L	Net mg/L	TOC mg/L	Reported TOC mg/L	
CBA	RB	1			0.0000	0	<0.5	
2	mb	1	0.000	0.0368	-0.0368	-0.03675	<0.5	11/24/2019
3	lcs	1	24.714	0.0368	24.6774	24.67735	24.7	11/24/2019
4	ccv	1	24.254	0.0368	24.2171	24.21705	24.2	11/25/2019
5	ccb	1	0.000	0.0368	-0.0368	-0.03675	<0.5	11/25/2019
6	K1911043-001	1000	11.760	0.0368	11.7231	11723.05	11723.05	11/25/2019
7	K1911043-001	1000	11.743	0.0368	11.7062	11706.15	11706.2	11/25/2019
8	K1911043-002	1000	0.000	0.0368	-0.0368	-36.75	<0.5	11/25/2019
9	K1911043-002	1000	0.000	0.0368	-0.0368	-36.75	<0.5	11/25/2019
10	K1910975-002	10	8.002	0.0368	7.9657	79.6565	79.66	11/25/2019
11	K1910975-002	10	8.302	0.0368	8.2651	82.6505	82.7	11/25/2019
12	K1910975-001	1	0.922	0.0368	0.8852	0.88515	0.89	11/25/2019
13	K1910975-001	1	0.756	0.0368	0.7189	0.71885	0.72	11/25/2019
14	KQ1917449-07	1	26.613	0.0368	26.5764	26.57635	26.58	11/25/2019
15	ccv	1	24.161	0.0368	24.1246	24.12455	24.1	11/25/2019
16	ccb	1	0.000	0.0368	-0.0368	-0.03675	<0.5	11/25/2019
17		1		0.0000	0.0000	0	<0.5	
18		1		0.0000	0.0000	0	<0.5	
19		1		0.0000	0.0000	0	<0.5	
20		1		0.0000	0.0000	0	<0.5	
21		1		0.0000	0.0000	0	<0.5	
22		1		0.0000	0.0000	0	<0.5	
23		1		0.0000	0.0000	0	<0.5	
24		1		0.0000	0.0000	0	<0.5	
25		1		0.0000	0.0000	0	<0.5	

ICAL Date 10/20/16 ICAL ID#:11-GEN-05-51A

LCS =24.0 ppm APG 4013 Lot #010615 (REF# 11-GEN-05-50N)

CCV = 25.0 ppm (Ref.#11-GEN-05-52E)

Spike: 0.05 ml of 5000 ppm stock ----> 10.0 ml =25.0 ppm x Dilution Factor (Ref.# 11-GEN-05-51M)

		date	time
Analyzed By:		Date Analyzed	11/23/19
Reviewed By:		Date Reviewed	11/26/19

Revision 1, 2010 R:\WET\ANALYSES\TOC\TEMPLATE\TOCwaterLIMS

TOC: 661076, 661077, 661078
DOC: 661079

Schedule: 11232019

Version: 8
Instrument: Fusion1
Last Saved by: Fusion1 (Fusion1)
Last Saved on: 2019/11/23 17:20 - Saturday

Position	Sample Type	Sample ID	Method ID (Calibration ID)	Reps	Use	State
(Clean)	Clean	Clean		1	True	Ready
(Clean)	Clean	Clean		1	True	Ready
(Clean)	Clean	Clean		1	True	Ready
(Blank)	Blank	Reagent/Acid Blank		1	True	Ready
D	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
1	Sample	MB1	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
C	Check Standard	[TOC] LCS [24.0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
2	Sample	ICS	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
3	Sample	K1910680-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
4	Sample	K1910680-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
5	Sample	K1910680-003.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
6	Sample	K1910680-004.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
7	Sample	K1910680-005.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
8	Sample	K1910796-004.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
9	Sample	K1910796-004.01 ms	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
10	Sample	K1910796-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
11	Sample	K1910796-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
12	Sample	K1910796-003.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
13	Sample	K1910847-001.01 20x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
14	Sample	K1910847-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
15	Sample	K1910847-003.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
16	Sample	K1910847-004.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
17	Sample	K1910861-001.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
18	Sample	K1910861-002.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
19	Sample	K1910861-003.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
20	Sample	MB2	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
C	Check Standard	[TOC] LCS [24.0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
21	Sample	K1910861-004.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
22	Sample	K1910861-005.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
23	Sample	K1910861-006.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
24	Sample	K1910861-007.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
25	Sample	K1910929-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
26	Sample	K1910929-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
27	Sample	K1910929-003.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
28	Sample	K1910969-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
29	Sample	K1911033-001.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
30	Sample	K1911033-002.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
31	Sample	K1911033-003.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
32	Sample	K1911033-004.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
33	Sample	K1911033-005.03 20x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
34	Sample	K1911033-006.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
35	Sample	K1911033-007.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
36	Sample	K1911033-008.03 1000x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
37	Sample	K1911033-009.08	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
38	Sample	K1911033-009.08 ms 2x	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready

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Schedule: 11232019

Position	Sample Type	Sample ID	Method ID (Calibration ID)	Reps	Use	State
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
39	Sample	MB3	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
C	Check Standard	[TOC] LCS [25.0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
40	Sample	K1911031-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
41	Sample	K1911032-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
42	Sample	K1911032-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
43	Sample	K1911032-003.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
44	Sample	K1911032-004.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
45	Sample	K1911032-005.01 400x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
46	Sample	K1911032-006.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
47	Sample	K1911032-007.03 ms 2x	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
48	Sample	K1911032-007.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
49	Sample	K1910803-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
50	Sample	K1910803-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
51	Sample	K1910803-003.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
52	Sample	K1910803-004.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
53	Sample	K1910803-005.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
54	Sample	K1910803-006.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
55	Sample	K1911047-001.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
56	Sample	K1911047-002.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
57	Sample	K1911049-001.01 20x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
58	Sample	MB4	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
C	Check Standard	[TOC] LCS [25.0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
59	Sample	K1911049-002.01 20x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
60	Sample	K1911049-002.01 ms 100x	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
61	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
62	Sample	K1911049-003.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
63	Sample	K1911049-004.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
64	Sample	K1911028-001.04	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
65	Sample	K1911028-002.04	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
66	Sample	K1911028-003.04	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
67	Sample	K1911028-004.04	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
68	Sample	K1911028-005.04	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
69	Sample	FB 11/21/19	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
70	Sample	FB 11/22/19	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
71	Sample	K1911043-001.01 doc 1000x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
72	Sample	K1911043-002.01 doc 1000x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
73	Sample	K1910975-002.01 doc 10x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
74	Sample	K1910975-001.01 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
75	Sample	K1910975-001.01 ms doc	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
61	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
					False	

Fusion Report - 11232019
Saturday, November 23, 2019 02:23 PM

(View - Reps, Unused Reps, Meta-Data, Signature, History)
Printed on 2019/11/26 09:09 - Tuesday

Report Summary Information

Company Location: Gen Chem Lab

Schedule Name: 11232019

Instrument Name: Fusion1

Report Version: 1 of 1

Report Creation by Operators (schedule version): Fusion1 (Fusion1) (v2), Fusion1 (Fusion1) (v3), Fusion1 (Fusion1) (v4), Fusion1 (Fusion1) (v5), Fusion1 (Fusion1) (v6), Fusion1 (Fusion1) (v7), Fusion1 (Fusion1) (v8)

Engine Version: 1.1.5.1

Firmware Version: 1.2.0696

Connection: RS232 COM1

Comment:

11/26/19

Report Results

Sample Type: Clean — From Schedule Version 2

	Pos	Analysis Type	Sample ID	Start Time
◆	(clean)		Clean	2019/11/23 14:23

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	13.02	17.16	4.14	49.59	05:26
2	TC Clean	7.50	10.99	3.49	49.85	07:19
3	TC Clean	2.01	5.61	3.60	49.88	07:04
4	TC Clean	1.40	5.11	3.71	49.85	07:02

Sample Type: Clean — From Schedule Version 3

	Pos	Analysis Type	Sample ID	Start Time
◆	(clean)		Clean	2019/11/23 14:55

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	11.72	15.29	3.57	49.65	05:23

2	TC Clean	3.64	7.23	3.59	49.87	07:17
3	TC Clean	1.59	5.34	3.74	49.87	07:02
4	TC Clean	1.19	4.93	3.74	49.91	07:02

Sample Type: Clean From Schedule Version 4

	Pos	Analysis Type	Sample ID	Start Time
◆	(clean)		Clean	2019/11/23 15:34

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	11.48	15.13	3.65	49.68	05:24
2	TC Clean	3.90	7.40	3.51	50.02	04:07
3	TC Clean	1.55	5.07	3.52	50.06	03:50
4	TC Clean	1.18	4.74	3.56	50.06	03:48

Sample Type: Blank (Creating v1323) From Schedule Version 5

	Pos	Analysis Type	Sample ID	Start Time
◆	(blank)		Reagent/Acid Blank	2019/11/23 15:56

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	11.31	14.93	3.62	49.60	05:13
2	TC Clean	3.39	7.01	3.62	50.04	04:06
3	TC Clean	1.31	4.93	3.61	50.06	03:48
4	TC Clean	1.45	4.95	3.50	50.05	03:47
5	Reagent Blank	4.02	7.68	3.66	50.07	05:09
6	Acid Blank	1.14	4.93	3.79	49.74	05:31

Sample Type: Sample From Schedule Version 6

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	D	TOC	RB	0.0324 ppm	0.0000 ppm	0.0000%	2019/11/23 16:30

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0324	0.3238	9.00	12.79	3.79	50.19	10:34

Dilution **Blank Contribution** **Method** **Calibration**

1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Sample Type: Check Standard --> CCV 25 ppm From Schedule Version 7

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◈	B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	24.5667 ppm (PASS)	0.0000 ppm	0%	2019/11/23 16:45

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.5667	245.6673	176.22	180.09	3.87	50.19	10:30

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	50 ppmC

Sample Type: Check Standard --> CCB From Schedule Version 7

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◈	D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/11/23 16:59

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	7.20	10.93	3.73	50.19	10:29

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	0 ppmC

Sample Type: Sample From Schedule Version 7

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	1	TOC	MB1	0.0000 ppm	0.0000 ppm	0.0000%	2019/11/23 17:14

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	5.91	9.77	3.86	50.22	10:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Sample Type: Check Standard --> LCS From Schedule Version 8

	Pos	BAT	Concentration	Dil	Sample ID	Min / Max	Result	Std. Dev.	RSD	Start Time

			(ppm)			(% dev)				
◈	C	TOC	25.0000	1:1	[TOC] LCS [24.0 ppm]	0 / infinity (NA / NA)	24.7737 ppm (PASS)	0.0000 ppm	0%	2019/11/23 17:29

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	24.7737	247.7372	177.62	181.34	3.71	50.22	10:32

Completion State	Success Action	Method	Calibration	STD Conc - Pos C
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	25 ppmC

Sample Type: Sample From Schedule Version 8

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	2	TOC	ICS	0.0515 ppm	0.0000 ppm	0.0000%	2019/11/23 17:43

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0515	0.5154	9.13	12.75	3.61	50.28	10:32

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	3	TOC	K1910680-001.01	0.3971 ppm	0.0041 ppm	1.0200%	2019/11/23 17:58

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.3942	3.9420	11.46	15.12	3.66	50.22	10:23
2	TOC	0.3999	3.9995	11.50	15.20	3.70	50.24	10:31

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	4	TOC	K1910680-002.01	0.3183 ppm	0.0252 ppm	7.9200%	2019/11/23 18:26

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.3362	3.3616	11.07	14.56	3.49	50.27	10:28
2	TOC	0.3005	3.0051	10.82	14.32	3.50	50.24	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	5	TOC	K1910680-003.01	0.6550 ppm	0.0139 ppm	2.1200%	2019/11/23 18:54

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.6648	6.6483	13.30	17.08	3.79	50.23	10:28
2	TOC	0.6452	6.4524	13.16	16.93	3.77	50.22	10:24

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	6	TOC	K1910680-004.01	0.6509 ppm	0.0751 ppm	11.5400%	2019/11/23 19:22

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.5978	5.9780	12.84	16.55	3.71	50.24	10:25
2	TOC	0.7040	7.0402	13.56	17.06	3.50	50.21	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	7	TOC	K1910680-005.03	0.2227 ppm	0.0196 ppm	8.7900%	2019/11/23 19:50

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.2089	2.0887	10.20	13.79	3.59	50.22	10:27
2	TOC	0.2366	2.3657	10.39	13.99	3.60	50.18	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	8	TOC	K1910796-004.01	0.2410 ppm	0.0085 ppm	3.5400%	2019/11/23 20:18

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.2349	2.3495	10.38	14.07	3.70	50.17	10:30
2	TOC	0.2470	2.4703	10.46	14.10	3.64	50.21	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	9	TOC	K1910796-004.01 ms	22.5196 ppm	0.0000 ppm	0.0000%	2019/11/23 20:46

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	22.5196	225.1962	161.65	165.26	3.61	50.18	10:32

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Sample Type: Check Standard --> CCV 25 ppm From Schedule Version 8

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◈	B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	24.6507 ppm (PASS)	0.0000 ppm	0%	2019/11/23 21:01

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.6507	246.5070	176.79	180.47	3.68	50.17	10:32

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	50 ppmC

Sample Type: Check Standard --> CCB From Schedule Version 8

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◈	D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/11/23 21:15

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	7.20	10.96	3.76	50.20	10:30

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	0 ppmC

Sample Type: Sample From Schedule Version 8

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	10	TOC	K1910796-001.01	1.1291 ppm	0.0626 ppm	5.5400%	2019/11/23 21:30

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.0848	10.8484	16.15	19.70	3.56	50.19	10:28
2	TOC	1.1734	11.7338	16.75	20.53	3.78	50.20	10:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	11	TOC	K1910796-002.01	0.8600 ppm	0.0811 ppm	9.4400%	2019/11/23 21:59

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.9173	9.1734	15.01	18.72	3.71	50.17	10:29

2	TOC	0.8026	8.0257	14.23	17.85	3.62	50.21	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	12	TOC	K1910796-003.01	1.8026 ppm	0.0160 ppm	0.8900%	2019/11/23 22:27

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.8139	18.1393	21.10	24.61	3.52	50.15	10:27
2	TOC	1.7912	17.9124	20.94	24.64	3.70	50.17	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	13	TOC	K1910847-001.01 20x	33.9319 ppm	0.1646 ppm	0.4900%	2019/11/23 22:55

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	34.0483	340.4830	239.90	243.51	3.61	50.13	10:25
2	TOC	33.8155	338.1553	238.32	242.06	3.74	50.17	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	14	TOC	K1910847-002.01	32.6696 ppm	0.2662 ppm	0.8100%	2019/11/23 23:23

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	32.8578	328.5780	231.82	235.44	3.62	50.13	10:29
2	TOC	32.4814	324.8140	229.27	232.83	3.57	50.16	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	15	TOC	K1910847-003.01	35.0515 ppm	0.3546 ppm	1.0100%	2019/11/23 23:51

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	35.3023	353.0229	248.41	251.92	3.51	50.15	10:24
2	TOC	34.8008	348.0081	245.01	248.71	3.70	50.19	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time

◆	16	TOC	K1910847-004.01	61.1285 ppm	0.2557 ppm	0.4200%	2019/11/24 00:19

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	61.3093	613.0929	424.95	428.74	3.79	50.16	10:26
2	TOC	60.9476	609.4762	422.49	426.28	3.78	50.18	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	17	TOC	K1910861-001.01 100x	7.0368 ppm	0.3612 ppm	5.1300%	2019/11/24 00:47

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	7.2922	72.9217	58.28	62.10	3.82	50.15	10:27
2	TOC	6.7814	67.8141	54.82	58.35	3.54	50.11	10:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	18	TOC	K1910861-002.01 100x	5.9322 ppm	0.1137 ppm	1.9200%	2019/11/24 01:15

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	6.0125	60.1255	49.60	53.26	3.66	50.14	10:29
2	TOC	5.8518	58.5182	48.51	52.12	3.61	50.05	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	19	TOC	K1910861-003.01 100x	5.9661 ppm	0.0454 ppm	0.7600%	2019/11/24 01:43

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.9983	59.9826	49.50	53.04	3.54	50.09	10:26
2	TOC	5.9340	59.3403	49.06	52.60	3.54	50.03	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Sample Type: Check Standard --> CCV 25 ppm From Schedule Version 8

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆	B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	24.5922 ppm (PASS)	0.0000 ppm	0%	2019/11/24 02:11

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.5922	245.9222	176.39	179.84	3.44	50.03	10:32

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	50 ppmC

Sample Type: Check Standard --> CCB From Schedule Version 8

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◈	D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0310 ppm (PASS)	0.0000 ppm	0%	2019/11/24 02:26

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0310	0.3101	9.67	13.33	3.66	50.08	10:31

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	0 ppmC

Sample Type: Sample From Schedule Version 8

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	20	TOC	MB2	0.0000 ppm	0.0000 ppm	0.0000%	2019/11/24 02:41

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.75	12.48	3.72	49.99	10:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Sample Type: Check Standard --> LCS From Schedule Version 8

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◈	C	TOC	25.0000	1:1	[TOC] LCS [24.0 ppm]	0 / infinity (NA / NA)	25.1233 ppm (PASS)	0.0000 ppm	0%	2019/11/24 02:55

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	25.1233	251.2331	180.00	183.53	3.53	50.03	10:32

Completion State	Success Action	Method	Calibration	STD Conc - Pos C
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	25 ppmC

Sample Type: Sample From Schedule Version 8

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	21	TOC	K1910861-004.01 100x	7.8099 ppm	0.0129 ppm	0.1700%	2019/11/24 03:10

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	7.8190	78.1899	61.86	65.43	3.57	50.08	10:27
2	TOC	7.8007	78.0072	61.74	65.35	3.62	50.02	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	22	TOC	K1910861-005.01 100x	7.4694 ppm	0.0388 ppm	0.5200%	2019/11/24 03:38

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	7.4968	74.9680	59.67	63.39	3.72	50.08	10:26
2	TOC	7.4420	74.4200	59.30	62.89	3.59	50.04	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	23	TOC	K1910861-006.01 100x	10.7216 ppm	0.0985 ppm	0.9200%	2019/11/24 04:06

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	10.7913	107.9132	82.04	85.66	3.63	50.12	10:29
2	TOC	10.6520	106.5195	81.09	84.72	3.63	50.06	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	24	TOC	K1910861-007.01 100x	8.2889 ppm	0.1349 ppm	1.6300%	2019/11/24 04:34

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	8.3843	83.8426	65.70	69.24	3.54	50.09	10:26
2	TOC	8.1935	81.9348	64.40	67.94	3.54	50.10	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	25	TOC	K1910929-001.01	1.4775 ppm	0.0693 ppm	4.6900%	2019/11/24 05:02

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.5265	15.2651	19.15	22.67	3.52	50.08	10:26
2	TOC	1.4285	14.2854	18.48	22.07	3.59	50.12	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	26	TOC	K1910929-002.01	0.8728 ppm	0.0649 ppm	7.4400%	2019/11/24 05:30

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.8269	8.2688	14.40	17.92	3.52	50.11	10:29
2	TOC	0.9187	9.1866	15.02	18.57	3.55	50.11	10:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	27	TOC	K1910929-003.01	1.9595 ppm	0.0231 ppm	1.1800%	2019/11/24 05:58

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.9431	19.4313	21.97	25.45	3.48	50.14	10:29
2	TOC	1.9758	19.7583	22.20	25.88	3.69	50.11	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	28	TOC	K1910969-002.01	1.1736 ppm	0.0380 ppm	3.2400%	2019/11/24 06:26

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.2005	12.0049	16.93	20.49	3.56	50.15	10:28
2	TOC	1.1467	11.4671	16.57	20.16	3.59	50.15	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Sample Type: Check Standard --> CCV 25 ppm From Schedule Version 8

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◈	B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	24.2594 ppm (PASS)	0.0000 ppm	0%	2019/11/24 06:54

Pos	Base Analysis	ID	Rep	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run

	Type		#							Time
B	TOC	25 ppm	1	24.2594	242.5942	174.13	177.81	3.67	50.11	10:29

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	50 ppmC

Sample Type: Check Standard --> CCB From Schedule Version 8

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◈	D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/11/24 07:09

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	7.62	11.38	3.76	50.13	10:30

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	0 ppmC

Sample Type: Sample From Schedule Version 8

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	29	TOC	K1911033-001.03	3.6897 ppm	0.0082 ppm	0.2200%	2019/11/24 07:24

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.6955	36.9550	33.87	37.44	3.58	50.10	10:30
2	TOC	3.6839	36.8386	33.79	37.44	3.65	50.12	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	30	TOC	K1911033-002.03	2.8101 ppm	0.0494 ppm	1.7600%	2019/11/24 07:52

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.8450	28.4502	28.10	31.78	3.68	50.13	10:24
2	TOC	2.7752	27.7519	27.62	31.38	3.76	50.10	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	31	TOC	K1911033-003.03	2.8154 ppm	0.0290 ppm	1.0300%	2019/11/24 08:20

Rep	Base			Adjusted		Baseline	Pressure	Run

#	Analysis Type	ppm	µg	(Abs)	NDIR (Abs)	(Abs)	(psig)	Time
1	TOC	2.8359	28.3589	28.03	31.72	3.68	50.10	10:27
2	TOC	2.7949	27.9493	27.76	31.45	3.69	50.12	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	32	TOC	K1911033-004.03	2.3843 ppm	0.0527 ppm	2.2100%	2019/11/24 08:48

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.4216	24.2162	25.22	28.84	3.62	50.11	10:29
2	TOC	2.3471	23.4708	24.72	28.28	3.57	50.10	10:32

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	33	TOC	K1911033-005.03 20x	39.2024 ppm	0.5662 ppm	1.4400%	2019/11/24 09:16

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	39.6027	396.0271	277.60	281.33	3.73	50.11	10:27
2	TOC	38.8020	388.0202	272.17	276.09	3.92	50.14	10:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	34	TOC	K1911033-006.03	3.8114 ppm	0.8350 ppm	21.9100%	2019/11/24 09:44

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	4.4019	44.0190	38.66	42.53	3.86	50.11	10:29
2	TOC	3.2210	32.2098	30.65	34.21	3.56	50.10	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	35	TOC	K1911033-007.03	2.4078 ppm	0.1907 ppm	7.9200%	2019/11/24 10:12

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.5427	25.4272	26.04	29.72	3.67	50.12	10:29
2	TOC	2.2730	22.7298	24.21	27.75	3.54	50.10	10:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	7.8608	78.6083	62.14	65.77	3.63	50.14	10:31
2	TOC	8.0441	80.4409	63.39	67.04	3.65	50.09	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	37	TOC	K1911033-009.08	3.8094 ppm	0.2302 ppm	6.0400%	2019/11/24 11:09

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.9722	39.7217	35.75	39.38	3.63	50.12	10:30
2	TOC	3.6466	36.4659	33.54	37.02	3.49	50.11	10:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	38	TOC	K1911033-009.08 ms 2x	26.1443 ppm	0.0000 ppm	0.0000%	2019/11/24 11:37

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	26.1443	261.4428	186.25	189.80	3.55	50.11	10:33

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Sample Type: Check Standard --> CCV 25 ppm From Schedule Version 8

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◈	B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	24.7622 ppm (PASS)	0.0000 ppm	0%	2019/11/24 11:51

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.7622	247.6222	177.55	181.02	3.47	50.15	10:28

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	50 ppmC

Sample Type: Check Standard --> CCB From Schedule Version 8

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◈	D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.2695 ppm (PASS)	0.0000 ppm	0%	2019/11/24 12:06

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.2695	2.6952	11.29	14.85	3.56	50.13	10:34

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	0 ppmC

Sample Type: Sample From Schedule Version 8

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	39	TOC	MB3	0.1773 ppm	0.0000 ppm	0.0000%	2019/11/24 12:21

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1773	1.7735	9.99	13.72	3.73	50.13	10:34

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Sample Type: Check Standard --> LCS From Schedule Version 8

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◈	C	TOC	25.0000	1:1	[TOC] LCS [25.0 ppm]	0 / infinity (NA / NA)	24.9621 ppm (PASS)	0.0000 ppm	0%	2019/11/24 12:36

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	24.9621	249.6214	178.90	182.70	3.80	50.17	10:37

Completion State	Success Action	Method	Calibration	STD Conc - Pos C
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	25 ppmC

Sample Type: Sample From Schedule Version 8

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	40	TOC	K1911031-001.01	0.8797 ppm	0.0764 ppm	8.6800%	2019/11/24 12:50

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time

1	TOC	0.9337	9.3369	15.12	18.87	3.75	50.14	10:29
2	TOC	0.8257	8.2570	14.39	18.18	3.79	50.17	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	41	TOC	K1911032-001.01	1.5194 ppm	0.0864 ppm	5.6800%	2019/11/24 13:19

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.5804	15.8042	19.51	23.29	3.78	50.19	10:28
2	TOC	1.4583	14.5830	18.68	22.26	3.58	50.20	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	42	TOC	K1911032-002.01	1.6117 ppm	0.0371 ppm	2.3000%	2019/11/24 13:47

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.5854	15.8543	19.55	22.98	3.44	50.25	10:28
2	TOC	1.6379	16.3788	19.90	23.42	3.52	50.20	10:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	43	TOC	K1911032-003.01	1.5818 ppm	0.0584 ppm	3.6900%	2019/11/24 14:15

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.6231	16.2315	19.80	23.26	3.46	50.22	10:25
2	TOC	1.5405	15.4050	19.24	22.79	3.54	50.25	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	44	TOC	K1911032-004.01	1.9794 ppm	0.1074 ppm	5.4300%	2019/11/24 14:43

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.0554	20.5538	22.74	26.37	3.63	50.21	10:30
2	TOC	1.9035	19.0350	21.70	25.32	3.61	50.22	10:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	45	TOC	K1911032-005.01 400x	4.7687 ppm	0.1385 ppm	2.9100%	2019/11/24 15:11

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	4.6708	46.7076	40.49	43.95	3.46	50.26	10:28
2	TOC	4.8667	48.6669	41.82	45.56	3.74	50.27	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	46	TOC	K1911032-006.01	1.9445 ppm	0.1188 ppm	6.1100%	2019/11/24 15:39

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.0284	20.2842	22.55	26.14	3.58	50.27	10:31
2	TOC	1.8605	18.6048	21.41	25.06	3.65	50.23	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	47	TOC	K1911032-007.03 ms 2x	26.3874 ppm	0.0000 ppm	0.0000%	2019/11/24 16:07

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	26.3874	263.8736	187.90	191.52	3.62	50.24	10:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Sample Type: Check Standard --> CCV 25 ppm From Schedule Version 8

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◈	B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	24.3561 ppm (PASS)	0.0000 ppm	0%	2019/11/24 16:22

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.3561	243.5606	174.79	178.42	3.63	50.26	10:33

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	50 ppmC

Sample Type: Check Standard --> CCB From Schedule Version 8

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆	D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/11/24 16:36

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	7.48	11.05	3.57	50.24	10:31

Completion State: Success - Criteria met.
Success Action: Do Nothing
Method: CAS_salt_010711 (v4)
Calibration: CAS_salt_010711 (v30)
STD Conc - Pos D: 0 ppmC

Sample Type: Sample — From Schedule Version 8

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	48	TOC	K1911032-007.03	4.1677 ppm	0.0667 ppm	1.6000%	2019/11/24 16:51

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	4.1205	41.2052	36.75	40.48	3.73	50.22	10:28
2	TOC	4.2148	42.1480	37.39	40.98	3.59	50.25	10:27

Dilution: 1:10
Blank Contribution: (TC) 8.7842 (IC) (v1323)
Method: CAS_salt_010711 (v4)
Calibration: CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	49	TOC	K1910803-001.01	44.1588 ppm	0.9849 ppm	2.2300%	2019/11/24 17:19

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	43.4623	434.6235	303.80	307.50	3.70	50.24	10:26
2	TOC	44.8553	448.5526	313.26	317.05	3.79	50.20	10:27

Dilution: 1:10
Blank Contribution: (TC) 8.7842 (IC) (v1323)
Method: CAS_salt_010711 (v4)
Calibration: CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	50	TOC	K1910803-002.01	121.0609 ppm	1.4739 ppm	1.2200%	2019/11/24 17:47

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	120.0187	1200.1870	823.46	827.29	3.83	50.25	10:28
2	TOC	122.1031	1221.0313	837.61	842.19	4.58	50.24	10:29

Dilution: 1:10
Blank Contribution: (TC) 8.7842 (IC) (v1323)
Method: CAS_salt_010711 (v4)
Calibration: CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time

◈	51	TOC	K1910803-003.01	20.0133 ppm	2.5636 ppm	12.8100%	2019/11/24 18:15

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	21.8260	218.2603	156.94	161.38	4.44	50.17	10:27
2	TOC	18.2005	182.0049	132.33	136.43	4.11	50.22	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	52	TOC	K1910803-004.01	68.5161 ppm	1.6462 ppm	2.4000%	2019/11/24 18:43

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	67.3521	673.5207	465.97	469.89	3.93	50.19	10:27
2	TOC	69.6802	696.8016	481.77	488.04	6.27	50.15	10:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	53	TOC	K1910803-005.01	31.2983 ppm	12.2840 ppm	39.2500%	2019/11/24 19:11

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	39.9844	399.8441	280.20	285.79	5.59	50.18	10:30
2	TOC	22.6123	226.1228	162.27	166.53	4.26	50.14	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	54	TOC	K1910803-006.01	14.3445 ppm	0.8810 ppm	6.1400%	2019/11/24 19:40

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	14.9674	149.6740	110.38	114.24	3.86	50.18	10:28
2	TOC	13.7215	137.2151	101.92	105.81	3.89	50.14	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	55	TOC	K1911047-001.01 100x	3.3581 ppm	0.4125 ppm	12.2800%	2019/11/24 20:08

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.6498	36.4983	33.56	37.32	3.76	50.14	10:27
2	TOC	3.0664	30.6644	29.60	33.16	3.56	50.17	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	56	TOC	K1911047-002.01 100x	26.8358 ppm	0.0527 ppm	0.2000%	2019/11/24 20:36

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	26.8731	268.7307	191.20	194.84	3.64	50.13	10:25
2	TOC	26.7985	267.9853	190.69	194.42	3.73	50.17	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	57	TOC	K1911049-001.01 20x	4.1392 ppm	0.1555 ppm	3.7600%	2019/11/24 21:04

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	4.2491	42.4913	37.63	41.27	3.65	50.16	10:28
2	TOC	4.0292	40.2918	36.13	39.75	3.61	50.12	10:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Sample Type: Check Standard --> CCV 25 ppm — From Schedule Version 8

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◈	B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	24.6687 ppm (PASS)	0.0000 ppm	0%	2019/11/24 21:32

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.6687	246.6868	176.91	180.57	3.66	50.17	10:34

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	50 ppmC

Sample Type: Check Standard --> CCB — From Schedule Version 8

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◈	D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/11/24 21:47

Pos	Base Analysis	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time

	Type									
D	TOC	0 ppm	1	0.0000	0.0000	8.80	12.38	3.58	50.14	10:32

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	0 ppmC

Sample Type: Sample — From Schedule Version 8

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	58	TOC	MB4	0.0000 ppm	0.0000 ppm	0.0000%	2019/11/24 22:01

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.03	11.47	3.43	50.10	10:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Sample Type: Check Standard --> LCS — From Schedule Version 8

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆	C	TOC	25.0000	1:1	[TOC] LCS [25.0 ppm]	0 / infinity (NA / NA)	24.7141 ppm (PASS)	0.0000 ppm	0%	2019/11/24 22:16

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	24.7141	247.1405	177.22	180.81	3.59	50.14	10:30

Completion State	Success Action	Method	Calibration	STD Conc - Pos C
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	25 ppmC

Sample Type: Sample — From Schedule Version 8

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	59	TOC	K1911049-002.01 20x	9.0455 ppm	0.0478 ppm	0.5300%	2019/11/24 22:31

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	9.0793	90.7931	70.41	74.08	3.66	50.15	10:27
2	TOC	9.0117	90.1169	69.96	73.45	3.50	50.14	10:24

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time

◆	60	TOC	K1911049-002.01 ms 100x	29.0715 ppm	0.0000 ppm	0.0000%	2019/11/24 22:59

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	29.0715	290.7153	206.12	209.76	3.64	50.16	10:32

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	61	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/11/24 23:13

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.92	11.64	3.72	50.14	10:34

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	62	TOC	K1911049-003.01	11.8161 ppm	0.0456 ppm	0.3900%	2019/11/24 23:28

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	11.7838	117.8381	88.77	92.40	3.62	50.11	10:31
2	TOC	11.8483	118.4834	89.21	92.81	3.60	50.16	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	63	TOC	K1911049-004.01	1.5999 ppm	0.0839 ppm	5.2400%	2019/11/24 23:56

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.6592	16.5924	20.05	23.59	3.54	50.11	10:30
2	TOC	1.5406	15.4065	19.24	22.81	3.57	50.13	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	64	TOC	K1911028-001.04	0.8950 ppm	0.0518 ppm	5.7800%	2019/11/25 00:24

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.9316	9.3163	15.11	18.58	3.47	50.15	10:28
2	TOC	0.8584	8.5841	14.61	18.06	3.45	50.11	10:24

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC)	CAS_salt_010711	CAS_salt_010711

(v1323) (v4) (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	65	TOC	K1911028-002.04	21.8501 ppm	0.4095 ppm	1.8700%	2019/11/25 00:52

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	22.1397	221.3968	159.07	162.59	3.52	50.14	10:29
2	TOC	21.5606	215.6056	155.14	158.84	3.70	50.12	10:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	66	TOC	K1911028-003.04	0.7336 ppm	0.0533 ppm	7.2700%	2019/11/25 01:21

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.7713	7.7134	14.02	17.61	3.59	50.10	10:26
2	TOC	0.6959	6.9591	13.51	17.14	3.64	50.14	10:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Sample Type: Check Standard --> CCV 25 ppm From Schedule Version 8

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆	B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	24.2538 ppm (PASS)	0.0000 ppm	0%	2019/11/25 01:49

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.2538	242.5382	174.10	177.84	3.74	50.11	10:29

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	50 ppmC

Sample Type: Check Standard --> CCB From Schedule Version 8

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆	D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/11/25 02:04

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	6.19	9.91	3.72	50.09	10:33

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	0 ppmC

Sample Type: Sample

From Schedule Version 8

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	67	TOC	K1911028-004.04	1.4272 ppm	0.0215 ppm	1.5000%	2019/11/25 02:18

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.4424	14.4239	18.58	22.17	3.60	50.13	10:29
2	TOC	1.4120	14.1204	18.37	22.07	3.70	50.12	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	68	TOC	K1911028-005.04	1.4693 ppm	0.0117 ppm	0.7900%	2019/11/25 02:47

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.4776	14.7759	18.81	22.49	3.68	50.15	10:28
2	TOC	1.4611	14.6110	18.70	22.34	3.64	50.11	10:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	69	TOC	FB 11/21/19	0.0000 ppm	0.0000 ppm	0.0000%	2019/11/25 03:15

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	5.76	9.25	3.49	50.12	10:32

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	70	TOC	FB 11/22/19	0.0000 ppm	0.0000 ppm	0.0000%	2019/11/25 03:29

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	5.79	9.29	3.50	50.13	10:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time

◆	71	TOC	K1911043-001.01 doc 1000x	11.7513 ppm	0.0120 ppm	0.1000%	2019/11/25 03:44

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	11.7598	117.5980	88.61	92.27	3.66	50.11	10:29
2	TOC	11.7429	117.4286	88.49	92.16	3.67	50.11	10:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	72	TOC	K1911043-002.01 doc 1000x	0.0000 ppm	0.0000 ppm	0.0000%	2019/11/25 04:12

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.79	11.41	3.62	50.11	10:29
2	TOC	0.0000	0.0000	7.15	10.87	3.72	50.09	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	73	TOC	K1910975-002.01 doc 10x	8.1521 ppm	0.2117 ppm	2.6000%	2019/11/25 04:40

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	8.0024	80.0240	63.10	66.61	3.51	50.14	10:30
2	TOC	8.3018	83.0176	65.14	68.78	3.64	50.11	10:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	74	TOC	K1910975-001.01 doc	0.8387 ppm	0.1176 ppm	14.0200%	2019/11/25 05:08

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.9219	9.2190	15.04	18.69	3.65	50.11	10:26
2	TOC	0.7556	7.5558	13.91	17.48	3.57	50.12	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	75	TOC	K1910975-001.01 ms doc	26.6131 ppm	0.0000 ppm	0.0000%	2019/11/25 05:36

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time

1	TOC	26.6131	266.1305	189.43	193.03	3.60	50.14	10:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	61	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/11/25 05:51

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.23	10.93	3.70	50.12	10:28
2	TOC	0.0000	0.0000	6.73	10.14	3.40	50.11	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7842 (IC) (v1323)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Sample Type: Check Standard --> CCV 25 ppm From Schedule Version 8

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◈	B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	24.1613 ppm (PASS)	0.0000 ppm	0%	2019/11/25 06:19

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.1613	241.6131	173.47	177.17	3.70	50.11	10:33

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	50 ppmC

Sample Type: Check Standard --> CCB From Schedule Version 8

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◈	D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/11/25 06:34

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	5.86	9.52	3.65	50.12	10:29

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	0 ppmC

Meta Data Used in this Report

Blanks

Version	Reagent (Abs)	Acid (Abs)	DI IC (Abs)	DI TC (Abs)	DI TOC (Abs)	Save Time	Operator
v1322	1.2997	0.8410	0.0000	0.0000	0.0000	2019/11/21 13:13	Fusion1 (Fusion1)
v1323	1.3397	1.1360	0.0000	0.0000	0.0000	2019/11/23 16:30	Fusion1 (Fusion1)

Calibrations

Name: CAS_salt_010711 (TOC)

Version: v30
Ver Creation: 2019/03/05 17:42
Comment:
Operator: Fusion1 (Fusion1)
Basic Analysis Type: TOC
Calibration curve formula: TOC: y = 6.788x + 9.463
r^2 value: TOC: r^2 = 0.99963

Basic Analysis Type: TOC

Sample ID	Y Raw Value	X Expected	Message	End Time
DI Water	7.8970	0.0000		2019/03/05 16:15
0.500 ppm	11.5280	0.5000		2019/03/05 16:29
1.0 ppm	14.9760	1.0000		2019/03/05 16:44
5.0 ppm	43.6500	5.0000		2019/03/05 16:58
10 ppm	79.6020	10.0000		2019/03/05 17:12
25 ppm	183.3580	25.0000		2019/03/05 17:26
50 ppm	346.3230	50.0000		2019/03/05 17:40

Methods

Name: CAS_salt_010711 (TOC)

Version: v4
Ver Creation: 2019/02/21 17:57
Comment:
Operator: Fusion1 (Fusion1)

Parameter	Value
SampleVolume	10.0 mL
Dilution	1:10
AcidVolume	0.5 ml
ReagentVolume	2.0 ml
UVReactorPrerinse	Off
UVReactorPrerinseVolume	5.0
NumberOfUVReactorPrerinses	1
ICSpargeTime	1.00 mins
DetectorSweepFlow	500 ml/min

Advanced Parameter	Value
NeedleRinseVolume	5.0 ml
VialPrimeVolume	2.0 ml
ICSamplePrimeVolume	2.0 ml
ICSpargeRinseVolume	12.0 ml
BaselineStabilizeTime	0.70 min
DetectorPressureFlow	150 ml/min
SyringeSpeedWaste	10
SyringeSpeedAcid	7
SyringeSpeedReagent	7

PreSpargeTime	2.00 mins	SyringeSpeedDIWater	7
SystemFlow	500 ml/min	NDIRPressurization	60 psig
		SyringeSpeedSampleDispense	5
		SyringeSpeedSampleAspirate	4
		SyringeSpeedUVDispense	5
		SyringeSpeedUVAspirate	5
		SyringeSpeedICDispense	5
		SyringeSpeedICAspirate	5
		NDIRPressureStabilize	1.75 min
		SampleMixing	Off
		SampleMixingCycles	1
		SampleMixingVolume	10.0
		LowLevelFilterNDIR	Off

Acceptance / Approval

Electronic Signatures

Report Version	User Name	Acceptance	Reason	Date

Report History

Report History

Report Version	User Name	System Reason	User Reason	Date
1	Fusion1 (Fusion1)	Schedule completed	Schedule completed	2019/11/25 06:49

ALS Environmental

StarLIMS Run: 661076, 661077, 661078, 661079

Analysis: DOC/TOC

Method: SM 5310 C, 9060A, 415.1, 9060

CCV: 11-GEN-05-82C 50 ppm LCS: 11-GEN-05-79J 25.0 ppm

ICAL Date: 3/6/19

ICAL ID: 11-GEN-05-76H

ICS ID: 11-GEN-05-78M

ICS TV: 25.0 ppm ICS % R < 1

Spike ID: 11-GEN-05-82C 0.05 ml of 5000 ppm stock ---> 10.0 ml = 25.0 ppm x dilution factor

Sodium Persulfate: 11-GEN-05-83D

21 % H3PO4: 11-GEN-05-83B

Equipment ID: K-TOC-03

PIPETTE ID: 124276B, 129001F, N11314F, Marge

FILTER ID: 16967789

Analyzed By: BCP	Date Analyzed: 11/26/19
Reviewed By:	Date Reviewed: 11/26/19

23 BCP 11/27/19

Case Narrative

Method: 6850
Analysis: Perchlorate
Analysis SOP: LC-MS-CLO4
ALS WO ID(s): 1932283; 1932284; 1932352

Client: ALS Laboratories (Houston, TX)
Matrix: Water
ELMS Batch (HBN): 2320 (252432)

General Set Information: There were seventeen field samples in these Work Orders. The samples were analyzed for perchlorate.

Method Summary: Each sample was prepared as noted below and analyzed using an Agilent 1100 LC/MSD system in select ion monitoring (SIM) mode at m/z 83 and 85, which corresponds to the loss of one oxygen atom from the perchlorate molecule. ChemStation software was used for instrument control and data analysis. The ion ratio of m/z 83 to 85 was used to positively identify the response peak as perchlorate. Quantitation was performed using the m/z 83 peak area. An internal standard (ISTD) of ^{18}O labeled perchlorate was added to each sample to establish the perchlorate peak retention time and used in quantitation.

Sample Preparation: A 10.0mL aliquot of each sample was transferred into a 15-mL centrifuge tube. 50µL of an ^{18}O labeled perchlorate solution was added to each sample as an internal standard. The samples were then capped, vortexed, and filtered into autosampler vial using Phenex PES membrane 0.45µm Syringe filters.

Holding Times: Holding times were met for all analyses.

Dilutions: Field sample 1932284006 was analyzed and reported from a 1:10 dilution. Field sample 1932284007 was analyzed and reported from a 1:100 dilution. Field samples 1932284008/09/10 and 1932352003 were analyzed and reported from 1:1,000 dilutions. The reporting limits have been adjusted accordingly.

Method QC data: The method blank (LMB 685442) was less than 1/2 the CRDL. The recovery for the LCS (685439) was within acceptable parameters.

MS/MSD Analysis: MS/MSD was performed on samples 1932352005/06 (Client ID: 50WW23-191113). 3.0µL of Working Standard Solution Horizon ID 49947 was added to 10.0mL of sample preparation. The spike target was 3.µg/L. The MS/MSD percent recoveries and relative percent difference (RPD) were within the performance limits.

Instrument QC: Instrument initial and continuing calibrations were performed in accordance with published procedures.

NC/CAR(s): NA

Sample Calculation: Samples were reported in µg/L. Results were calculated in µg/L by the equation (A)x(B),

where: A = Analyte concentration from the standard curve (µg/L)
B = Dilution performed at time of analysis

Miscellaneous Comments: These samples were analyzed in accordance with the requirements found in the DOD QSM Version 5.1.1. The Reporting Limit Verification Standard (RLVS – 685440) is reported from the analysis of the Laboratory Control Sample (LCS – 685439) at a level of 3.0µg/L. Due to limitations of the Chemstation Software, some of the chromatographic peaks may require manual integrations. A manual integration was performed for one of the Initial Calibration analyses (datafile: 20SEPI03) along with datafile 22NOV19D07.

Thomas Bosch November 25, 2019
Analyst Date

ANALYTICAL REPORT

Report Date: November 26, 2019

RJ Modashia
ALS Environmental (Houston)
10450 Stancliff Road
Suite 210
Houston, TX 77099

Phone: 281 530-5656

E-mail: RJ.Modashia@ALSGlobal.com

Workorder: **34-1932352**
Project ID: HS19110684
Purchase Order: HS19110684
Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
50WW16-191113	1932352001	11/13/19	11/15/19	HS19110684-01
50WW14-191113	1932352002	11/13/19	11/15/19	HS19110684-01
50WW13-191113	1932352003	11/13/19	11/15/19	HS19110684-01
50WW23-191113	1932352004	11/13/19	11/15/19	HS19110684-01

Client QC ID *	Lab ID	Collect Date	Receive Date	Sampling Site
50WW23-191113 MS	1932352005	11/13/19	11/15/19	HS19110684-01
50WW23-191113 MSD	1932352006	11/13/19	11/15/19	HS19110684-01

***Client QC is reported as part of the Quality Control results report, if requested.**

ANALYTICAL REPORT

Workorder: 34-1932352
Client: ALS Environmental (Houston)
Project Manager: Kevin W. Griffiths

Analytical Results

Sample ID: **50WW16-191113** | Sampling Site: HS19110684-01 | Collected: 11/13/2019
Lab ID: 1932352001 | Media: 125 mL Nalgene | Received: 11/15/2019
Matrix: Water | Sampling Parameter: NA

Analysis Method - EPA 6850, DoD QSM

Preparation: Not Applicable
Analysis: EPA 6850, DoD QSM Water | **Instrument ID:** LCMS04
Batch: ELMS/2320 (HBN: 252432) | **%Solids:** NA
Analyzed: 11/22/2019 12:13 | **Report Basis:** Wet

Analyte	Result (ug/L)	DL (ug/L)	LOD (ug/L)	LOQ (ug/L)	Dilution	Qual
Perchlorate	1.6	1.0	2.0	4.0	1	J

Sample ID: **50WW14-191113** | Sampling Site: HS19110684-01 | Collected: 11/13/2019
Lab ID: 1932352002 | Media: 125 mL Nalgene | Received: 11/15/2019
Matrix: Water | Sampling Parameter: NA

Analysis Method - EPA 6850, DoD QSM

Preparation: Not Applicable
Analysis: EPA 6850, DoD QSM Water | **Instrument ID:** LCMS04
Batch: ELMS/2320 (HBN: 252432) | **%Solids:** NA
Analyzed: 11/22/2019 12:27 | **Report Basis:** Wet

Analyte	Result (ug/L)	DL (ug/L)	LOD (ug/L)	LOQ (ug/L)	Dilution	Qual
Perchlorate	ND	1.0	2.0	4.0	1	U

Sample ID: **50WW13-191113** | Sampling Site: HS19110684-01 | Collected: 11/13/2019
Lab ID: 1932352003 | Media: 125 mL Nalgene | Received: 11/15/2019
Matrix: Water | Sampling Parameter: NA

Analysis Method - EPA 6850, DoD QSM

Preparation: Not Applicable
Analysis: EPA 6850, DoD QSM Water | **Instrument ID:** LCMS04
Batch: ELMS/2320 (HBN: 252432) | **%Solids:** NA
Analyzed: 11/22/2019 12:41 | **Report Basis:** Wet

Analyte	Result (ug/L)	DL (ug/L)	LOD (ug/L)	LOQ (ug/L)	Dilution	Qual
Perchlorate	**4900**	1000	2000	4000	1000	

Sample ID: **50WW23-191113** | Sampling Site: HS19110684-01 | Collected: 11/13/2019
Lab ID: 1932352004 | Media: 125 mL Nalgene | Received: 11/15/2019
Matrix: Water | Sampling Parameter: NA

Analysis Method - EPA 6850, DoD QSM

Preparation: Not Applicable
Analysis: EPA 6850, DoD QSM Water | **Instrument ID:** LCMS04
Batch: ELMS/2320 (HBN: 252432) | **%Solids:** NA
Analyzed: 11/22/2019 12:55 | **Report Basis:** Wet

Analyte	Result (ug/L)	DL (ug/L)	LOD (ug/L)	LOQ (ug/L)	Dilution	Qual
Perchlorate	ND	1.0	2.0	4.0	1	U

ANALYTICAL REPORT

Workorder: 34-1932352
Client: ALS Environmental (Houston)
Project Manager: Kevin W. Griffiths

Comments

Quality Control: **EPA 6850, DoD QSM - (HBN: 252432)**

Field sample 1932284006 was analyzed and reported from a 1:10 dilution. Field sample 1932284007 was analyzed and reported from a 1:100 dilution. Field samples 1932284008/09/10 and 1932352003 were analyzed and reported from 1:1,000 dilutions. The reporting limits have been adjusted accordingly.

Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

Method	Analyst	Peer Review
EPA 6850, DoD QSM	/S/ Thomas Bosch 11/25/2019 12:25	/S/ Stephen Brose 11/26/2019 07:45

Laboratory Contact Information

ALS Environmental
960 W Levoy Drive
Salt Lake City, Utah 84123

Phone: (801) 266-7700
Email: alslt.lab@ALSGlobal.com
Web: www.alsslc.com

General Lab Comments

The results provided in this report relate only to the items tested.
Samples were received in acceptable condition unless otherwise noted.
Samples have not been blank corrected unless otherwise noted.
This test report shall not be reproduced, except in full, without written approval of ALS.

ALS provides professional analytical services for all samples submitted. ALS is not in a position to interpret the data and assumes no responsibility for the quality of the samples submitted.

All quality control samples processed with the samples in this report yielded acceptable results unless otherwise noted.

ALS is accredited for specific fields of testing (scopes) in the following testing sectors. The quality system implemented at ALS conforms to accreditation requirements and is applied to all analytical testing performed by ALS. The following table lists testing sector, accreditation body, accreditation number and website. Please contact these accrediting bodies or your ALS project manager for the current scope of accreditation that applies to your analytical testing.

Testing Sector	Accreditation Body (Standard)	Certificate Number	Website
Environmental	PJLA (DoD ELAP)	L17-506	http://www.pjlabs.com
	PJLA (ISO 17025)	L17-507-R1	http://www.pjlabs.com
	Utah (TNI)	UT00953	http://lams.nelac-institute.org/search
	Iowa (TNI)	IA# 376	http://www.shl.uiowa.edu/labcert/idnr/
	Kansas	E-10416	http://www.kdheks.gov/envlab/disclaimer.html
Industrial Hygiene	AIHA (ISO 17025 & AIHA IHLAP)	101574	http://www.aihaaccreditedlabs.org
	DOECAP-AP	L18-606	http://www.pjlabs.com
	Washington	C596	https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation
Dietary Supplements	PJLA (ISO 17025)	L17-507-R1	http://www.pjlabs.com

ANALYTICAL REPORT

Workorder: 34-1932352
Client: ALS Environmental (Houston)
Project Manager: Kevin W. Griffiths

Result Symbol Definitions

MDL = Method Detection Limit, a statistical estimate of method/media/instrument sensitivity.
RL = Reporting Limit, a verified value of method/media/instrument sensitivity.
CRDL = Contract Required Detection Limit
Reg. Limit = Regulatory Limit.
ND = Not Detected, testing result not detected above the MDL or RL.
< Means this testing result is less than the numerical value.
** No result could be reported, see sample comments for details.

Qualifier Symbol Definitions

U = Qualifier indicates that the analyte was not detected above the MDL.
J = Qualifier Indicates that the analyte value is between the MDL and the RL. It is also used to indicate an estimated value for tentatively identified compounds in mass spectrometry where a 1:1 response is assumed.
B = Qualifier indicates that the analyte was detected in the blank.
E = Qualifier indicates that the analyte result exceeds calibration range.
P = Qualifier indicates that the RPD between the two columns is greater than 40%.

Quality Control Sample Batch Report

Analysis Information

Workorder: 1932352

Limits:	Client SOW/Contract Specified	**Preparation:**	NA	**Analysis:**	EPA 6850, DoD QSM
Basis:	DoD QSM	**Batch:**	NA	**Batch:**	ELMS/2320 (HBN: 252432)
		Prepared By:	NA	**Analyzed By:**	Thomas Bosch

Blank

LMB: 685442
Analyzed: 11/22/2019 08:51
Units: ug/L

Analyte	Result	MDL	RL
Perchlorate	ND	1	2.00

Laboratory Control Sample

LCS: 685439
Analyzed: 11/22/2019 08:23
Dilution: 1
Units: ug/L

Analyte	Result	Target	% Rec	QC Limits	
Perchlorate	2.92	3.00	97.3	78.8	123.8

Matrix Spike - Matrix Spike Duplicate

Sample:	1932352004	**MS:**	1932352005	**MSD:**	1932352006
Analyzed:	11/22/2019 12:55	**Analyzed:**	11/22/2019 13:09	**Analyzed:**	11/22/2019 13:23
Dilution:	1	**Dilution:**	1	**Dilution:**	1
Units:	ug/L	**Units:**	ug/L	**Units:**	ug/L

Analyte	Result	Result	Target	% Rec	QC Limits		Result	% Rec	RPD	QC Limits	
Perchlorate	ND	3.29	3	110	78.8	123.8	3.05	102	7.54	0.0	20.0

Comments

Field sample 1932284006 was analyzed and reported from a 1:10 dilution. Field sample 1932284007 was analyzed and reported from a 1:100 dilution. Field samples 1932284008/09/10 and 1932352003 were analyzed and reported from 1:1,000 dilutions. The reporting limits have been adjusted accordingly.

QC Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

Analyst	Peer Review
/S/ Thomas Bosch	/S/ Stephen Brose
11/25/2019 12:27	11/26/2019 07:45

Symbols and Definitions

* - Analyte above reporting limit or outside of control limits
▲ - Sample result is greater than 4 times the spike added
◆ - Sample and Matrix Duplicate less than 5 times the reporting limit
● - Result is above the calibration range
- The Matrix Spike, Matrix Spike duplicate or Matrix Duplicate is reported for your information only. The sample matrix may be inappropriate for the method selected.

RPD - Relative % Difference (Spike / Spike Duplicate)
ND - Not Detected (U - Qualifier also flags analyte as not detected)
NA - Not Applicable
QC results are not adjusted for moisture correction, where applicable

1932352



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

18698 / # 2

Subcontract Chain of Custody

SAMPLING STATE: **Texas** **COC ID:** **12631**

SUBCONTRACT TO:

ALS Laboratory Group
960 LeVoy Dr
Salt Lake City, UT 84123

Phone: +1 801 266 7700

CUSTOMER INFORMATION:

Company:	ALS Houston
Contact:	RJ Modashia
Address:	10450 Stancliff Rd, Ste 210
Phone:	+1 281 530 5656
Email:	RJ.Modashia@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:	HS19110684
TSR:	Sonia West

	LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
	ANALYSIS REQUESTED			DUE DATE
1.	**HS19110684-01**	**50WW16-191113**	**Groundwater**	**13 Nov 2019 08:35**
	SUB_Perch-6850			02 Dec 2019
2.	**HS19110684-02**	**50WW14-191113**	**Groundwater**	**13 Nov 2019 09:45**
	SUB_Perch-6850			02 Dec 2019
3.	**HS19110684-03**	**50WW13-191113**	**Groundwater**	**13 Nov 2019 10:35**
	SUB_Perch-6850			02 Dec 2019
4.	**HS19110684-04**	**50WW23-191113**	**Groundwater**	**13 Nov 2019 11:40**
	SUB_Perch-6850			02 Dec 2019

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

HS19110684-04 MS/MSD

QC Level: DOD IV (DoD Data Package)

Relinquished By: _____ Date/Time: 11/14/19 1800.

Received By: Jamiran Jussell Date/Time: 11-15-19 9:04

Cooler ID(s): _____ Temperature(s): _____

PROJECT SOLUTIONS | RIGHT PARTNER

ALS Environmental

CHAIN-OF-CUSTODY

Project / Job / Task: HS19110684-01	***Split:***	**Workorder ID:** 1932352	**Level:** ENV_LVL4	**Requested Analysis**
Client: ALS Environmental (Houston)		**Account:** 8101	**Type:** 125Poly	
Comments:			**Preservatives**	

Item	Collect Date/Time	Sample ID	Lab ID	QC	Matrix	Containers ID(s)	Containers Count	COOL	EPA 6850, DoD QSM
1	11/13/2019 08:35	50WW16-191113	1932352001		Water	A	1		A
2	11/13/2019 09:45	50WW14-191113	1932352002		Water	A	1		A
3	11/13/2019 10:35	50WW13-191113	1932352003		Water	A	1		A
4	11/13/2019 11:40	50WW23-191113	1932352004		Water	A	1		A
5	11/13/2019 11:40	50WW23-191113 MS	1932352005	MS	Water	A	1		A
6	11/13/2019 11:40	50WW23-191113 MSD	1932352006	MSD	Water	A	1		A
7									
8									
9									
10									

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Reason for Transfer / Storage Location
VanTassell, Tami	11/15/2019 09:04	ALS Sample Receiving	Sample Login
[signature] R.33.	11-15-19 11:20 11/20/19 14:00	6C T. Burch	Storage COC analysis

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep / Analysis for: _____ Lab Notebook No.: _____

Prepared / Analyzed by: _____ Date / Time: _____

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Reason for Transfer / Storage Location

Fri, 11/15/19 11:18 AM

ALSCOCV3.1

ALS-SALT LAKE CITY-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: ALS Houston

Project/Task/Site: HS19110684-01

Date/Time of Receipt: 11-15-19 9:04

Number of Coolers Received: 1

Condition of Coolers:	Acceptable/Unacceptable	Temperature Control:	Present/Not Included
Cooler Custody Seals:	Present/Absent/NA		
	Intact/Broken/NA	Location Temp Taken:	Control/Between Samples
Container Custody Seals:	Present/Absent/NA		
	Intact/Broken/NA	Are all temperatures within project specific guidelines?	Yes/No/NA
Ice Present:	Yes/No/NA		
	Frozen/Melted/NA	VOA Headspace Present?	Yes/No/NA

pH Check Performed:							
	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA

Cooler Received	Cooler Condition	Temp.	Cooler Received	Cooler Condition	Temp.	Cooler Received	Cooler Condition	Temp.
1	good	3 °C	4		°C	7		°C
2		°C	5		°C	8		°C
3		°C	6		°C	9		°C

Taken By: Jennifer Tassell (Signature) T. Vartassell (Printed Name) 11-15-19 (Date)

CLIENT-RELATED INFORMATION

☐ Missing Cooler	☐ Missing Samples/Bottles	☐ Incorrect Preservation	☐ Insufficient Sample Volume
☐ Cooler Conditions	☐ Broken/Leaking Samples	☐ pH Criteria Not Met	☐ Chain of Custody Problems
☐ Missing Paperwork	☐ Incorrect Bottle Type	☐ Residual Chlorine Present	☐ Other:
☐ Missing/Incorrect Bottle Labels	☐ Cooler Temperatures Out of Range	☐ Head Space in Bottles	

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

Client Notified? YES ☐ NO ☐

Response Required Within 24 Hours

PROJECT MANAGEMENT

PROJECT MANAGER COMMENTS:

ALS Project Manager: _____ (Printed Name) Returned to Sample Receipt by: _____ (Signature) Date: _____



ORIGIN ID:SGRA (281) 530-5656
SHIPPING DEPT
ALS LABORATORY GROUP
10450 STANCLIFF RD
SUITE 210
HOUSTON, TX 77099
UNITED STATES US

SHIP DATE: 14NOV19
ACTWGT: 11.35 LB
CAD: 300130/CAFE3211
DIMS: 14x11x10 IN

BILL THIRD PARTY

TO SAMPLE RECEIVING
ALS ENVIRONMENTAL
960 W. LEVOY DRIVE

SALT LAKE CITY UT 84123
(801) 266-7700
REF: HS19110684 - RJ

FedEx Express

FRI - 15 NOV 3:00P
STANDARD OVERNIGHT

TRK# 0201 1251 0291 8281

AX BTFA

84123
UT-US SLC

Batch Worklist

Batch: ELMS/ 2320 Created: 11/22/2019 07:40 Instrument:

Rule: EPA 6850, DoD QSM Water Analyst: T. Bosch Status: WP

HBN: 252432

Workorder: 1932283 [ENV_LVL4]
Workorder: 1932284 [ENV_LVL4]
Workorder: 1932352 [ENV_LVL4]

Pos	Lab ID	Sample ID	Prep Initial	Prep Final	Dust Weight	Type	Mx	Container	Procedure	Mgr	Expire Date	Due Date	Run Date
1	685438	CCV for HBN 252432 [ELMS/2320]				CCV	3		E685041C3Q	5311		11/27/2019	
2	685439	LCS for HBN 252432 [ELMS/2320]				LCS	3		E6850Q413Q	5311		11/27/2019	
3	685440	RLVS for HBN 252432 [ELMS/2320				RLVS	3		E685041C3Q	5311		11/27/2019	
4	685441	ICS for HBN 252432 [ELMS/2320]				ICS	3		E6850..D3Q	5311		11/27/2019	
5	685442	LMB for HBN 252432 [ELMS/2320]				LMB	3		E6850Q413Q	5311		11/27/2019	
6	1932283001	LH18/24-SP650_111219_AIX				SAMPLE	3	1932283001-A	E6850Q41.3	5480	12/10/2019	11/27/2019	
7	1932284001	50WW29-191111				SAMPLE	3	1932284001-A	E6850Q41.3	5480	12/9/2019	11/27/2019	
8	1932284002	50WW10-191111				SAMPLE	3	1932284002-A	E6850Q41.3	5480	12/9/2019	11/27/2019	
9	1932284003	50WW09-191111				SAMPLE	3	1932284003-A	E6850Q41.3	5480	12/9/2019	11/27/2019	
10	1932284004	50WW09-191111-FD				SAMPLE	3	1932284004-A	E6850Q41.3	5480	12/9/2019	11/27/2019	
11	1932284005	50WW22-191112				SAMPLE	3	1932284005-A	E6850Q41.3	5480	12/10/2019	11/27/2019	
12	1932284006	50WW08-191112				SAMPLE	3	1932284006-A	E6850Q41.3	5480	12/10/2019	11/27/2019	
13	1932284007	50WW06-191112				SAMPLE	3	1932284007-A	E6850Q41.3	5480	12/10/2019	11/27/2019	
14	1932284008	50WW11-191112				SAMPLE	3	1932284008-A	E6850Q41.3	5480	12/10/2019	11/27/2019	
15	1932284009	50WW12-191112				SAMPLE	3	1932284009-A	E6850Q41.3	5480	12/10/2019	11/27/2019	
16	685443	CCV for HBN 252432 [ELMS/2320]				CCV	3		E685041C3Q	5311		11/27/2019	
17	1932284010	50WW12-191112-FD				SAMPLE	3	1932284010-A	E6850Q41.3	5480	12/10/2019	11/27/2019	
18	1932352001	50WW16-191113				SAMPLE	3	1932352001-A	E6850Q41.3	5480	12/11/2019	12/2/2019	
19	1932352002	50WW14-191113				SAMPLE	3	1932352002-A	E6850Q41.3	5480	12/11/2019	12/2/2019	
20	1932352003	50WW13-191113				SAMPLE	3	1932352003-A	E6850Q41.3	5480	12/11/2019	12/2/2019	
21	1932352004	50WW23-191113				SAMPLE	3	1932352004-A	E6850Q41.3	5480	12/11/2019	12/2/2019	
22	1932352005	50WW23-191113 MS				MS	3	1932352005-A	E6850Q413Q	5480		11/27/2019	
23	1932352006	50WW23-191113 MSD				MSD	3	1932352006-A	E6850Q413Q	5480		11/27/2019	
24	685444	CCV for HBN 252432 [ELMS/2320]				CCV	3		E685041C3Q	5311		11/27/2019	

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Analytical Documentation

Analyst Write-up

ALS Work Order #'s & Sample #( )'s: 1932283 (001); 1932284 (001-10); 1932352 (001-06)
ELMS Batch/HBN ID: 2320 (252432)
Prep Date: 11/20/2019 Analysis Date: 11/22/2019 Analyst: Tom Bosch
Analyte: **Perchlorate** Matrix: **Water** Method: **6850**
Sequence: \\HPCHEM\1\SEQUENCE\CLO4\2019\NOV\22NOV19D.s
Reported DL: **1.0µg/L** Reported LOD: **2.0µg/L** Reported LOQ: **4.0µg/L**

SAMPLE PREPARATION/ANALYSIS:

Water: Samples were prepared by Tom Bosch. 10.0mL of each sample was pipetted into a 15-mL centrifuge tube, and 50µL of an oxygen-18 labeled perchlorate solution was added as an internal standard. The samples were capped, vortexed, and filtered with Phenex PES membrane 0.45µm Syringe filters prior to analysis.

REAGENTS: Eluent A1: 95% ASTM Type II water (ALS)/5%ACN (B&J Lot DU461-US)/0.1% glacial acetic acid (JT-Baker Lot 122550).
Eluent B1: 95% ACN (B&J Lot DU461-US)/5% ASTM Type II water (ALS)/0.1% glacial acetic acid (JT-Baker Lot 122550).

STANDARDS: Internal Standard Spiking Solution Horizon# 47863. Dilutions of Working Standards (Horizon: 49947/48) used for ICAL, CCV's, RLVS and ICS.

CALIBRATION CURVE: Used curve from 09/20/2019, sequence 20SEP19D.s Offline Quantitation Method: CLO4-DP3.M

INSTRUMENT CONDITIONS: Samples were analyzed with an Agilent 1100 LC/MSD system, in negative SIM mode, monitoring m/z 83, 85, and 89.
Instrument ID: **LCMS04** Online Acquisition Method: CLO4-AQN.M Fragmentor: 160 Output Gain: 8 Injection Volume: 35µL
Column: KP-RPPX C8 separator, 250mm Mobile Phase: 70% Eluent A1; 30% Eluent B1 Run time: 12.0min.

FLOW GRADIENT:

Time (min.)	Flow (mL/min)
0	0.65
5.8	0.65
5.9	0.25
10.3	0.25
10.5	0.65
12.0	0.65

QC DATA: 3.0µL of QC Solution Horizon ID 47516 was used for LCS 685439; Target = 3.0µg/L. ASTM type II water was used for LMB 685442.

MS/MSD: The Matrix Spike and duplicate (MS/MSD) was performed on samples 1932352005/06 (Client ID's: 50WW23-191113. 3.0µl of Working Standard Solution Horizon ID 49947 was added to 10.0mL of sample preparation. Spike target = 3.0µg/L.

COMMENTS:

1) Results reported in µg/L. Field sample 1932284006 was analyzed and reported from a 1:10 dilution. Field sample 1932284007 was analyzed and reported from a 1:100 dilution. Field samples 1932284008/09/10 and 1932352003 were analyzed and reported from 1:1,000 dilutions. The reporting limits have been adjusted accordingly.
2) All QC, Blank, CCV, and MS/MSD results were within method parameters.
3) Sample data can be viewed at two directories within the ALS system: \\ALSLTWS013\LCMS\LCMS04\2019\NOV\HBN# or through NuGenesis\Tree\PrintData\LCMS\DefaultView.
4) Notebook: \\alsltws013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\252432-DoD-ALS-Hstn LCMS4 or through \\ALSLTWS013\DATAREVIEW\HBN#
5) The Reporting Limit Verification Standard (RLVS – 685440) is reported from the analysis of the Laboratory Control Sample (LCS – 685439) at a level of 3.0µg/L.
6) Due to limitations of the Chemstation Software, some of the chromatographic peaks require manual integration. Manual Integrations were performed for one of the Initial Calibration analyses (datafile: 20SEPI03) along with datafile 22NOV19D07.

5.5 Chromatography (GC, HPLC and LC/MS) Technical Review

Note: It is the peer reviewer's responsibility to ensure that appropriate criteria are used as defined in the HORIZON PROFILE. The evaluation criteria are prioritized as per Section 2.2 of this SOP. These items must be checked for all projects. The following checklist will be completed by both the analyst and the peer reviewer and scanned into the HBN folder with the raw data.

Chromatography (GC, HPLC, LC/MS) Technical Review Criteria **Batch(es)/SDG:** ELMS 2320 HBN: 252432 **Sample Set IDs if Applicable:** 1932283/1932284/1932352	**Analyst Initials**	**Reviewer Initials**
Sample positions on autosampler verified against instrument sequence	TB	NA
Calibration standards analyzed and meets criteria	TB	SB
Standards traceability checked and meets criteria	TB	SB
Standard curve coefficients evaluated and meet criteria	TB	SB
ICVs analyzed and meet acceptance criteria	TB	SB
CCVs analyzed and meet acceptance criteria	TB	SB
Retention Time Windows checked	TB	SB
For method 8081A, Endrin/DDT Breakdown is checked for compliance	—	—
Surrogate recoveries checked and appropriately addressed	—	—
Method Preparation Blanks analyzed and meet acceptance criteria	TB	SB
MSs, MSDs, and/or MDs analyzed and calculations checked; applicable	TB	SB
RLVS analyzed	TB	SB
Preparation and analysis hold times met	TB	SB
Preparation deviations and re-preparations noted when performed	TB	SB
Analysis deviations and re-analyses noted when performed	TB	SB
Sample dilution factors noted on reports	TB	SB
Electronic records in HBN transcription accuracy and completeness	TB	SB
Preparation and analysis calculations checked	TB	SB
NCRs are completed as necessary NC/CAR#_____	TB	SB
Report forms are complete and accurate	TB	SB
Manual integrations checked	TB	SB

STANDARD REPORT

Working Standard - CLO4ISTDWRK

CLO4ISTDWRK		Description - Perchlorate ISTD Wrk 1,000ug/L
Standard: 49946	**Created By:** Thomas Bosch	**Amount:** 25 mL
MFG: ALS/SLC	**Create Date:** 09/23/2019 03:09PM	**Expires:** 09/19/2020
MFG Lot: TNB: 09/20/2019	**Verified By:** Thomas Bosch	**Usable:** Yes
Pipette ID: Not Provided	**Verify Date:**	**Lab Lot:** CLO4ISTDWRK

Pos.	Analyte	Name	Concentration
1	14797-73-0-8385	Perchlorate 83:85 Ratio	1000 ug/L
2	14797-73-0-89	Perchlorate 89	1000 ug/L

Composition

Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
47863	CLO4ISTDSTK	Perchlorate ISTD Stock	CLO4ISTDSTK	0.25 mL	12/05/2028

STANDARD REPORT

Constituent

Stock Standard - CLO4ISTDSTK

CLO4ISTDSTK		**Description - Perchlorate ISTD Stock**
Standard: 47863	**Created By:** Thomas Bosch	**Amount:** 1 mL
MFG: Cambridge Isotope	**Create Date:** 05/23/2019 10:05AM	**Expires:** 12/05/2028
MFG Lot: SDIH-016	**Verified By:** Thomas Bosch	**Usable:** Yes
Part ID: OLM-7310-S	**Verify Date:**	**Lab Lot:** CLO4ISTDSTK

Pos.	Analyte	Name	Concentration
1	14797-73-0-8385	Perchlorate 83:85 Ratio	100 ug/mL
2	14797-73-0-89	Perchlorate 89	100 ug/mL

STANDARD REPORT

Working Standard - CLO4 WRK

CLO4 WRK		Description - 6850 WKG Std 100.ug/L
Standard: 49948	**Created By:** Thomas Bosch	**Amount:** 10 mL
MFG: ALS/SLC	**Create Date:** 09/20/2019 03:09PM	**Expires:** 07/25/2020
MFG Lot: TNB: 09/20/2019		**Usable:** Yes
Pipette ID: Not Provided		**Lab Lot:** CLO4 WRK

Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	0.1 ug/mL
2	14797-73-0-8385	Perchlorate 83:85 Ratio	0.1 ug/mL

Composition

Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
49947	CLO4 INT	6850 Intermdt AccStd 10.ug/mL	CLO4 INT	0.1 mL	07/25/2020

STANDARD REPORT

Constituent

Stock Standard - CLO4 STOCK

CLO4 STOCK		Description - 6850 Stock AccStd 1,000ug/mL
Standard: 43659	**Created By:** Thomas Bosch	**Amount:** 100 mL
MFG: AccuStandard	**Create Date:** 09/17/2018 09:09AM	**Expires:** 07/25/2020
MFG Lot: 218065075		**Usable:** Yes
Part ID: IC-PER-10X-1		**Lab Lot:** CLO4 STOCK

Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	1000 ug/mL
2	14797-73-0-8385	Perchlorate 83:85 Ratio	1000 ug/mL

STANDARD REPORT

Constituent

Solvent Standard - ASTM H2O

ASTM H2O			Description - ASTM Type II Water
Standard: 109	**Created By:** ALS Support (Lims)	**Amount:** 1000 L	
MFG: DCL In House	**Create Date:** 10/06/2005 09:10AM	**Expires:** 11/07/2025	
MFG Lot: Not Provided		**Usable:** Yes	
Part ID: Not Provided		**Lab Lot:** LAB 109	

Pos.	Analyte	Name	Concentration
Solvent - Analyte(s) not applicable			

STANDARD REPORT

Constituent

Working Standard - CLO4 INT

CLO4 INT		Description - 6850 Intermdt AccStd 10.ug/mL
Standard: 49947	**Created By:** Thomas Bosch	**Amount:** 10 mL
MFG: ALS/SLC	**Create Date:** 09/23/2019 03:09PM	**Expires:** 07/25/2020
MFG Lot: TNB: 09/20/2019		**Usable:** Yes
Pipette ID: Not Provided		**Lab Lot:** CLO4 INT

Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	10 ug/mL
2	14797-73-0-8385	Perchlorate 83:85 Ratio	10 ug/mL

Composition

Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
43659	CLO4 STOCK	6850 Stock AccStd 1,000ug/mL	CLO4 STOCK	0.1 mL	07/25/2020

STANDARD REPORT

Working Standard - CLO4 QC WRK

CLO4 QC WRK		Description - 6850 QC WKG STD 100ug/L
Standard: 47516	**Created By:** Thomas Bosch	**Amount:** 10 mL
MFG: ALS/SLC	**Create Date:** 05/06/2019 03:05PM	**Expires:** 03/31/2020
MFG Lot: TNB: 05/06/2019		**Usable:** Yes
Pipette ID: Not Provided		**Lab Lot:** CLO4 QC WRK 100.ug/L

Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	100 ug/L

Composition

Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
47515	CLO4 QC INT	6850 QC Intrmdt Std-QC 10ug/mL	CLO4 QC INT 10.ug/mL	0.1 mL	03/31/2020

STANDARD REPORT

Constituent

Solvent Standard - ASTM H2O

ASTM H2O		**Description - ASTM Type II Water**
Standard: 109	**Created By:** ALS Support (Lims)	**Amount:** 1000 L
MFG: DCL In House	**Create Date:** 10/06/2005 09:10AM	**Expires:** 11/07/2025
MFG Lot: Not Provided		**Usable:** Yes
Part ID: Not Provided		**Lab Lot:** LAB 109

Pos.	Analyte	Name	Concentration
Solvent - Analyte(s) not applicable			

STANDARD REPORT

Constituent

Stock Standard - CLO4 QCSTOCK

CLO4 QCSTOCK		Description - 6850 QC Stock STD 1,000ug/mL
Standard: 36748	**Created By:** Thomas Bosch	**Amount:** 100 mL
MFG: Ultra Scientific	**Create Date:** 05/11/2017 01:05PM	**Expires:** 03/31/2020
MFG Lot: CP-0860		**Usable:** Yes
Part ID: ICC-013		**Lab Lot:** CLO4 QC STOCK

Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	1000 ug/mL

STANDARD REPORT

Constituent

Working Standard - CLO4 QC INT

CLO4 QC INT		Description - 6850 QC Intrmdt Std-QC 10ug/mL
Standard: 47515	**Created By:** Thomas Bosch	**Amount:** 10 mL
MFG: ALS/SLC	**Create Date:** 05/06/2019 03:05PM	**Expires:** 03/31/2020
MFG Lot: TNB: 05/06/2019		**Usable:** Yes
Pipette ID: Not Provided		**Lab Lot:** CLO4 QC INT 10.ug/mL

Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	10 ug/mL

Composition

Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
36748	CLO4 QCSTOCK	6850 QC Stock STD 1,000ug/mL	CLO4 QC STOCK	0.1 mL	03/31/2020

125 Market Street
New Haven, CT 06513
USA

AccuStandard®

Tel (203)786-5290
Fax (203)786-5287
www.AccuStandard.com

CERTIFICATE OF ANALYSIS

S 43659

AccuTrace™ Reference Standard

Catalog No: IC-PER-10X-1
Description: Perchlorate Standard
Element: Perchlorate (ClO_4)
SRM: Ind. Std.
Lot: 218065075
Matrix: Water
Hazards: *Refer to SDS for complete safety information*

Signal Word: None

Date Certified: Jun 25, 2018
Expiration: Jul 25, 2020
Sample Size: 100 mL
Components: 1
Storage Condition: Ambient (>5 °C)

Included on ISO/IEC 17025 Scope of Accreditation: Yes

Included on ISO 17034 Scope of Accreditation: Yes

Component		SRM #	Prepared Concentration (µg/mL)
ClO_4	Perchlorate	Ind. Std.	1000

The gravimetric uncertainty for this product is ±0.24%.

The final solution was checked against an independent standard to verify its concentration.

We use the highest purity raw materials available to minimize impurity levels in the final solution. Typically 99.999%+ pure starting materials are used as well as ASTM Type I 18 megohm deionized water.

All solutions are filtered through a 0.2 µm filter prior to being bottled.

All glassware used in preparation is Class A and calibrated regularly.

All weights are traceable through NIST, Test No. 822-275872-11

All bottles are triple rinsed with deionized water prior to use.

Shake bottle prior to use and do not pipette directly out of the bottle. Use only cleaned Class A volumetric glassware.

We certify the accuracy of this standard to be ±0.5% of the stated value until its expiration date provided it is kept tightly capped and stored under the conditions stated above.

Certified By: Meigan O'Leary

Meigan O'Leary, Inorganic QC Manager

For use in routine laboratory analysis.

AccuStandard is accredited to ISO 17034, ISO/IEC 17025 and certified to ISO 9001:2015

QR-ORG/INO-001
Rev. 5/18

ULTRA SCIENTIFIC
Analytical Solutions

Certificate of Analysis

TRIPLE ISO CERTIFICATION ISO 9001 ISO 17025 ISO GUIDE 34 ULTRA

ISO Guide 34 Reference Material

Product Number: ICC-013
Lot Number: CP-0860

S 36748

Lot Issue Date: 29-Feb 2016
Expiration Date: 31-Mar 2020

Product Name: Perchlorate IC Standard

Description:
This Reference Material (RM) was gravimetrically prepared in accordance with ISO Guide 34 and under ULTRA Scientific's ISO 9001 registered quality system. The neat materials used for this product have been verified by ULTRA's ISO 17025 laboratory and under ULTRA's ISO Guide 34 accreditation. The analyte concentrations were verified by ULTRA's ISO 17025 accredited laboratory. For each analyte, the true value, with its uncertainty value calculated at the 95% confidence level, is reported below.

Analyte	Starting Material	Lot Number	Purity (%)	Calculated Value	True Value	Traceability & Method
perchlorate	potassium perchlorate	RM07987	100	1001 ± 5 µg/mL	976 ± 6 µg/mL	NIST SRM 3141A; ICP-OES

Solvent: water (low TOC, < 50 ppb)

Storage: Store at Room Temperature (15° to 30°C).

Traceability:
Traceability has been established through an unbroken chain of comparisons, each having stated uncertainties. Comparisons are based on appropriate physical or chemical measurements, including gravimetric or volumetric dilution, where the mass or volume of a solution before and after dilution is measured. The balances used for these measurements are calibrated with weights traceable to NIST in compliance with ANSI/NCSL Z-540-1, ISO 9001, ISO 17025, and ISO Guide 34. Calibrated Class A glassware is used for volumetric measurements. Thermometers are calibrated against a NIST traceable thermometer in accordance with NIST Special Publication 819.

Estimation of Uncertainties:
The true value is reported, with its uncertainty value calculated at the 95% confidence level.

Homogeneity:
This RM was formulated and unitized according to an in-house procedure and is guaranteed to be homogeneous. There is no minimum sub-sample size required.

Intended Use:
This RM is intended for the preparation of working reference samples for use in routine laboratory analyses, calibration of instruments, validation of analytical methods, assessments of measurement methods and continuing calibration verification.

Instructions for Use:
Sample aliquots for analysis should be withdrawn at 20°C to 25°C immediately after opening and should be processed without delay for the true value to be valid within the stated uncertainties. Do not pipet from the bottle. Do not return any material removed for pipetting to the bottle. Tightly cap the bottle after removing any material and store according to the instructions noted above.

Hazards:
Refer to the Safety Data Sheet for information regarding this RM.

Expiration of Certification:
The certification of this RM is valid, within the measurement uncertainty specified, until the expiration date specified above, provided the RM is handled and stored in accordance with the instructions given in this certificate. This certification is nullified if the RM is damaged, contaminated, or otherwise modified.

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER
ANAB ACCREDITED ISO/IEC 17025 TESTING LABORATORY

ISO 9001 Registered Quality System – TUV USA

250 SMITH STREET • NORTH KINGSTOWN, RHODE ISLAND 02852 • WWW.ULTRASCI.COM

ULTRA SCIENTIFIC
Analytical Solutions

Certificate of Analysis

ISO Guide 34 Reference Material

Product Number: ICC-013
Lot Number: CP-0860

Lot Issue Date: 29-Feb 2016
Expiration Date: 31-Mar 2020

Maintenance of Certification:
The real-time, long term stability of the RM may be monitored over the lifetime of the certification. If substantive changes occur that affect the certification before the expiration of this certificate, ULTRA Scientific will notify the purchaser.

Peter A. King, Ph.D.
VP, Technical Operations

Daniel J. Lamendola
Director of QA/RA

ANAB ACCREDITED ISO17034 REFERENCE MATERIAL PRODUCER

ANAB ACCREDITED ISO/IEC 17025 TESTING LABORATORY

ISO 9001 Registered Quality System – TUV USA

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Cambridge Isotope Laboratories, Inc.

Certificate of Analysis

S 47863

Product Name: (Isotopic Label & Enrichment Specification) PERCHLORIC ACID, SODIUM SALT (18O4, 90%+) 100 UG/ML IN WATER

Lot Number: SDIH-016

Catalog Number: OLM-7310-S

Product Information

Chemical Purity Specification:	≥ 98%
MW*: ** For isotopically labeled compounds, MW listed is for the fully enriched product.*	130.44
Labeled CAS Number:	NA
Unlabeled CAS Number:	7601-89-0
Chemical Formula:	NaCl*O4
Storage:	Store at room temperature away from light and moisture.
Stability:	See storage and expiration date.

$NaCl^{18}O_4$

Certification

Cambridge Isotope Laboratories, Inc. guarantees that this material meets or exceeds the specifications stated. Absolute identity as well as chemical and isotopic purities are assured by the use of unambiguous synthetic routes and multiple chemical analyses whenever possible. Results are representative of QC testing at time of release from Quality Control unless otherwise stated. CIL Certificates of Analysis are occasionally updated with new data following recertification. We recommend checking the website for the latest version.

Volumetric measurements were made with Class A glassware. Gravimetry is traceable to the NIST through calibrated balances and certified, calibrated, standard weights. The calibrations are traceable to the NIST under Test No. 822/270236-04. The calibrations also meet specifications outlined in ISO 9001, ISO/IEC 17025, ANSI/NSCL Z540-1-1994, NCR Document 10CFR50 Appendix B, and applicable subdocuments.

This COA references the bulk catalog number before packaging. The COA also applies to the CIL finished good catalog number . Some possible packaging sizes and their corresponding suffix are -1.2, -1, -0.5, -10, or -0.1.

Approved by: Sashi Sivendran-Basak

Sashi Sivendran-Basak, Ph.D., Quality Review

Quality Control Tests and Results

QC Release Date	12/05/2018
Expiration Date	12/05/2028
Concentration Based on Gravimetry	100.0 ± 1.0 µg/mL (k=2)
Chemical Purity of Neat Material(s)	98%
LC/MS for Concentration	105.4 ± 1.1 µg/mL (k=2)

CIL subscribes to the following standards for different products: ISO Guide 34, ISO/IEC 17025, ISO 13485 and cGMP as appropriate.

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Raw Data

Batch Report: C:\HPCHEM\1\DATA\22NOV19D\22NOV19S.B

Batch Review Method:
C:\HPCHEM\1\METHODS\CLO4-DP3.M

['#' ==> Run has not been reprocessed with Batch Review Method
'*' ==> Run has been saved with batch file]

#*	Sample	Location	Inj	SampleType	Run	Perchlorate Area	Perchlorat RT	Perchlorate Amount
*	685438 CCV@25	Vial 71	1	Control	1	1.18387e6	7.449	24.67940
*	685439 QC@3.0	Vial 72	1	Control	2	1.54064e5	7.386	2.91840
*	685441 ICS@3.0	Vial 73	1	Control	3	8.60264e4	7.254	2.21034
*	685442 LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1932283001	Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	1932284001	Vial 76	1	Sample	6	0.00000	0.000	0.00000
*	1932284002	Vial 77	1	Sample	7	0.00000	0.000	0.00000
*	1932284003	Vial 78	1	Sample	8	3.39907e5	7.111	6.60218
*	1932284004	Vial 79	1	Sample	9	3.51318e5	7.127	7.40859
*	1932284005	Vial 80	1	Sample	10	0.00000	0.000	0.00000
*	1932284006 10X	Vial 81	1	Sample	11	3.45930e5	7.327	83.07076
*	1932284008 1K	Vial 83	1	Sample	13	3.33136e5	7.511	7986.47256
*	1932284009 1K	Vial 84	1	Sample	14	2.24426e6	7.566	4.73695e4
*	685443 CCV@25	Vial 71	1	Control	15	1.08713e6	7.452	23.36377
*	1932284010 1K	Vial 85	1	Sample	16	2.57913e6	7.503	4.25987e4
*	1932352001	Vial 86	1	Sample	17	8.45132e4	7.334	1.64039
*	1932352002	Vial 87	1	Sample	18	0.00000	0.000	0.00000
*	1932352003 1K	Vial 88	1	Sample	19	2.46586e5	7.620	4887.02652
*	1932352004	Vial 89	1	Sample	20	0.00000	0.000	0.00000
*	1932352005 MS	Vial 90	1	Sample	21	1.31208e5	7.056	3.28992
*	1932352006 MSD	Vial 91	1	Sample	22	1.21739e5	6.973	3.05088
*	1932284007 100	Vial 92	1	Sample	23	2.00097e6	7.508	4344.98594
*	685444 CCV@25	Vial 71	1	Control	24	1.01321e6	7.528	23.41845

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount
*	685438 CCV@25	Vial 71	1	Control	1	1.64125e5	7.468	5.00000
*	685439 QC@3.0	Vial 72	1	Control	2	1.94166e5	7.409	5.00000
*	685441 ICS@3.0	Vial 73	1	Control	3	1.42348e5	7.286	5.00000
*	685442 LMB	Vial 74	1	Control	4	1.76890e5	7.423	5.00000
*	1932283001	Vial 75	1	Sample	5	1.50033e5	7.238	5.00000
*	1932284001	Vial 76	1	Sample	6	1.75095e5	7.088	5.00000
*	1932284002	Vial 77	1	Sample	7	1.69527e5	7.355	5.00000
*	1932284003	Vial 78	1	Sample	8	1.89098e5	7.138	5.00000
*	1932284004	Vial 79	1	Sample	9	1.73764e5	7.145	5.00000
*	1932284005	Vial 80	1	Sample	10	1.68474e5	7.001	5.00000
*	1932284006 10X	Vial 81	1	Sample	11	1.52150e5	7.348	50.00000
*	1932284008 1K	Vial 83	1	Sample	13	1.52567e5	7.535	5000.00000
*	1932284009 1K	Vial 84	1	Sample	14	1.48043e5	7.591	5000.00000
*	685443 CCV@25	Vial 71	1	Control	15	1.60069e5	7.476	5.00000
*	1932284010 1K	Vial 85	1	Sample	16	1.92723e5	7.534	5000.00000
*	1932352001	Vial 86	1	Sample	17	1.86562e5	7.360	5.00000
*	1932352002	Vial 87	1	Sample	18	1.64477e5	7.141	5.00000
*	1932352003 1K	Vial 88	1	Sample	19	1.85984e5	7.653	5000.00000
*	1932352004	Vial 89	1	Sample	20	1.67521e5	7.041	5.00000
*	1932352005 MS	Vial 90	1	Sample	21	1.46896e5	7.077	5.00000
*	1932352006 MSD	Vial 91	1	Sample	22	1.46852e5	6.990	5.00000
*	1932284007 100	Vial 92	1	Sample	23	1.46105e5	7.536	500.00000
*	685444 CCV@25	Vial 71	1	Control	24	1.48803e5	7.553	5.00000

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
*	685438 CCV@25	Vial 71	1	Control	1	3.62557e5	7.464	24.77392
*	685439 QC@3.0	Vial 72	1	Control	2	4.98007e4	7.424	3.00461

Batch Report: C:\HPCHEM\1\DATA\22NOV19D\22NOV19S.B

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
*	685441 ICS@3.0	Vial 73	1	Control	3	3.55197e4	7.263	2.91970
*	685442 LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1932283001	Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	1932284001	Vial 76	1	Sample	6	0.00000	0.000	0.00000
*	1932284002	Vial 77	1	Sample	7	0.00000	0.000	0.00000
*	1932284003	Vial 78	1	Sample	8	1.13127e5	7.120	7.10077
*	1932284004	Vial 79	1	Sample	9	1.17024e5	7.135	7.98367
*	1932284005	Vial 80	1	Sample	10	0.00000	0.000	0.00000
*	1932284006 10X	Vial 81	1	Sample	11	1.11676e5	7.348	86.89341
*	1932284008 1K	Vial 83	1	Sample	13	1.02889e5	7.529	7994.43215
*	1932284009 1K	Vial 84	1	Sample	14	6.95779e5	7.584	4.83298e4
*	685443 CCV@25	Vial 71	1	Control	15	3.40343e5	7.472	23.92121
*	1932284010 1K	Vial 85	1	Sample	16	7.87731e5	7.521	4.28684e4
*	1932352001	Vial 86	1	Sample	17	2.73332e4	7.346	1.65533
*	1932352002	Vial 87	1	Sample	18	0.00000	0.000	0.00000
*	1932352003 1K	Vial 88	1	Sample	19	7.88807e4	7.651	5031.65245
*	1932352004	Vial 89	1	Sample	20	0.00000	0.000	0.00000
*	1932352005 MS	Vial 90	1	Sample	21	4.82831e4	7.074	3.88198
*	1932352006 MSD	Vial 91	1	Sample	22	4.25685e4	6.990	3.41115
*	1932284007 100	Vial 92	1	Sample	23	6.21132e5	7.526	4434.86232
*	685444 CCV@25	Vial 71	1	Control	24	3.26599e5	7.551	24.62821

*** End of Report ***

Sequence: C:\HPCHEM\1\SEQUENCE\CLO4\2019\NOV\22NOV19D.S

Sequence Table:

Method and Injection Info Part:

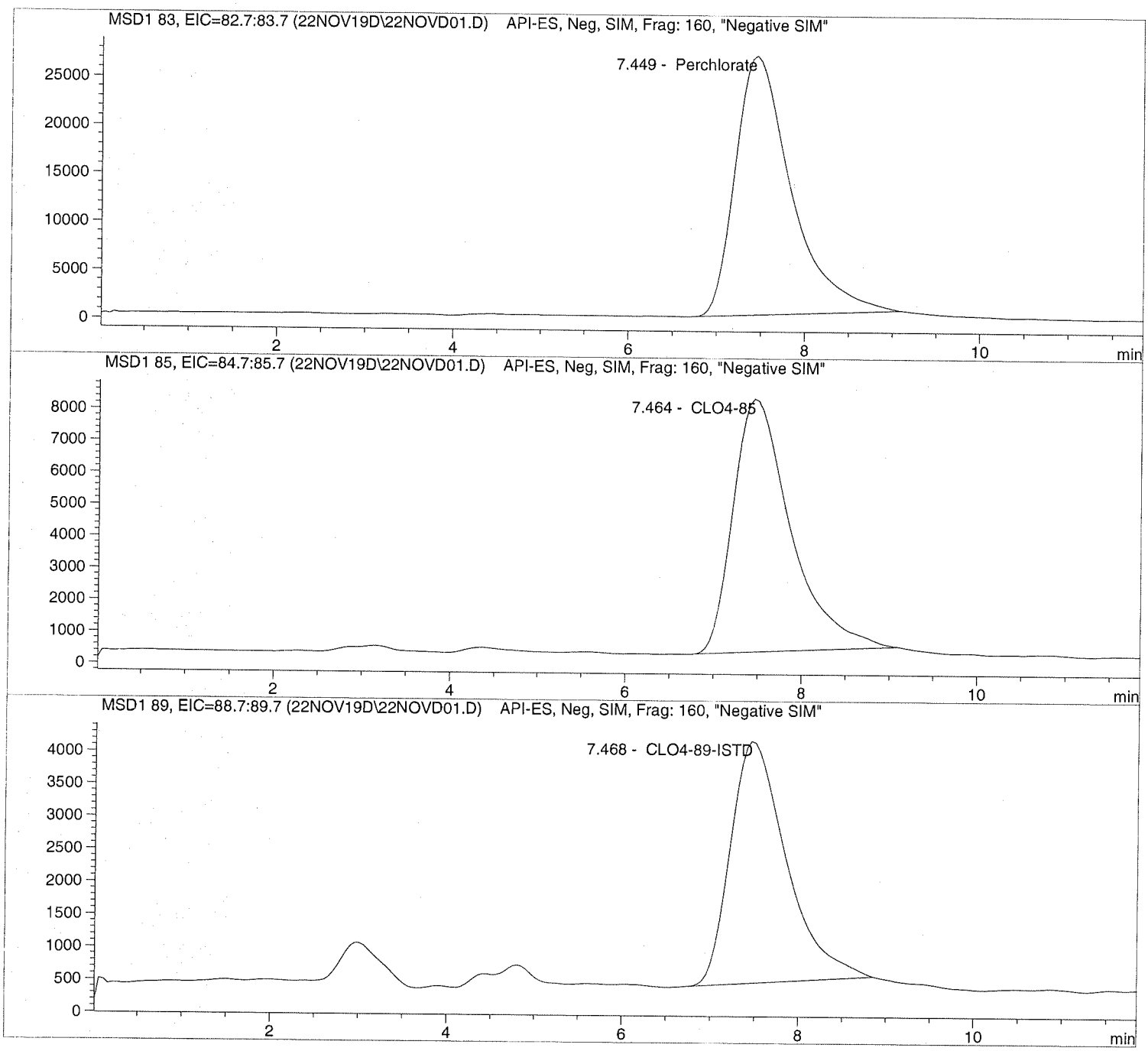
Line	Location	SampleName		Method	Inj	SampleType	InjVolume	DataFile
1	Vial 71	685438	CCV@25	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	685439	QC@3.0	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	685441	ICS@3.0	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	685442	LMB	CLO4-AQN	1	Ctrl Samp		
5	Vial 75	1932283001		CLO4-AQN	1	Sample		
6	Vial 76	1932284001		CLO4-AQN	1	Sample		
7	Vial 77	1932284002		CLO4-AQN	1	Sample		
8	Vial 78	1932284003		CLO4-AQN	1	Sample		
9	Vial 79	1932284004		CLO4-AQN	1	Sample		
10	Vial 80	1932284005		CLO4-AQN	1	Sample		
11	Vial 81	1932284006	10X	CLO4-AQN	1	Sample		
12	Vial 82	1932284007	1K	CLO4-AQN	1	Sample		
13	Vial 83	1932284008	1K	CLO4-AQN	1	Sample		
14	Vial 84	1932284009	1K	CLO4-AQN	1	Sample		
15	Vial 71	685443	CCV@25	CLO4-AQN	1	Ctrl Samp		
16	Vial 85	1932284010	1K	CLO4-AQN	1	Sample		
17	Vial 86	1932352001		CLO4-AQN	1	Sample		
18	Vial 87	1932352002		CLO4-AQN	1	Sample		
19	Vial 88	1932352003	1K	CLO4-AQN	1	Sample		
20	Vial 89	1932352004		CLO4-AQN	1	Sample		
21	Vial 90	1932352005	MS	CLO4-AQN	1	Sample		
22	Vial 91	1932352006	MSD	CLO4-AQN	1	Sample		
23	Vial 92	1932284007	100	CLO4-AQN	1	Sample		
24	Vial 71	685444	CCV@25	CLO4-AQN	1	Ctrl Samp		

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD01.D Sample Name: 685438 CCV@25

Injection Date:	11/22/2019 08:07:39	Seq Line:	1
Sample Name:	685438 CCV@25	Location:	Vial 71
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD01.D Sample Name: 685438 CCV@25

Injection Date:	11/22/2019 08:07:39	Seq Line:	1
Sample Name:	685438 CCV@25	Location:	Vial 71
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	25.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.449	PBA	1183865.7	24.6794	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.464	PBA	362557.4	24.7739	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.468	PBA	164125.4	5.0000	CLO4-89-ISTD

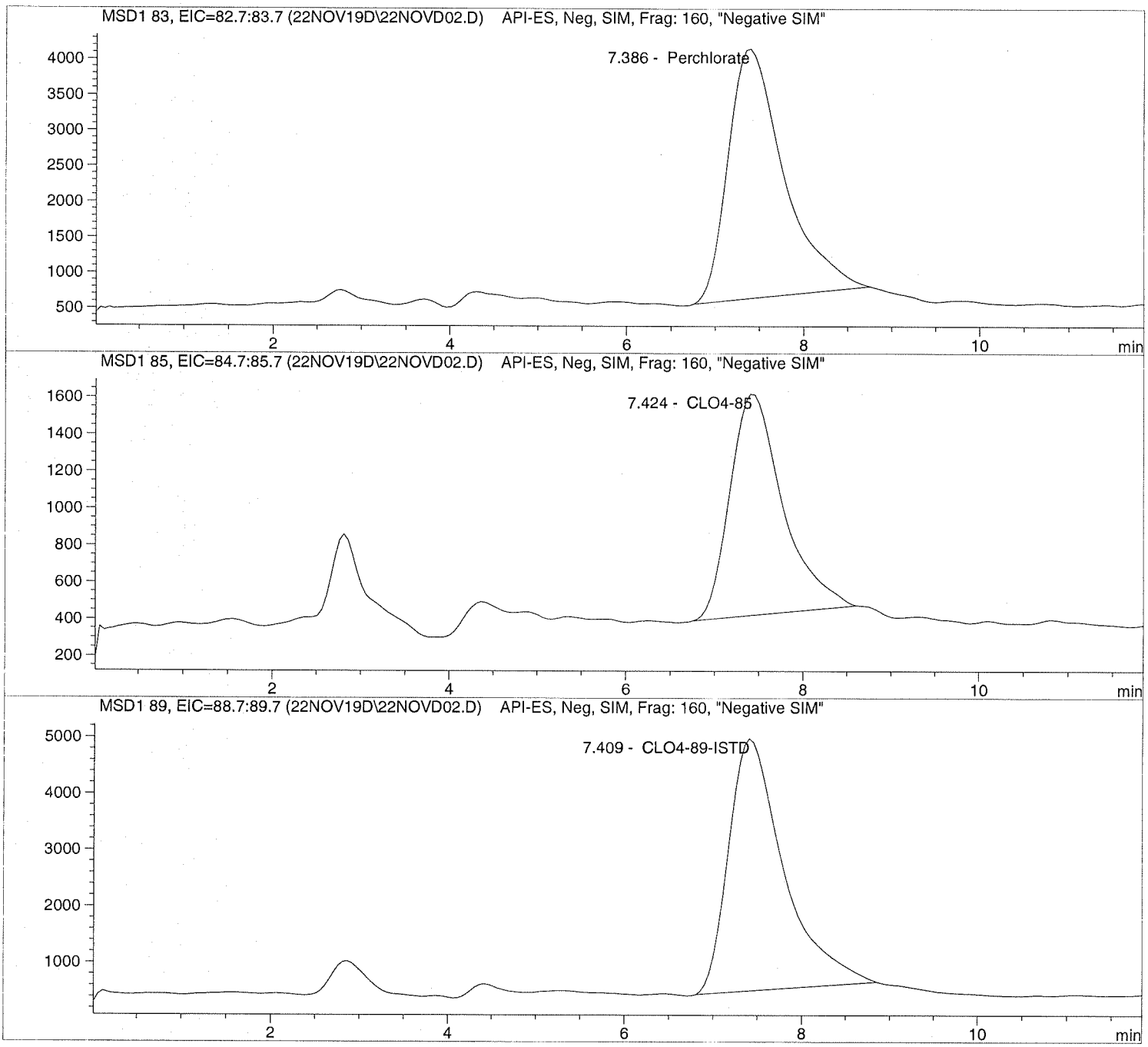
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD02.D Sample Name: 685439 QC@3.0

Injection Date:	11/22/2019 08:23:13	Seq Line:	2
Sample Name:	685439 QC@3.0	Location:	Vial 72
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD02.D Sample Name: 685439 QC@3.0

Injection Date:	11/22/2019 08:23:13	Seq Line:	2
Sample Name:	685439 QC@3.0	Location:	Vial 72
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	3.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.386	PBA	154063.9	2.9184	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.424	PBA	49800.7	3.0046	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.409	PBA	194166.2	5.0000	CLO4-89-ISTD

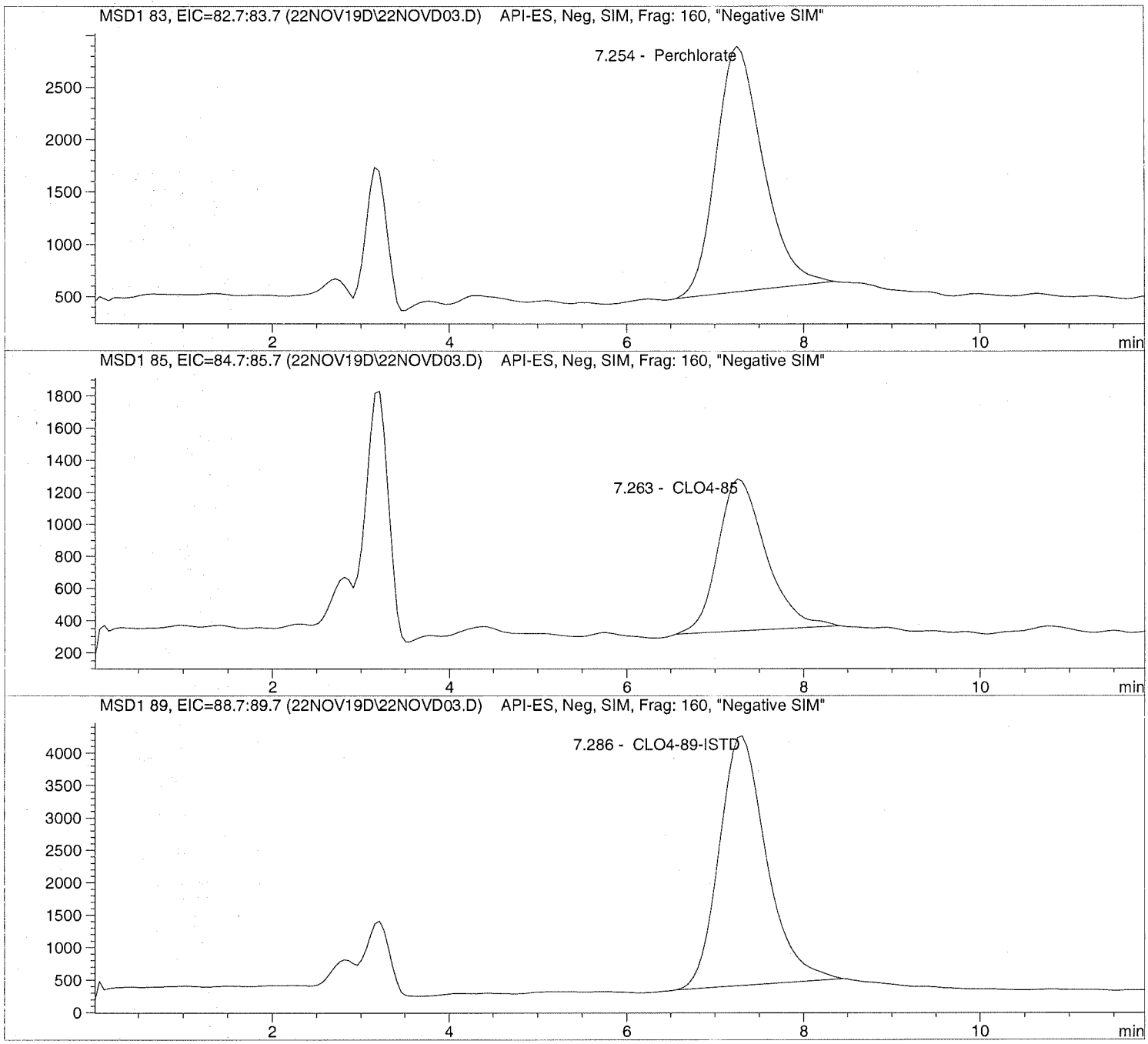
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD03.D Sample Name: 685441 ICS@3.0

Injection Date:	11/22/2019 08:37:06	Seq Line:	3
Sample Name:	685441 ICS@3.0	Location:	Vial 73
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD03.D Sample Name: 685441 ICS@3.0

Injection Date:	11/22/2019 08:37:06	Seq Line:	3
Sample Name:	685441 ICS@3.0	Location:	Vial 73
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	3.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.254	PBA	86026.4	2.2103	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.263	BBA	35519.7	2.9197	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.286	PBA	142348.3	5.0000	CLO4-89-ISTD

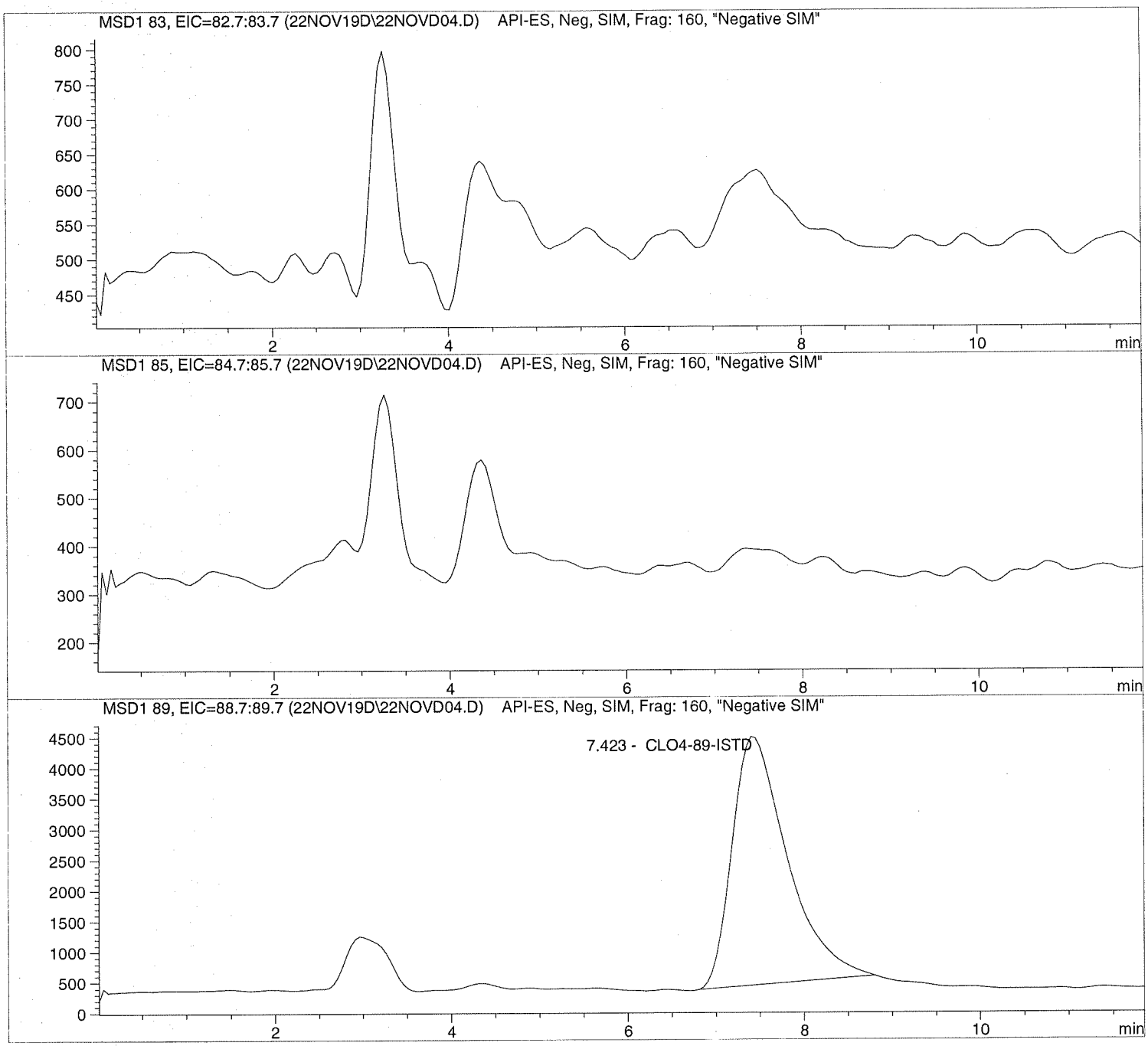
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD04.D Sample Name: 685442 LMB

Injection Date:	11/22/2019 08:51:01	Seq Line:	4
Sample Name:	685442 LMB	Location:	Vial 74
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD04.D Sample Name: 685442 LMB

Injection Date:	11/22/2019 08:51:01	Seq Line:	4
Sample Name:	685442 LMB	Location:	Vial 74
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.423	PBA	176890.3	5.0000	CLO4-89-ISTD

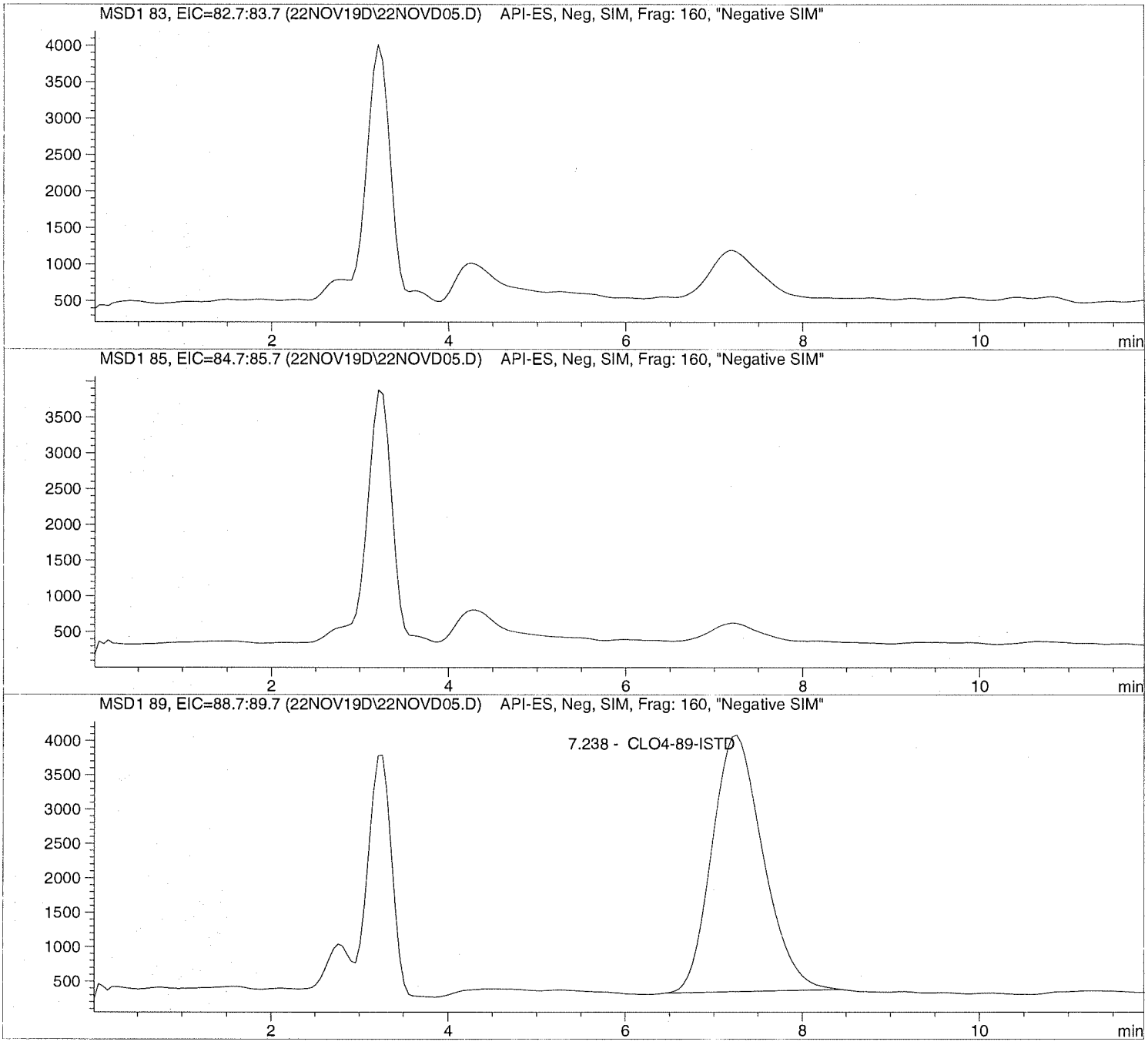
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD05.D Sample Name: 1932283001

Injection Date:	11/22/2019 09:12:41	Seq Line:	5
Sample Name:	1932283001	Location:	Vial 75
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD05.D Sample Name: 1932283001

Injection Date:	11/22/2019 09:12:41	Seq Line:	5
Sample Name:	1932283001	Location:	Vial 75
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.238	PBA	150033.3	5.0000	CLO4-89-ISTD

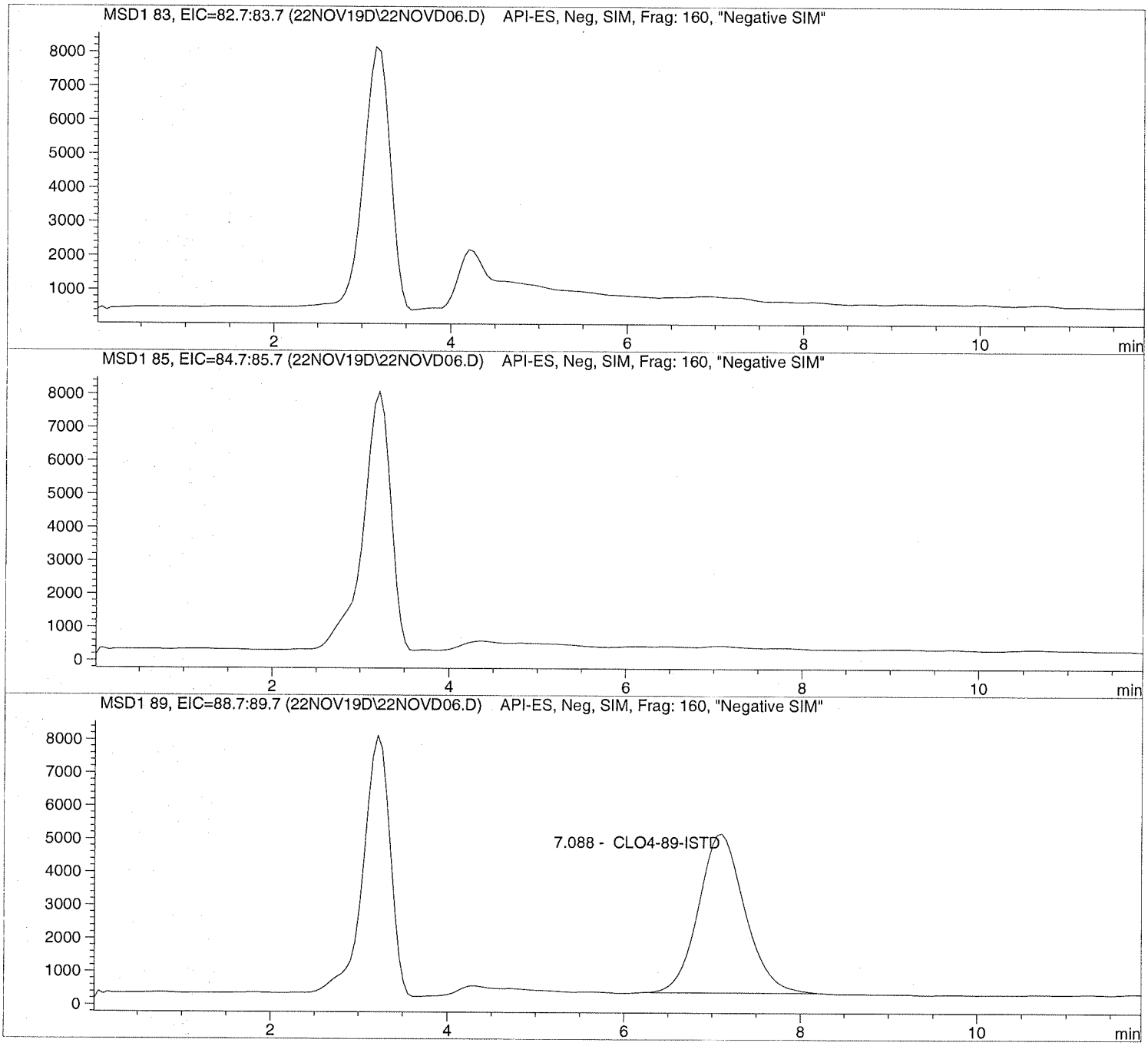
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD06.D Sample Name: 1932284001

Injection Date:	11/22/2019 09:26:34	Seq Line:	6
Sample Name:	1932284001	Location:	Vial 76
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD06.D Sample Name: 1932284001

Injection Date:	11/22/2019 09:26:34	Seq Line:	6
Sample Name:	1932284001	Location:	Vial 76
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method:	CLO4-AQN.M
Analysis Method:	C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed:	11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.088	BBA	175095.0	5.0000	CLO4-89-ISTD

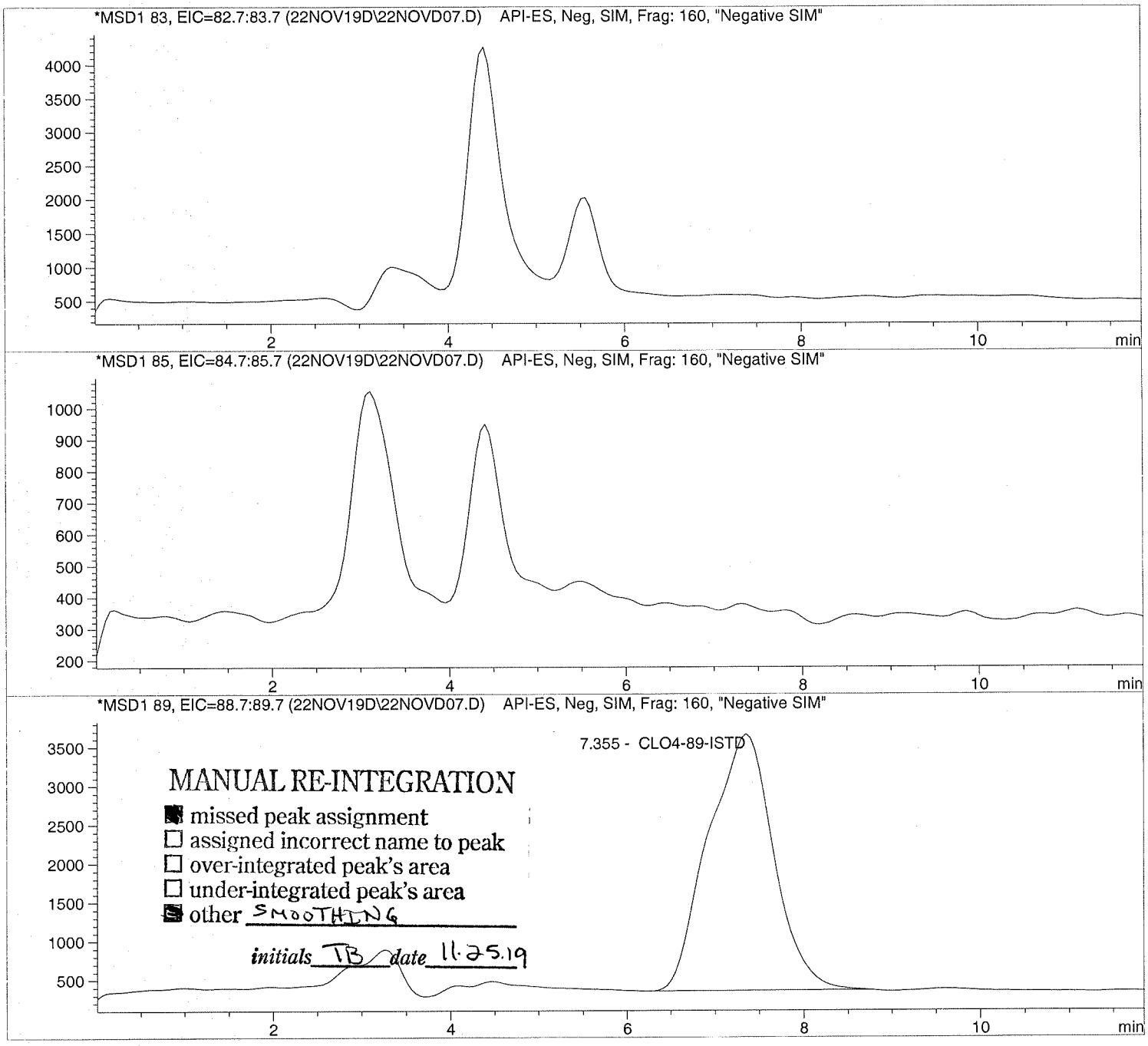
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD07.D Sample Name: 1932284002

Injection Date:	11/22/2019 09:55:02	Seq Line:	7
Sample Name:	1932284002	Location:	Vial 77
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD07.D Sample Name: 1932284002

Injection Date:	11/22/2019 09:55:02	Seq Line:	7
Sample Name:	1932284002	Location:	Vial 77
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.355	PBA	169526.6	5.0000	CLO4-89-ISTD

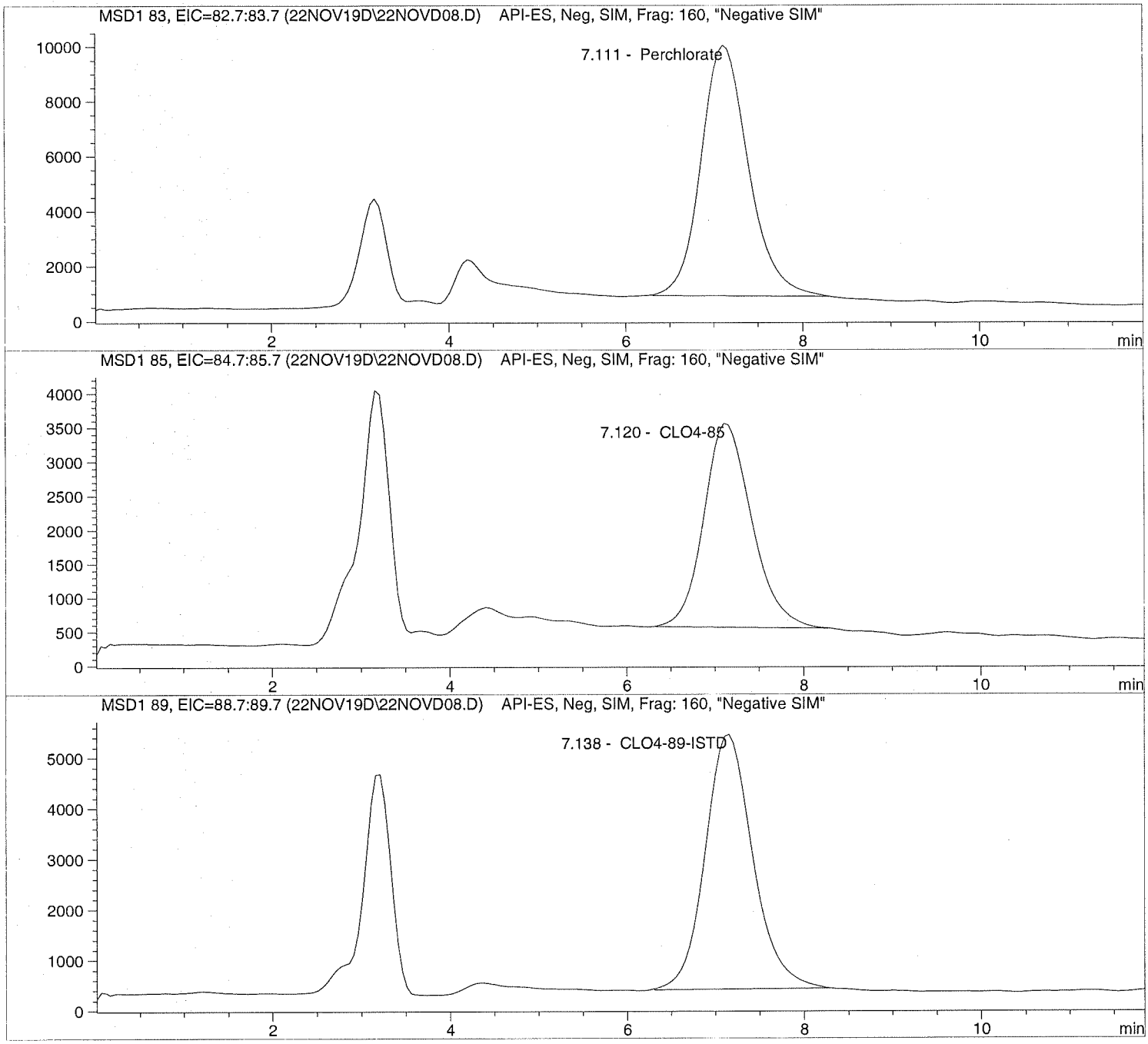
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD08.D Sample Name: 1932284003

Injection Date:	11/22/2019 10:08:56	Seq Line:	8
Sample Name:	1932284003	Location:	Vial 78
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD08.D Sample Name: 1932284003

Injection Date:	11/22/2019 10:08:56	Seq Line:	8
Sample Name:	1932284003	Location:	Vial 78
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.111	BBA	339906.7	6.6022	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.120	PBA	113127.0	7.1008	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.138	PBA	189097.7	5.0000	CLO4-89-ISTD

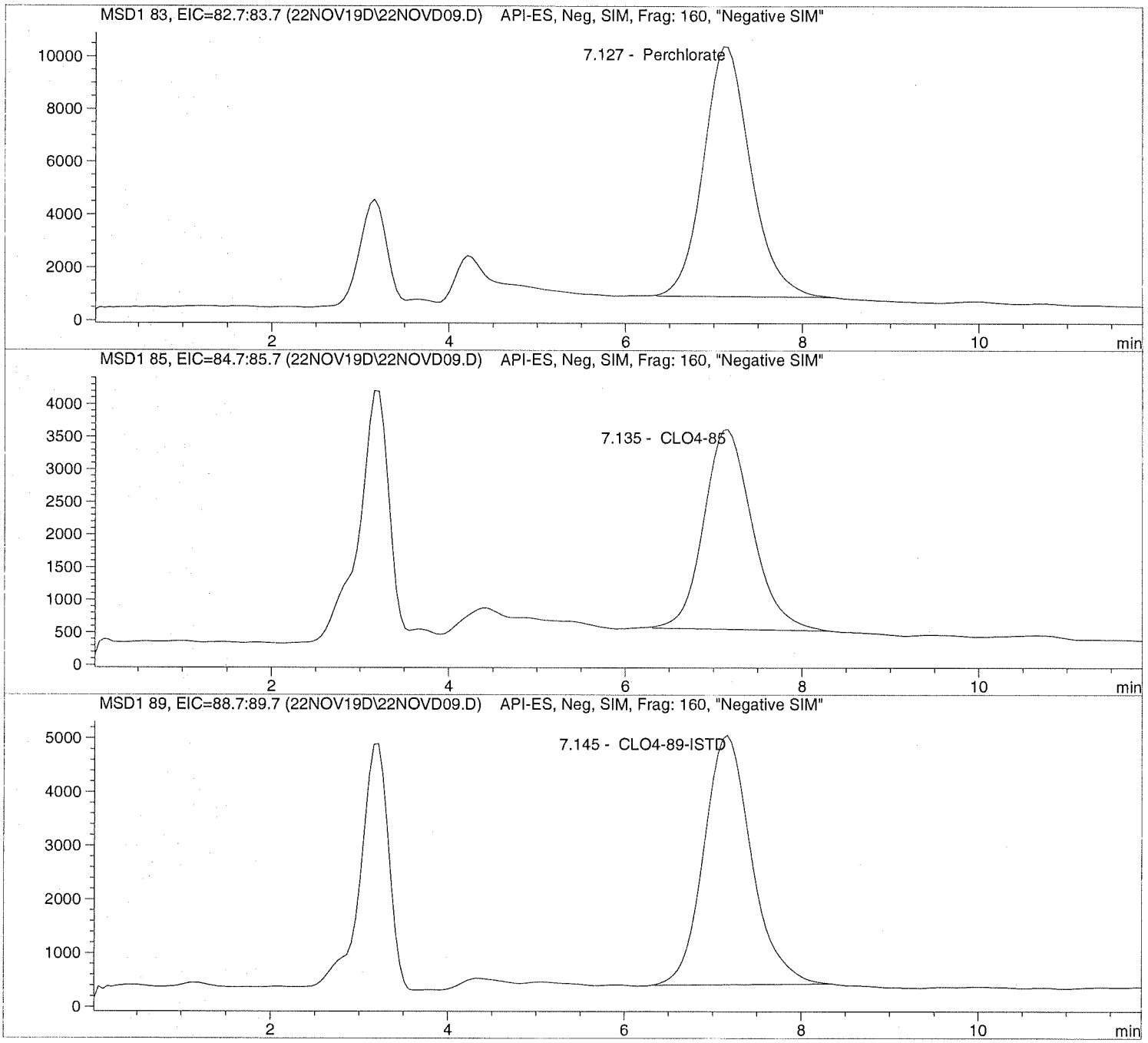
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD09.D Sample Name: 1932284004

Injection Date:	11/22/2019 10:22:49	Seq Line:	9
Sample Name:	1932284004	Location:	Vial 79
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD09.D Sample Name: 1932284004

Injection Date:	11/22/2019 10:22:49	Seq Line:	9
Sample Name:	1932284004	Location:	Vial 79
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.127	BBA	351317.6	7.4086	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.135	BBA	117024.3	7.9837	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.145	PBA	173763.9	5.0000	CLO4-89-ISTD

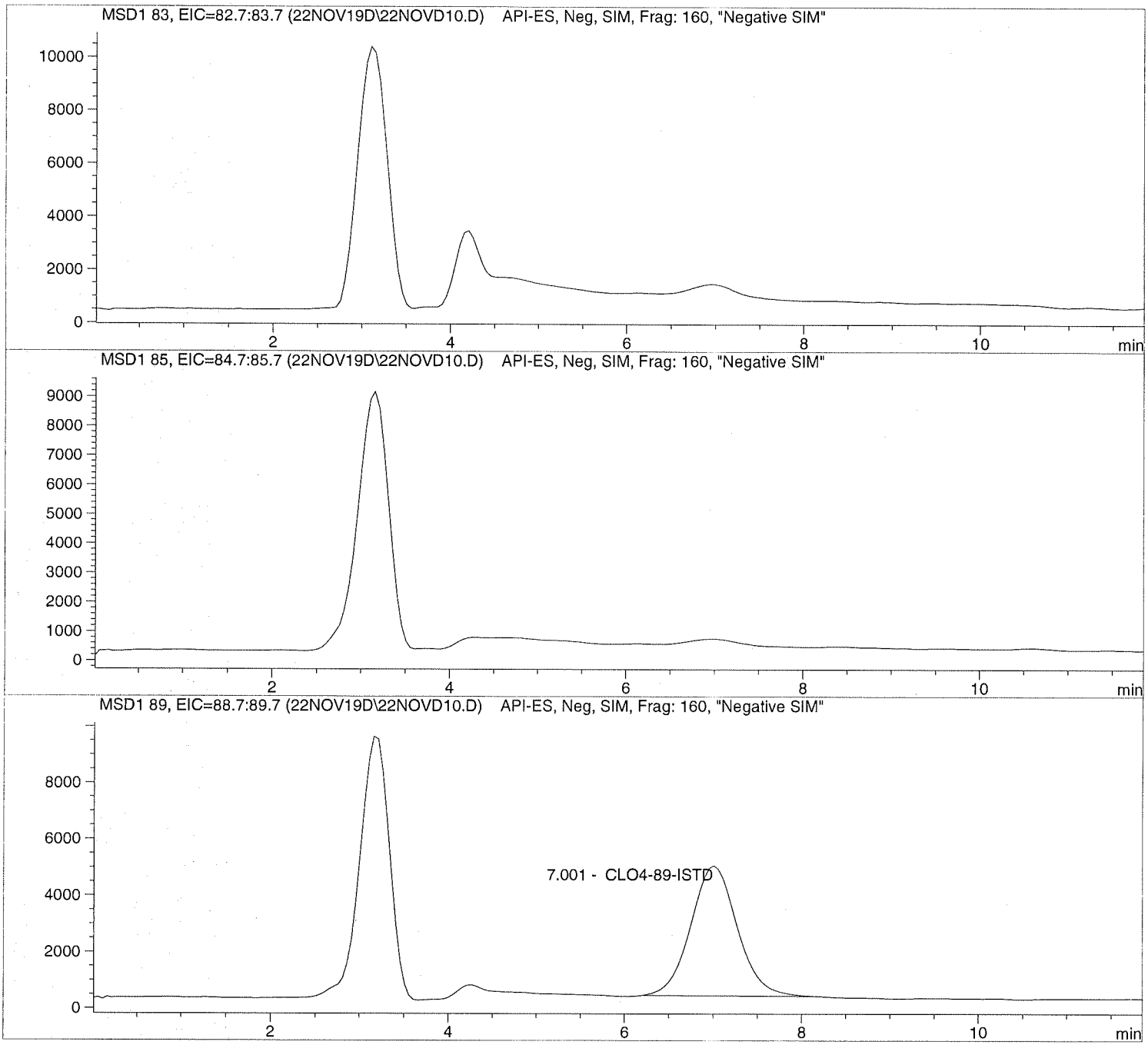
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD10.D Sample Name: 1932284005

Injection Date:	11/22/2019 10:36:43	Seq Line:	10
Sample Name:	1932284005	Location:	Vial 80
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD10.D Sample Name: 1932284005

Injection Date:	11/22/2019 10:36:43	Seq Line:	10
Sample Name:	1932284005	Location:	Vial 80
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.001	BBA	168474.5	5.0000	CLO4-89-ISTD

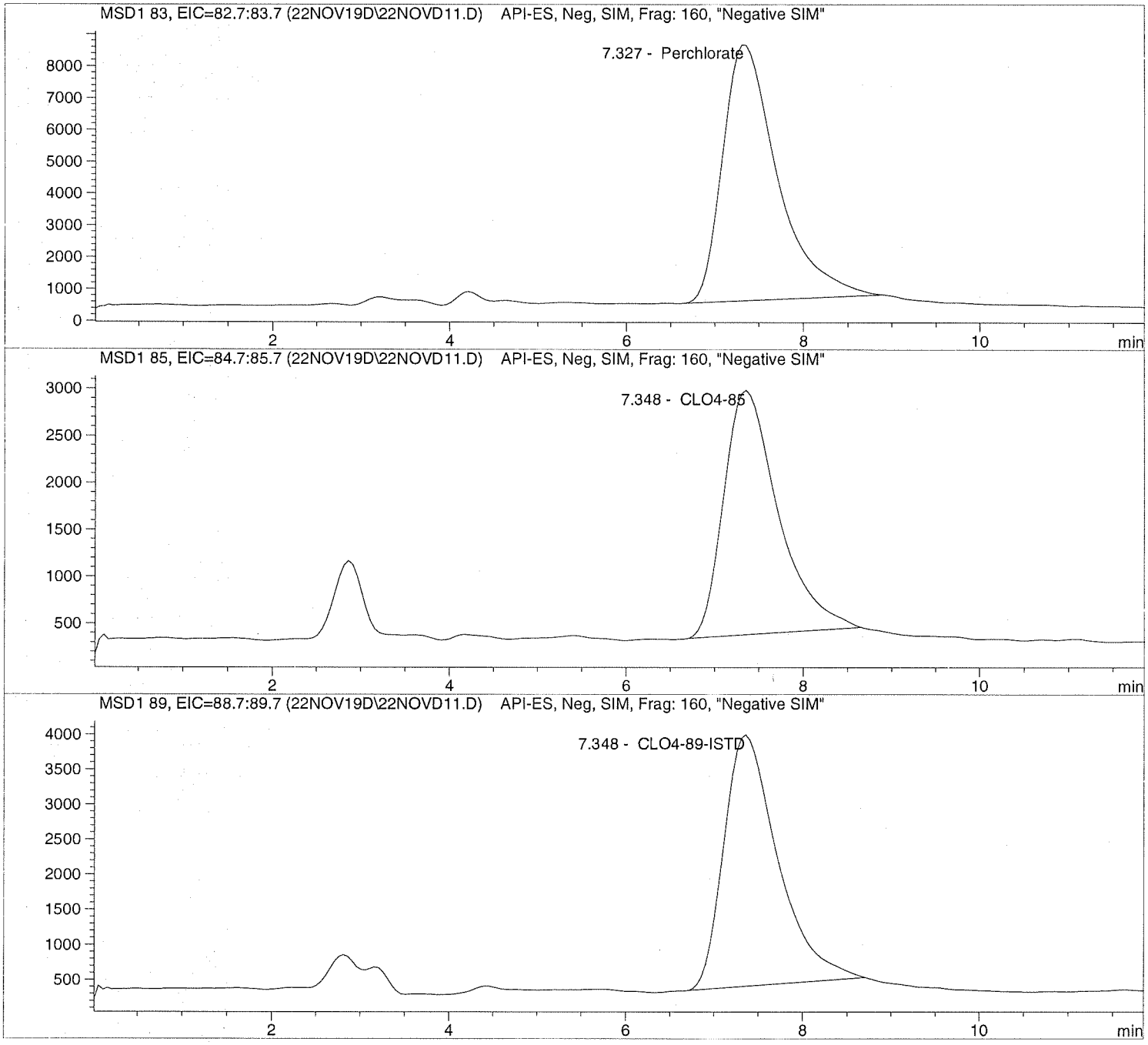
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD11.D Sample Name: 1932284006 10X

Injection Date:	11/22/2019 10:50:36	Seq Line:	11
Sample Name:	1932284006 10X	Location:	Vial 81
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD11.D Sample Name: 1932284006 10X

Injection Date:	11/22/2019 10:50:36	Seq Line:	11
Sample Name:	1932284006 10X	Location:	Vial 81
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	10.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.327	PBA	345930.0	83.0708	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.348	PBA	111675.8	86.8934	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.348	PBA	152149.8	50.0000	CLO4-89-ISTD

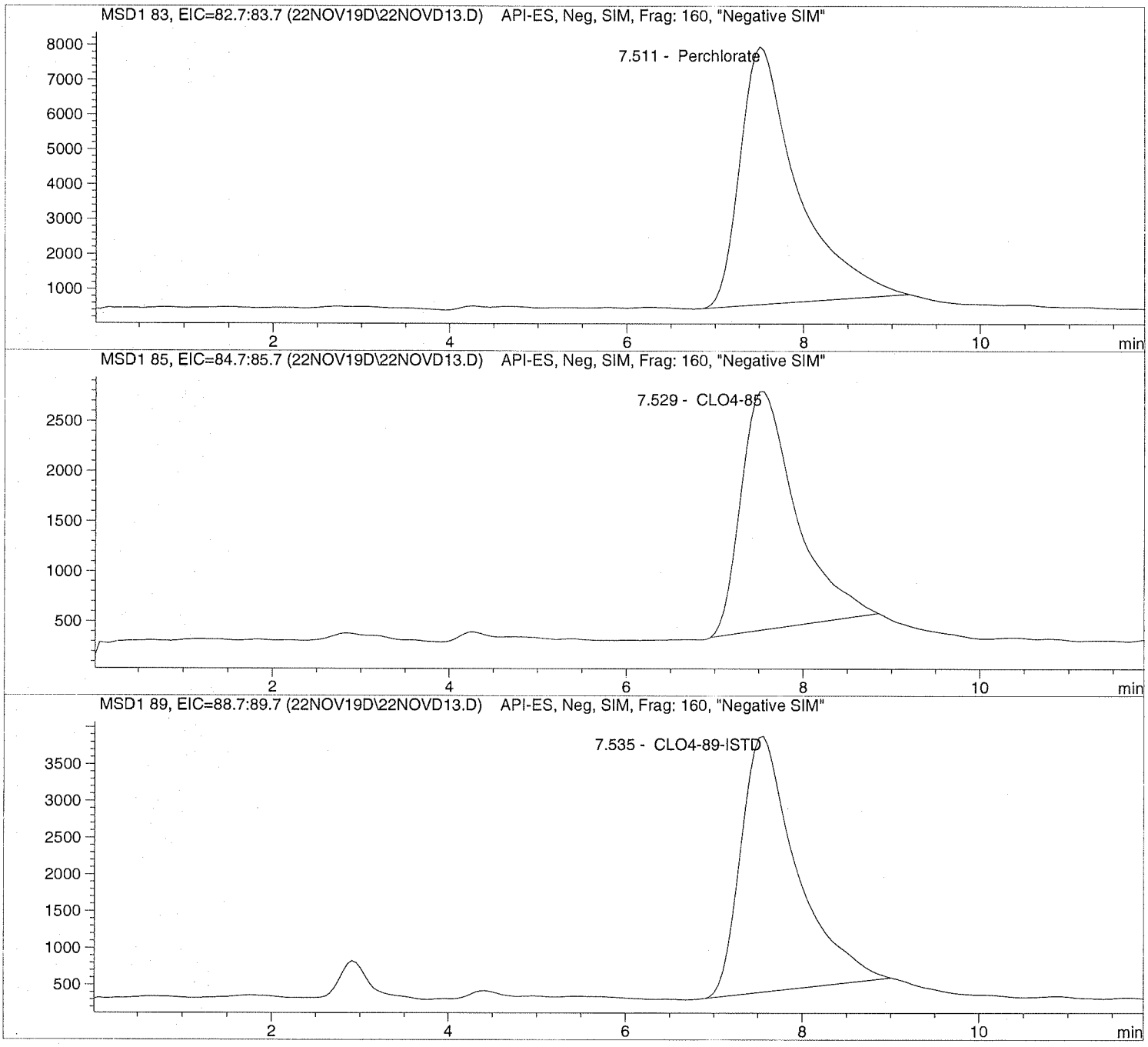
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD13.D Sample Name: 1932284008 1K

Injection Date:	11/22/2019 11:18:19	Seq Line:	13
Sample Name:	1932284008 1K	Location:	Vial 83
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD13.D Sample Name: 1932284008 1K

Injection Date:	11/22/2019 11:18:19	Seq Line:	13
Sample Name:	1932284008 1K	Location:	Vial 83
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1000.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.511	PBA	333135.6	7986.4726	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.529	PBA	102889.4	7994.4321	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.535	PBA	152567.1	5000.0000	CLO4-89-ISTD

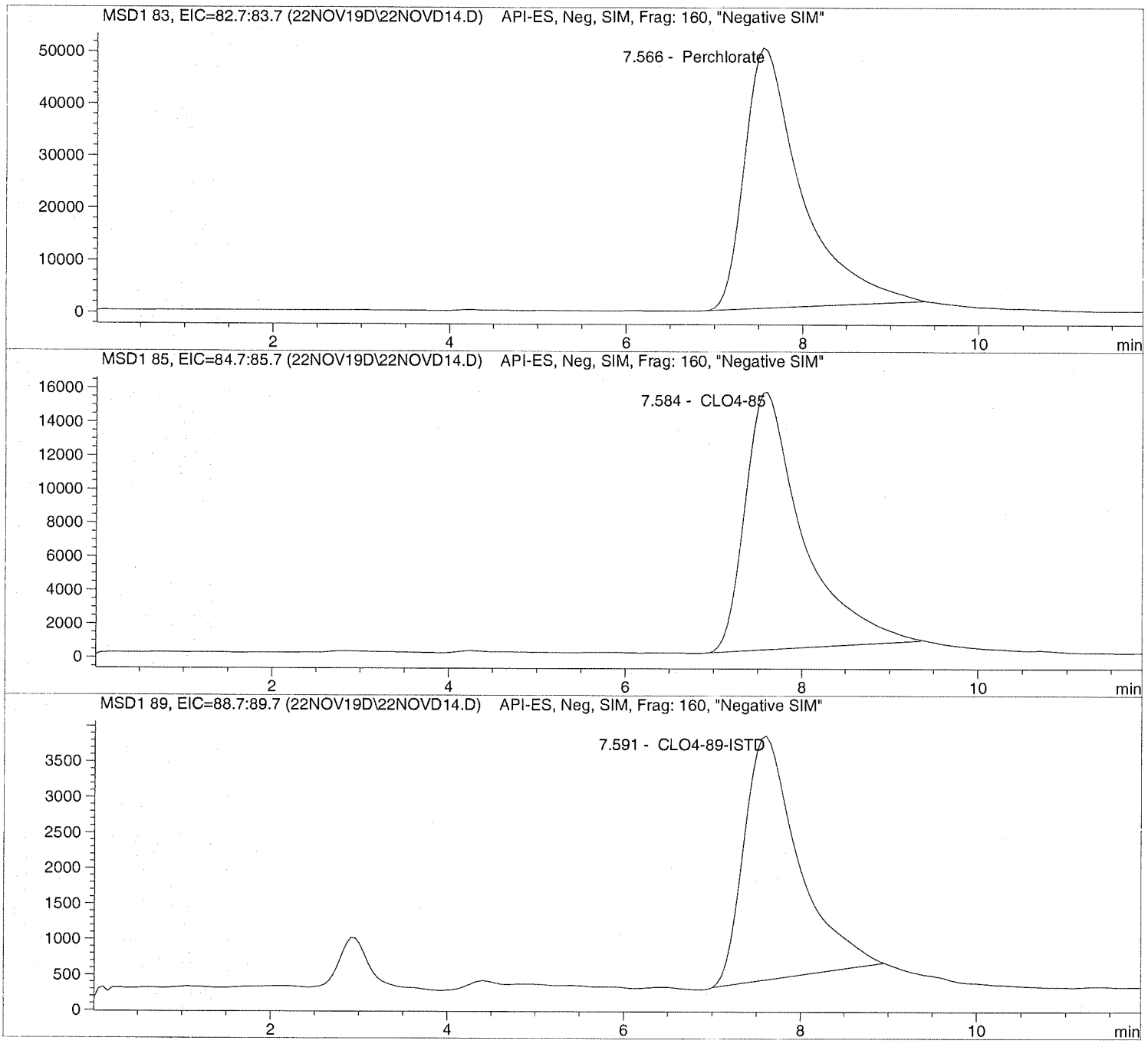
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD14.D Sample Name: 1932284009 1K

Injection Date:	11/22/2019 11:32:09	Seq Line:	14
Sample Name:	1932284009 1K	Location:	Vial 84
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD14.D Sample Name: 1932284009 1K

Injection Date:	11/22/2019 11:32:09	Seq Line:	14
Sample Name:	1932284009 1K	Location:	Vial 84
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1000.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.566	PBA	2244256.0	47369.5432	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.584	PBA	695778.6	48329.8011	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.591	PBA	148042.5	5000.0000	CLO4-89-ISTD

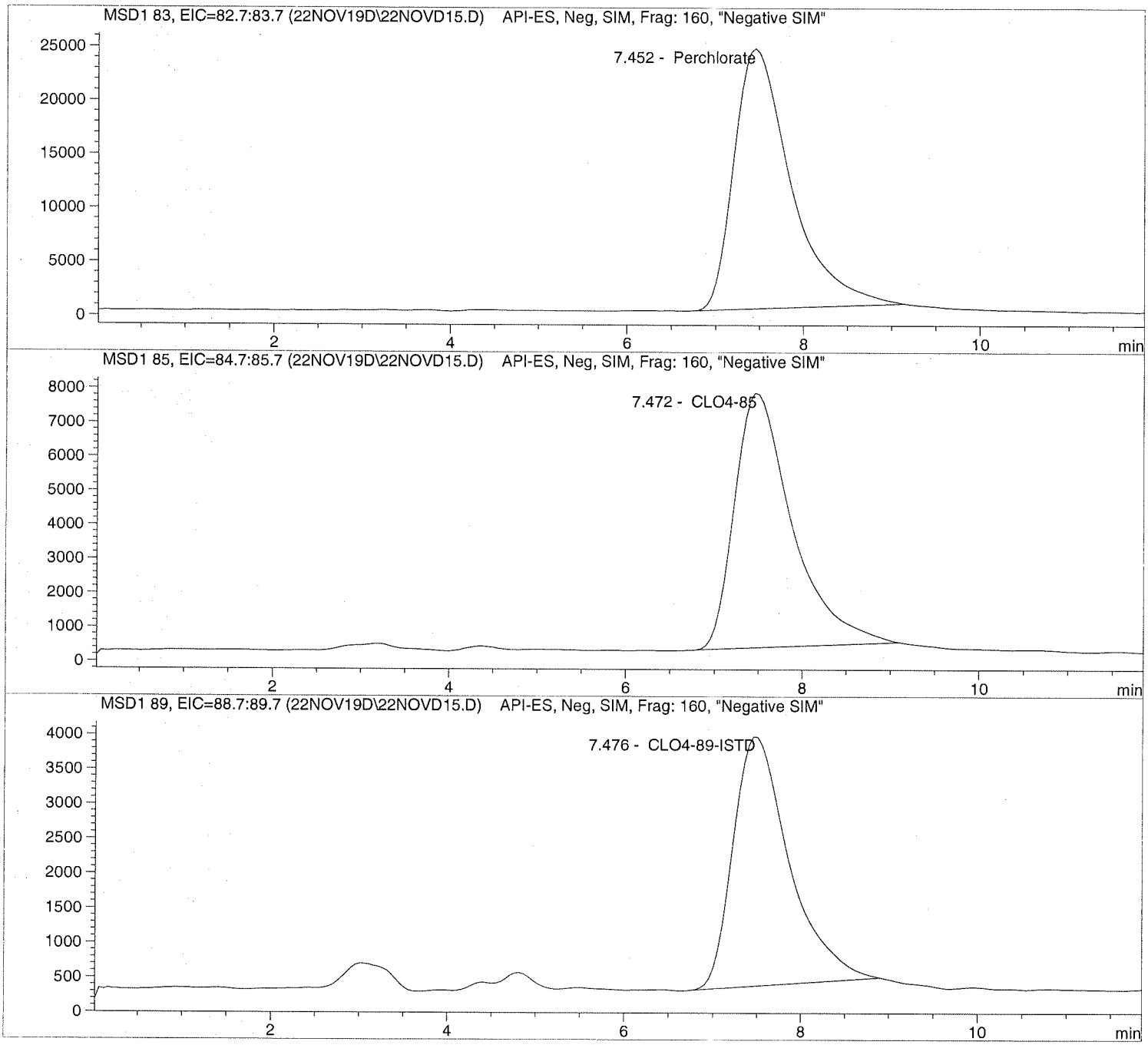
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD15.D Sample Name: 685443 CCV@25

Injection Date:	11/22/2019 11:46:00	Seq Line:	15
Sample Name:	685443 CCV@25	Location:	Vial 71
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD15.D Sample Name: 685443 CCV@25

Injection Date:	11/22/2019 11:46:00	Seq Line:	15
Sample Name:	685443 CCV@25	Location:	Vial 71
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	25.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.452	PBA	1087130.5	23.3638	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.472	PBA	340342.8	23.9212	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.476	PBA	160068.6	5.0000	CLO4-89-ISTD

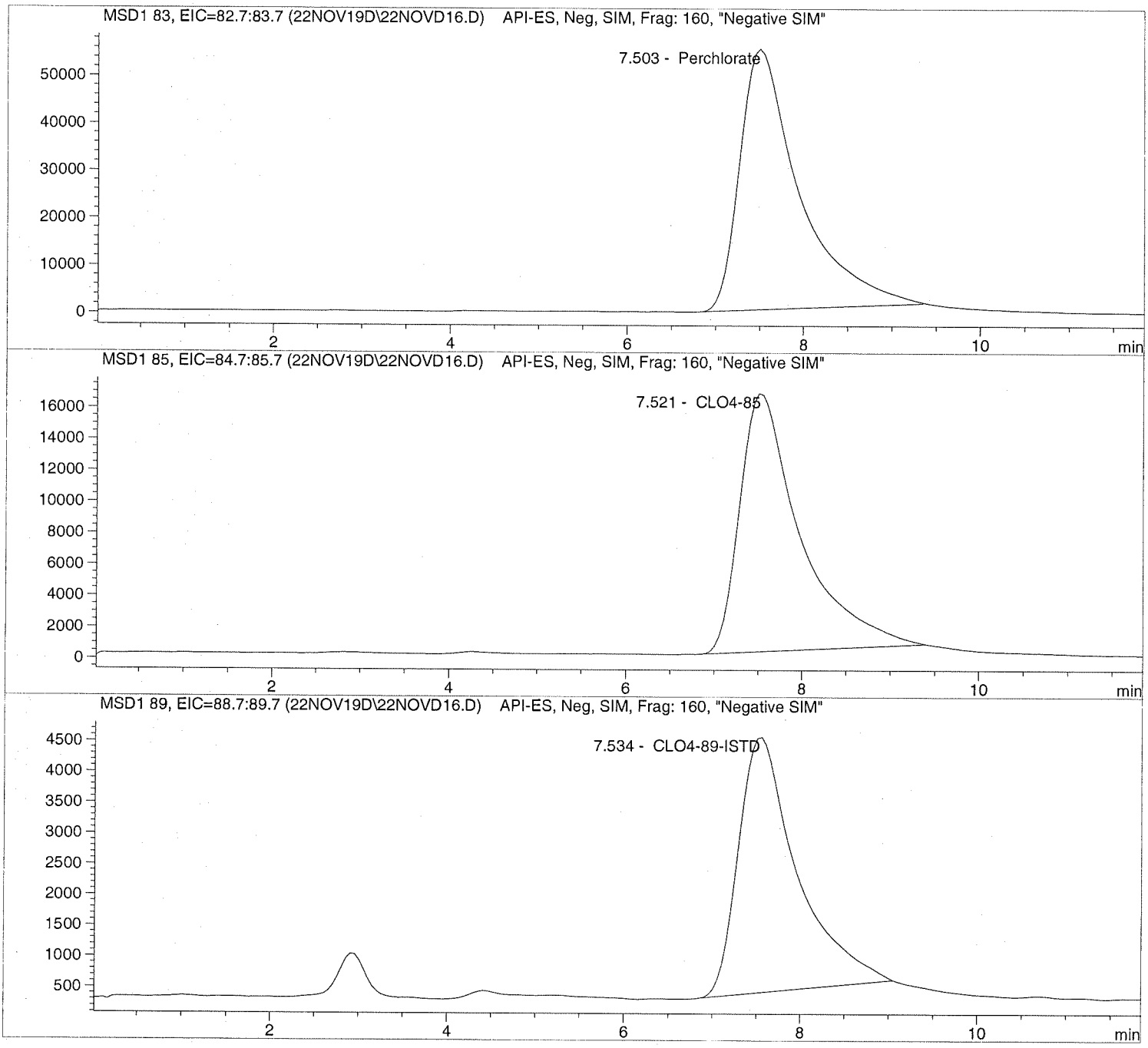
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD16.D Sample Name: 1932284010 1K

Injection Date:	11/22/2019 11:59:50	Seq Line:	16
Sample Name:	1932284010 1K	Location:	Vial 85
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD16.D Sample Name: 1932284010 1K

Injection Date:	11/22/2019 11:59:50	Seq Line:	16
Sample Name:	1932284010 1K	Location:	Vial 85
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1000.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.503	PBA	2579132.0	42598.6907	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.521	PBA	787731.0	42868.3703	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.534	PBA	192723.4	5000.0000	CLO4-89-ISTD

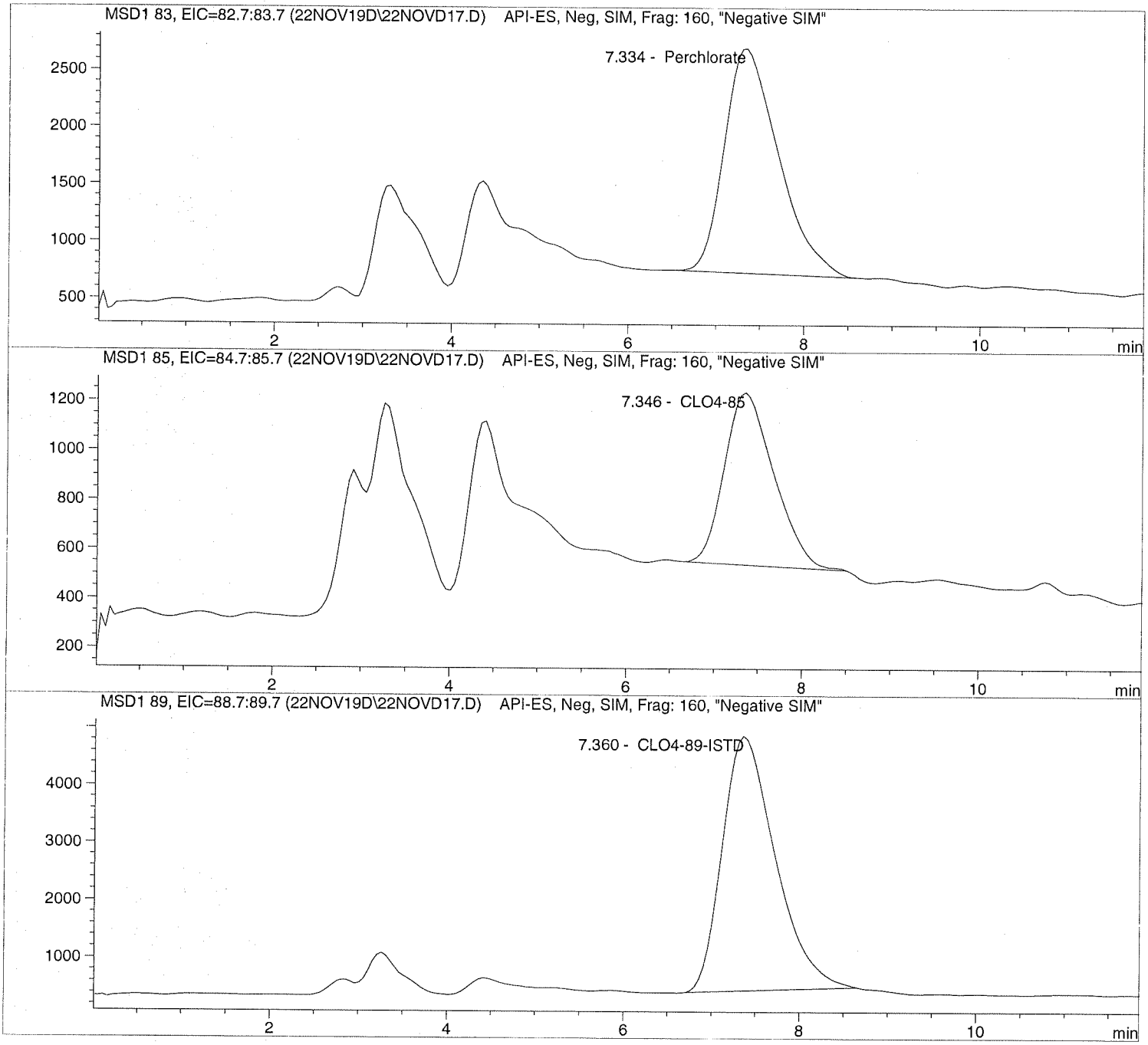
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD17.D Sample Name: 1932352001

Injection Date:	11/22/2019 12:13:41	Seq Line:	17
Sample Name:	1932352001	Location:	Vial 86
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD17.D Sample Name: 1932352001

Injection Date:	11/22/2019 12:13:41	Seq Line:	17
Sample Name:	1932352001	Location:	Vial 86
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.334	PBA	84513.2	1.6404	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.346	PBA	27333.2	1.6553	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.360	PBA	186562.4	5.0000	CLO4-89-ISTD

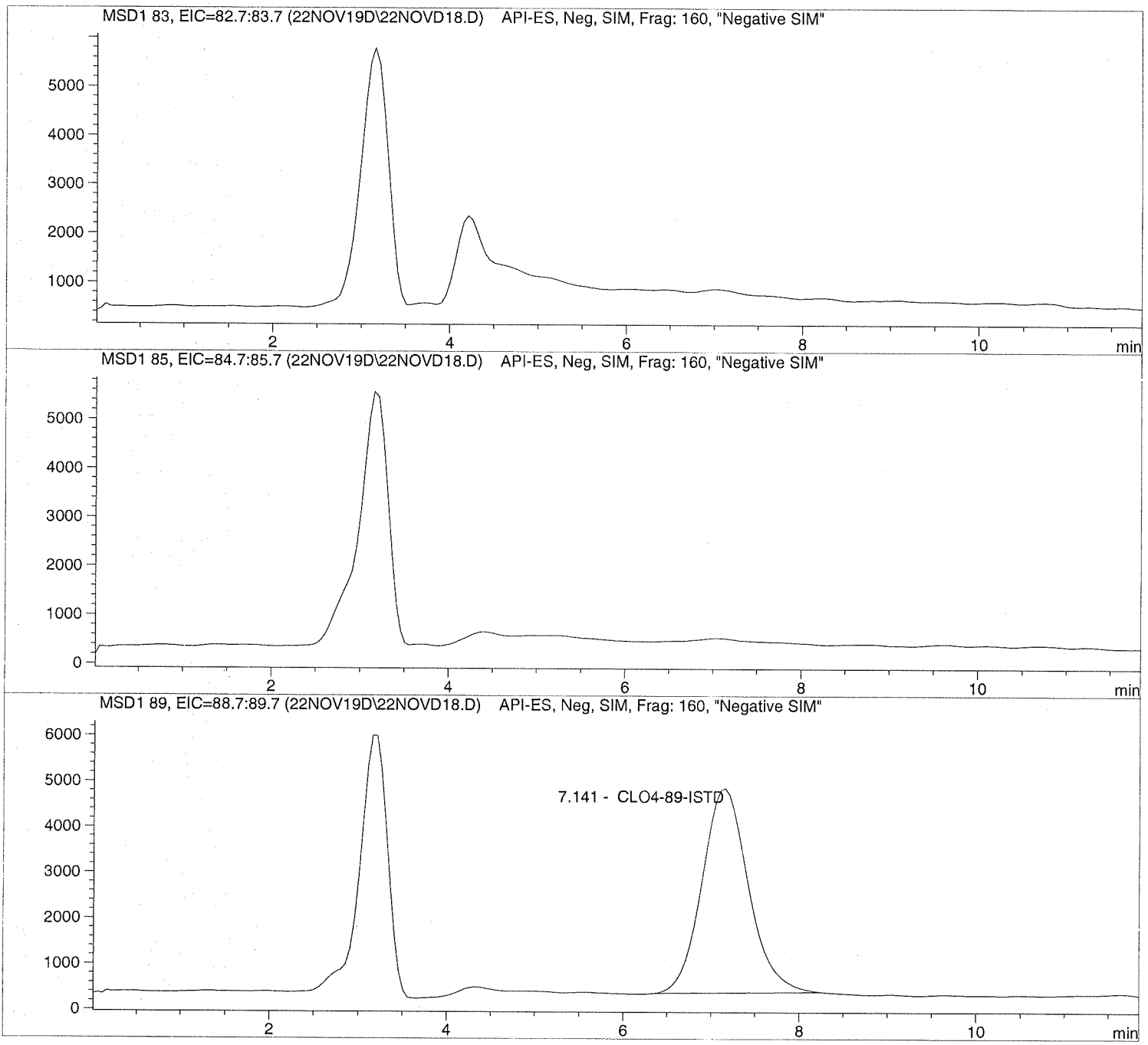
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD18.D Sample Name: 1932352002

Injection Date:	11/22/2019 12:27:35	Seq Line:	18
Sample Name:	1932352002	Location:	Vial 87
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD18.D Sample Name: 1932352002

Injection Date:	11/22/2019 12:27:35	Seq Line:	18
Sample Name:	1932352002	Location:	Vial 87
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.141	PBA	164476.7	5.0000	CLO4-89-ISTD

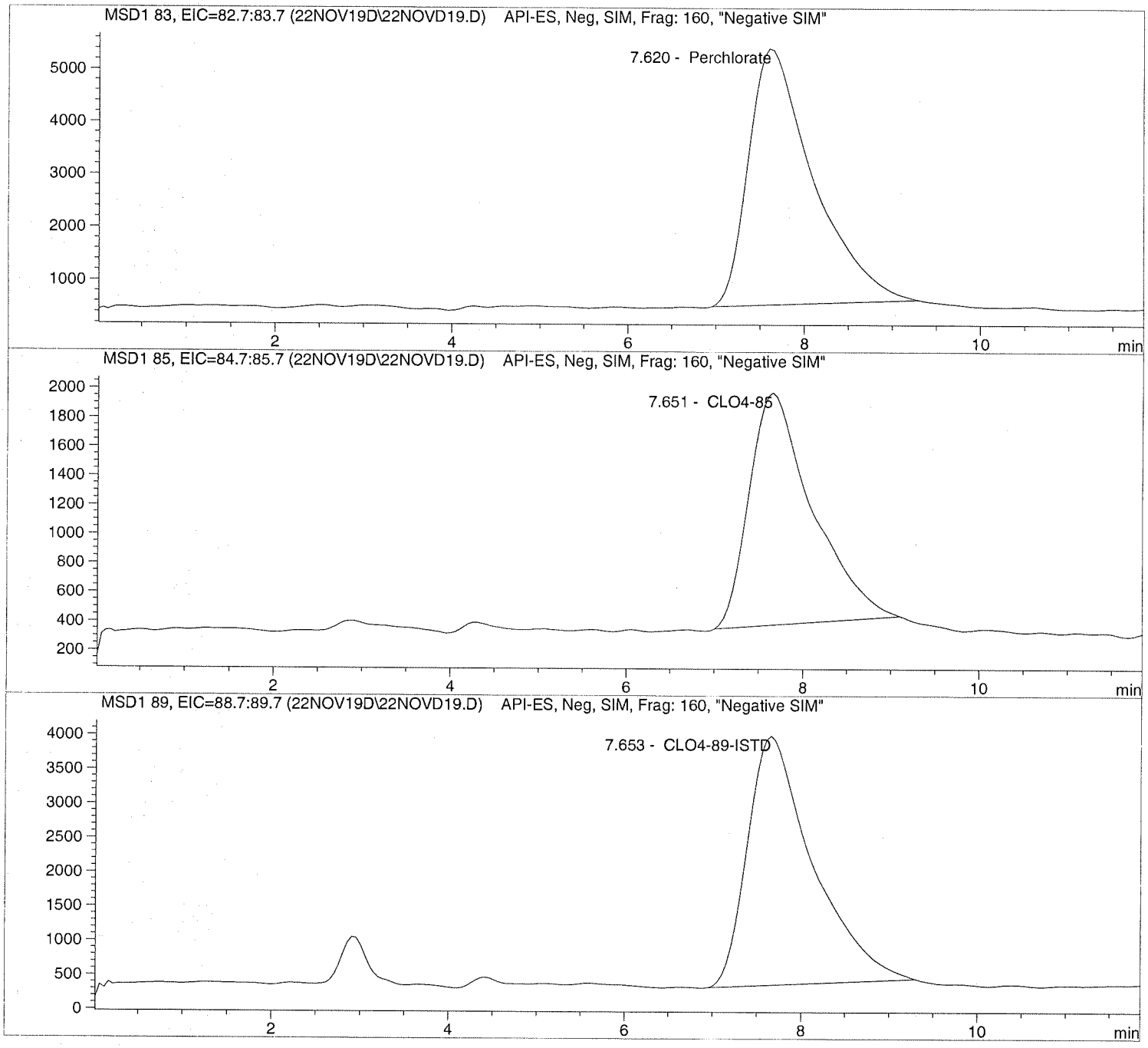
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD19.D Sample Name: 1932352003 1K

Injection Date:	11/22/2019 12:41:26	Seq Line:	19
Sample Name:	1932352003 1K	Location:	Vial 88
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD19.D Sample Name: 1932352003 1K

Injection Date:	11/22/2019 12:41:26	Seq Line:	19
Sample Name:	1932352003 1K	Location:	Vial 88
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1000.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.620	PBA	246585.9	4887.0265	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.651	PBA	78880.7	5031.6524	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.653	PBA	185984.5	5000.0000	CLO4-89-ISTD

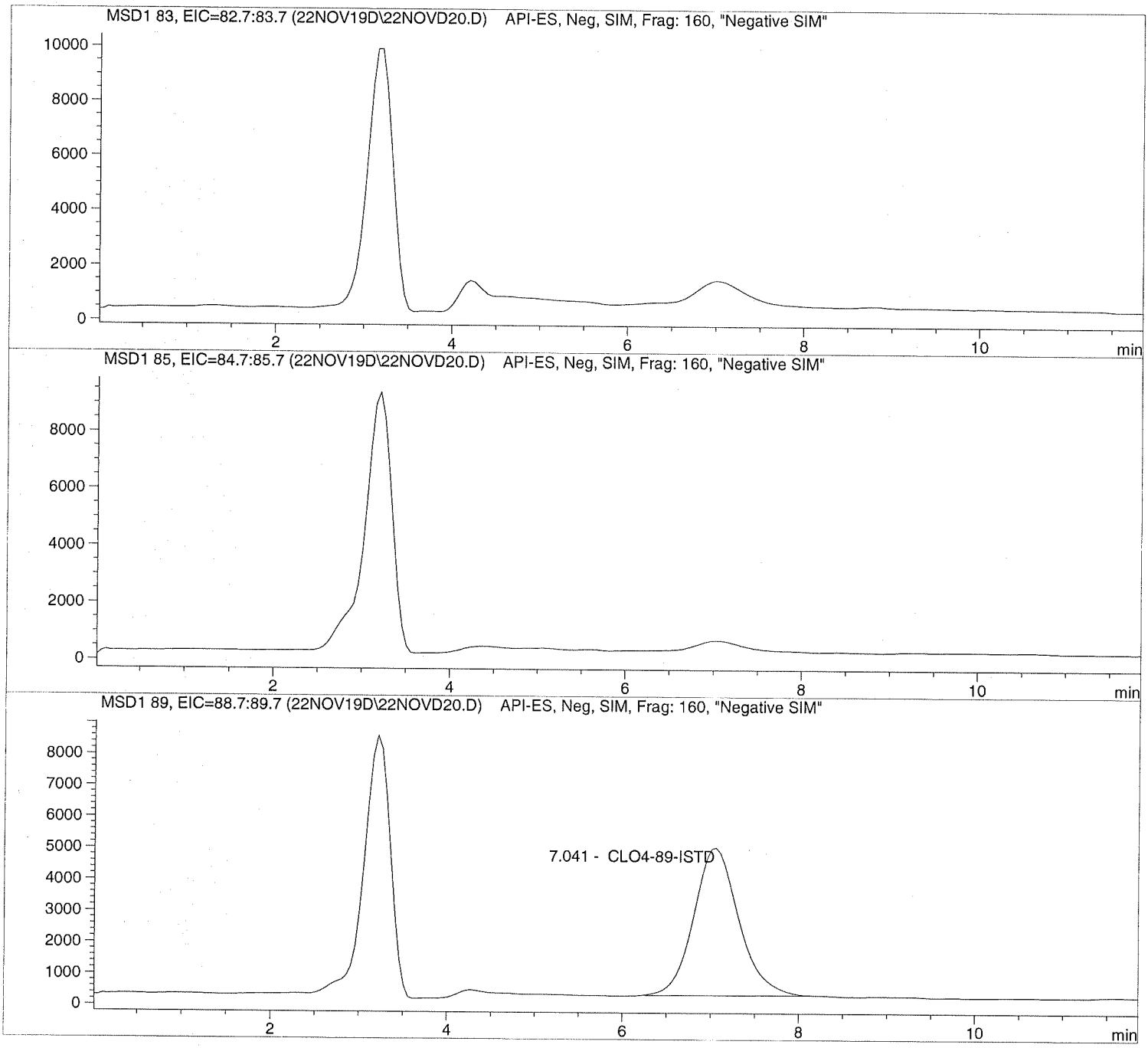
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD20.D Sample Name: 1932352004

Injection Date:	11/22/2019 12:55:21	Seq Line:	20
Sample Name:	1932352004	Location:	Vial 89
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD20.D Sample Name: 1932352004

Injection Date:	11/22/2019 12:55:21	Seq Line:	20
Sample Name:	1932352004	Location:	Vial 89
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method:	CLO4-AQN.M
Analysis Method:	C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed:	11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.041	BBA	167521.2	5.0000	CLO4-89-ISTD

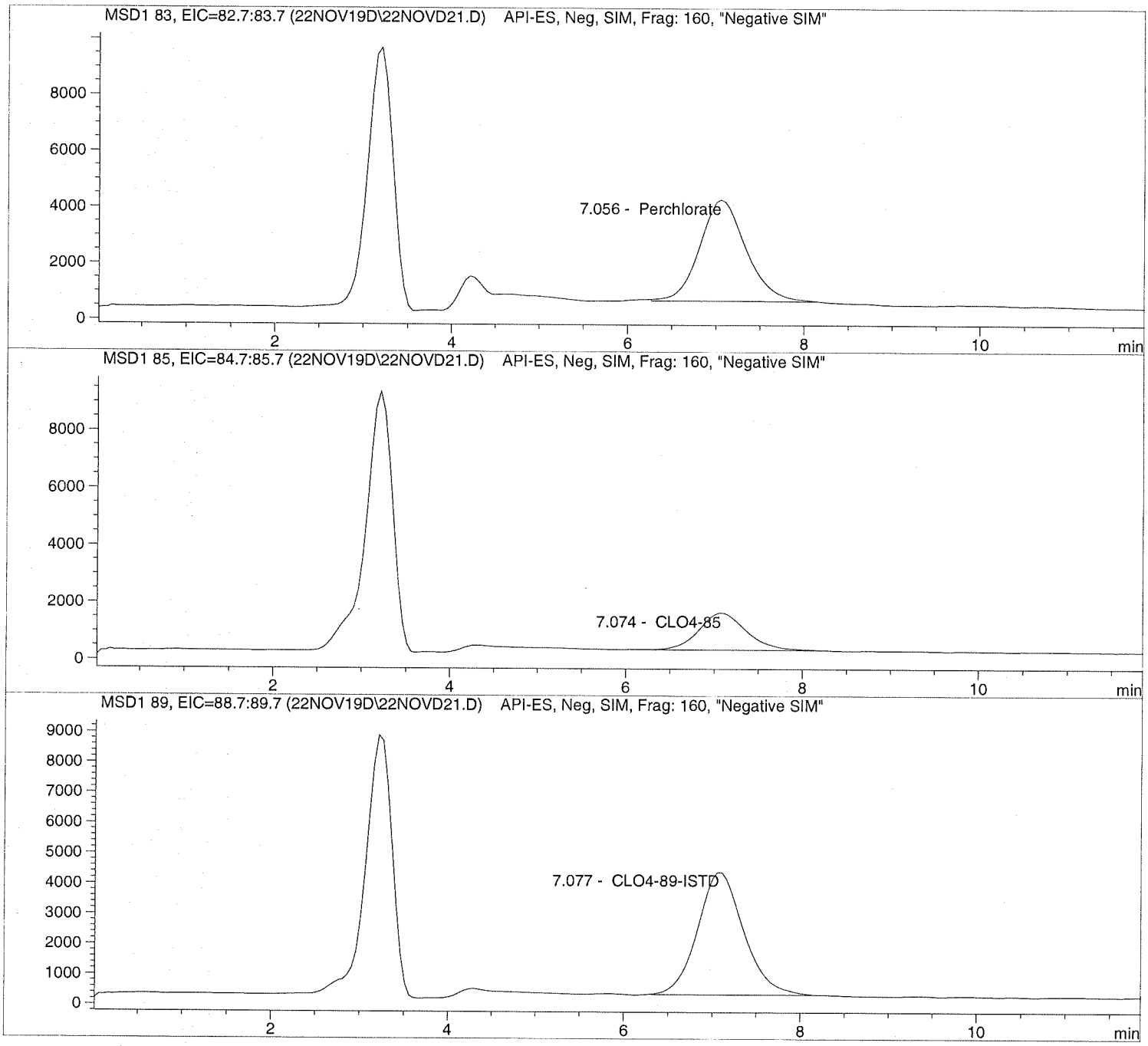
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD21.D Sample Name: 1932352005 MS

Injection Date:	11/22/2019 13:09:17	Seq Line:	21
Sample Name:	1932352005 MS	Location:	Vial 90
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD21.D Sample Name: 1932352005 MS

Injection Date:	11/22/2019 13:09:17	Seq Line:	21
Sample Name:	1932352005 MS	Location:	Vial 90
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.056	BBA	131207.6	3.2899	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.074	BBA	48283.1	3.8820	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.077	PBA	146896.4	5.0000	CLO4-89-ISTD

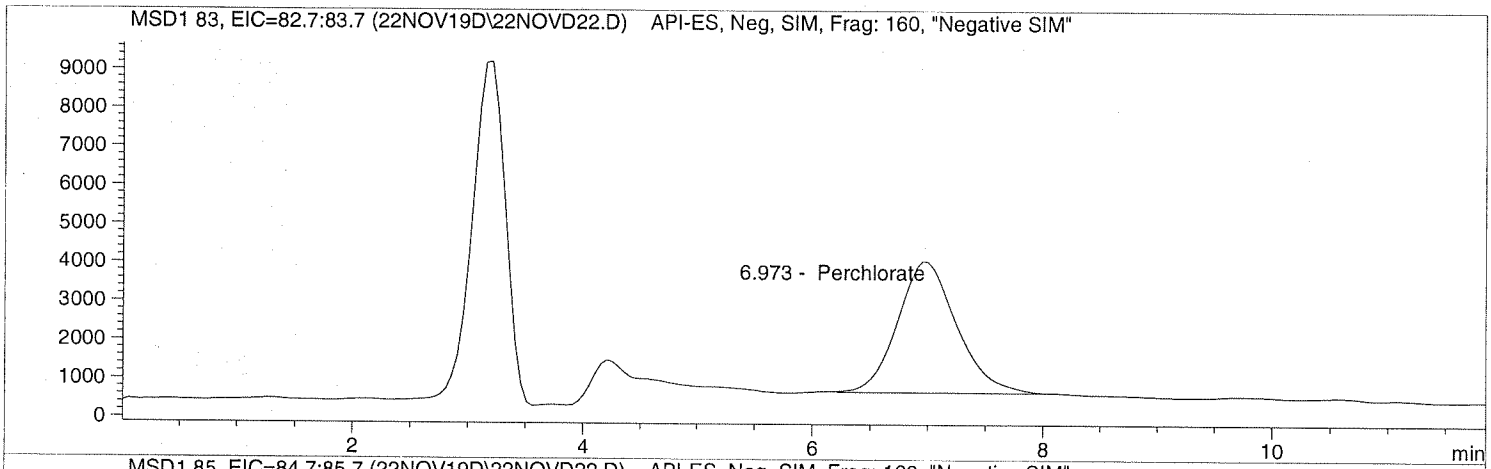
*** End of Report ***

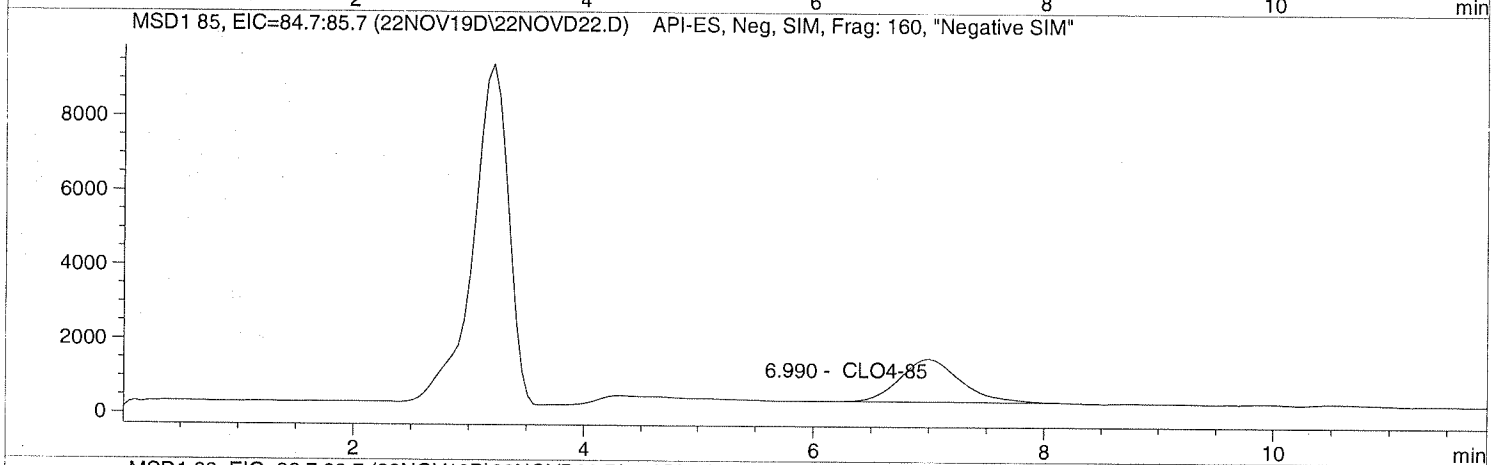
Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD22.D Sample Name: 1932352006 MSD

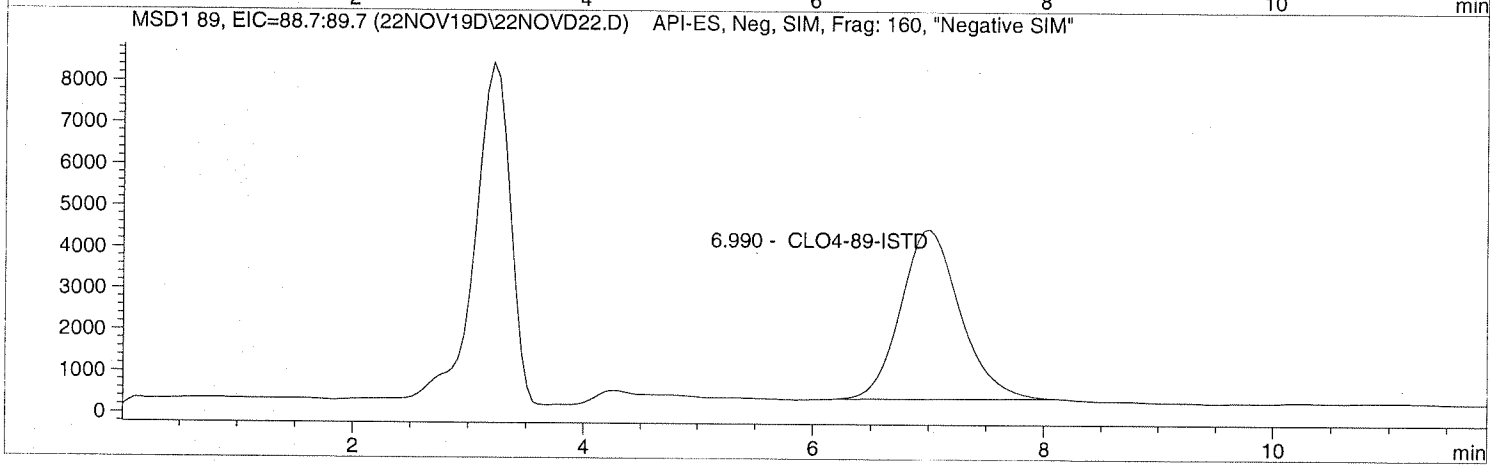
Injection Date:	11/22/2019 13:23:12	Seq Line:	22
Sample Name:	1932352006 MSD	Location:	Vial 91
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis







Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD22.D Sample Name: 1932352006 MSD

Injection Date:	11/22/2019 13:23:12	Seq Line:	22
Sample Name:	1932352006 MSD	Location:	Vial 91
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.973	BBA	121738.6	3.0509	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.990	BBA	42568.5	3.4112	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.990	BBA	146852.0	5.0000	CLO4-89-ISTD

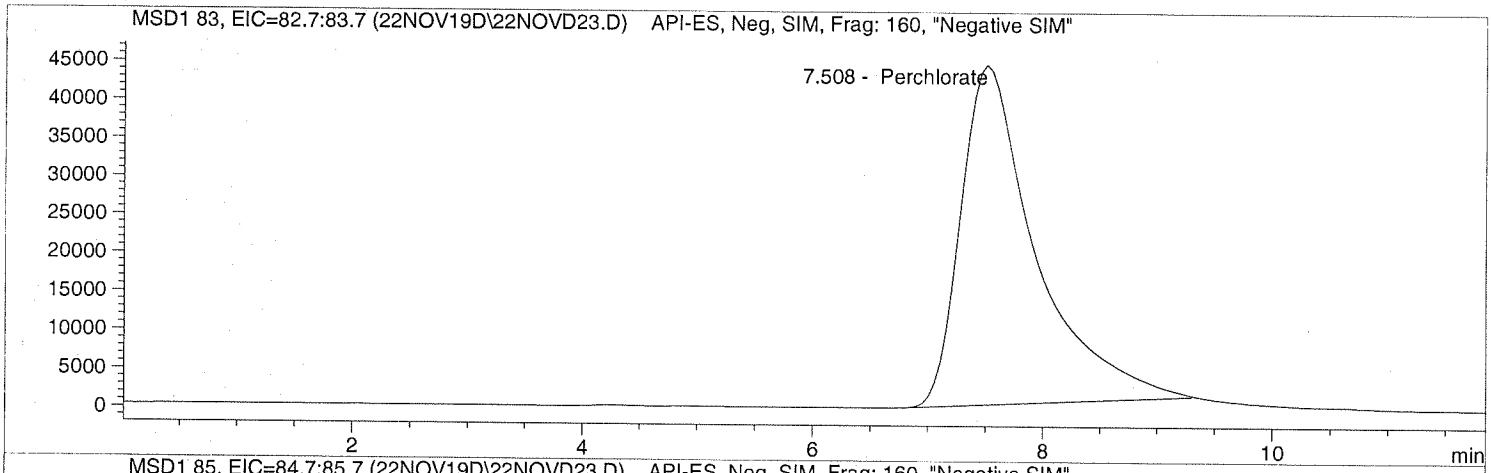
*** End of Report ***

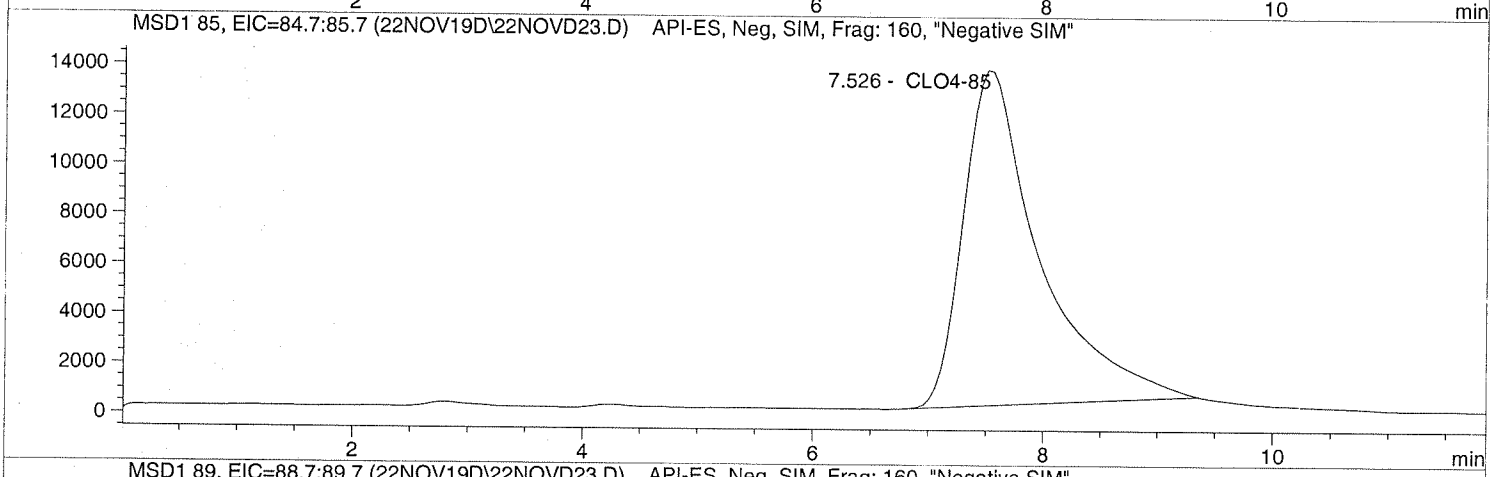
Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD23.D Sample Name: 1932284007 100

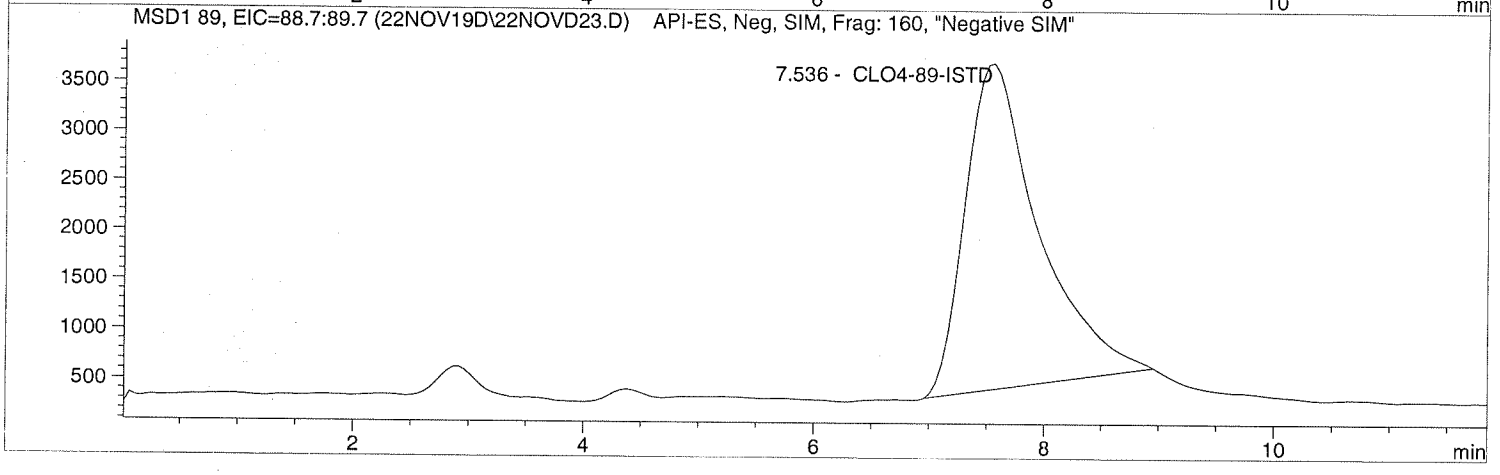
Injection Date:	11/22/2019 13:39:02	Seq Line:	23
Sample Name:	1932284007 100	Location:	Vial 92
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis







Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD23.D Sample Name: 1932284007 100

Injection Date:	11/22/2019 13:39:02	Seq Line:	23
Sample Name:	1932284007 100	Location:	Vial 92
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	100.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.508	PBA	2000966.8	4344.9859	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.526	PBA	621132.3	4434.8623	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.536	PBA	146104.5	500.0000	CLO4-89-ISTD

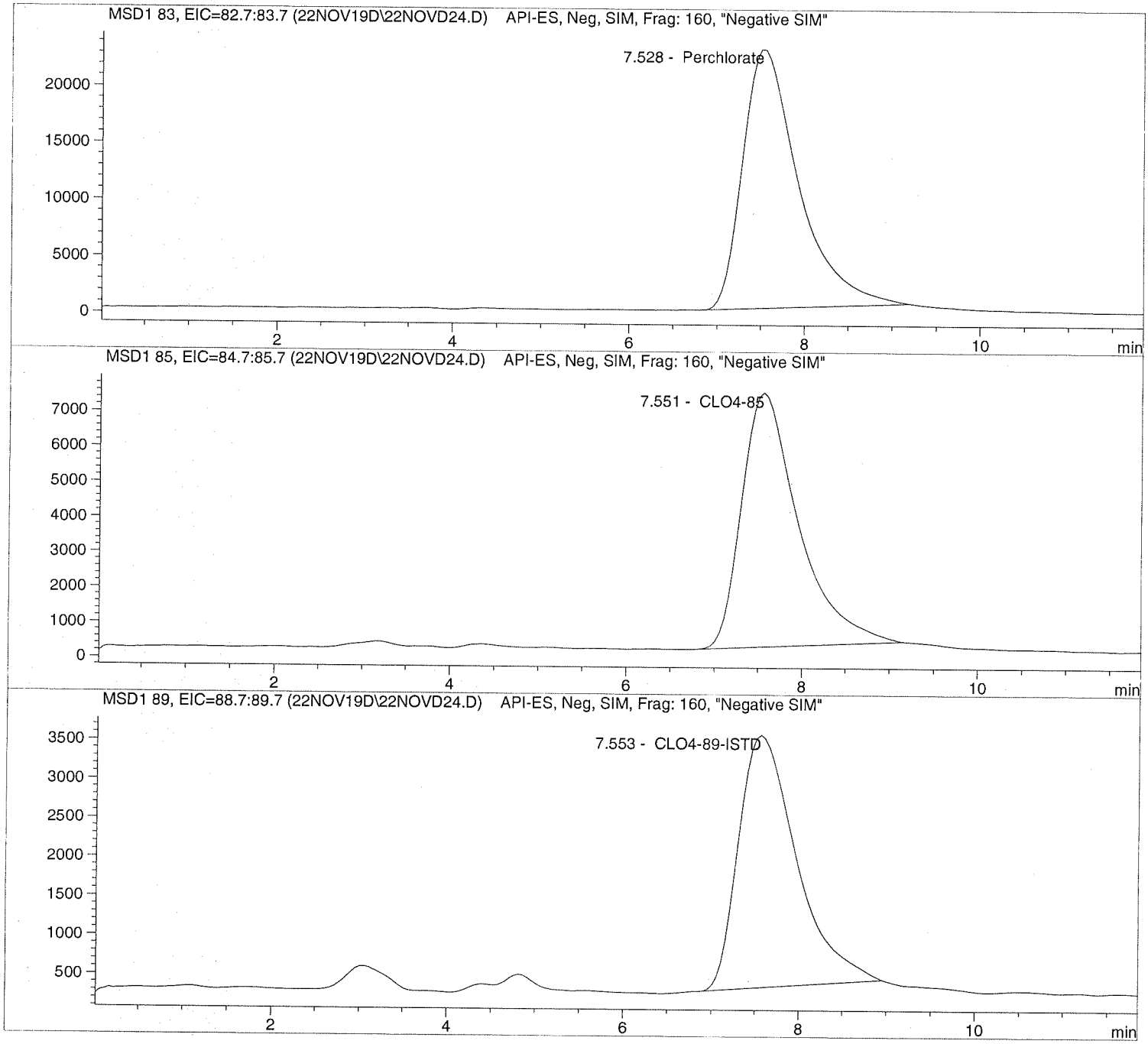
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD24.D Sample Name: 685444 CCV@25

Injection Date:	11/22/2019 13:54:23	Seq Line:	24
Sample Name:	685444 CCV@25	Location:	Vial 71
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD24.D Sample Name: 685444 CCV@25

Injection Date:	11/22/2019 13:54:23	Seq Line:	24
Sample Name:	685444 CCV@25	Location:	Vial 71
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	25.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.528	PBA	1013210.4	23.4184	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.551	PBA	326598.5	24.6282	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.553	PBA	148802.7	5.0000	CLO4-89-ISTD

*** End of Report ***

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Raw Data

Initial Calibration

Calibration Table

Perchlorate

Calib. Data Modified : 9/23/2019 12:20:59 PM

Calculate : Internal Standard
Based on : Peak Area

Rel. Reference Window : 20.000 %
Abs. Reference Window : 0.000 min
Rel. Non-ref. Window : 20.000 %
Abs. Non-ref. Window : 0.000 min
Use Multiplier & Dilution Factor with ISTDs
Uncalibrated Peaks : not reported
Partial Calibration : No recalibration if peaks missing

Curve Type : Quadratic (some peaks differ, see below)
Origin : Ignored (some peaks differ, see below)
Weight : Linear (Amnt) (some peaks differ, see below)

Recalibration Settings:
Average Response : Average all calibrations
Average Retention Time: Floating Average New 75%

Calibration Report Options :
Printout of recalibrations within a sequence:
Calibration Table after Recalibration
Normal Report after Recalibration
If the sequence is done with bracketing:
Results of first cycle (ending previous bracket)

Default Sample ISTD Information (if not set in sample table):

ISTD #	ISTD Amount	Name
1	5.00000	CLO4-89-ISTD

Signal 1: MSD1 83, EIC=82.7:83.7
Signal 2: MSD1 85, EIC=84.7:85.7
Signal 3: MSD1 89, EIC=88.7:89.7

RetTime [min]	Sig	Lvl	Amount	Area	Amt/Area	Ref	Grp	Name
7.750	1	3	1.00000	5.39218e4	1.85454e-5	1		Perchlorate
		4	2.00000	1.32825e5	1.50574e-5			
		5	5.00000	2.76271e5	1.80982e-5			
		6	10.00000	5.61298e5	1.78159e-5			
		7	25.00000	1.51820e6	1.64669e-5			
		8	50.00000	3.31156e6	1.50986e-5			
		9	75.00000	5.23914e6	1.43153e-5			
7.767	3	3	5.00000	2.14568e5	2.33026e-5	+I1		CLO4-89-ISTD
		4	5.00000	2.04758e5	2.44190e-5			
		5	5.00000	2.13407e5	2.34294e-5			
		6	5.00000	2.09246e5	2.38953e-5			
		7	5.00000	2.07403e5	2.41077e-5			
		8	5.00000	2.02929e5	2.46391e-5			
		9	5.00000	1.97933e5	2.52611e-5			
7.778	2	3	1.00000	1.70436e4	5.86732e-5	1		CLO4-85
		4	2.00000	4.20754e4	4.75337e-5			
		5	5.00000	9.24707e4	5.40712e-5			
		6	10.00000	1.68622e5	5.93041e-5			
		7	25.00000	4.63724e5	5.39114e-5			
		8	50.00000	9.95933e5	5.02042e-5			

Method C:\HPCHEM\1\METHODS\CLO4-DP3.M

RetTime [min]	Sig	Lvl	Amount	Area	Amt/Area	Ref	Grp	Name
		9	75.00000	1.58066e6	4.74484e-5			

More compound-specific settings:

Compound: Perchlorate
- Time Window : From 3.581 min To 11.899 min
- Curve Type : Quadratic
- Origin : Ignored
- Calibration Level Weights:/
  - Level 3 : 1
  - Level 4 : 0.5
  - Level 5 : 0.2
  - Level 6 : 0.1
  - Level 7 : 0.04
  - Level 8 : 0.02
  - Level 9 : 0.013333

Compound: CLO4-89-ISTD
- Time Window : From 3.581 min To 11.896 min
- Curve Type : Linear
- Origin : Included
- Calibration Level Weights:/
  - Level 3 : 1
  - Level 4 : 1
  - Level 5 : 1
  - Level 6 : 1
  - Level 7 : 1
  - Level 8 : 1
  - Level 9 : 1

Compound: CLO4-85
- Time Window : From 3.601 min To 11.913 min
- Curve Type : Quadratic
- Origin : Ignored
- Calibration Level Weights:/
  - Level 3 : 1
  - Level 4 : 0.5
  - Level 5 : 0.2
  - Level 6 : 0.1
  - Level 7 : 0.04
  - Level 8 : 0.02
  - Level 9 : 0.013333

Peak Sum Table

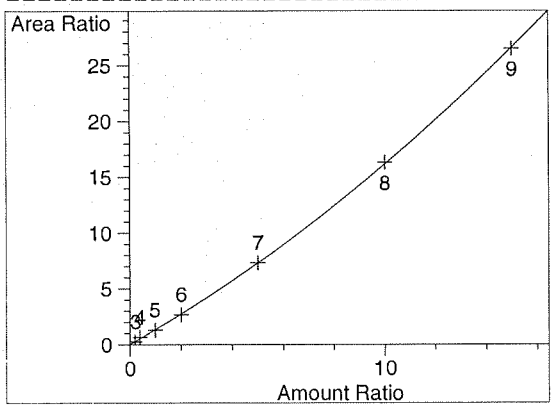
No Entries in table

Method C:\HPCHEM\1\METHODS\CLO4-DP3.M

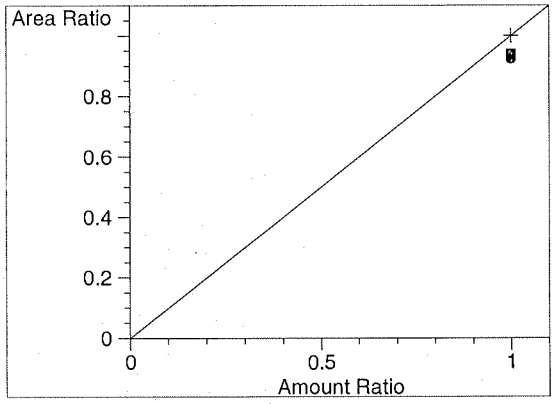
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Calibration Curves

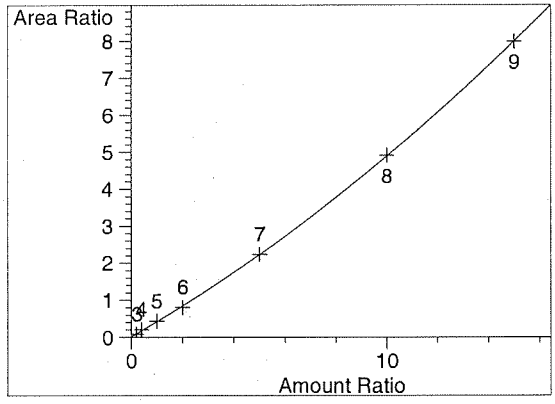
==========



Perchlorate at exp. RT: 7.750
MSD1 83, EIC=82.7:83.7
Correlation: 0.99975
Residual Std. Dev.: 0.10284
Formula: $y = ax^2 + bx + c$
a: 3.10463e-2
b: 1.30369
c: 2.19496e-2
x: Amount Ratio
y: Area Ratio
Calibration Level Weights:
Level 3 : 1
Level 4 : 0.5
Level 5 : 0.2
Level 6 : 0.1
Level 7 : 0.04
Level 8 : 0.02
Level 9 : 0.013333



CLO4-89-ISTD at exp. RT: 7.767
MSD1 89, EIC=88.7:89.7
Correlation: 1.00000
Residual Std. Dev.: 0.00000
Formula: $y = mx + b$
m: 1.00000
b: 0.00000
x: Amount Ratio
y: Area Ratio
Calibration Level Weights:
Level 3 : 1
Level 4 : 1
Level 5 : 1
Level 6 : 1
Level 7 : 1
Level 8 : 1
Level 9 : 1



CLO4-85 at exp. RT: 7.778
MSD1 85, EIC=84.7:85.7
Correlation: 0.99969
Residual Std. Dev.: 0.02601
Formula: $y = ax^2 + bx + c$
a: 8.85207e-3
b: 3.99283e-1
c: 1.33505e-2
x: Amount Ratio
y: Area Ratio
Calibration Level Weights:
Level 3 : 1
Level 4 : 0.5
Level 5 : 0.2
Level 6 : 0.1
Level 7 : 0.04
Level 8 : 0.02
Level 9 : 0.013333

==========

Batch Report: C:\HPCHEM\1\DATA\20SEP19I\20SEP19D.B

Batch Review Method:
C:\HPCHEM\1\METHODS\CLO4-DP3.M

['#' ==> Run has not been reprocessed with Batch Review Method
'*' ==> Run has been saved with batch file]

#	*	Sample	Location	Inj	SampleType	Run	Perchlorate Area	Perchlorat RT	Perchlorate Amount
#	*	CLO4@ 1.0ug/L	Vial 73	1	Control	3	5.39218e4	7.750	8.75982e-1
#	*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	1.32825e5	7.797	2.37682
#	*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	2.76271e5	7.770	4.77237
#	*	CLO4@ 10.ug/L	Vial 76	1	Control	6	5.61298e5	7.785	9.75097
#	*	CLO4@ 25.ug/L	Vial 77	1	Control	7	1.51820e6	7.741	25.01082
#	*	CLO4@ 50.ug/L	Vial 78	1	Control	8	3.31156e6	7.775	50.40300
#	*	CLO4@ 75.ug/L	Vial 79	1	Control	9	5.23914e6	7.736	74.79107
#	*	ICAL Verf@10ug/L	Vial 80	1	Control	11	5.74879e5	7.756	10.11855

#	*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount
#	*	CLO4@ 1.0ug/L	Vial 73	1	Control	3	2.14568e5	7.767	5.00000
#	*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	2.04758e5	7.816	5.00000
#	*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	2.13407e5	7.793	5.00000
#	*	CLO4@ 10.ug/L	Vial 76	1	Control	6	2.09246e5	7.798	5.00000
#	*	CLO4@ 25.ug/L	Vial 77	1	Control	7	2.07403e5	7.763	5.00000
#	*	CLO4@ 50.ug/L	Vial 78	1	Control	8	2.02929e5	7.800	5.00000
#	*	CLO4@ 75.ug/L	Vial 79	1	Control	9	1.97933e5	7.765	5.00000
#	*	ICAL Verf@10ug/L	Vial 80	1	Control	11	2.06243e5	7.776	5.00000

#	*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
#	*	CLO4@ 1.0ug/L	Vial 73	1	Control	3	1.70436e4	7.778	8.24488e-1
#	*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	4.20754e4	7.805	2.38090
#	*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	9.24707e4	7.787	5.14166
#	*	CLO4@ 10.ug/L	Vial 76	1	Control	6	1.68622e5	7.781	9.52209
#	*	CLO4@ 25.ug/L	Vial 77	1	Control	7	4.63724e5	7.760	25.04916
#	*	CLO4@ 50.ug/L	Vial 78	1	Control	8	9.95933e5	7.793	50.14223
#	*	CLO4@ 75.ug/L	Vial 79	1	Control	9	1.58066e6	7.758	74.93659
#	*	ICAL Verf@10ug/L	Vial 80	1	Control	11	1.71000e5	7.760	9.79043

*** End of Report ***

Sequence: C:\HPCHEM\1\SEQUENCE\CLO4\2019\SEP\20SEP19I.S

Sequence Table:

Method and Injection Info Part:

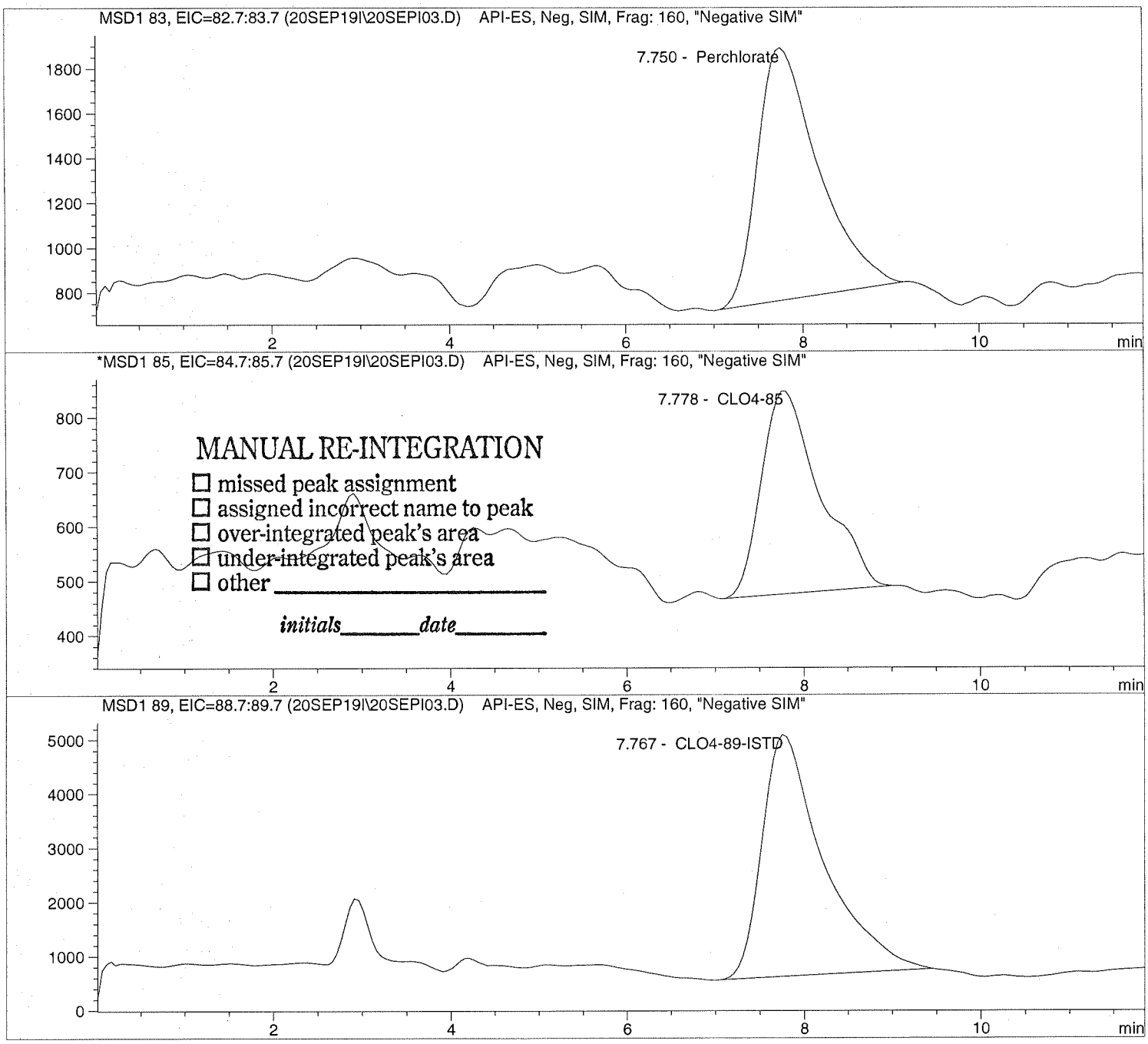
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
1	Vial 71	CLO4@ 0.2ug/L	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	CLO4@ 0.5ug/L	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	CLO4@ 1.0ug/L	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	CLO4@ 2.0ug/L	CLO4-AQN	1	Ctrl Samp		
5	Vial 75	CLO4@ 5.0ug/L	CLO4-AQN	1	Ctrl Samp		
6	Vial 76	CLO4@ 10.ug/L	CLO4-AQN	1	Ctrl Samp		
7	Vial 77	CLO4@ 25.ug/L	CLO4-AQN	1	Ctrl Samp		
8	Vial 78	CLO4@ 50.ug/L	CLO4-AQN	1	Ctrl Samp		
9	Vial 79	CLO4@ 75.ug/L	CLO4-AQN	1	Ctrl Samp		
10	Vial 71	CLO4@ 0.2ug/L	CLO4-AQN	1	Ctrl Samp		
11	Vial 80	ICAL Verf@10ug/L	CLO4-AQN	1	Ctrl Samp		

Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI03.D Sample Name: CLO4@ 1.0ug/L

Injection Date:	9/20/2019 09:24:05	Seq Line:	3
Sample Name:	CLO4@ 1.0ug/L	Location:	Vial 73
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI03.D Sample Name: CLO4@ 1.0ug/L

Injection Date:	9/20/2019 09:24:05	Seq Line:	3
Sample Name:	CLO4@ 1.0ug/L	Location:	Vial 73
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method:	CLO4-AQN.M
Analysis Method:	C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed:	9/23/2019 12:21:47

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	1.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.750	PBA	53921.8	0.8760	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.778	MM	17043.6	0.8245	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.767	PBA	214568.1	5.0000	CLO4-89-ISTD

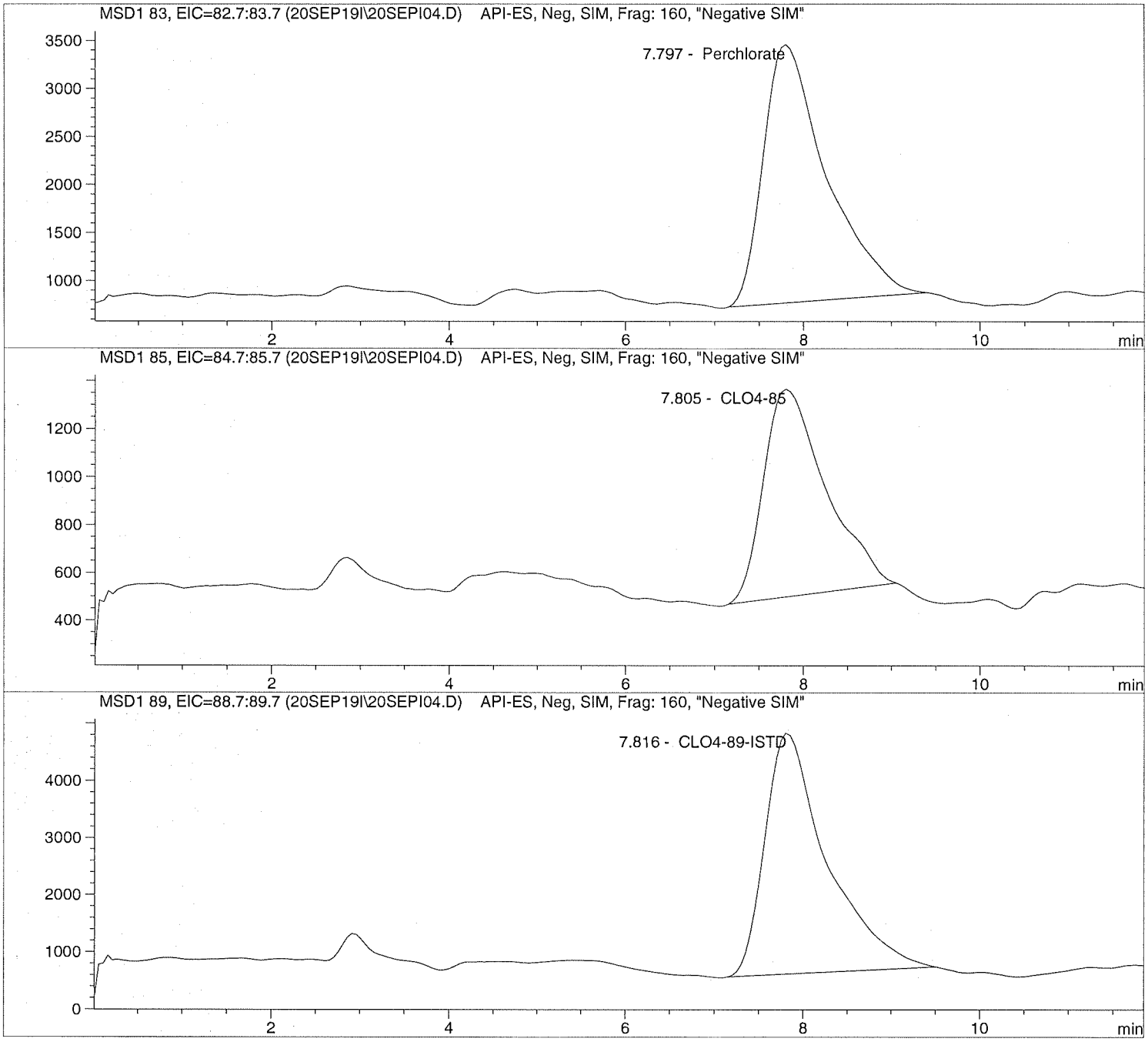
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI04.D Sample Name: CLO4@ 2.0ug/L

Injection Date:	9/20/2019 09:37:58	Seq Line:	4
Sample Name:	CLO4@ 2.0ug/L	Location:	Vial 74
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI04.D Sample Name: CLO4@ 2.0ug/L

Injection Date:	9/20/2019 09:37:58	Seq Line:	4
Sample Name:	CLO4@ 2.0ug/L	Location:	Vial 74
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	2.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.797	PBA	132825.2	2.3768	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.805	PBA	42075.4	2.3809	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.816	PBA	204758.3	5.0000	CLO4-89-ISTD

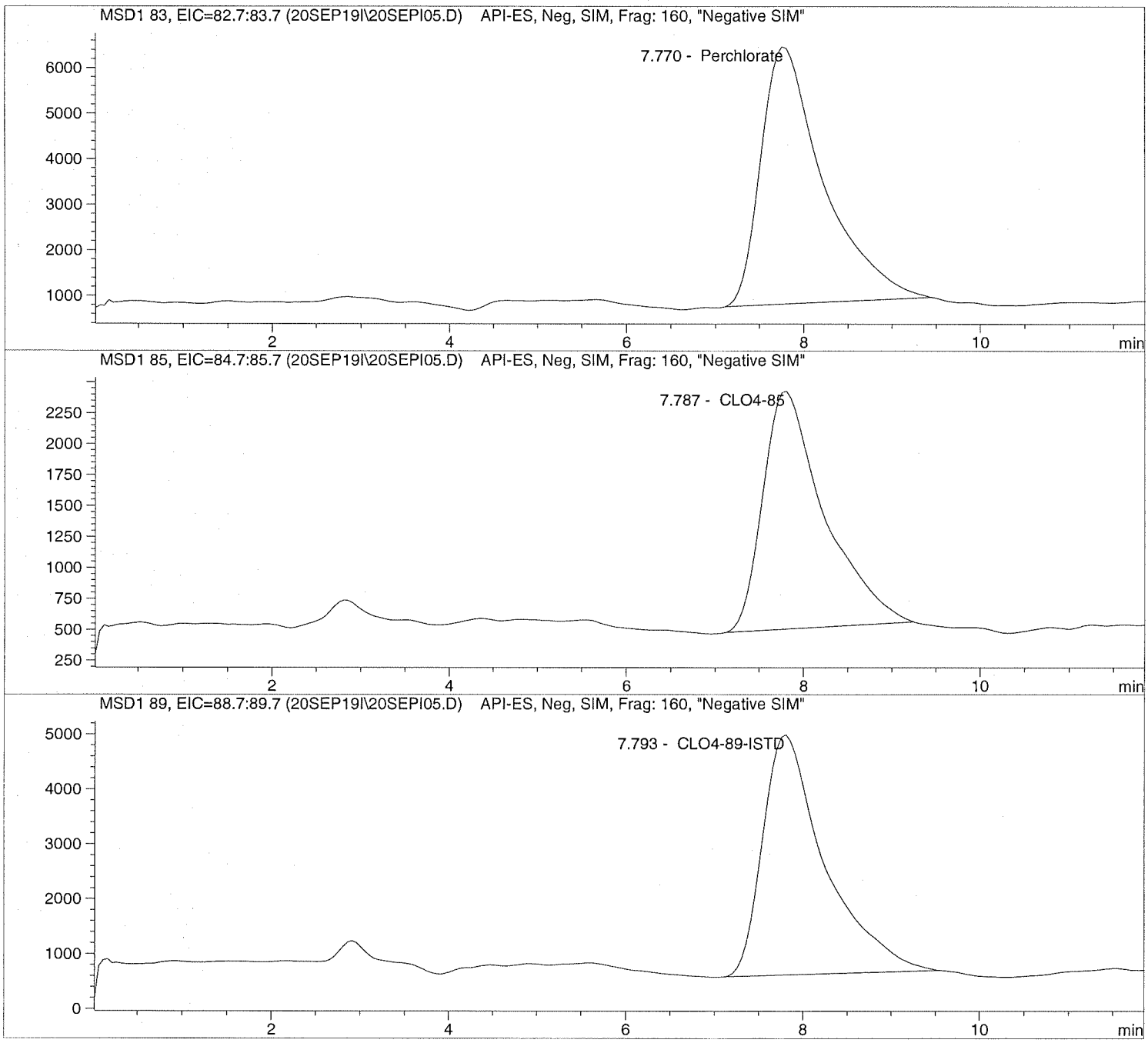
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI05.D Sample Name: CLO4@ 5.0ug/L

Injection Date:	9/20/2019 09:51:49	Seq Line:	5
Sample Name:	CLO4@ 5.0ug/L	Location:	Vial 75
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI05.D Sample Name: CLO4@ 5.0ug/L

Injection Date:	9/20/2019 09:51:49	Seq Line:	5
Sample Name:	CLO4@ 5.0ug/L	Location:	Vial 75
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	5.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.770	PBA	276270.7	4.7724	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.787	PBA	92470.7	5.1417	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.793	PBA	213407.0	5.0000	CLO4-89-ISTD

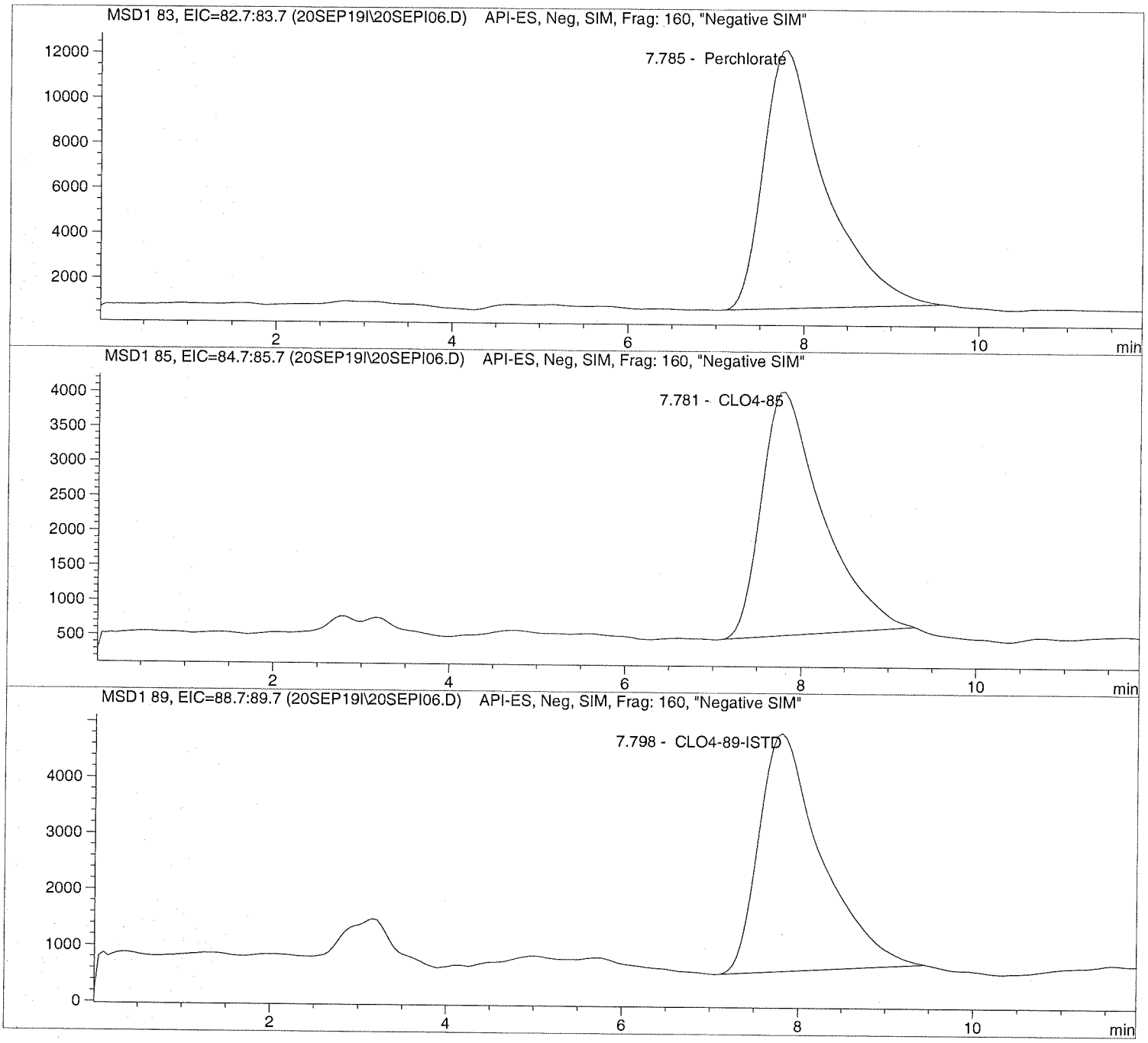
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI06.D Sample Name: CLO4@ 10.ug/L

Injection Date:	9/20/2019 10:05:36	Seq Line:	6
Sample Name:	CLO4@ 10.ug/L	Location:	Vial 76
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI06.D Sample Name: CLO4@ 10.ug/L

Injection Date:	9/20/2019 10:05:36	Seq Line:	6
Sample Name:	CLO4@ 10.ug/L	Location:	Vial 76
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	10.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.785	PBA	561297.7	9.7510	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.781	PBA	168622.4	9.5221	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.798	PBA	209246.3	5.0000	CLO4-89-ISTD

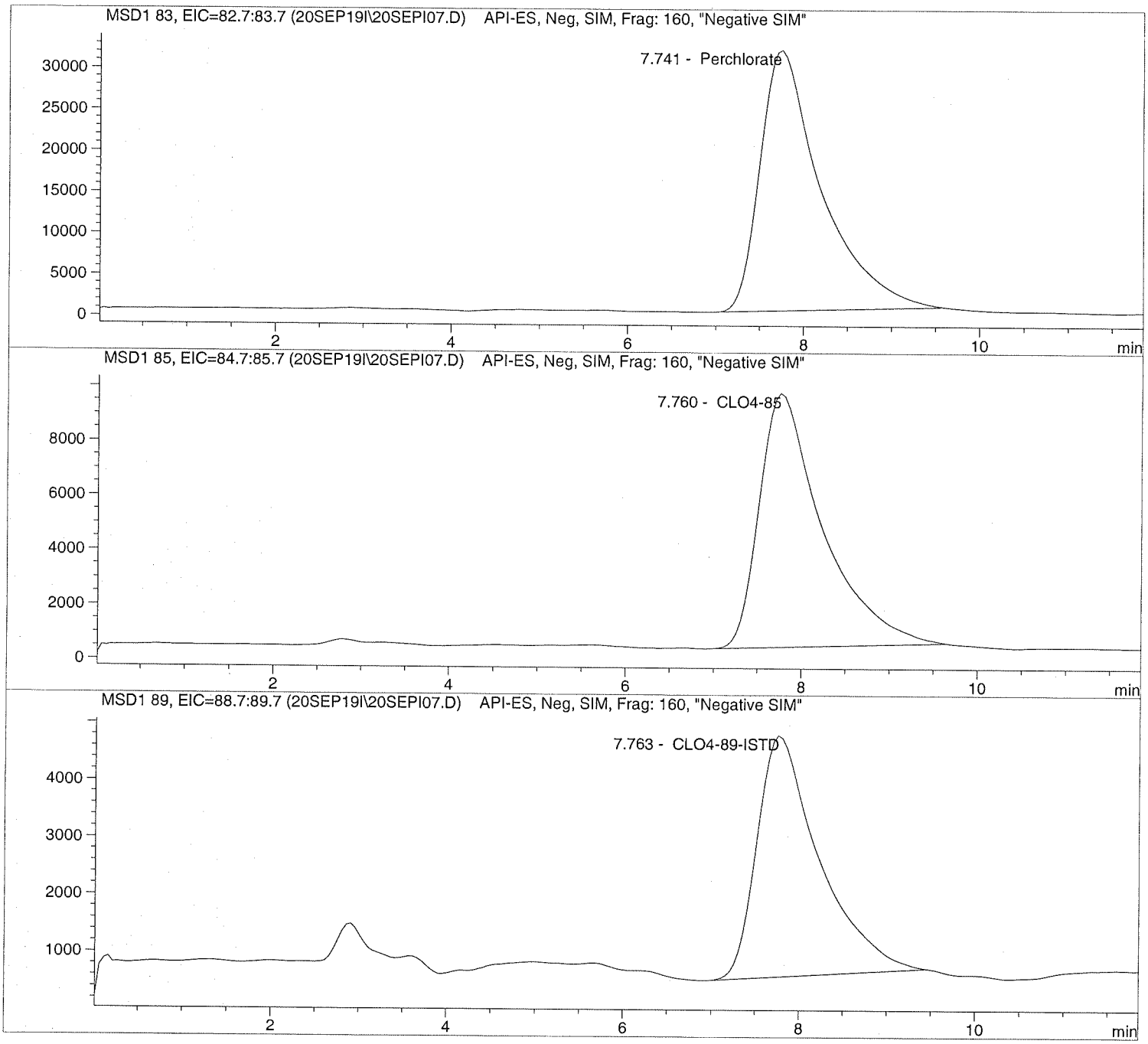
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI07.D Sample Name: CLO4@ 25.ug/L

Injection Date:	9/20/2019 10:19:23	Seq Line:	7
Sample Name:	CLO4@ 25.ug/L	Location:	Vial 77
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI07.D Sample Name: CLO4@ 25.ug/L

Injection Date:	9/20/2019 10:19:23	Seq Line:	7
Sample Name:	CLO4@ 25.ug/L	Location:	Vial 77
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	25.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.741	PBA	1518197.9	25.0108	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.760	PBA	463724.0	25.0492	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.763	PBA	207402.8	5.0000	CLO4-89-ISTD

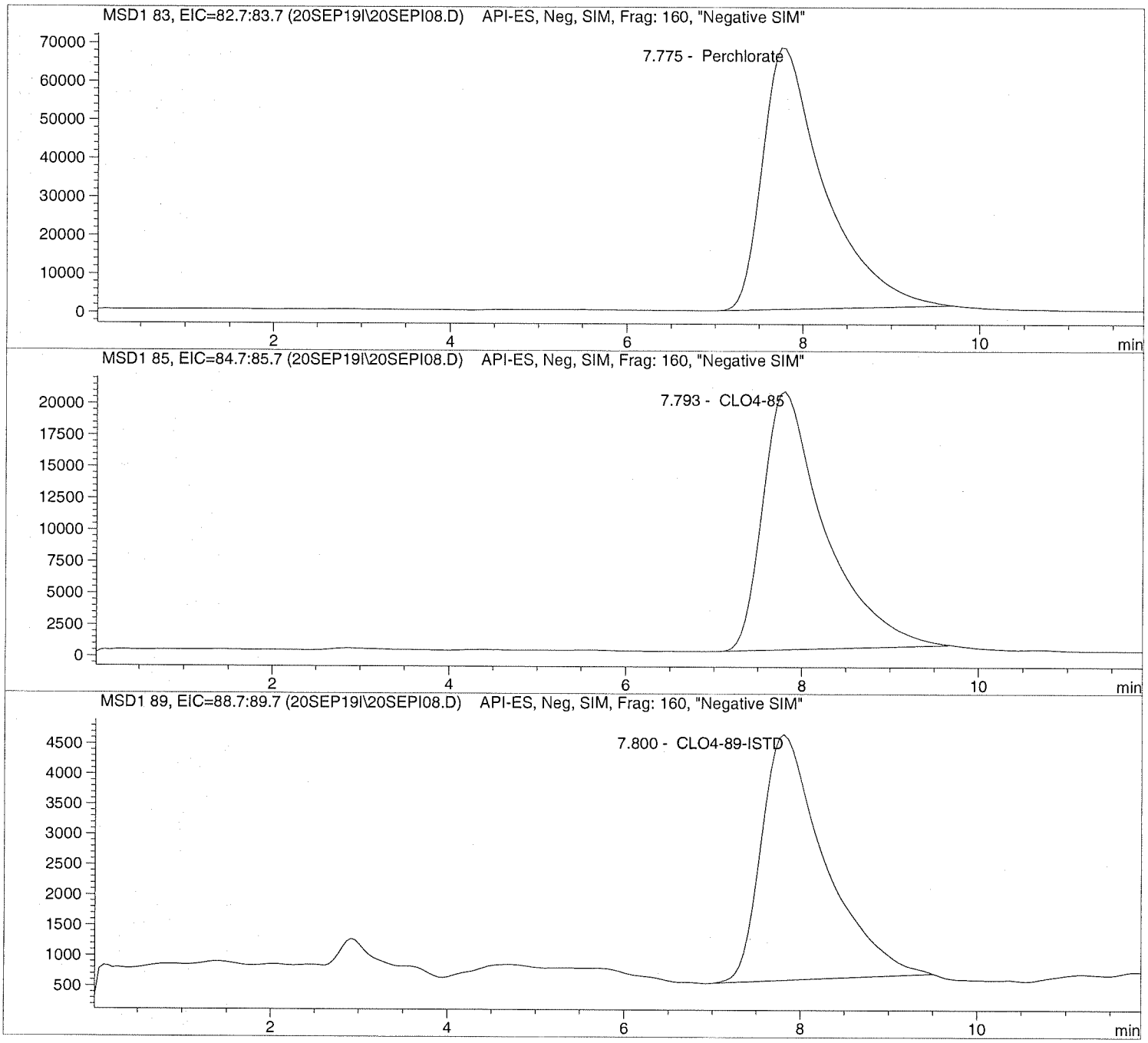
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI08.D Sample Name: CLO4@ 50.ug/L

Injection Date:	9/20/2019 10:33:18	Seq Line:	8
Sample Name:	CLO4@ 50.ug/L	Location:	Vial 78
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI08.D Sample Name: CLO4@ 50.ug/L

Injection Date:	9/20/2019 10:33:18	Seq Line:	8
Sample Name:	CLO4@ 50.ug/L	Location:	Vial 78
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	50.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.775	PBA	3311559.2	50.4030	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.793	PBA	995933.0	50.1422	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.800	PBA	202929.2	5.0000	CLO4-89-ISTD

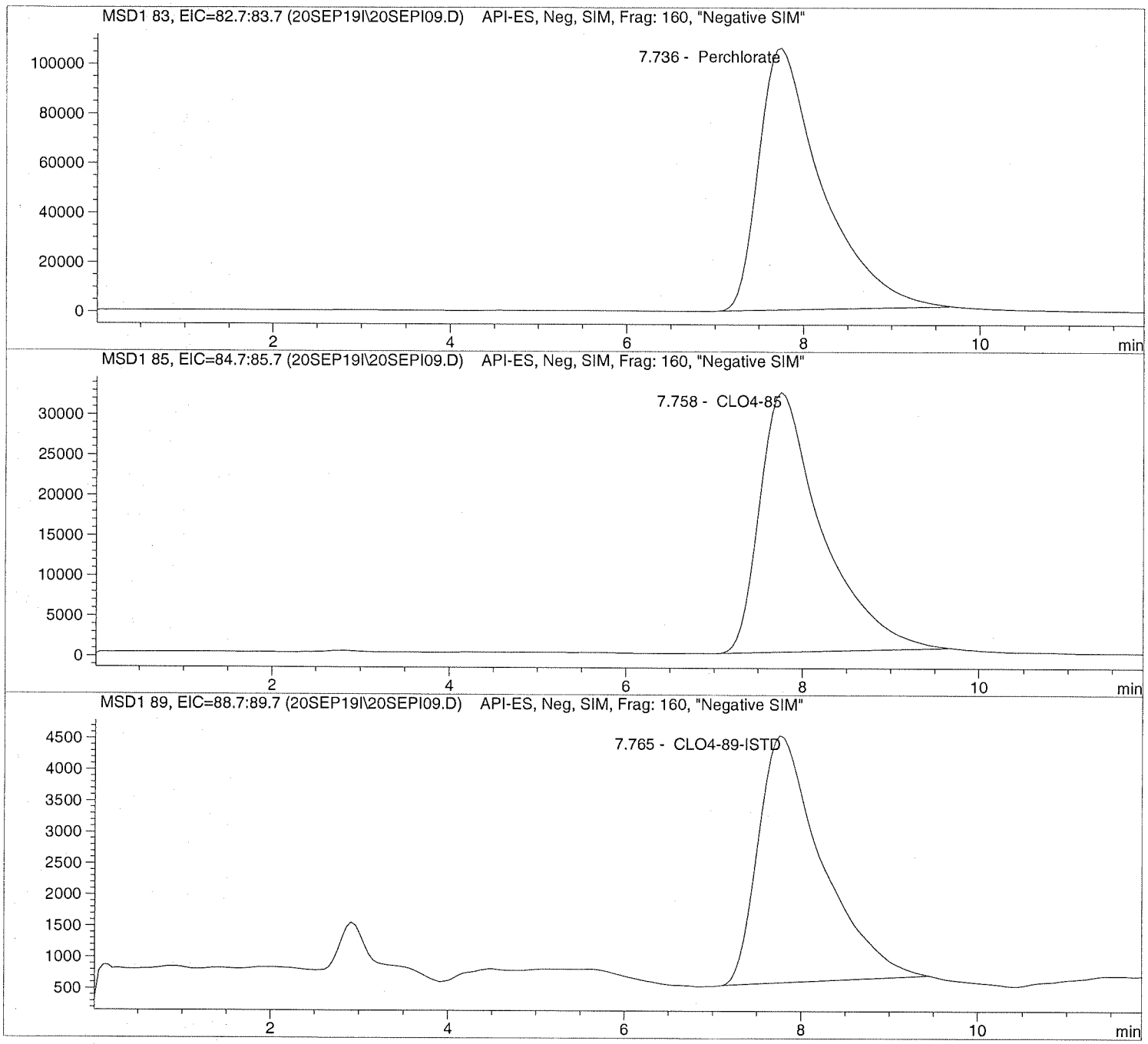
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI09.D Sample Name: CLO4@ 75.ug/L

Injection Date:	9/20/2019 10:47:05	Seq Line:	9
Sample Name:	CLO4@ 75.ug/L	Location:	Vial 79
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI09.D Sample Name: CLO4@ 75.ug/L

Injection Date:	9/20/2019 10:47:05	Seq Line:	9
Sample Name:	CLO4@ 75.ug/L	Location:	Vial 79
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	75.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.736	PBA	5239145.0	74.7911	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.758	PBA	1580664.2	74.9366	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.765	PBA	197932.5	5.0000	CLO4-89-ISTD

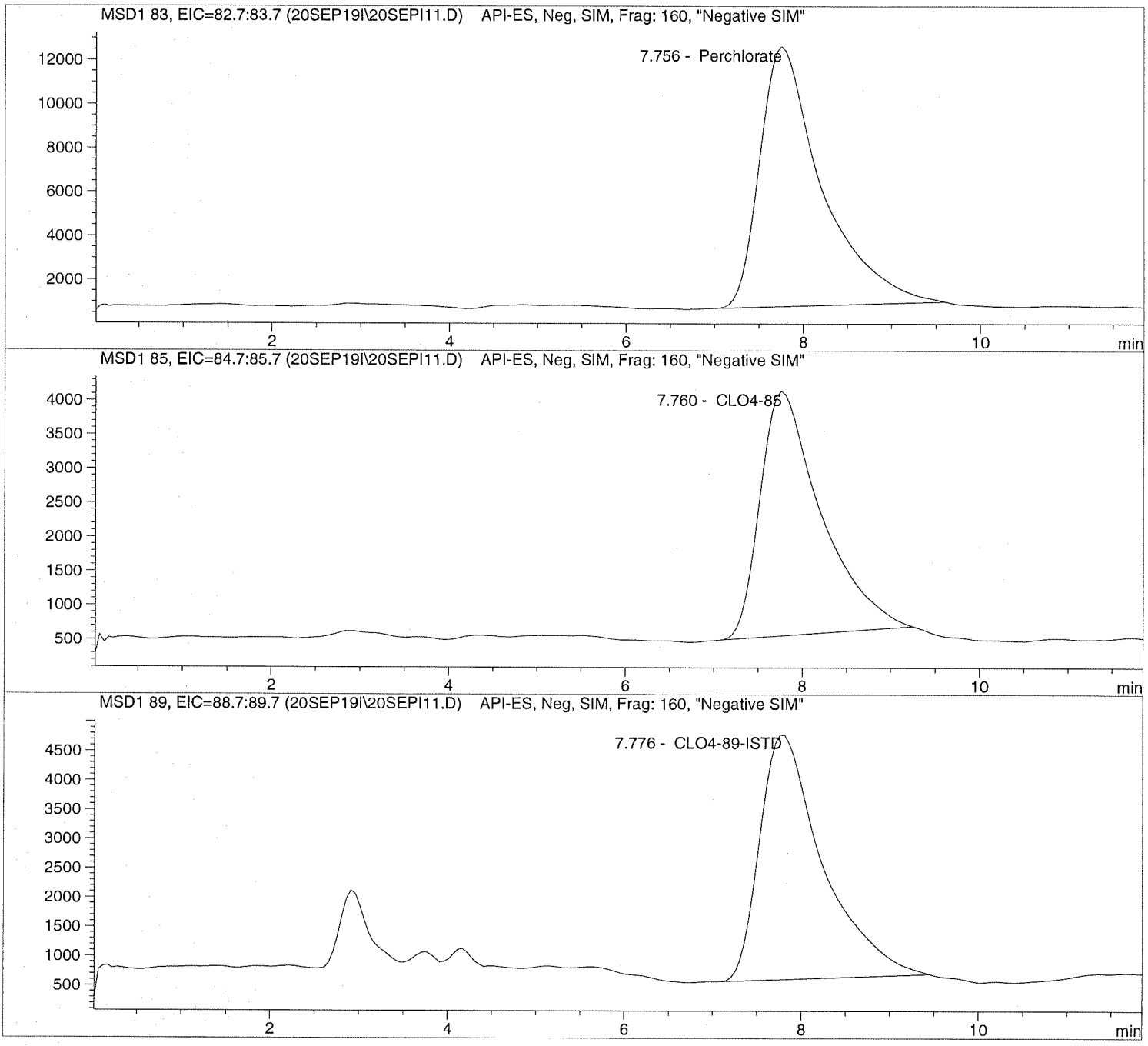
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI11.D Sample Name: ICAL Verf@10ug/L

Injection Date:	9/20/2019 11:14:45	Seq Line:	11
Sample Name:	ICAL Verf@10ug/L	Location:	Vial 80
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:21:47

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI11.D Sample Name: ICAL Verf@10ug/L

Injection Date:	9/20/2019 11:14:45	Seq Line:	11
Sample Name:	ICAL Verf@10ug/L	Location:	Vial 80
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method:	CLO4-AQN.M
Analysis Method:	C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed:	9/23/2019 12:21:47

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	10.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.756	PBA	574879.4	10.1185	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.760	PBA	171000.4	9.7904	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.776	PBA	206243.3	5.0000	CLO4-89-ISTD

*** End of Report ***

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Raw Data

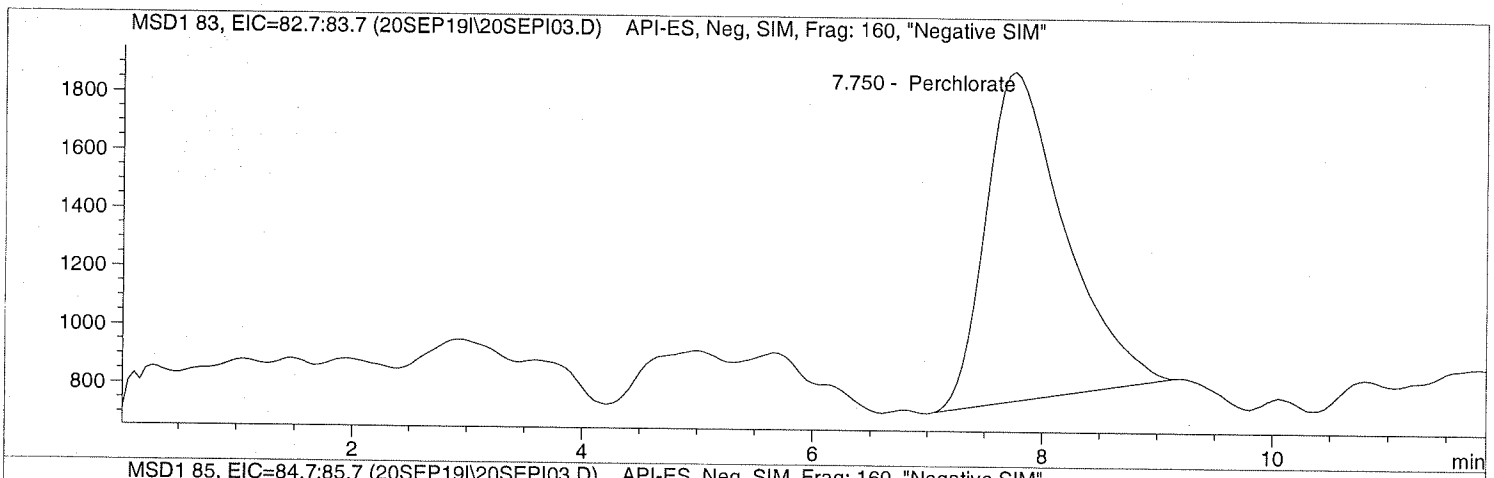
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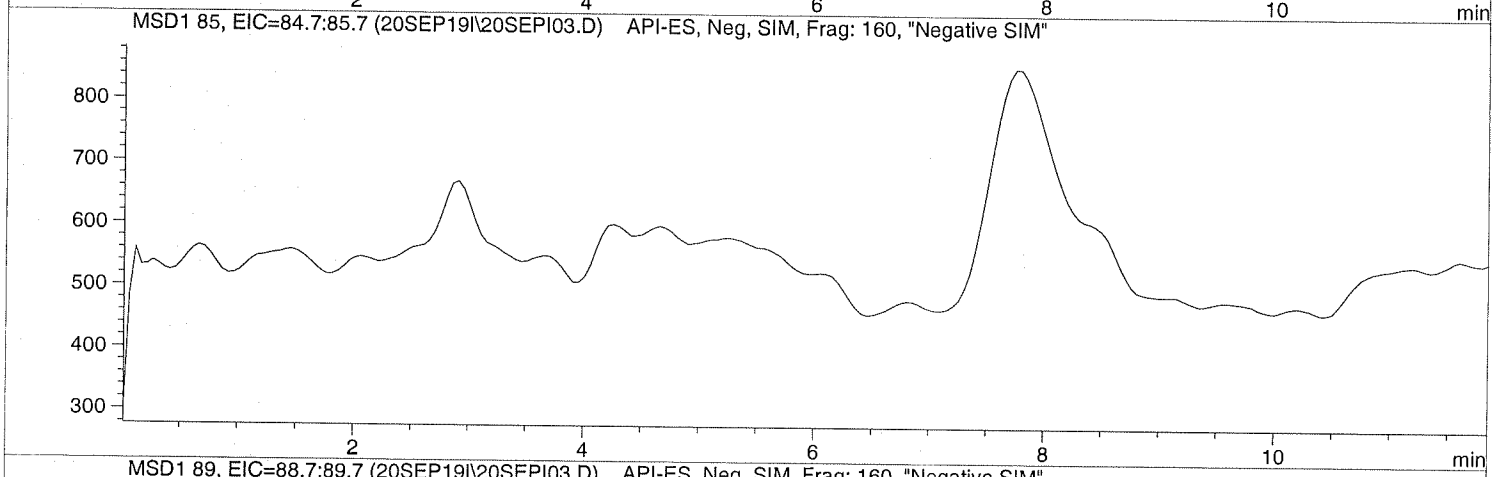
Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI03.D Sample Name: CLO4@ 1.0ug/L

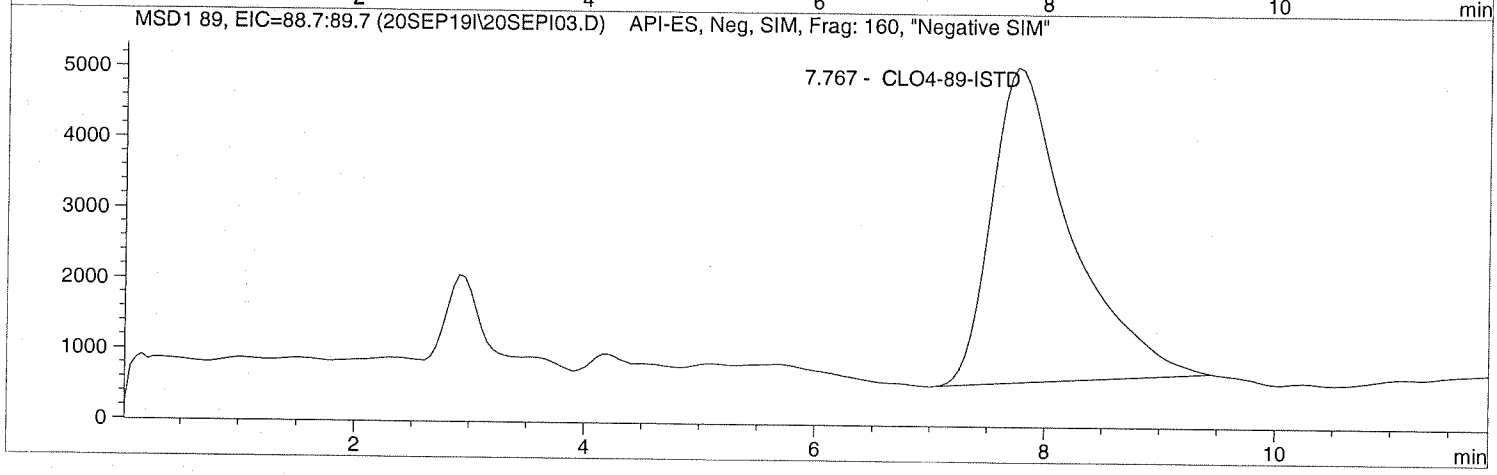
Injection Date:	9/20/2019 09:24:05	Seq Line:	3
Sample Name:	CLO4@ 1.0ug/L	Location:	Vial 73
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 9/23/2019 12:27:11

Perchlorate analysis







Data file: C:\HPCHEM\1\DATA\20SEP19I\20SEPI03.D Sample Name: CLO4@ 1.0ug/L

Injection Date:	9/20/2019 09:24:05	Seq Line:	3
Sample Name:	CLO4@ 1.0ug/L	Location:	Vial 73
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method:	CLO4-AQN.M
Analysis Method:	C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed:	9/23/2019 12:27:11

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	1.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.750	PBA	53921.8	0.8760	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.767	PBA	214568.1	5.0000	CLO4-89-ISTD

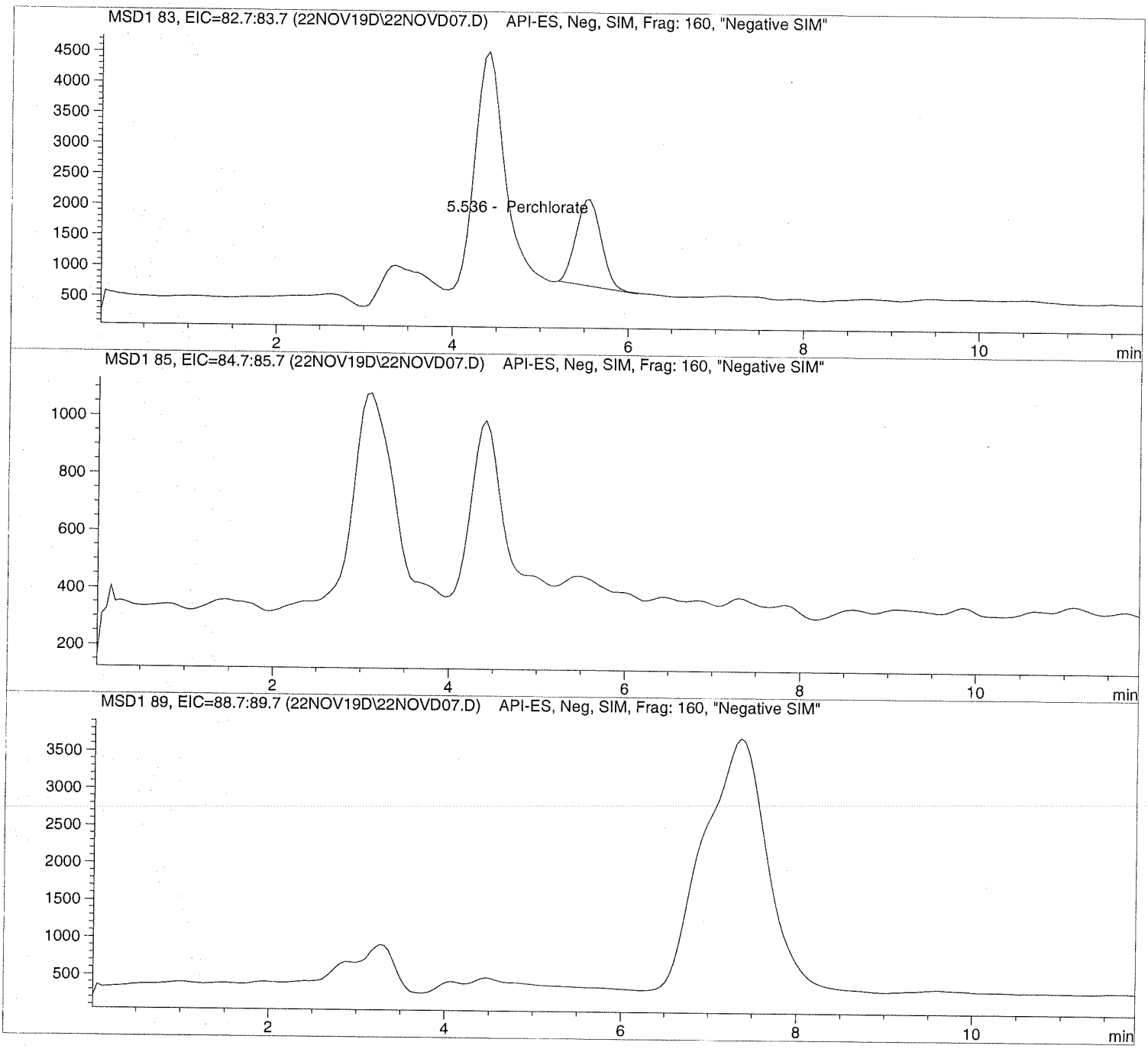
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD07.D Sample Name: 1932284002

Injection Date:	11/22/2019 09:55:02	Seq Line:	7
Sample Name:	1932284002	Location:	Vial 77
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed: 11/5/2019 08:44:45

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD07.D Sample Name: 1932284002

Injection Date:	11/22/2019 09:55:02	Seq Line:	7
Sample Name:	1932284002	Location:	Vial 77
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

Acq. Method:	CLO4-AQN.M
Analysis Method:	C:\HPCHEM\1\METHODS\CLO4-DP3.M
Last Changed:	11/5/2019 08:44:45

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Mon, 23. Sep. 2019,00:20:59 pm
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
5.536	PBA	27611.0	0.0000	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-89-ISTD

*** End of Report ***

LABORATORY REPORT

December 3, 2019

RJ Modashia
ALS Laboratory Group
10450 Stancliff Road Suite 210
Houston, TX 77099-4338

RE: HS19110684-01

Dear RJ:

Enclosed are the results of the samples submitted to our laboratory on November 15, 2019. For your reference, these analyses have been assigned our service request number P1907040.

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. 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.

Respectfully submitted,

ALS | Environmental

By Hayden Akers at 10:55 am, Dec 03, 2019

Hayden Akers
Project Manager

Client: ALS Laboratory Group
Project: HS19110684-01

Service Request No: P1907040

CASE NARRATIVE

The samples were received intact under chain of custody on November 15, 2019 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.

Methane, Ethene and Ethane & Carbon Dioxide Analysis

The samples were analyzed for methane, ethene, ethane and carbon dioxide using a gas chromatograph equipped with a flame ionization detector (FID). A known amount of liquid was displaced by injecting 8.0 milliliters of helium creating a headspace in the sample vial. Each sample vial was agitated using a sonic disrupter for fifteen minutes and then allowed to equilibrate for at least two hours. A volume of the headspace was withdrawn using a gas-tight syringe and analyzed using a manual injection technique. The amount of dissolved gases (methane, ethene and ethane) in the original sample was calculated using Henry's Law. This method was performed with guidance from RSK 175. 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 laboratory's NELAP or DoD-ELAP accreditation.

The recovery and relative percent difference were outside the DOD control limits for carbon dioxide for the matrix spike and its duplicate. However all quality control parameters were met for the laboratory control sample and its duplicate.

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.

ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
Alaska DEC	http://dec.alaska.gov/eh/lab.aspx	17-019
Arizona DHS	http://www.azdhs.gov/preparedness/state-laboratory/lab-licensure-certification/index.php#laboratory-licensure-home	AZ0694
Florida DOH (NELAP)	http://www.floridahealth.gov/licensing-and-regulation/environmental-laboratories/index.html	E871020
Louisiana DEQ (NELAP)	http://www.deq.louisiana.gov/page/la-lab-accreditation	05071
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/professionals/labCert.shtml	2018027
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	1521096
New Jersey DEP (NELAP)	http://www.nj.gov/dep/enforcement/oqa.html	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://www.oregon.gov/oha/ph/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-006
Pennsylvania DEP	http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx	68-03307 (Registration)
PJLA (DoD ELAP)	http://www.pjlabs.com/search-accredited-labs	65818 (Testing)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/agency/qa/env_lab_accreditation.html	T104704413-19-10
Utah DOH (NELAP)	http://health.utah.gov/lab/lab_cert_env	CA016272019-10
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

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 www.alsglobal.com, or at the accreditation body's website.

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.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: ALS Laboratory Group
Project ID: HS19110684-01
Service Request: P1907040

Date Received: 11/15/2019
Time Received: 09:15

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	RSK 175 - CO2	RSK 175 - Gases
50WW16-191113	P1907040-001	Water	11/13/2019	08:35	X	X
50WW14-191113	P1907040-002	Water	11/13/2019	09:45	X	X
50WW13-191113	P1907040-003	Water	11/13/2019	10:35	X	X
50WW23-191113	P1907040-004	Water	11/13/2019	11:40	X	X

P1907040

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: Texas **COC ID:** 12633

SUBCONTRACT TO:

ALS Environmental
2655 Park Center Drive, Suite A
Simi Valley, CA 93065 **Phone:** +1 805 526 7161

CUSTOMER INFORMATION:

Company:	ALS Houston
Contact:	RJ Modashia
Address:	10450 Stancliff Rd, Ste 210
Phone:	+1 281 530 5656
Email:	RJ.Modashia@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:	HS19110684
TSR:	Sonia West

	LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
	ANALYSIS REQUESTED			DUE DATE
1.	**HS19110684-01**	**50WW16-191113**	**Groundwater**	**13 Nov 2019 08:35**
	MEE + CO2. DOD IV. Equis EDD. EQuIS 5.0 - Longhorn			02 Dec 2019
2.	**HS19110684-02**	**50WW14-191113**	**Groundwater**	**13 Nov 2019 09:45**
	MEE + CO2. DOD IV. Equis EDD. EQuIS 5.0 - Longhorn			02 Dec 2019
3.	**HS19110684-03**	**50WW13-191113**	**Groundwater**	**13 Nov 2019 10:35**
	MEE + CO2. DOD IV. Equis EDD. EQuIS 5.0 - Longhorn			02 Dec 2019
4.	**HS19110684-04**	**50WW23-191113**	**Groundwater**	**13 Nov 2019 11:40**
	MEE + CO2. DOD IV. Equis EDD. EQuIS 5.0 - Longhorn			02 Dec 2019

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

HS19110684-04 MS/MSD

QC Level: DOD IV (DoD Data Package)

Relinquished By: _____ Date/Time: 11/14/19 1800.

Received By: _____ Date/Time: 11-15-19 0915

Cooler ID(s): _____ Temperature(s): 2° cor 1615

ALS Environmental
Sample Acceptance Check Form

Client: ALS Laboratory Group Work order: P1907040

Project: HS19110684-01

Sample(s) received on: 11/15/19 Date opened: 11/15/19 by: ADAVID

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Did **sample containers** arrive in good condition?	☒	☐	☐
3	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
4	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
5	Was **sample volume** received adequate for analysis?	☒	☐	☐
6	Are samples within specified holding times?	☒	☐	☐
7	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☒	☐	☐
	Cooler Temperature: ° C Blank Temperature: 2° C Thermometer ID T-111 Wet Ice			
8	Were **custody seals** on outside of cooler/Box/Container?	☒	☐	☐
	Location of seal(s)? Cooler lid. Sealing Lid?	☒	☐	☐
	Were signature and date included?	☒	☐	☐
	Were seals intact?	☒	☐	☐
9	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☒	☐	☐
	Is there a client indication that the submitted samples are **pH** preserved?	☒	☐	☐
	Were **VOA vials** checked for presence/absence of air bubbles?	☒	☐	☐
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☒	☐
10	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
11	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1907040-001.01	40mL VOA NP		6		A	11/22/2019 WH/LD
P1907040-001.02	40mL VOA NP				A	
P1907040-001.03	40mL VOA NP				A	
P1907040-001.04	40ml VOA HCL		1		A	11/25/2019 WH/LD
P1907040-001.05	40ml VOA HCL				A	
P1907040-001.06	40ml VOA HCL				A	
P1907040-002.01	40mL VOA NP		6		A	11/22/2019 WH/LD
P1907040-002.02	40mL VOA NP				A	
P1907040-002.03	40mL VOA NP				A	
P1907040-002.04	40ml VOA HCL		1		A	11/25/2019 WH/LD
P1907040-002.05	40ml VOA HCL				A	
P1907040-002.06	40ml VOA HCL				A	
P1907040-003.01	40mL VOA NP		6		A	11/22/2019 WH/LD
P1907040-003.02	40mL VOA NP				A	
P1907040-003.03	40mL VOA NP				A	

Explain any discrepancies: (include lab sample ID numbers):

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS Environmental
Sample Acceptance Check Form

Client: ALS Laboratory Group Work order: P1907040

Project: HS19110684-01

Sample(s) received on: 11/15/19 Date opened: 11/15/19 by: ADAVID

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1907040-003.04	40ml VOA HCL		1		A	11/25/2019 WH/LD
P1907040-003.05	40ml VOA HCL				A	
P1907040-003.06	40ml VOA HCL				A	
P1907040-004.01	40mL VOA NP		6		A	11/22/2019 WH/LD
P1907040-004.02	40mL VOA NP		6		A	11/22/2019 WH/LD
P1907040-004.03	40mL VOA NP		6		A	11/22/2019 WH/LD
P1907040-004.04	40ml VOA HCL		1		A	11/25/2019 WH/LD
P1907040-004.05	40ml VOA HCL		1		A	11/25/2019 WH/LD
P1907040-004.06	40ml VOA HCL		1		A	11/25/2019 WH/LD
P1907040-004.07	40mL VOA NP				A	
P1907040-004.08	40mL VOA NP				A	
P1907040-004.09	40mL VOA NP				A	
P1907040-004.10	40mL VOA NP				A	
P1907040-004.11	40mL VOA NP				A	
P1907040-004.12	40mL VOA NP				A	
P1907040-004.13	40ml VOA HCL				A	
P1907040-004.14	40ml VOA HCL				A	
P1907040-004.15	40ml VOA HCL				A	
P1907040-004.16	40ml VOA HCL				A	
P1907040-004.17	40ml VOA HCL				A	
P1907040-004.18	40ml VOA HCL				A	

Explain any discrepancies: (include lab sample ID numbers):

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **ALS Laboratory Group**
Client Project ID: **HS19110684-01** ALS Project ID: P1907040

Carbon Dioxide

Test Code: RSK 175
Instrument ID: HP5890A/GC10/TCD
Analyst: Li Donghao/Wade Henton
Matrix: Water
Test Notes:

Date(s) Collected: 11/13/19
Date Received: 11/15/19
Date Analyzed: 11/22/19

Client Sample ID	ALS Sample ID	Injection Volume ml(s)	Result µg/L	LOQ µg/L	LOD µg/L	MDL µg/L	Data Qualifier
50WW16-191113	P1907040-001	0.10	**26,000**	1,000	860	370	
50WW14-191113	P1907040-002	0.10	**97,000**	1,000	860	370	
50WW13-191113	P1907040-003	0.10	**86,000**	1,000	860	370	
50WW23-191113	P1907040-004	0.10	**190,000**	1,000	860	370	
Method Control Sample	P191122-MB	0.10	860	1,000	860	370	**U**

The Method Control Sample is laboratory water carried through the entire analytical process.
U = Compound was analyzed for, but not detected above the laboratory detection limit.
LOQ = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

MATRIX SPIKE / DUPLICATE MATRIX SPIKE SUMMARY

Client: **ALS Laboratory Group**
Client Sample ID: **50WW23-191113**
Client Project ID: **HS19110684-01**

ALS Project ID: P1907040
ALS Sample ID: P1907040-004MS
P1907040-004DMS

Test Code: RSK 175
Instrument ID: HP5890A/GC10/TCD
Analyst: Li Donghao/Wade Henton
Matrix: Water
Test Notes:

Date Collected: 11/13/19
Date Received: 11/15/19
Date Analyzed: 11/22/19
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Spike Amount MS / DMS ug/L	Sample Amount ug/L	Result MS ug/L	Result DMS ug/L	% Recovery MS	% Recovery DMS	DOD Acceptance Limits	RPD	RPD Limit	Data Qualifier
124-38-9	Carbon Dioxide	22,900	185,000	195,000	213,000	**44**	**122**	80-122	94	30	**N, R**

N = The matrix spike sample recovery is not within control limits. See case narrative.
R = Duplicate precision not met.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE / DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Client: **ALS Laboratory Group**
Client Sample ID: **Duplicate Lab Control Sample** ALS Project ID: P1907040
Client Project ID: **HS19110684-01** ALS Sample ID: P191122-DLCS

Test Code: RSK 175 Date Collected: NA
Instrument ID: HP5890A/GC10/TCD Date Received: NA
Analyst: Li Donghao/Wade Henton Date Analyzed: 11/22/19
Matrix: Water Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	Compound	Spike Amount LCS / DLCS ug/L	Result$_1$ LCS ug/L	Result$_1$ DLCS ug/L	% Recovery LCS	% Recovery DLCS	DOD Acceptance Limits	RPD	RPD Limit	Data Qualifier
124-38-9	Carbon Dioxide	22,900	18,900	19,400	**83**	**85**	80-122	2	12	

$_1$ = The concentration shown includes a subtraction of the Method Control Sample value, even if the result is less than the MRL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **ALS Laboratory Group**
Client Sample ID: **50WW16-191113**
Client Project ID: **HS19110684-01**

ALS Project ID: P1907040
ALS Sample ID: P1907040-001

Test Code: RSK 175
Instrument ID: HP5890A/GC10/FID
Analyst: Li Donghao/Wade Henton
Matrix: Water
Test Notes:

Date Collected: 11/13/19
Date Received: 11/15/19
Date Analyzed: 11/25/19
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result µg/L	LOQ µg/L	LOD µg/L	MDL µg/L	Data Qualifier
74-82-8	Methane	**3.0**	1.3	1.0	0.51	
74-85-1	Ethene	0.55	1.0	0.55	0.24	**U**
74-84-0	Ethane	0.47	0.60	0.47	0.16	**U**

U = Compound was analyzed for, but not detected above the laboratory detection limit.
LOQ = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **ALS Laboratory Group**
Client Sample ID: **50WW14-191113**
Client Project ID: **HS19110684-01**

ALS Project ID: P1907040
ALS Sample ID: P1907040-002

Test Code: RSK 175
Instrument ID: HP5890A/GC10/FID
Analyst: Li Donghao/Wade Henton
Matrix: Water
Test Notes:

Date Collected: 11/13/19
Date Received: 11/15/19
Date Analyzed: 11/25/19
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result µg/L	LOQ µg/L	LOD µg/L	MDL µg/L	Data Qualifier
74-82-8	Methane	**1.8**	1.3	1.0	0.51	
74-85-1	Ethene	0.55	1.0	0.55	0.24	**U**
74-84-0	Ethane	0.47	0.60	0.47	0.16	**U**

U = Compound was analyzed for, but not detected above the laboratory detection limit.
LOQ = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **ALS Laboratory Group**
Client Sample ID: **50WW13-191113**
Client Project ID: **HS19110684-01**

ALS Project ID: P1907040
ALS Sample ID: P1907040-003

Test Code: RSK 175
Instrument ID: HP5890A/GC10/FID
Analyst: Li Donghao/Wade Henton
Matrix: Water
Test Notes:

Date Collected: 11/13/19
Date Received: 11/15/19
Date Analyzed: 11/25/19
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result µg/L	LOQ µg/L	LOD µg/L	MDL µg/L	Data Qualifier
74-82-8	Methane	**4.7**	1.3	1.0	0.51	
74-85-1	Ethene	0.55	1.0	0.55	0.24	**U**
74-84-0	Ethane	0.47	0.60	0.47	0.16	**U**

U = Compound was analyzed for, but not detected above the laboratory detection limit.
LOQ = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **ALS Laboratory Group**
Client Sample ID: **50WW23-191113**
Client Project ID: **HS19110684-01**

ALS Project ID: P1907040
ALS Sample ID: P1907040-004

Test Code: RSK 175
Instrument ID: HP5890A/GC10/FID
Analyst: Li Donghao/Wade Henton
Matrix: Water
Test Notes:

Date Collected: 11/13/19
Date Received: 11/15/19
Date Analyzed: 11/25/19
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result µg/L	LOQ µg/L	LOD µg/L	MDL µg/L	Data Qualifier
74-82-8	Methane	1.0	1.3	1.0	0.51	**U**
74-85-1	Ethene	0.55	1.0	0.55	0.24	**U**
74-84-0	Ethane	0.47	0.60	0.47	0.16	**U**

U = Compound was analyzed for, but not detected above the laboratory detection limit.
LOQ = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **ALS Laboratory Group**
Client Sample ID: **Method Control Sample**
Client Project ID: **HS19110684-01**

ALS Project ID: P1907040
ALS Sample ID: P191125-MB

Test Code: RSK 175
Instrument ID: HP5890A/GC10/FID
Analyst: Li Donghao/Wade Henton
Matrix: Water
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 11/25/19
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result µg/L	LOQ µg/L	LOD µg/L	MDL µg/L	Data Qualifier
74-82-8	Methane	1.0	1.3	1.0	0.51	**U**
74-85-1	Ethene	0.55	1.0	0.55	0.24	**U**
74-84-0	Ethane	0.47	0.60	0.47	0.16	**U**

The Method Control Sample is laboratory water carried through the entire analytical process.
U = Compound was analyzed for, but not detected above the laboratory detection limit.
LOQ = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

MATRIX SPIKE / DUPLICATE MATRIX SPIKE SUMMARY

Client: **ALS Laboratory Group**
Client Sample ID: **50WW23-191113**
Client Project ID: **HS19110684-01**

ALS Project ID: P1907040
ALS Sample ID: P1907040-004MS
P1907040-004DMS

Test Code: RSK 175
Instrument ID: HP5890A/GC10/FID
Analyst: Li Donghao/Wade Henton
Matrix: Water
Test Notes:

Date Collected: 11/13/19
Date Received: 11/15/19
Date Analyzed: 11/25/19
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Spike Amount MS / DMS µg/L	Sample Amount µg/L	Result MS µg/L	Result DMS µg/L	% Recovery MS	% Recovery DMS	DOD Acceptance Limits	RPD	RPD Limit	Data Qualifier
74-82-8	Methane	2.52	ND	2.38	2.35	**94**	**93**	73-125	1	30	
74-85-1	Ethene	4.40	ND	4.05	4.24	**92**	**96**	72-133	4	30	
74-84-0	Ethane	4.72	ND	4.23	4.38	**90**	**93**	74-131	3	30	

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE / DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Client: **ALS Laboratory Group**
Client Sample ID: **Duplicate Lab Control Sample**
Client Project ID: **HS19110684-01**

ALS Project ID: P1907040
ALS Sample ID: P191125-LCS
P191125-DLCS

Test Code: RSK 175
Instrument ID: HP5890A/GC10/FID
Analyst: Li Donghao/Wade Henton
Matrix: Water
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 11/25/19
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Spike Amount LCS / DLCS µg/L	Result$_1$ LCS µg/L	Result$_1$ DLCS µg/L	% Recovery LCS	% Recovery DLCS	DOD Acceptance Limits	RPD	RPD Limit	Data Qualifier
74-82-8	Methane	2.52	2.49	2.53	**99**	**100**	73-125	1	26	
74-85-1	Ethene	4.40	4.44	4.47	**101**	**102**	72-133	1	11	
74-84-0	Ethane	4.72	4.61	4.61	**98**	**98**	74-131	0	10	

$_1$ = The concentration shown includes a subtraction of the Method Control Sample value, even if the result is less than the MRL.

Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\22\
Data File : 11221906.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 22-Nov-2019, 13:36:14
Operator : WH/LD
Sample : P1907040-001 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 22 13:46:57 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.906f	1762438	0.370	ppm
2)	Carbon monoxide	1.906f	1762438	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	5.982	284121	1210.421	ppm
6)	Methane (FID)	0.000	0	N.D.	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	0.000	0	N.D.	ppm
10)	Propane	0.000	0	N.D.	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	0.000	0	N.D.	ppm
13)	n-Butane	0.000	0	N.D.	ppm

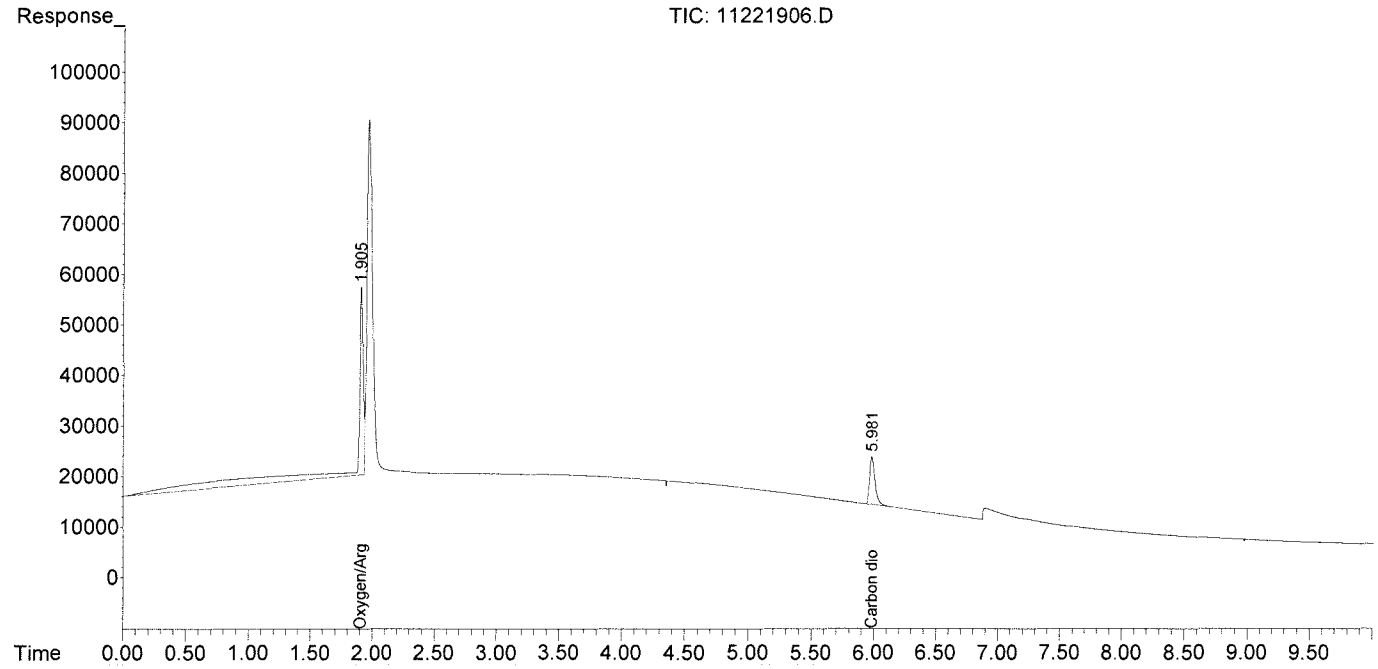
(f)=RT Delta > 1/2 Window (m)=manual int.

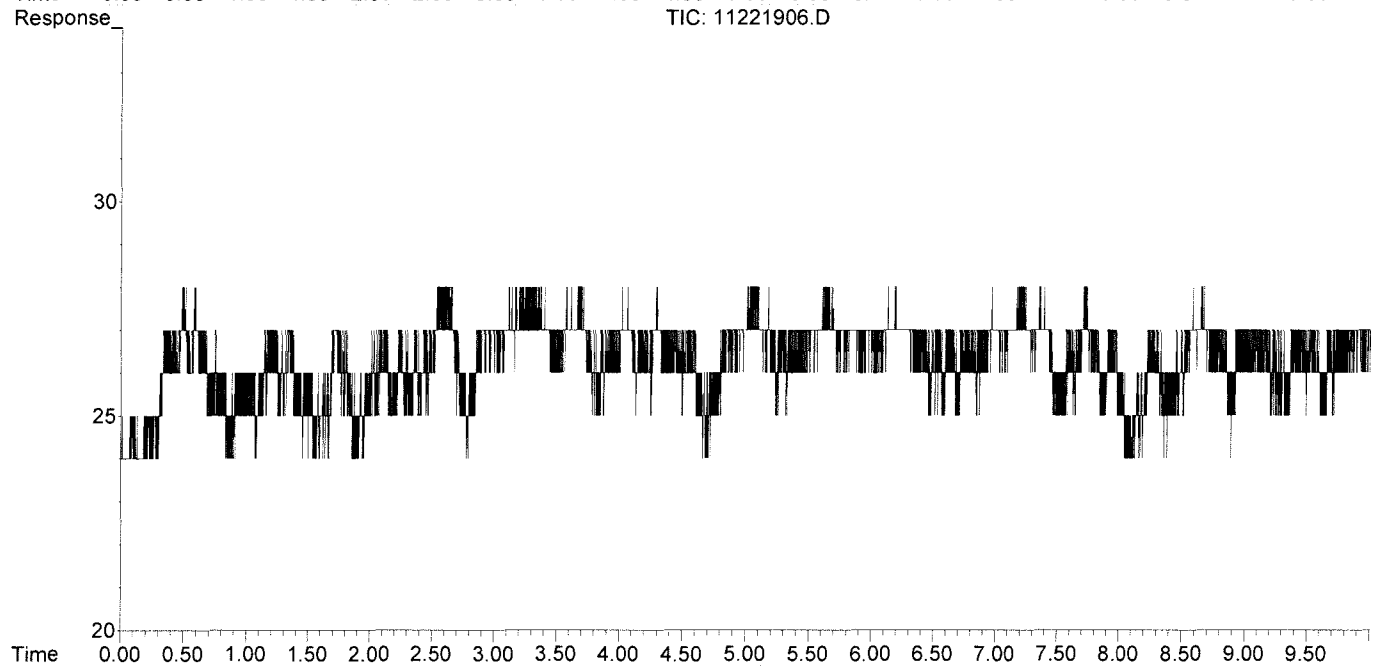
Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\22\
Data File : 11221906.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 22-Nov-2019, 13:36:14
Operator : WH/LD
Sample : P1907040-001 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 22 13:46:57 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\22\
Data File : 11221907.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 22-Nov-2019, 13:49:08
Operator : WH/LD
Sample : P1907040-002 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 22 13:47:14 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.906f	1610984	0.338	ppm
2)	Carbon monoxide	1.906f	1610984	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	5.964	1047117	4460.958	ppm
6)	Methane (FID)	0.000	0	N.D.	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	0.000	0	N.D.	ppm
10)	Propane	0.000	0	N.D.	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	0.000	0	N.D.	ppm
13)	n-Butane	0.000	0	N.D.	ppm

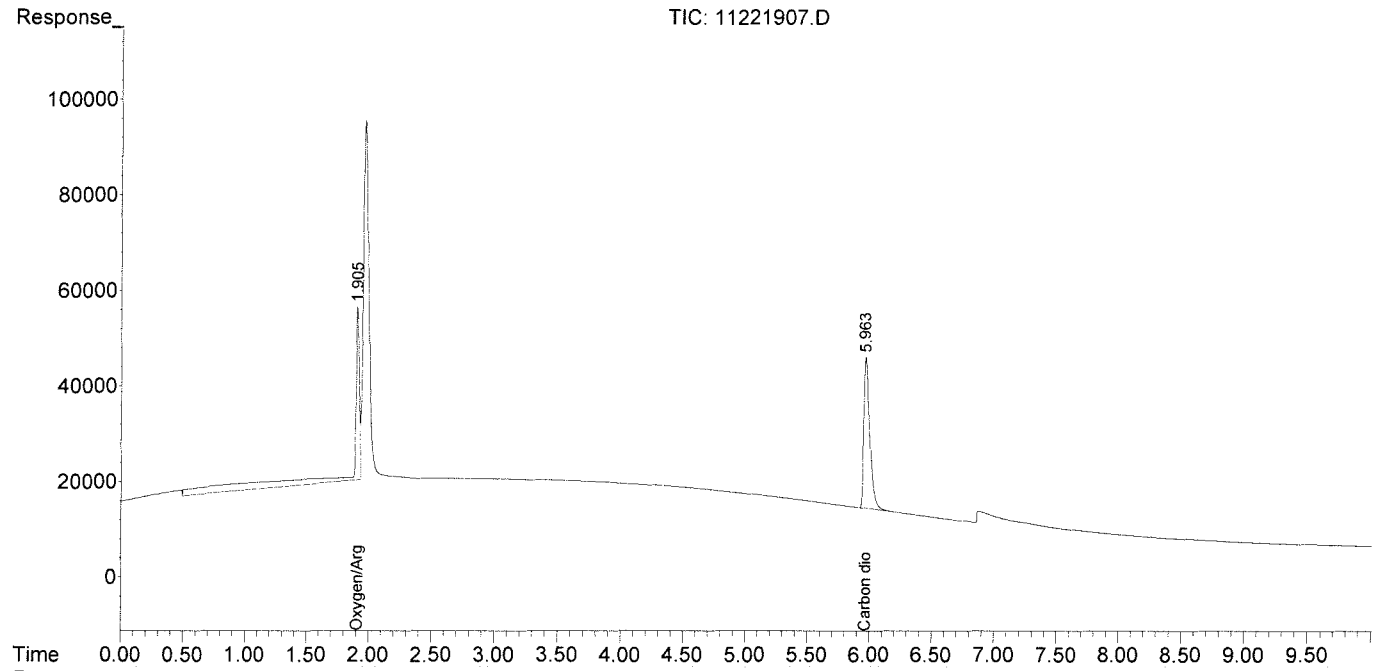
(f)=RT Delta > 1/2 Window (m)=manual int.

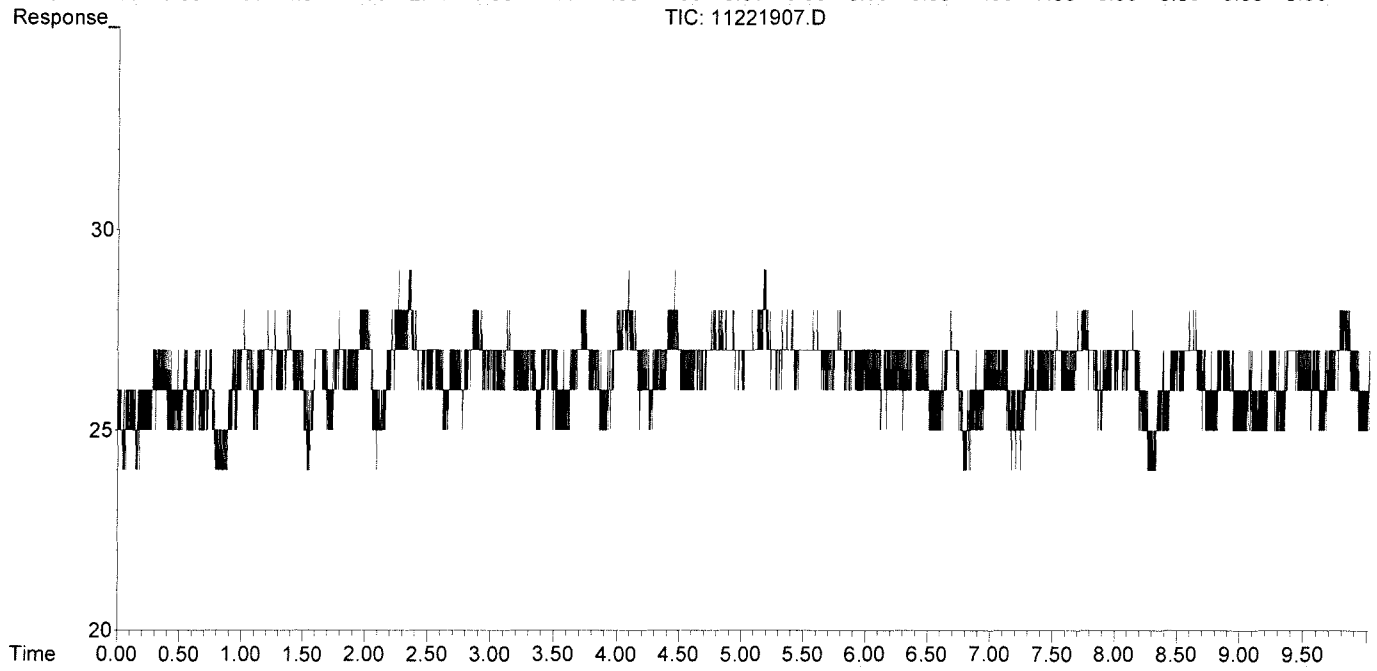
Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\22\
Data File : 11221907.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 22-Nov-2019, 13:49:08
Operator : WH/LD
Sample : P1907040-002 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 22 13:47:14 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\22\
Data File : 11221908.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 22-Nov-2019, 14:23:57
Operator : WH/LD
Sample : P1907040-003 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 22 13:47:29 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.903	619369	0.130	ppm
2)	Carbon monoxide	1.903	619369	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	5.964	923180	3932.958	ppm
6)	Methane (FID)	0.000	0	N.D.	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	0.000	0	N.D.	ppm
10)	Propane	0.000	0	N.D.	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	0.000	0	N.D.	ppm
13)	n-Butane	0.000	0	N.D.	ppm

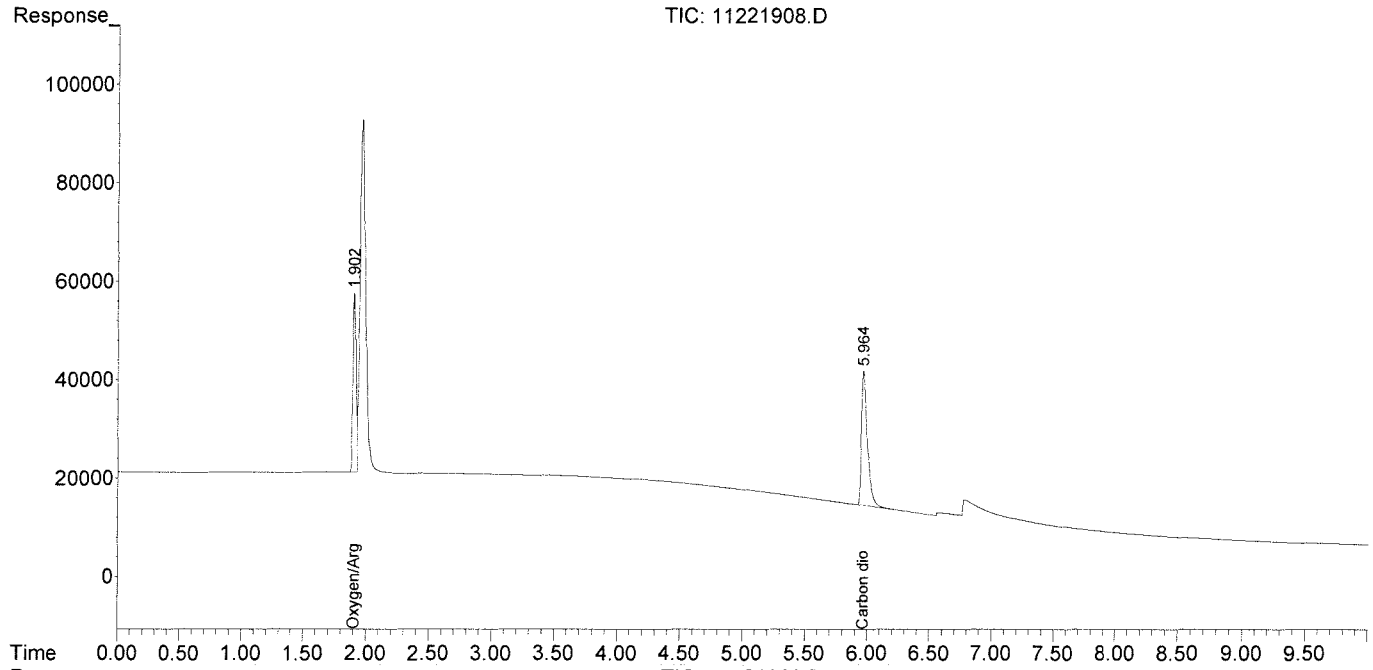
(f)=RT Delta > 1/2 Window (m)=manual int.

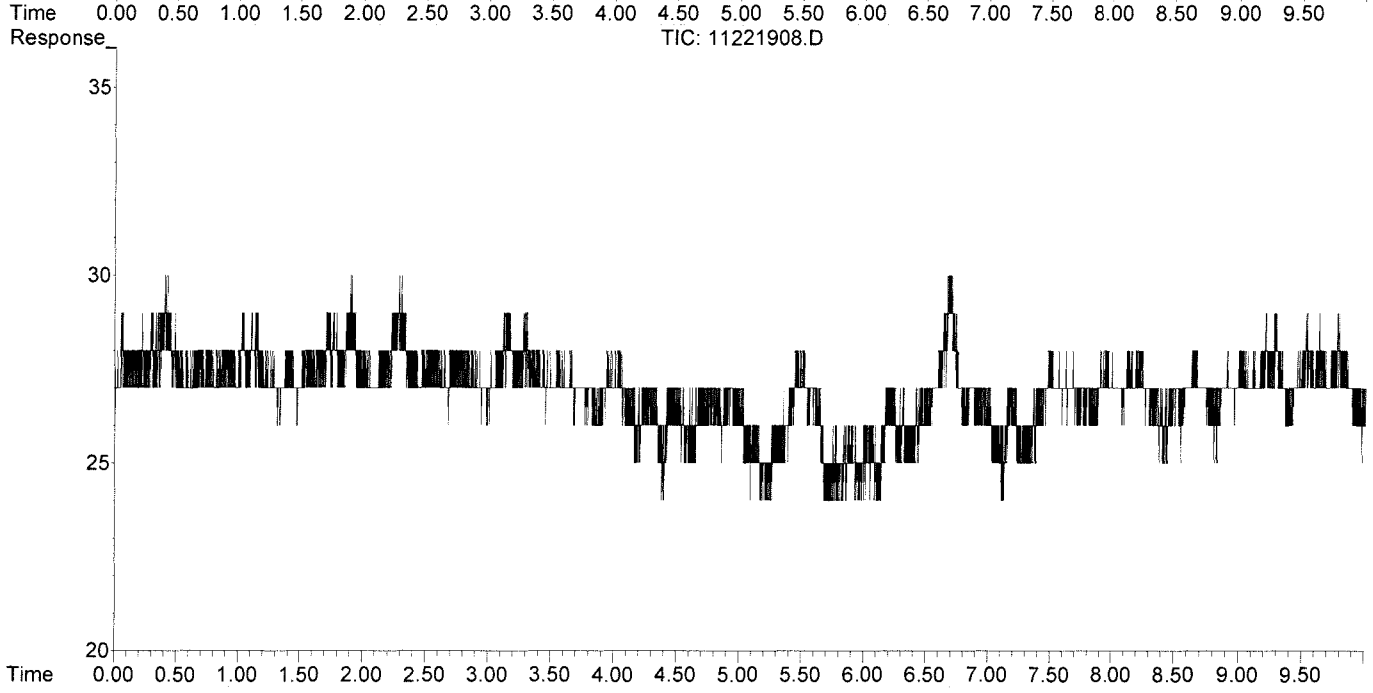
Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\22\
Data File : 11221908.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 22-Nov-2019, 14:23:57
Operator : WH/LD
Sample : P1907040-003 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 22 13:47:29 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\22\
Data File : 11221909.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 22-Nov-2019, 14:44:44
Operator : WH/LD
Sample : P1907040-004 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 22 14:01:00 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.903	588229	0.124	ppm
2)	Carbon monoxide	1.903	588229	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	5.944	1993576	8493.089	ppm
6)	Methane (FID)	0.000	0	N.D.	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	0.000	0	N.D.	ppm
10)	Propane	0.000	0	N.D.	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	0.000	0	N.D.	ppm
13)	n-Butane	0.000	0	N.D.	ppm

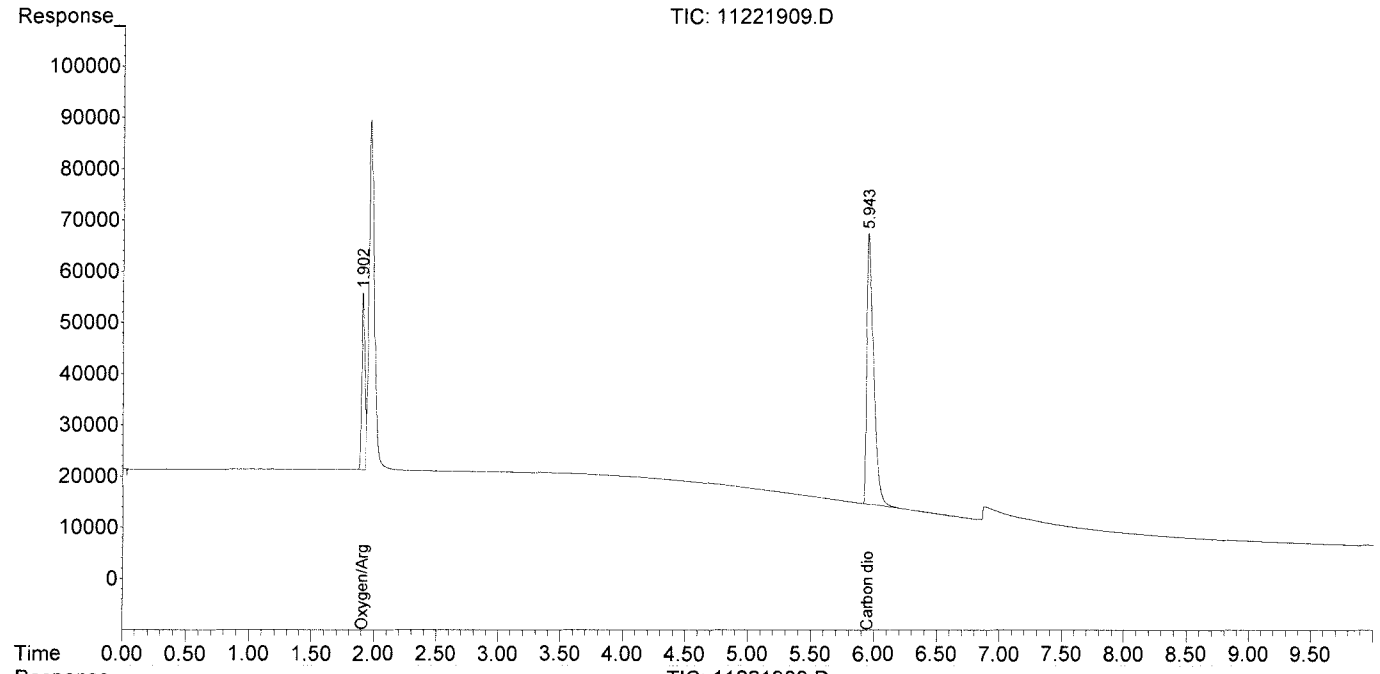
(f)=RT Delta > 1/2 Window (m)=manual int.

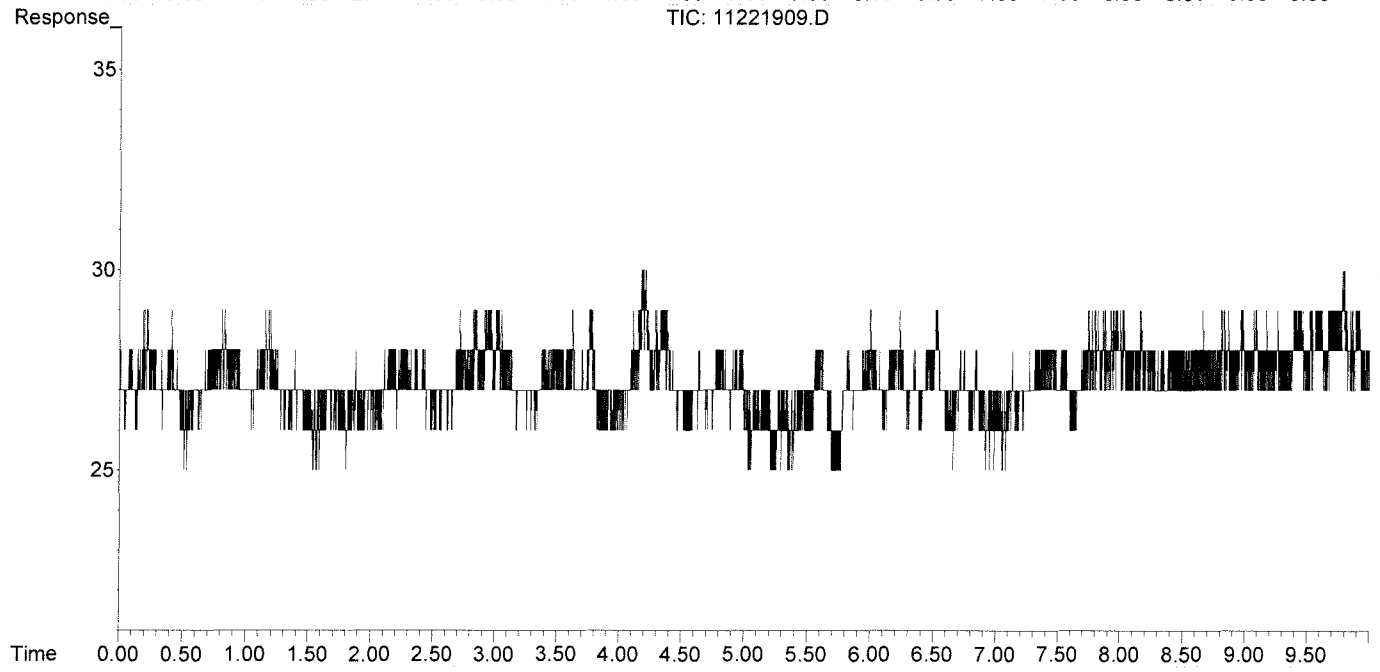
Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\22\
Data File : 11221909.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 22-Nov-2019, 14:44:44
Operator : WH/LD
Sample : P1907040-004 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 22 14:01:00 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (Not Reviewed)

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\22\
Data File : 11221903.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 22-Nov-2019, 12:56:11
Operator : WH/LD
Sample : MCS 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 22 12:06:57 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.907f	727601	0.153	ppm
2)	Carbon monoxide	1.907f	727601	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	0.000	0	N.D.	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	0.000	0	N.D.	ppm
10)	Propane	0.000	0	N.D.	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	0.000	0	N.D.	ppm
13)	n-Butane	0.000	0	N.D.	ppm

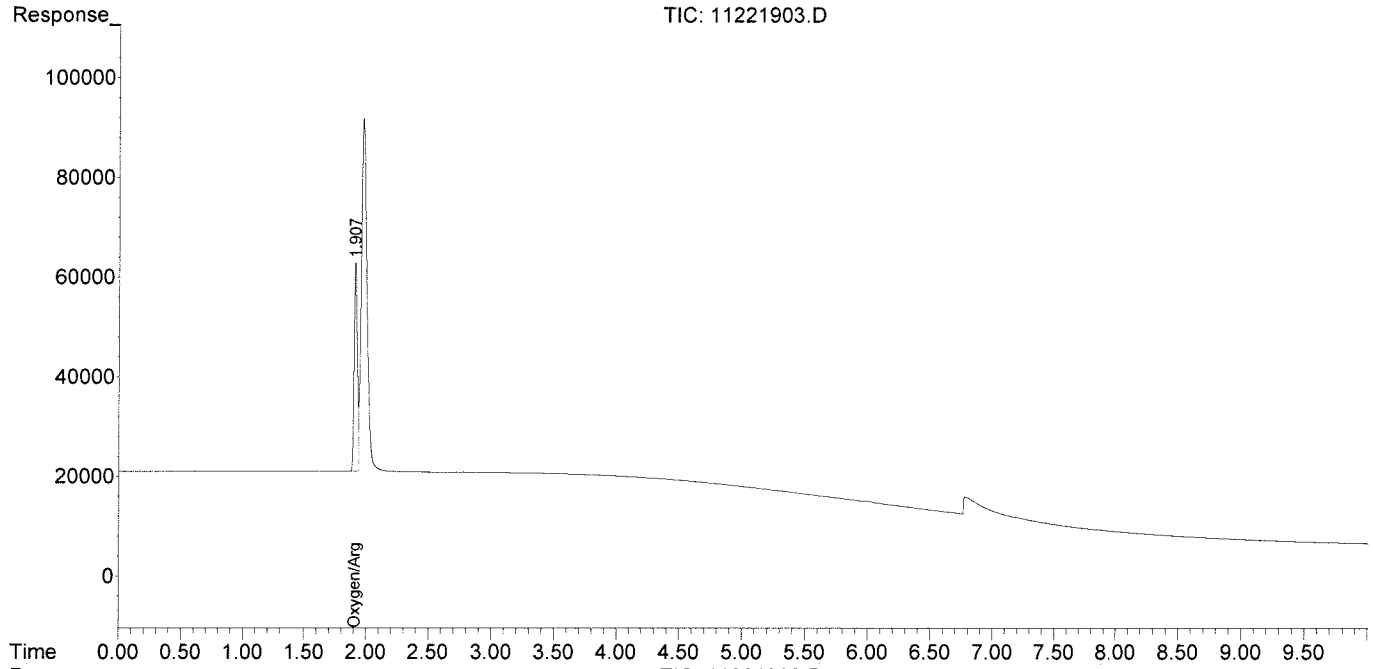
(f)=RT Delta > 1/2 Window (m)=manual int.

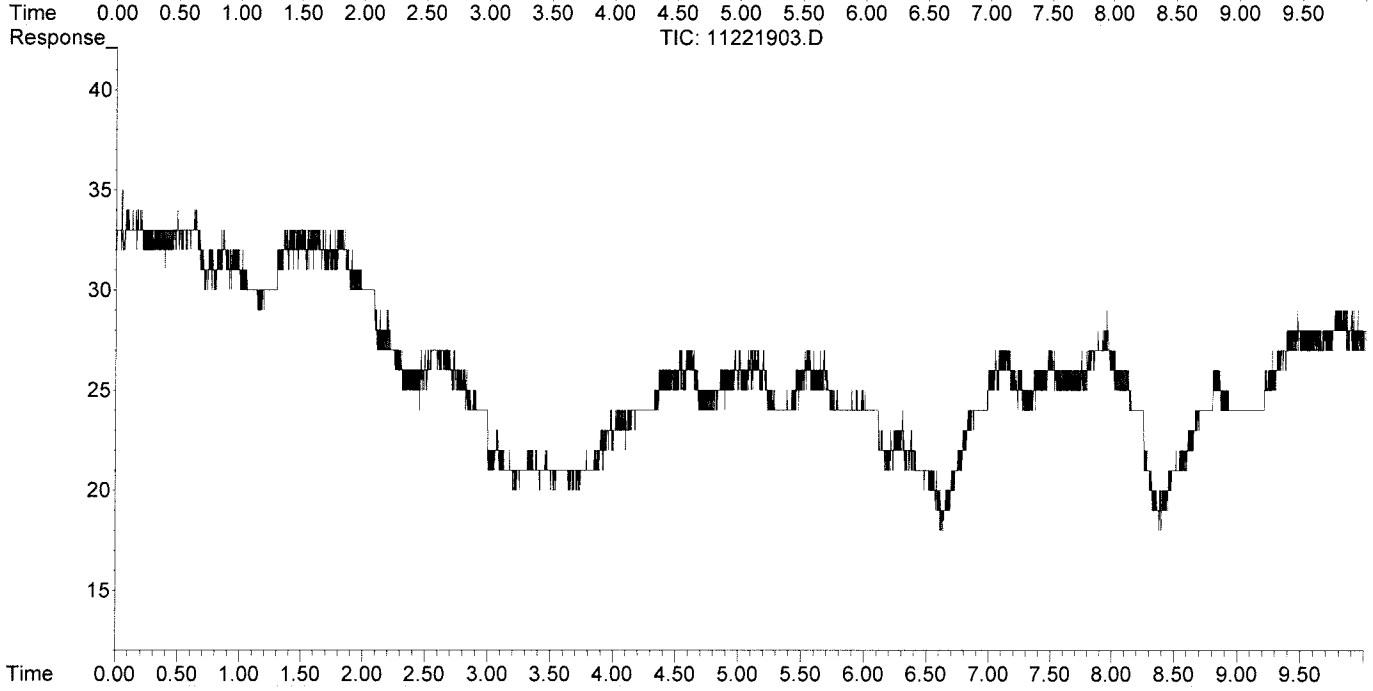
Quantitation Report (Not Reviewed)

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\22\
Data File : 11221903.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 22-Nov-2019, 12:56:11
Operator : WH/LD
Sample : MCS 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 22 12:06:57 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\22\
Data File : 11221911.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 22-Nov-2019, 18:11:33
Operator : WH/LD
Sample : P1907040-004ms 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 25 09:55:26 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.914f	931313	0.196	ppm
2)	Carbon monoxide	1.914f	931313	N.D.	ppm
3)	Methane (TCD)	4.094f	538764	56967.771	ppm
4)	Carbon dioxide	5.955	2096703	8932.435	ppm
6)	Methane (FID)	0.000	0	N.D.	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	0.000	0	N.D.	ppm
10)	Propane	0.000	0	N.D.	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	0.000	0	N.D.	ppm
13)	n-Butane	0.000	0	N.D.	ppm

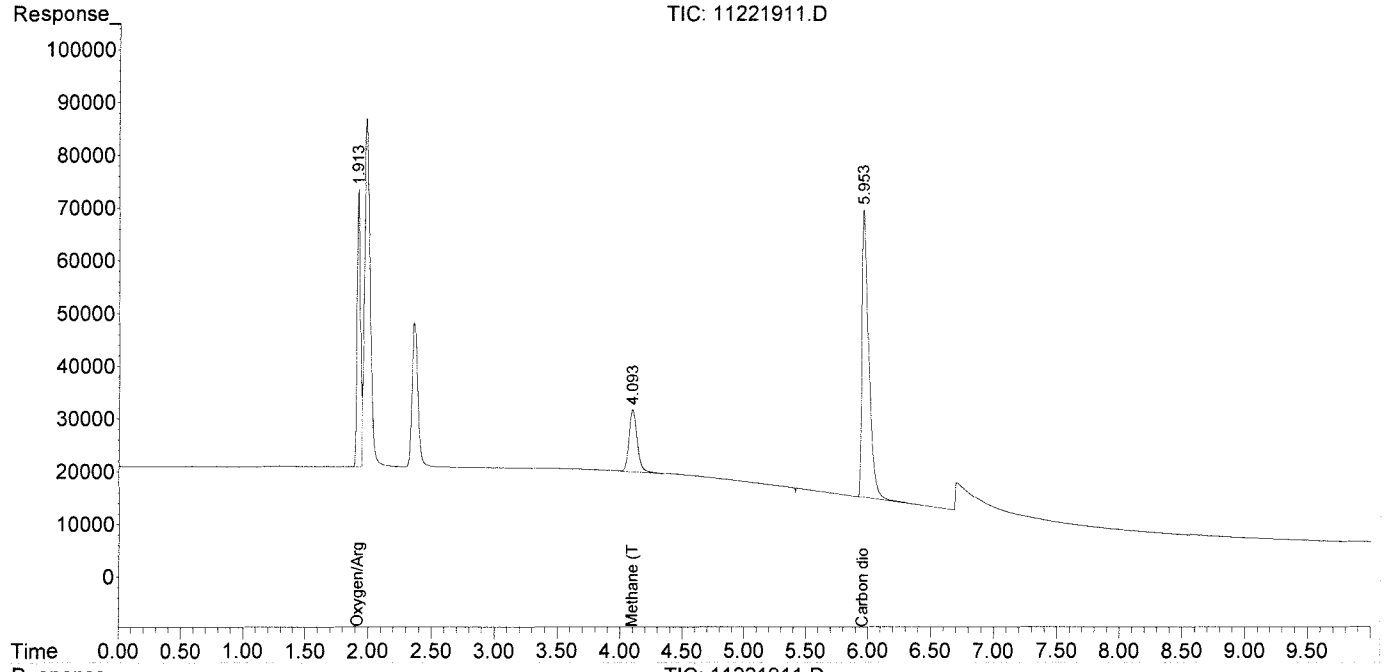
(f)=RT Delta > 1/2 Window (m)=manual int.

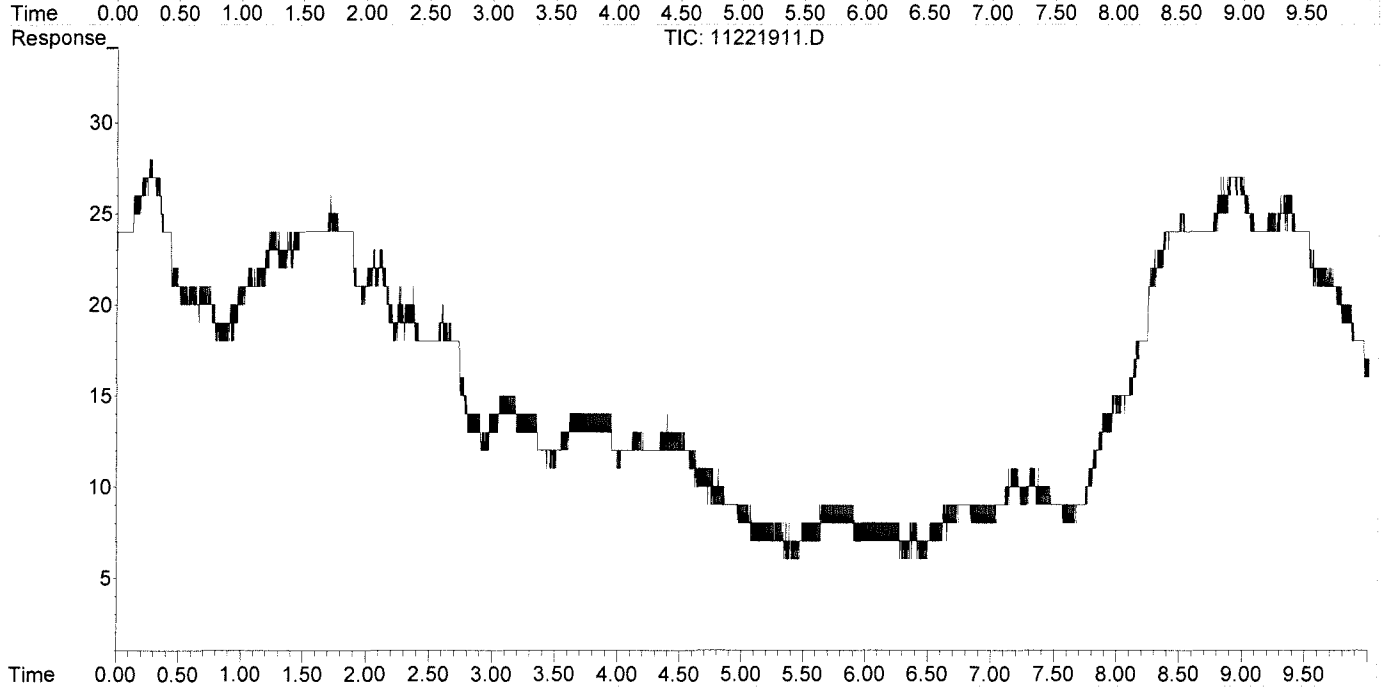
Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\22\
Data File : 11221911.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 22-Nov-2019, 18:11:33
Operator : WH/LD
Sample : P1907040-004ms 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 25 09:55:26 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\22\
Data File : 11221912.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 22-Nov-2019, 18:31:18
Operator : WH/LD
Sample : P1907070-004msd 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 22 17:43:02 2019
Quant Method : J:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.916f	1007402	0.212	ppm
2)	Carbon monoxide	1.916f	1007402	N.D.	ppm
3)	Methane (TCD)	4.097f	578385	61157.149	ppm
4)	Carbon dioxide	5.955	2287950	9747.190	ppm
6)	Methane (FID)	0.000	0	N.D.	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	0.000	0	N.D.	ppm
10)	Propane	0.000	0	N.D.	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	0.000	0	N.D.	ppm
13)	n-Butane	0.000	0	N.D.	ppm

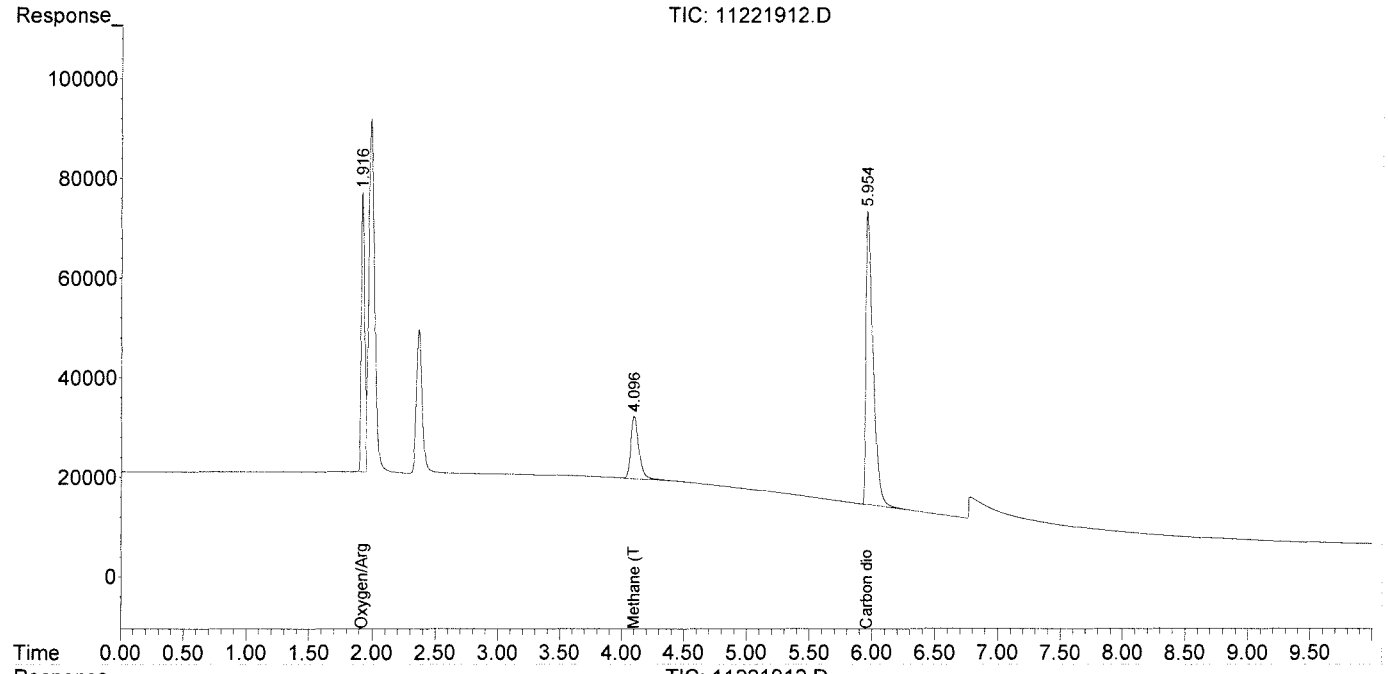
(f)=RT Delta > 1/2 Window (m)=manual int.

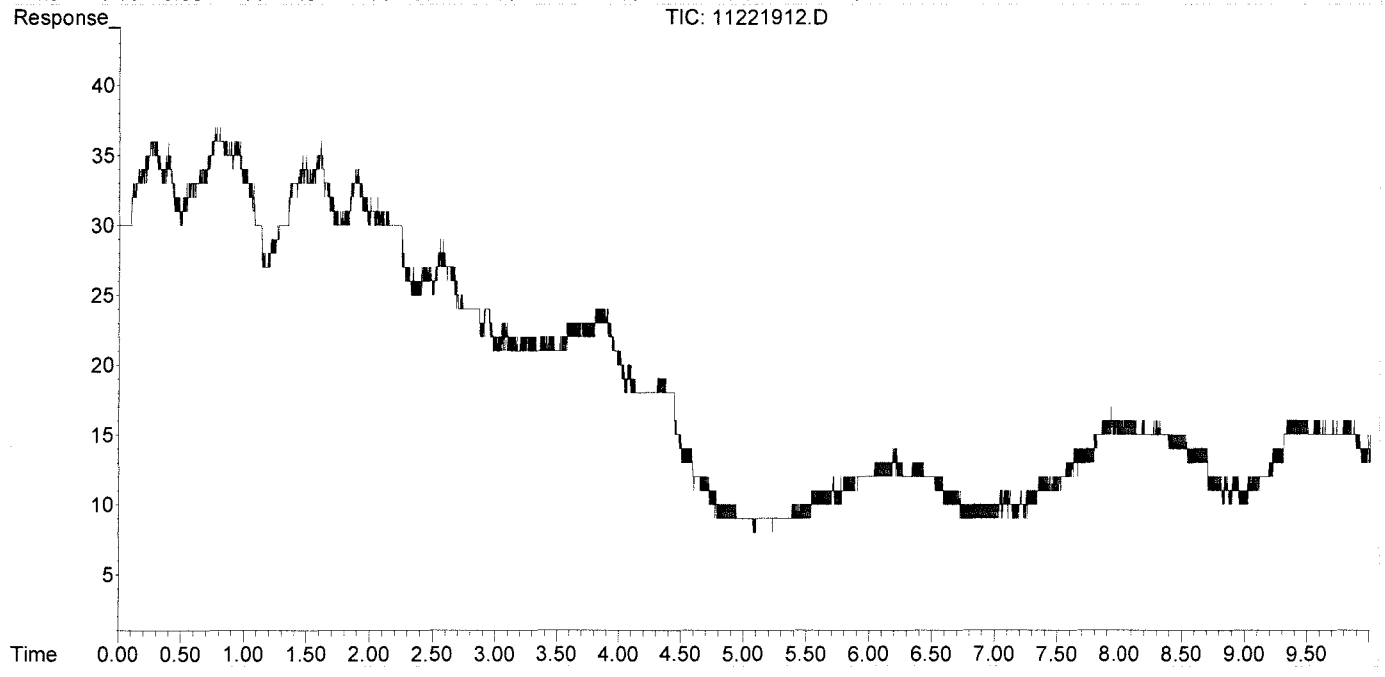
Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\22\
Data File : 11221912.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 22-Nov-2019, 18:31:18
Operator : WH/LD
Sample : P1907070-004msd 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 22 17:43:02 2019
Quant Method : J:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\22\
Data File : 11221904.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 22-Nov-2019, 13:10:20
Operator : WH/LD
Sample : LCS S32-08141901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 22 12:23:17 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.895	1404792	0.295	ppm	
2)	Carbon monoxide	1.895	1404792	N.D.	ppm	
3)	Methane (TCD)	4.089f	541798	57288.555	ppm	
4)	Carbon dioxide	5.990	203565	867.235	ppm	m
6)	Methane (FID)	0.000	0	N.D.	ppm	
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	0	N.D.	ppm	
9)	Propylene	0.000	0	N.D.	ppm	
10)	Propane	0.000	0	N.D.	ppm	
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	0.000	0	N.D.	ppm	
13)	n-Butane	0.000	0	N.D.	ppm	

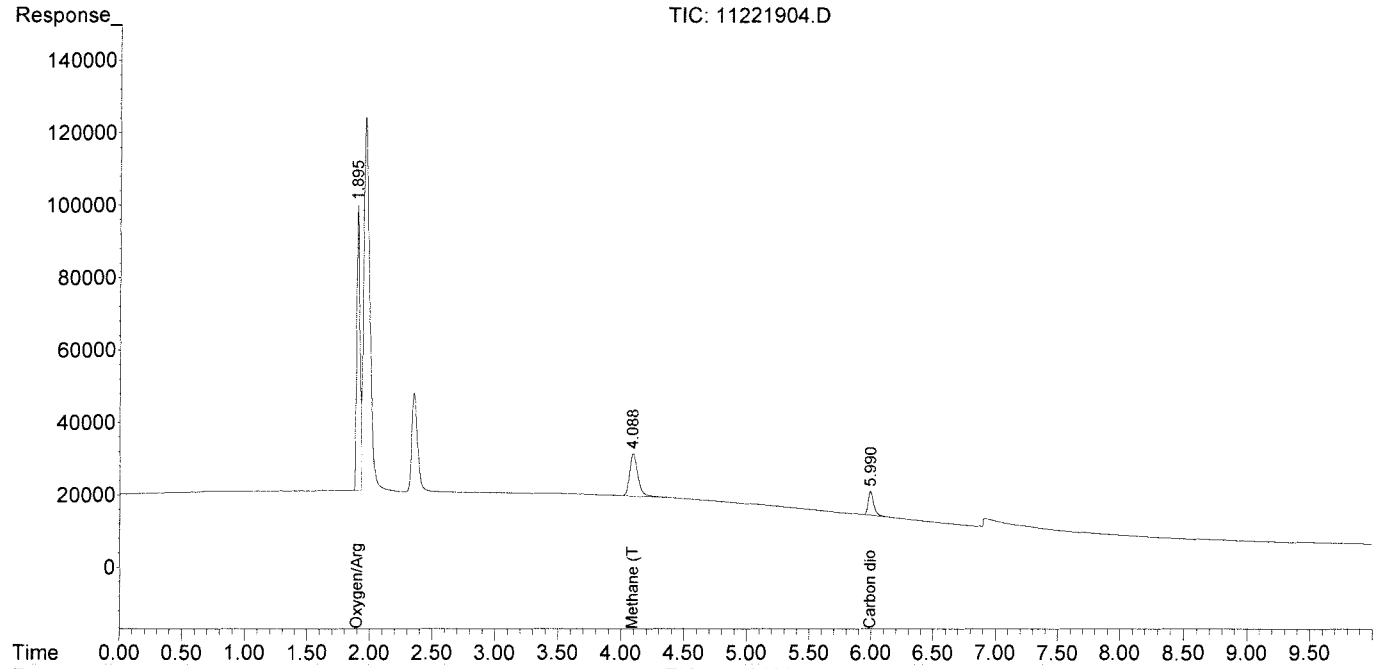
(f)=RT Delta > 1/2 Window (m)=manual int.

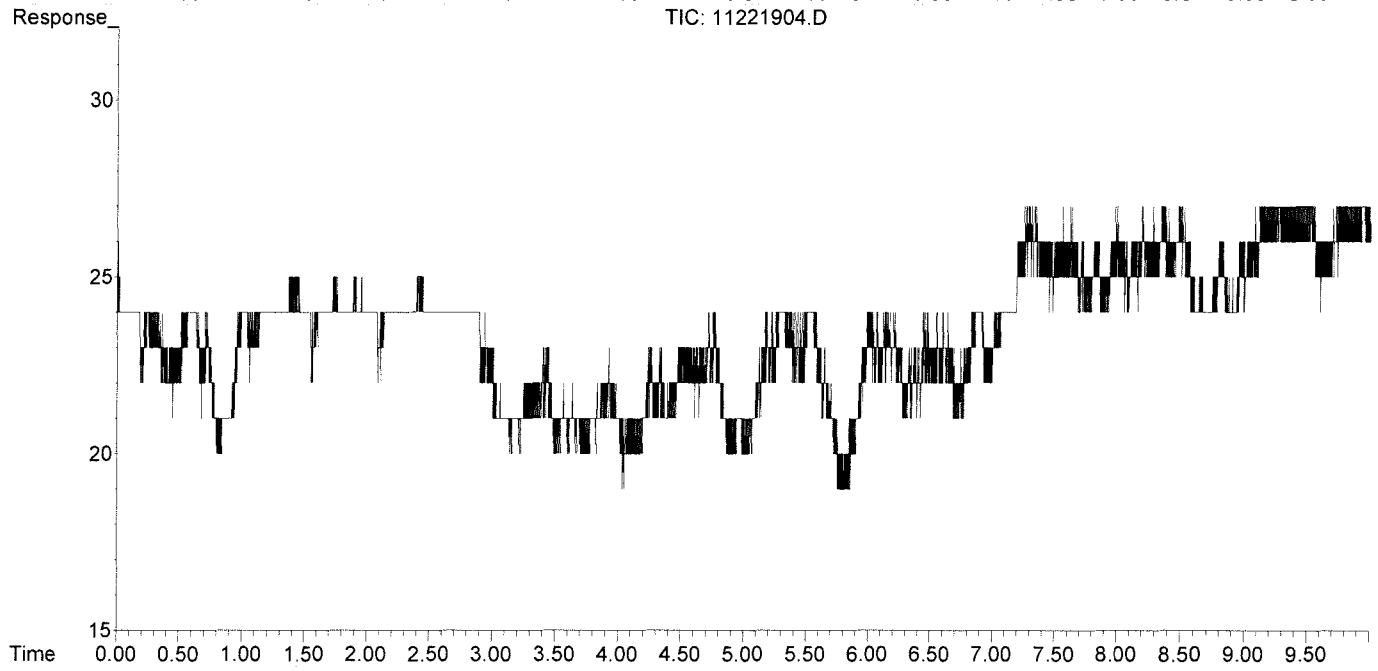
Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\22\
Data File : 11221904.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 22-Nov-2019, 13:10:20
Operator : WH/LD
Sample : LCS S32-08141901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 22 12:23:17 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



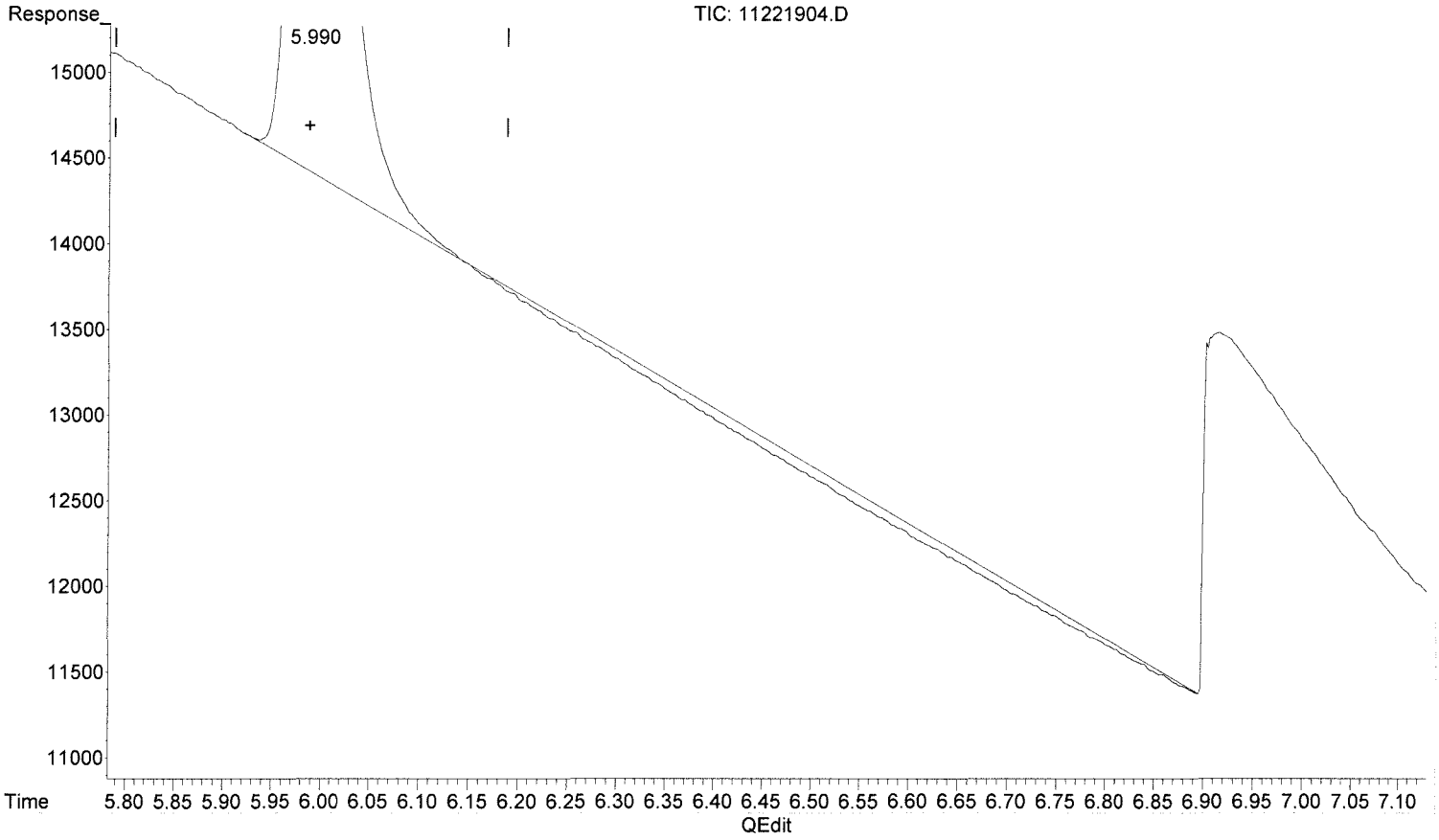


Quantitation Report (Qedit)

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\22\
Data File : 11221904.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 22-Nov-2019, 13:10:20
Operator : WH/LD
Sample : LCS S32-08141901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 22 12:23:17 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



(4) Carbon dioxide

5.991min 786.662 ppm

response 184653

(+) = Expected Retention Time
RS082817_CO2.M Fri Nov 22 12:34:18 2019 Page: 1

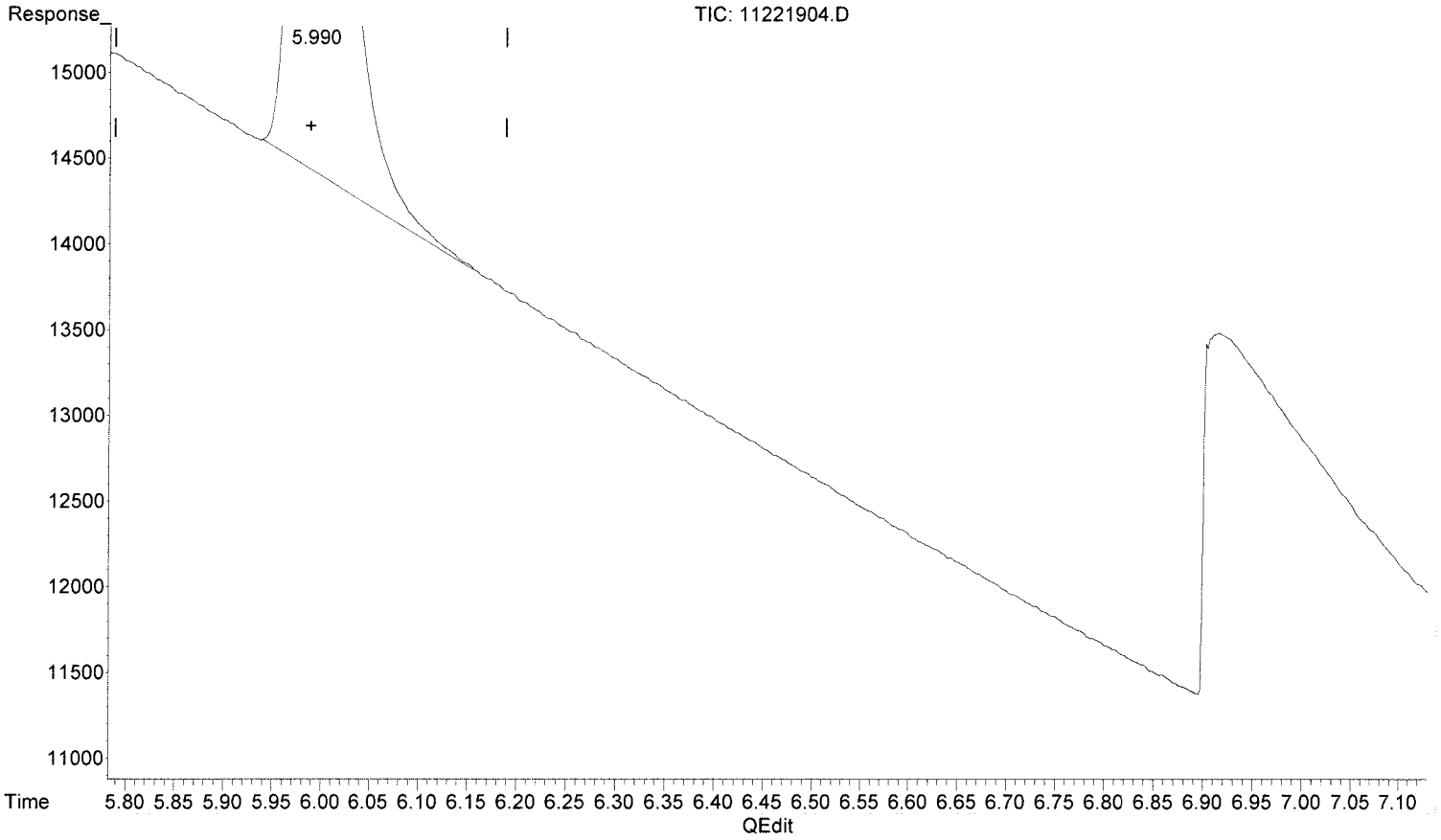
Quantitation Report (Qedit)

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\22\
Data File : 11221904.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 22-Nov-2019, 13:10:20
Operator : WH/LD
Sample : LCS S32-08141901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 22 12:23:17 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

CP
BLC
11/22

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



(4) Carbon dioxide

5.990min 867.235 ppm m

response 203565

11/22/19 MLC 11/25/19

(+) = Expected Retention Time
RS082817_CO2.M Fri Nov 22 12:34:25 2019 Page: 1

Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\22\
Data File : 11221905.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 22-Nov-2019, 13:23:19
Operator : WH/LD
Sample : LCSD S32-08141901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 22 12:33:18 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.895	1431820	0.301	ppm	
2)	Carbon monoxide	1.895	1431820	N.D.	ppm	
3)	Methane (TCD)	4.089f	545387	57668.031	ppm	
4)	Carbon dioxide	5.986	209057	890.632	ppm	m
6)	Methane (FID)	0.000	0	N.D.	ppm	
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	0	N.D.	ppm	
9)	Propylene	0.000	0	N.D.	ppm	
10)	Propane	0.000	0	N.D.	ppm	
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	0.000	0	N.D.	ppm	
13)	n-Butane	0.000	0	N.D.	ppm	

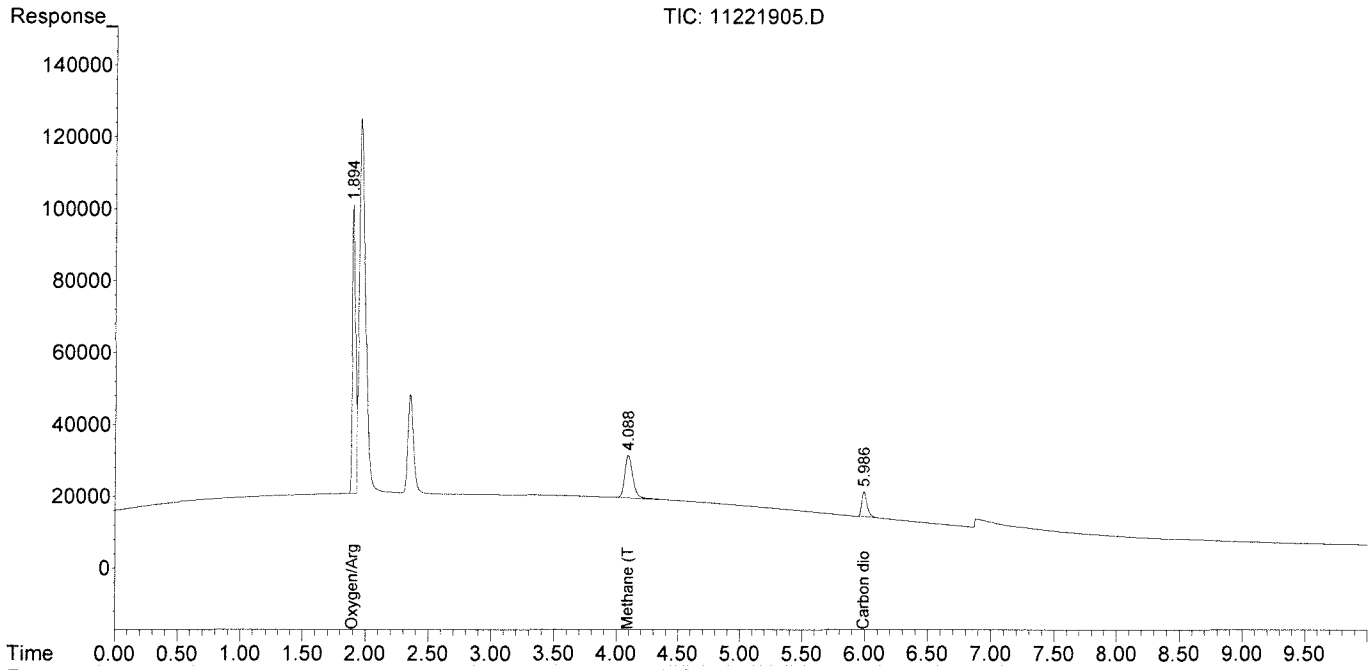
(f)=RT Delta > 1/2 Window (m)=manual int.

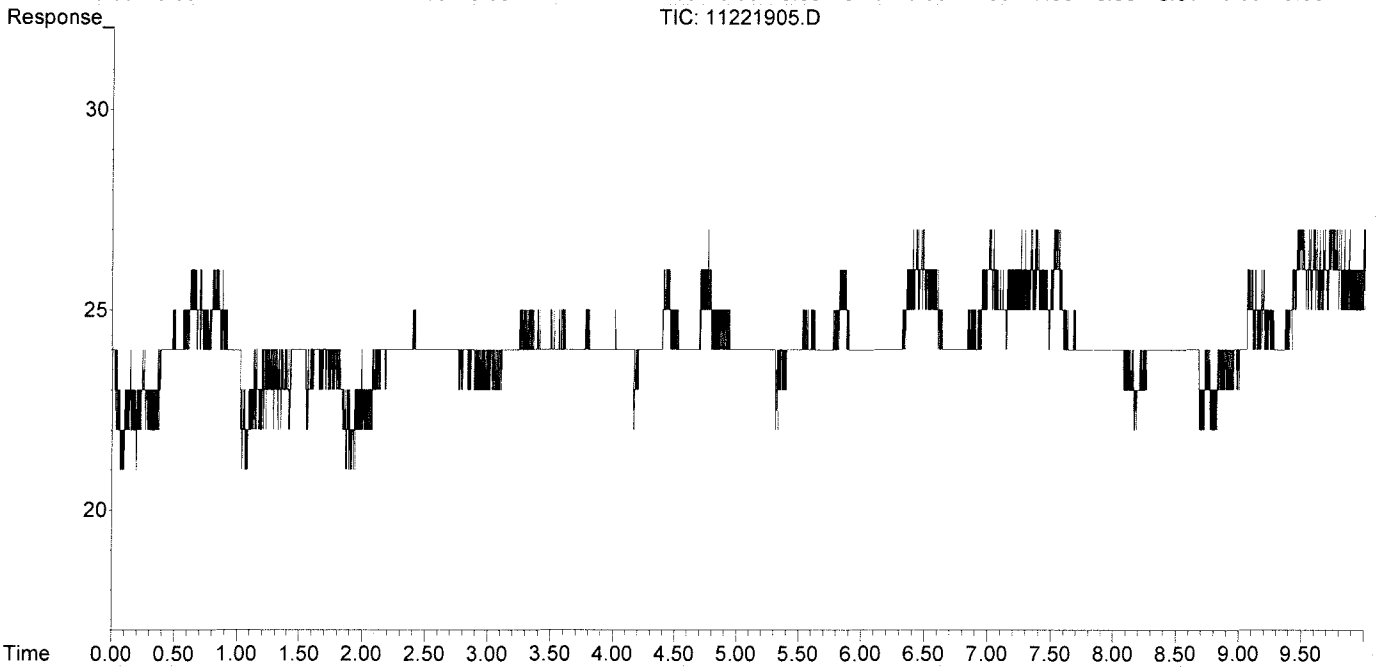
Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\22\
Data File : 11221905.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 22-Nov-2019, 13:23:19
Operator : WH/LD
Sample : LCSD S32-08141901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 22 12:33:18 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



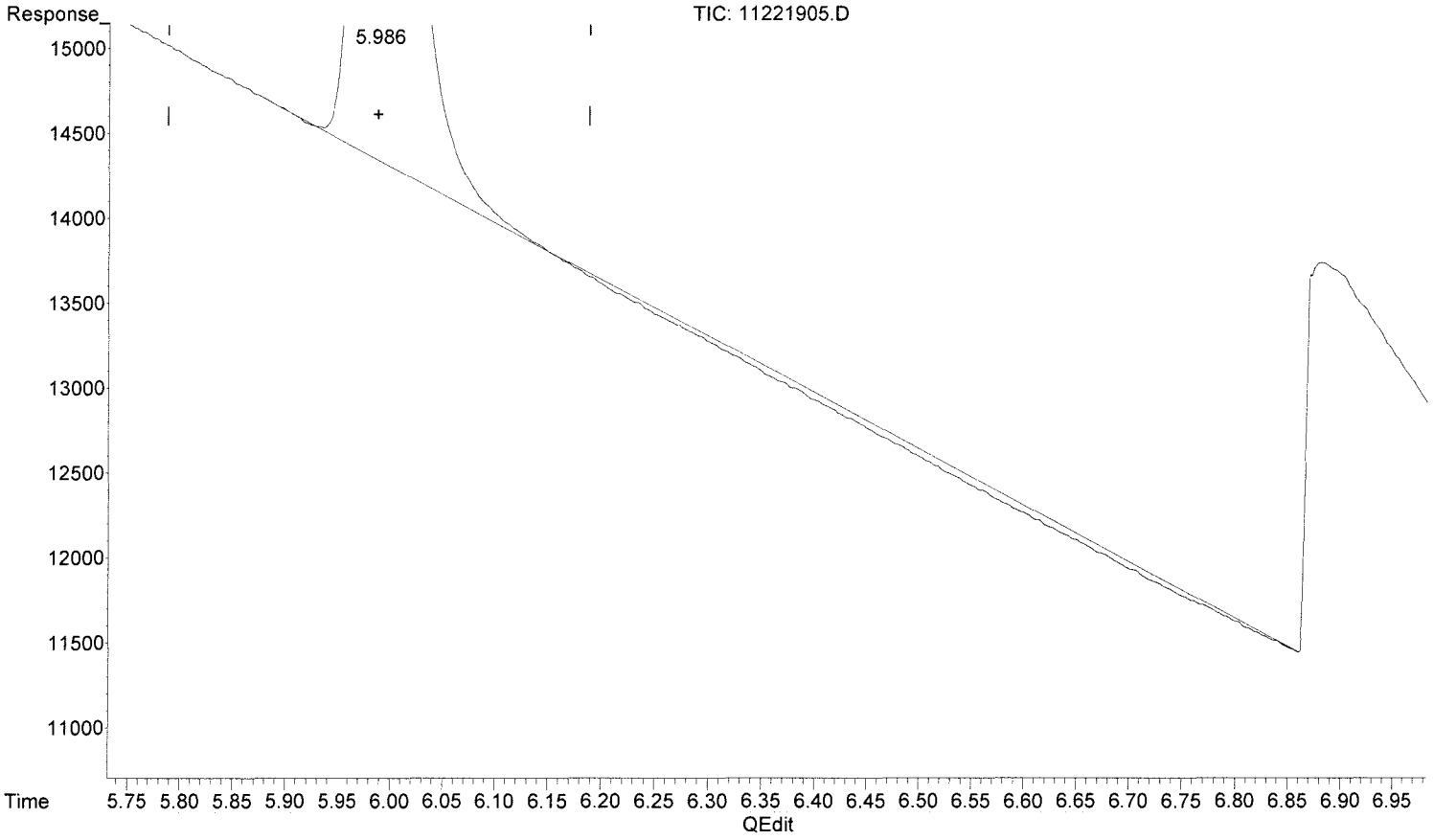


Quantitation Report (Qedit)

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\22\
Data File : 11221905.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 22-Nov-2019, 13:23:19
Operator : WH/LD
Sample : LCSD S32-08141901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 22 12:33:18 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



(4) Carbon dioxide

5.987min 834.764 ppm

response 195944

(+) = Expected Retention Time
RS082817_CO2.M Fri Nov 22 12:34:38 2019 Page: 1

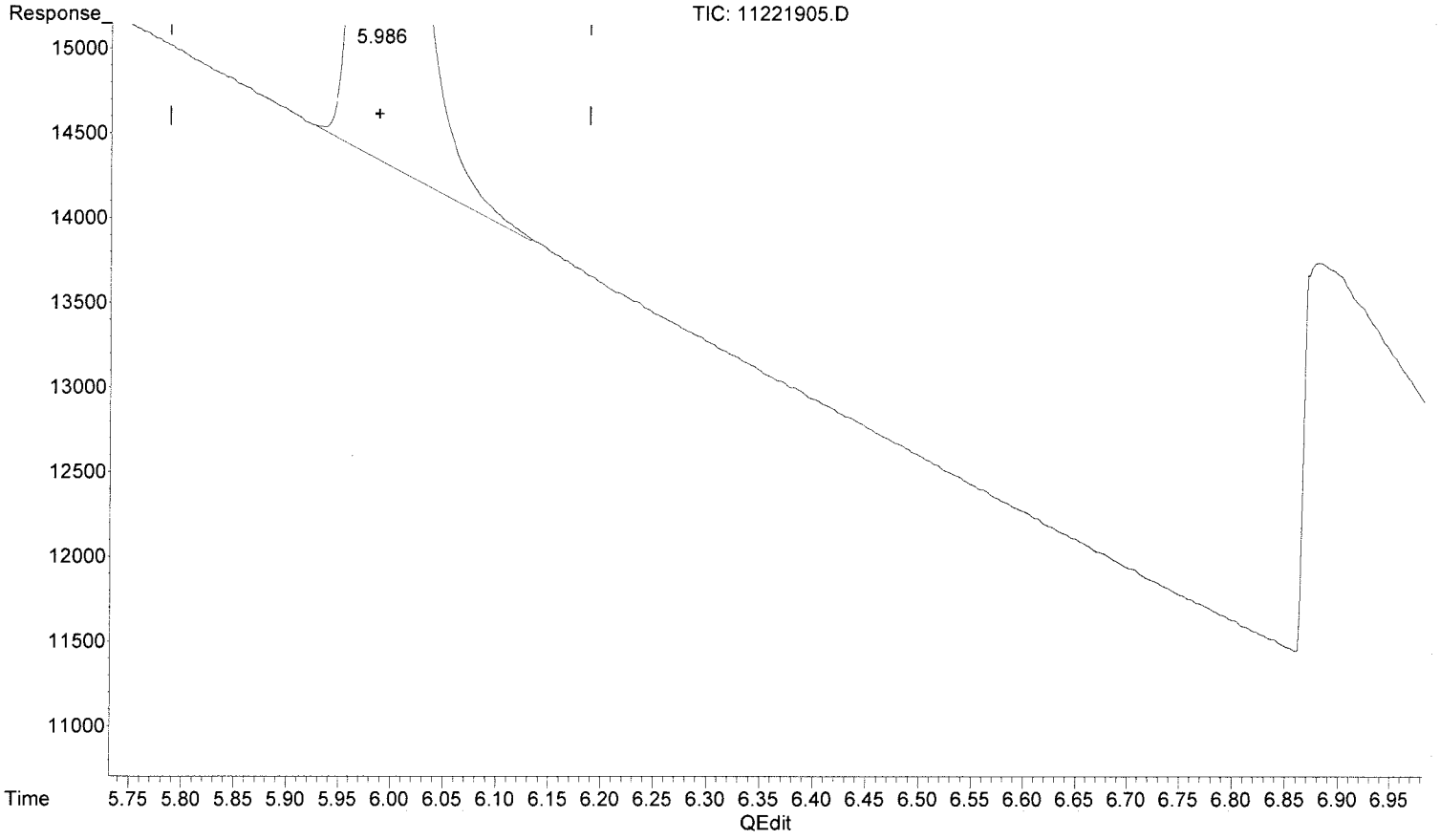
Quantitation Report (Qedit)

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\22\
Data File : 11221905.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 22-Nov-2019, 13:23:19
Operator : WH/LD
Sample : LCSD S32-08141901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 22 12:33:18 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

LD
BLC
11/22

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



(4) Carbon dioxide

5.986min 890.632 ppm m

response 209057

11/22/19

MR 11/25/19

(+) = Expected Retention Time
RS082817_CO2.M Fri Nov 22 12:34:47 2019 Page: 1

Response Factor Report HP5890

Method Path : I:\GC10\METHODS\
Method File : RS082817_CO2.M
Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
Last Update : Tue Aug 29 16:13:13 2017
Response Via : Initial Calibration

Calibration Files
1 =08291715.D 2 =08291716.D 3 =08291717.D
4 =08291719.D 5 =08291720.D 6 =08291721.D

	Compound	1	2	3	4	5	6	Avg		%RSD
1)	Oxygen/Argon	4.760						4.760	E6	0.00
2)	Carbon monoxide	2.775		1.066	0.043	0.033	0.027	0.657	E6	170.12
3)	Methane (TCD)							9.457		0.00
4)	Carbon dioxide	2.717	2.193	2.338	2.272	2.265	2.298	2.347	E2	7.99

Signal #2 Calibration Files
1 =08291715.D 2 =08291716.D 3 =08291717.D
4 =08291719.D 5 =08291720.D 6 =08291721.D

	Compound	1	2	3	4	5	6	Avg		%RSD
6)	Methane (FID)	1.253	1.160	1.005	0.927	0.848	0.848	0.945	E4	15.85
7)	Ethylene	1.677	1.605	1.900	1.749	1.597	1.579	1.684	E4	7.30
8)	Ethane	1.769	1.631	1.866	1.767	1.639	1.667	1.723	E4	5.40
9)	Propylene	2.402	2.309	2.767	2.551	2.331	2.333	2.449	E4	7.32
10)	Propane	2.906	2.737	2.817	2.639	2.410	2.420	2.655	E4	7.75
11)	Isobutylene							0.000		-1.00
12)	Isobutane							0.000		-1.00
13)	n-Butane							0.000		-1.00

(#) = Out of Range ### Number of calibration levels exceeded format ###

RS082817_CO2.M Wed Aug 30 13:24:19 2017

dit Compounds -- Compound #4 -- Carbon dioxide

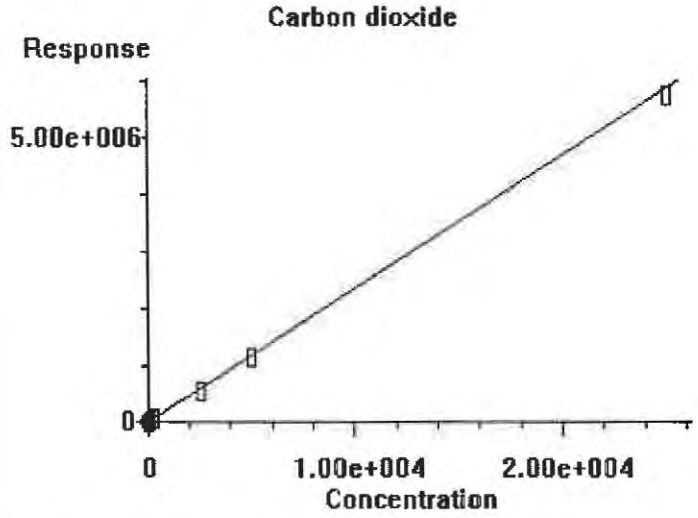
Search by: Ret Time | Name | Index | Find Compound

- Compound Database
- External Standard Compoun
  - Oxygen/Argon
  - Carbon monoxide
  - Methane (TCD)
  - Carbon dioxide
  - Signal #2
  - Methane (FID)
  - Ethylene
  - Ethane
  - Propylene
  - Propane
  - Isobutylene
  - Isobutane
  - n-Butane

Identification | Calibration | User-Defined | Advanced | Reporting

Lvl ID	Concentration	Response
1	25.000000	6793.665186
2	100.000000	21932.418000
3	250.000000	58460.642510
4	2500.000000	568043.388750
5	5000.000000	1132363.215937
6	25000.000000	5744294.891563
7	25000.000000	
8	25000.000000	
9	2000.000000	
10	30000.000000	

Lvl ID	Concentration	Response



0.000e+000	Quadratic term
2.347e+002	Linear term
0.000e+000	Constant term
7.987%	RF Rel Std Dev

OK | Cancel | Help | Print Calibration Curve | Copy Calibration Curve

Calibration Status Report HP5890

Method Path : I:\GC10\METHODS\
Method File : RS082817_CO2.M
Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
Last Update : Tue Aug 29 16:13:13 2017
Response Via : Initial Calibration

#	ID	Conc	ISTD Conc	Path\File
1	1	0	0	J:\GC10\DATA\RSK_FID\2017_08\29\08291715.D
2	2	0	0	J:\GC10\DATA\RSK_FID\2017_08\29\08291716.D
3	3	3	0	J:\GC10\DATA\RSK_FID\2017_08\29\08291717.D
4	4	10	0	J:\GC10\DATA\RSK_FID\2017_08\29\08291719.D
5	5	25	0	J:\GC10\DATA\RSK_FID\2017_08\29\08291720.D
6	6	125	0	J:\GC10\DATA\RSK_FID\2017_08\29\08291721.D
7	7	5000	0	J:\GC10\DATA\RSK_FID\2017_08\24\08241708.D
8	8	25000	0	J:\GC10\DATA\RSK_FID\2017_08\24\08241709.D
9	9	2000	0	J:\GC10\DATA\RSK_FID\2017_08\24\08241710.D
10	10	30000	0	J:\GC10\DATA\RSK_FID\2017_08\24\08241711.D

#	ID	Update Time	Quant Time	Acquisition Time
1	1	Aug 29 14:21 2017	Aug 29 14:20 2017	29-Aug-2017, 14:07
2	2	Aug 29 14:52 2017	Aug 29 14:51 2017	29-Aug-2017, 14:22
3	3	Aug 29 15:04 2017	Aug 29 15:04 2017	29-Aug-2017, 14:53
4	4	Aug 29 15:36 2017	Aug 29 15:36 2017	29-Aug-2017, 15:23
5	5	Aug 29 15:57 2017	Aug 29 15:57 2017	29-Aug-2017, 15:44
6	6	Aug 29 16:13 2017	Aug 29 16:13 2017	29-Aug-2017, 16:00
7	7	Aug 25 09:05 2017	Aug 24 16:00 2017	24-Aug-2017, 15:44
8	8	Aug 25 09:06 2017	Aug 24 16:13 2017	24-Aug-2017, 16:02
9	9	Aug 25 09:06 2017	Aug 24 16:31 2017	24-Aug-2017, 16:16
10	10	Aug 25 09:07 2017	Aug 24 16:42 2017	24-Aug-2017, 16:33

RS082817_CO2.M Wed Aug 30 13:24:30 2017

Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_08\29\
Data File : 08291715.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 29-Aug-2017, 14:07
Operator : MC
Sample : 25ppm s32-08291701 0.25ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Aug 29 14:20:06 2017
Quant Method : I:\GC10\METHODS\RS082417.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Fri Aug 25 09:19:14 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	0.000	0	N.D.	ppm	d
2)	Carbon monoxide	1.776	277465	N.D.	ppm	
3)	Methane (TCD)	0.000	0	N.D.	ppm	
4)	Carbon dioxide	5.978	6794	27.870	ppm	m
6)	Methane (FID)	0.000	0	N.D.	ppm	d
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	0	N.D.	ppm	
9)	Propylene	0.000	0	N.D.	ppm	
10)	Propane	0.000	0	N.D.	ppm	
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	0.000	0	N.D.	ppm	
13)	n-Butane	0.000	0	N.D.	ppm	

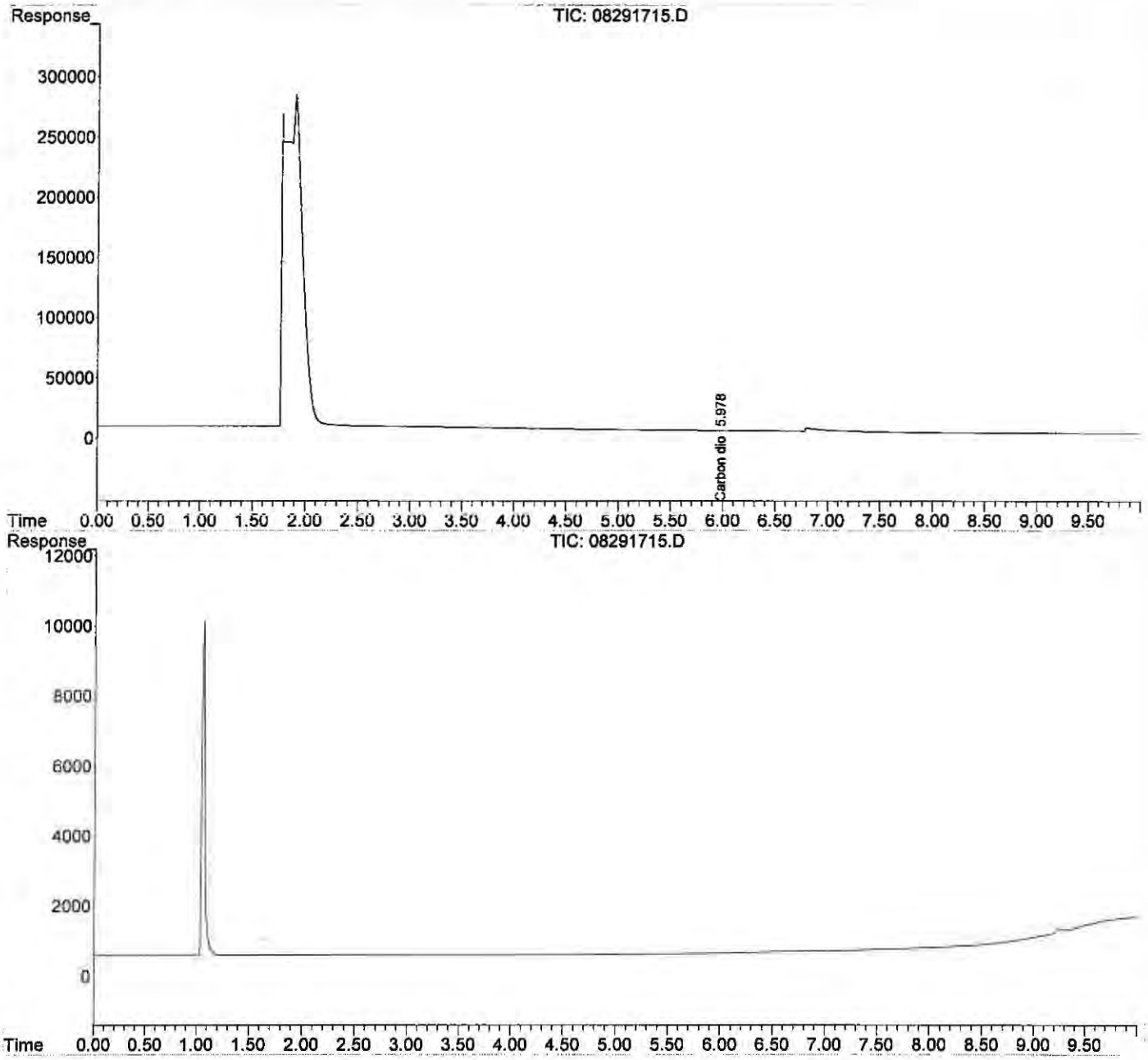
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_08\29\
Data File : 08291715.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 29-Aug-2017, 14:07
Operator : MC
Sample : 25ppm s32-08291701 0.25ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Aug 29 14:20:06 2017
Quant Method : I:\GC10\METHODS\RS082417.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Fri Aug 25 09:19:14 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

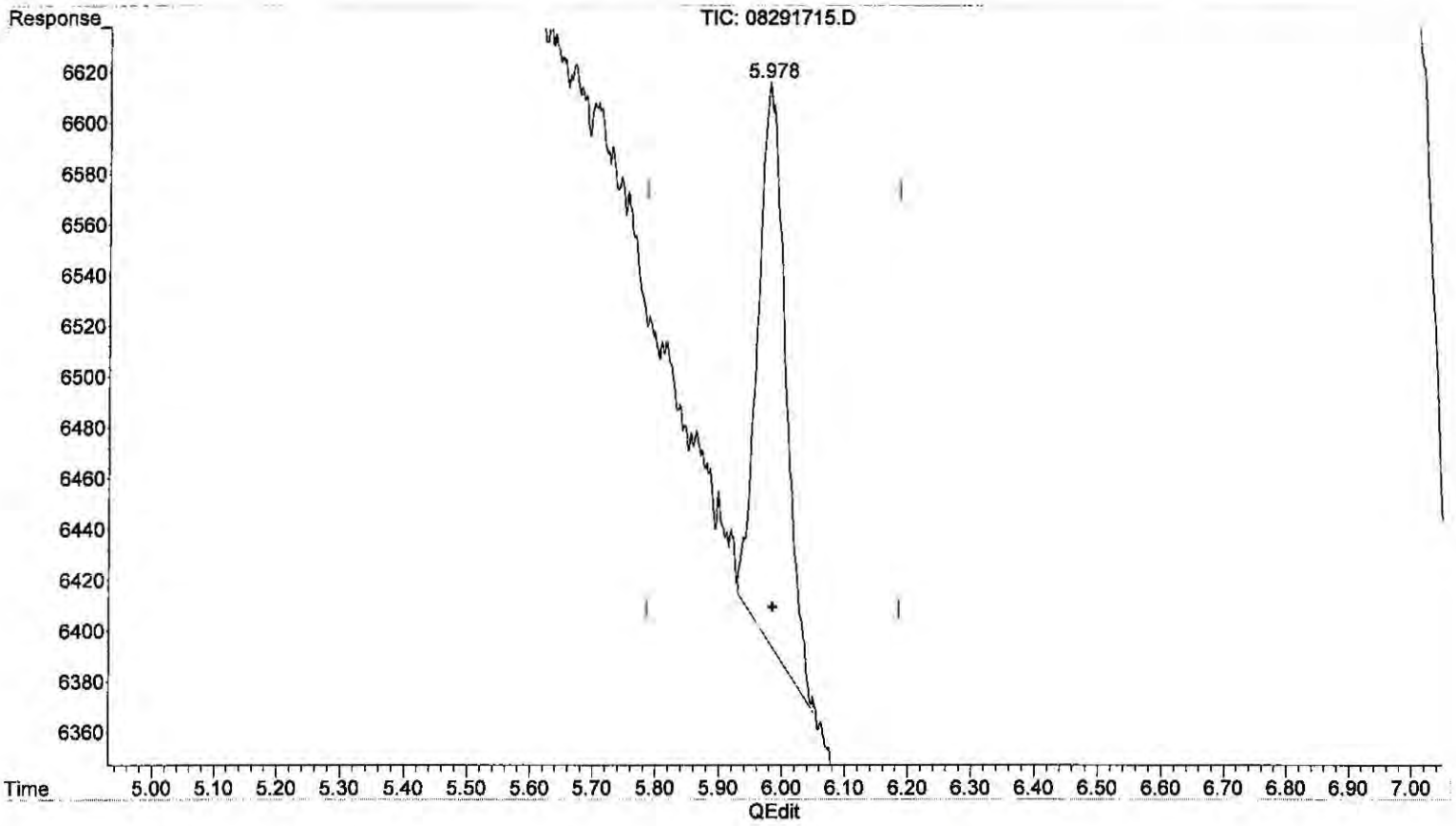


Quantitation Report (Qedit)

Data Path : J:\GC10\DATA\RSK_FID\2017_08\29\
Data File : 08291715.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 29-Aug-2017, 14:07
Operator : MC
Sample : 25ppm s32-08291701 0.25ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Aug 29 14:20:06 2017
Quant Method : I:\GC10\METHODS\RS082417.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Fri Aug 25 09:19:14 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



(4) Carbon dioxide

5.978min 27.870 ppm m

response 6794

8/30/17 BW M. prcvw

8/4/17

(+) = Expected Retention Time

RS082817_CO2.M Wed Aug 30 13:17:47 2017

Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_08\29\
Data File : 08291716.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 29-Aug-2017, 14:22
Operator : MC
Sample : 100ppm s32-08291702 0.2ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Aug 29 14:51:38 2017
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 14:21:08 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.790	-598962	N.D.	ppm	
2)	Carbon monoxide	0.000	0	N.D.	ppm	d
3)	Methane (TCD)	0.000	0	N.D.	ppm	
4)	Carbon dioxide	5.978	21932	87.858	ppm	
6)	Methane (FID)	0.000	0	N.D.	ppm	d
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	0	N.D.	ppm	
9)	Propylene	0.000	0	N.D.	ppm	
10)	Propane	0.000	0	N.D.	ppm	
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	0.000	0	N.D.	ppm	
13)	n-Butane	0.000	0	N.D.	ppm	

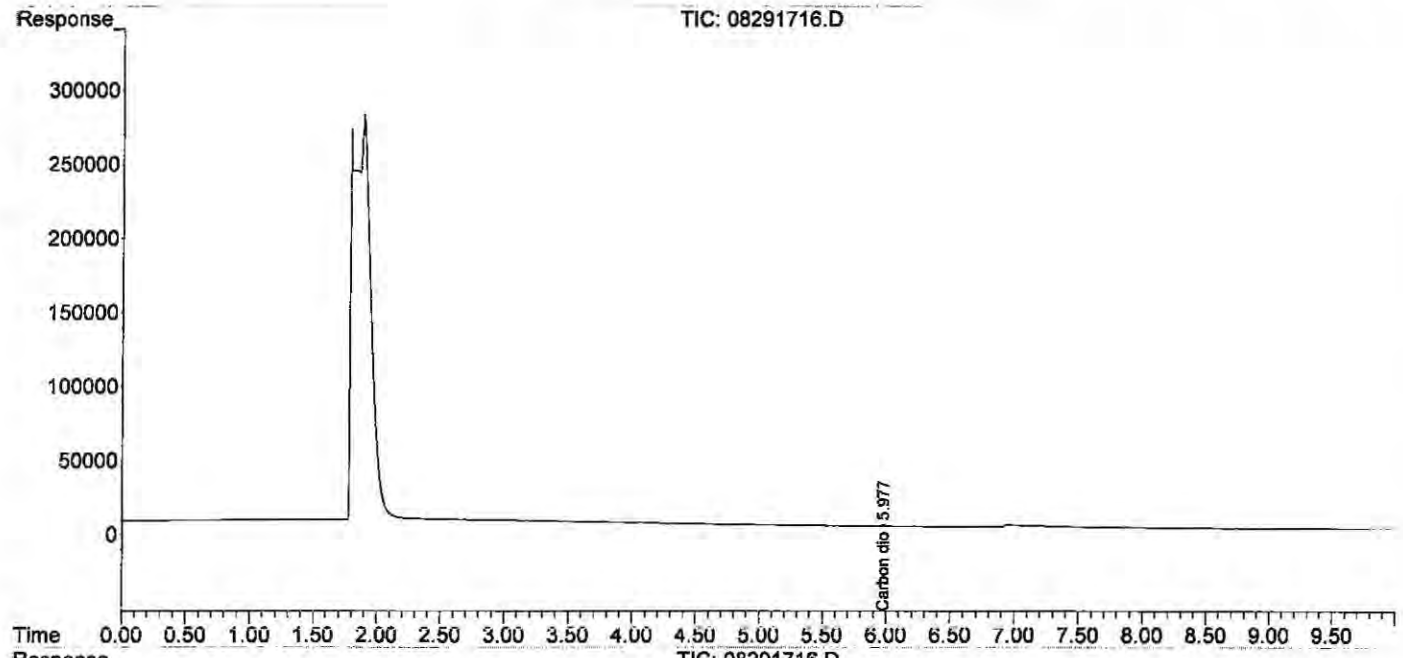
(f)=RT Delta > 1/2 Window (m)=manual int.

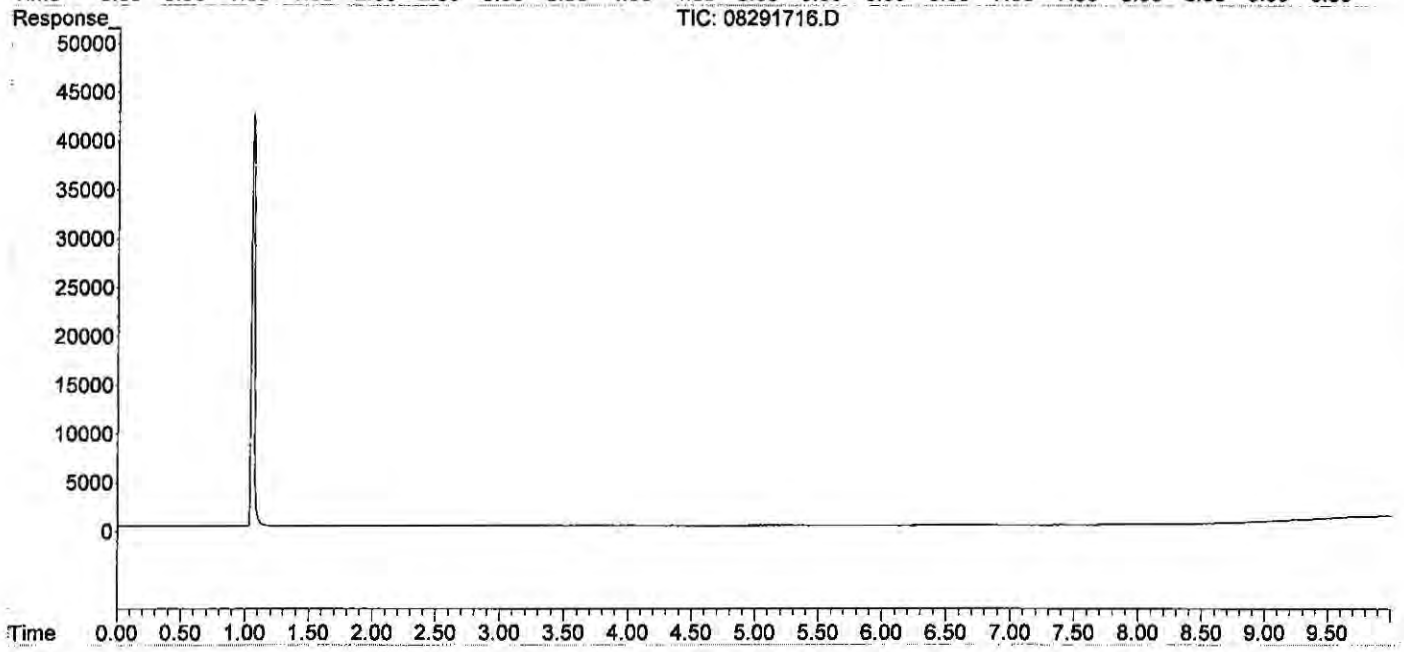
Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_08\29\
Data File : 08291716.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 29-Aug-2017, 14:22
Operator : MC
Sample : 100ppm s32-08291702 0.2ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Aug 29 14:51:38 2017
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 14:21:08 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_08\29\
Data File : 08291717.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 29-Aug-2017, 14:53
Operator : MC
Sample : 250ppm s32-08291702 0.5ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Aug 29 15:03:42 2017
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 14:52:06 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

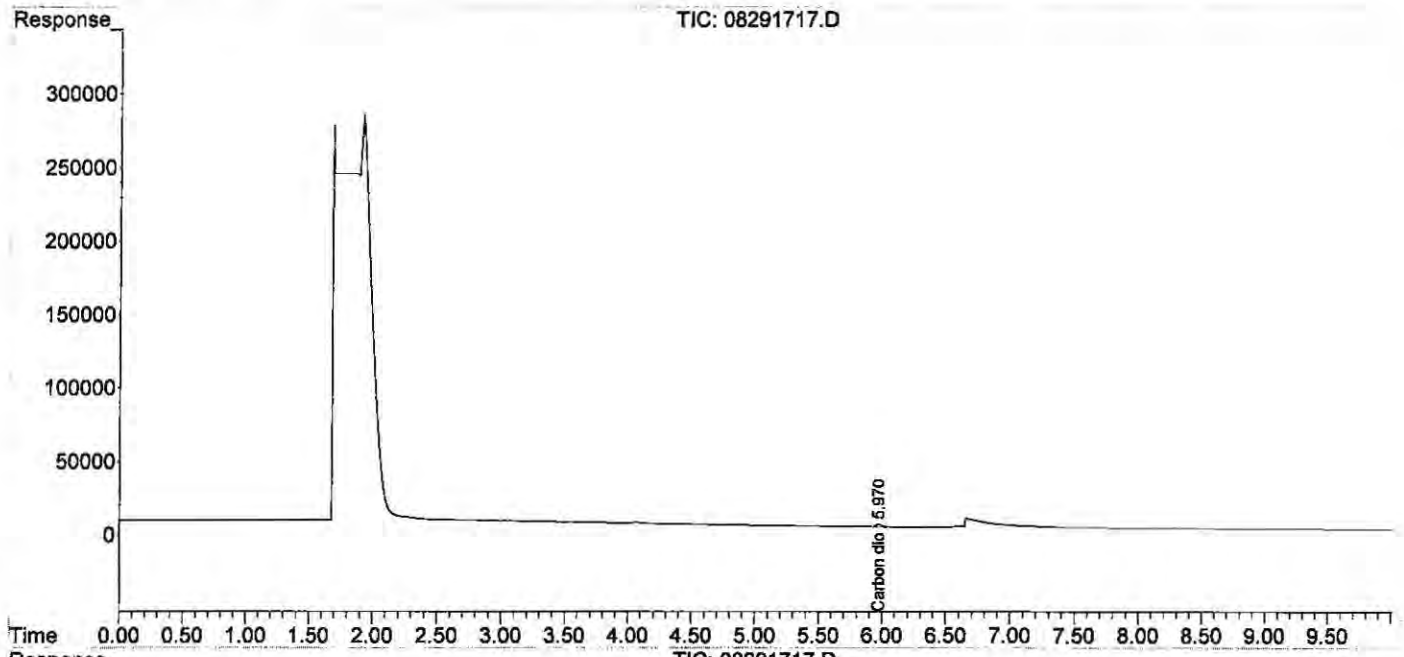
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.920f	-30716454	N.D.	ppm	
2)	Carbon monoxide	0.000	0	N.D.	ppm	d
3)	Methane (TCD)	0.000	0	N.D.	ppm	d
4)	Carbon dioxide	5.970	58461	240.204	ppm	m
6)	Methane (FID)	0.000	0	N.D.	ppm	d
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	0	N.D.	ppm	
9)	Propylene	0.000	0	N.D.	ppm	
10)	Propane	0.000	0	N.D.	ppm	
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	0.000	0	N.D.	ppm	
13)	n-Butane	0.000	0	N.D.	ppm	

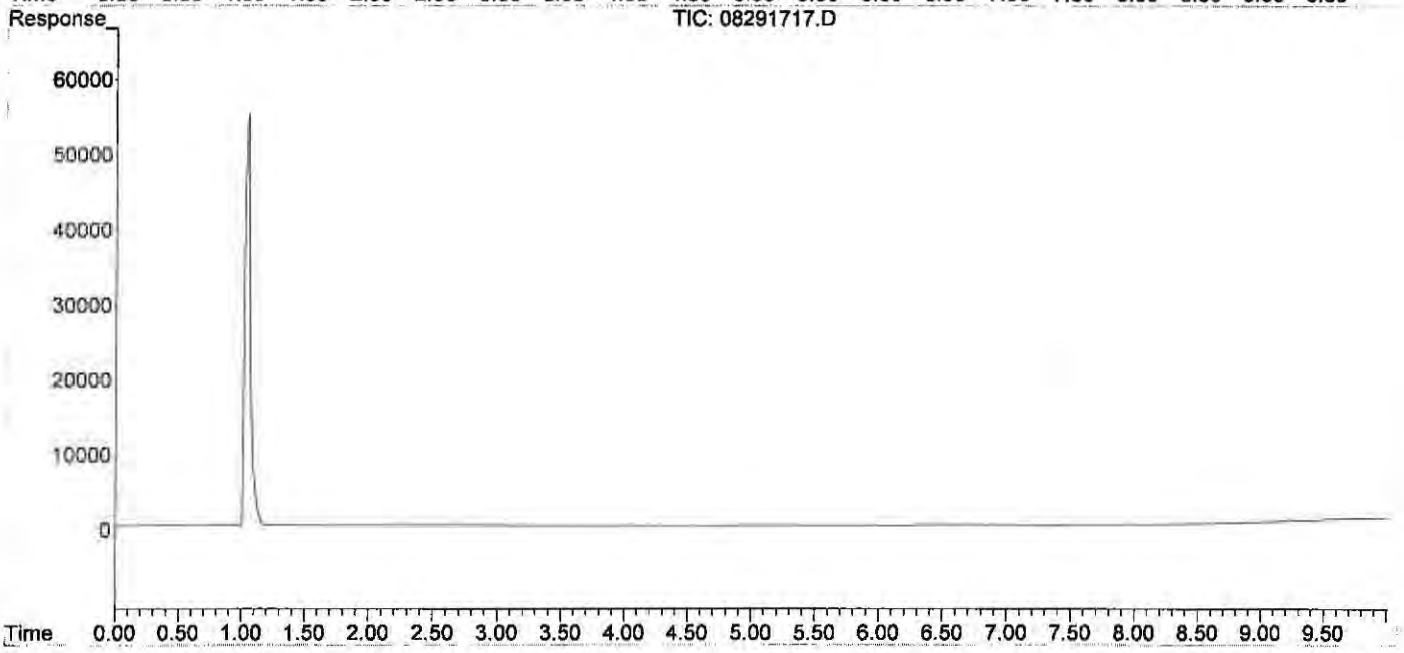
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2017_08\29\
Data File : 08291717.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 29-Aug-2017, 14:53
Operator : MC
Sample : 250ppm s32-08291702 0.5ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Aug 29 15:03:42 2017
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 14:52:06 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



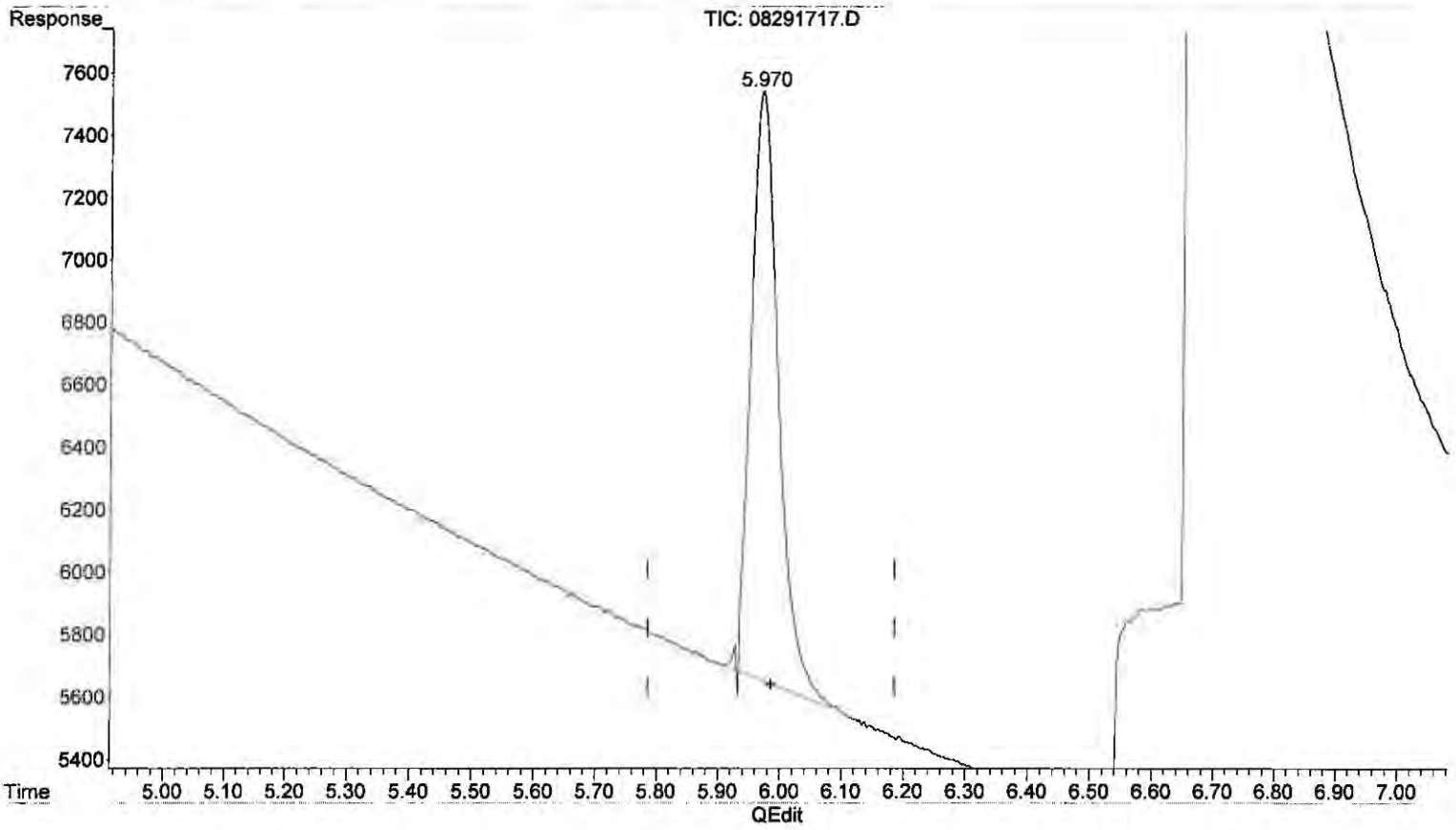


Quantitation Report (Qedit)

Data Path : J:\GC10\DATA\RSK_FID\2017_08\29\
Data File : 08291717.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 29-Aug-2017, 14:53
Operator : MC
Sample : 250ppm s32-08291702 0.5ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Aug 29 15:03:42 2017
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 14:52:06 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase :
Signal #1 Info :
Signal #2 Phase:
Signal #2 Info :



(4) Carbon dioxide

5.970min 240.204 ppm m

response 58461

(+) = Expected Retention Time

Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_08\29\
Data File : 08291719.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 29-Aug-2017, 15:23
Operator : MC
Sample : 2500ppm s32-08231701 50ul
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Aug 29 15:35:50 2017
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 15:04:14 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

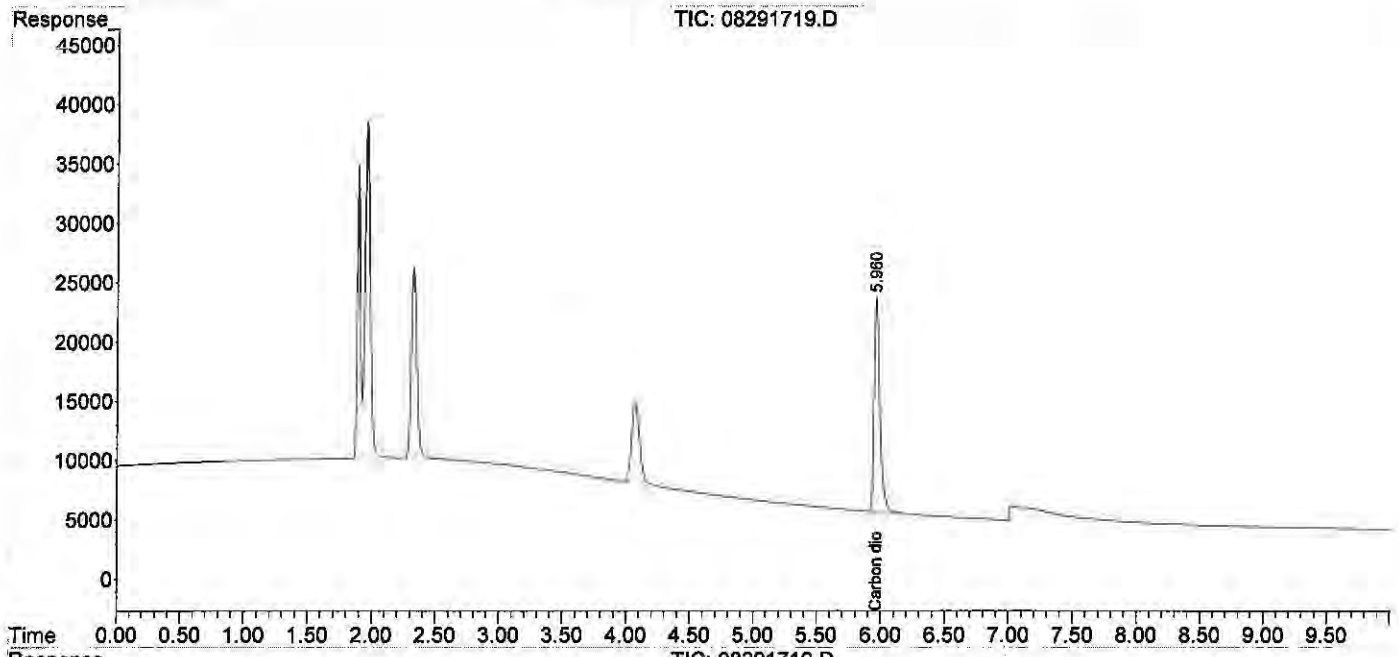
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	0.000	0	N.D.	ppm	d
2)	Carbon monoxide	1.891	425113	N.D.	ppm	
3)	Methane (TCD)	0.000	0	N.D.	ppm	d
4)	Carbon dioxide	5.962	568043	2369.673	ppm	
6)	Methane (FID)	0.000	0	N.D.	ppm	d
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	0	N.D.	ppm	
9)	Propylene	0.000	0	N.D.	ppm	
10)	Propane	0.000	0	N.D.	ppm	
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	0.000	0	N.D.	ppm	
13)	n-Butane	0.000	0	N.D.	ppm	

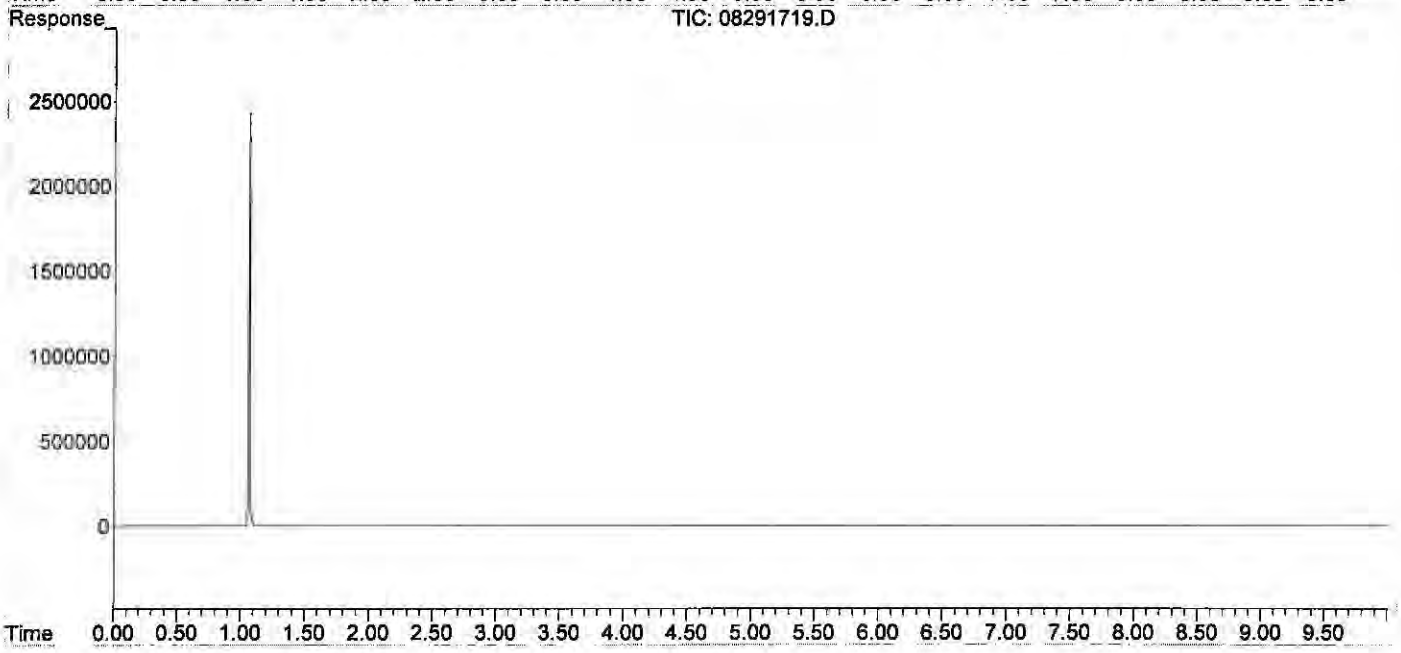
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2017_08\29\
Data File : 08291719.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 29-Aug-2017, 15:23
Operator : MC
Sample : 2500ppm s32-08231701 50ul
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Aug 29 15:35:50 2017
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 15:04:14 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_08\29\
Data File : 08291720.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 29-Aug-2017, 15:44
Operator : MC
Sample : 5000ppm s32-08231701 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Aug 29 15:57:17 2017
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 15:36:14 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

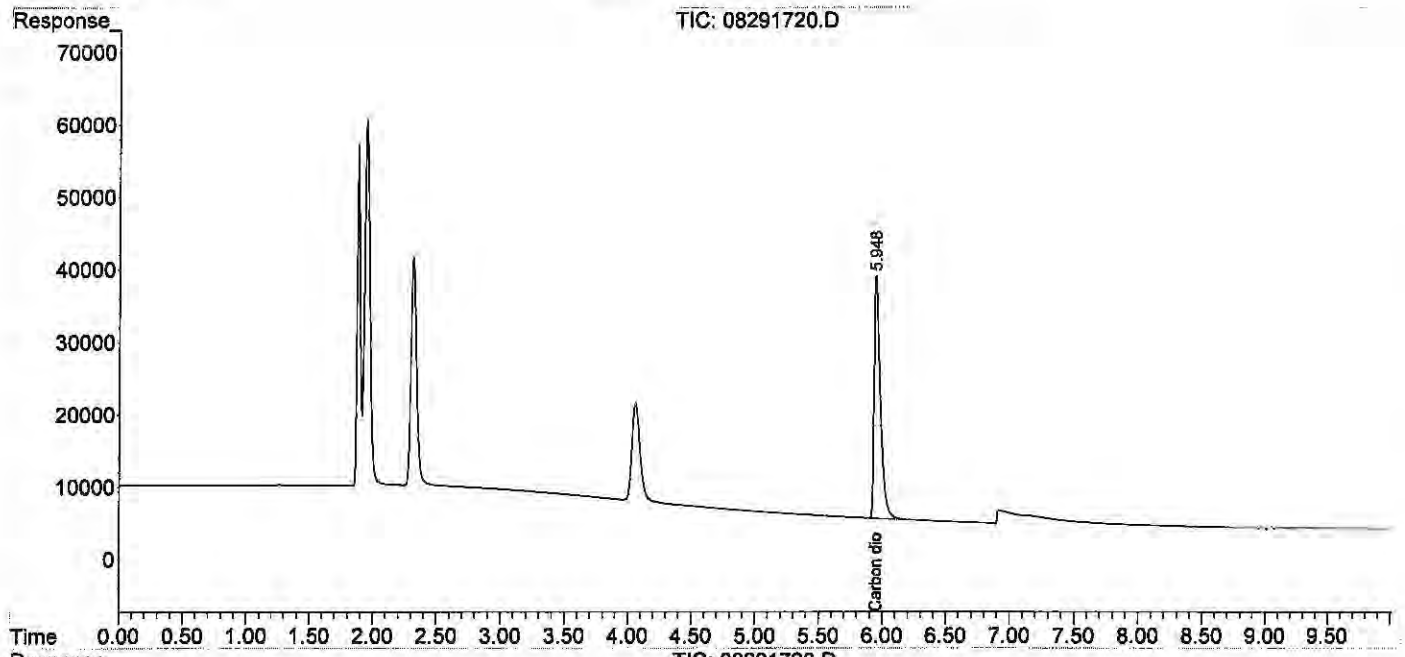
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	0.000	0	N.D.	ppm	d
2)	Carbon monoxide	1.880	819221	N.D.	ppm	
3)	Methane (TCD)	0.000	0	N.D.	ppm	d
4)	Carbon dioxide	5.948	1132363	4753.126	ppm	
6)	Methane (FID)	0.000	0	N.D.	ppm	d
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	0	N.D.	ppm	
9)	Propylene	0.000	0	N.D.	ppm	
10)	Propane	0.000	0	N.D.	ppm	
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	0.000	0	N.D.	ppm	
13)	n-Butane	0.000	0	N.D.	ppm	

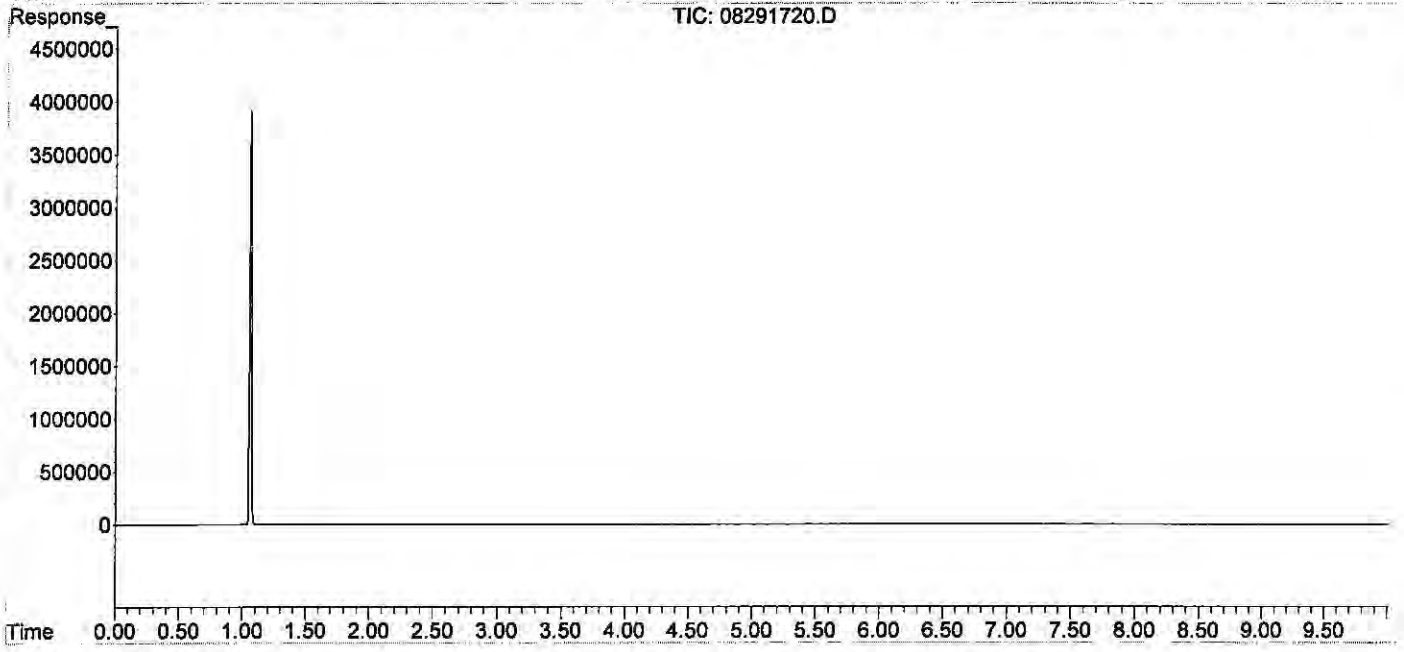
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2017_08\29\
Data File : 08291720.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 29-Aug-2017, 15:44
Operator : MC
Sample : 5000ppm s32-08231701 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Aug 29 15:57:17 2017
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 15:36:14 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_08\29\
Data File : 08291721.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 29-Aug-2017, 16:00
Operator : MC
Sample : 25000ppm s32-08231701 0.5ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Aug 29 16:12:53 2017
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 15:57:37 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	0.000	0	N.D.	ppm	d
2)	Carbon monoxide	1.827	3325463	N.D.	ppm	
3)	Methane (TCD)	0.000	0	N.D.	ppm	d
4)	Carbon dioxide	5.879f	5744295	24443.288	ppm	
6)	Methane (FID)	0.000	0	N.D.	ppm	d
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	0	N.D.	ppm	
9)	Propylene	0.000	0	N.D.	ppm	
10)	Propane	0.000	0	N.D.	ppm	
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	0.000	0	N.D.	ppm	
13)	n-Butane	0.000	0	N.D.	ppm	

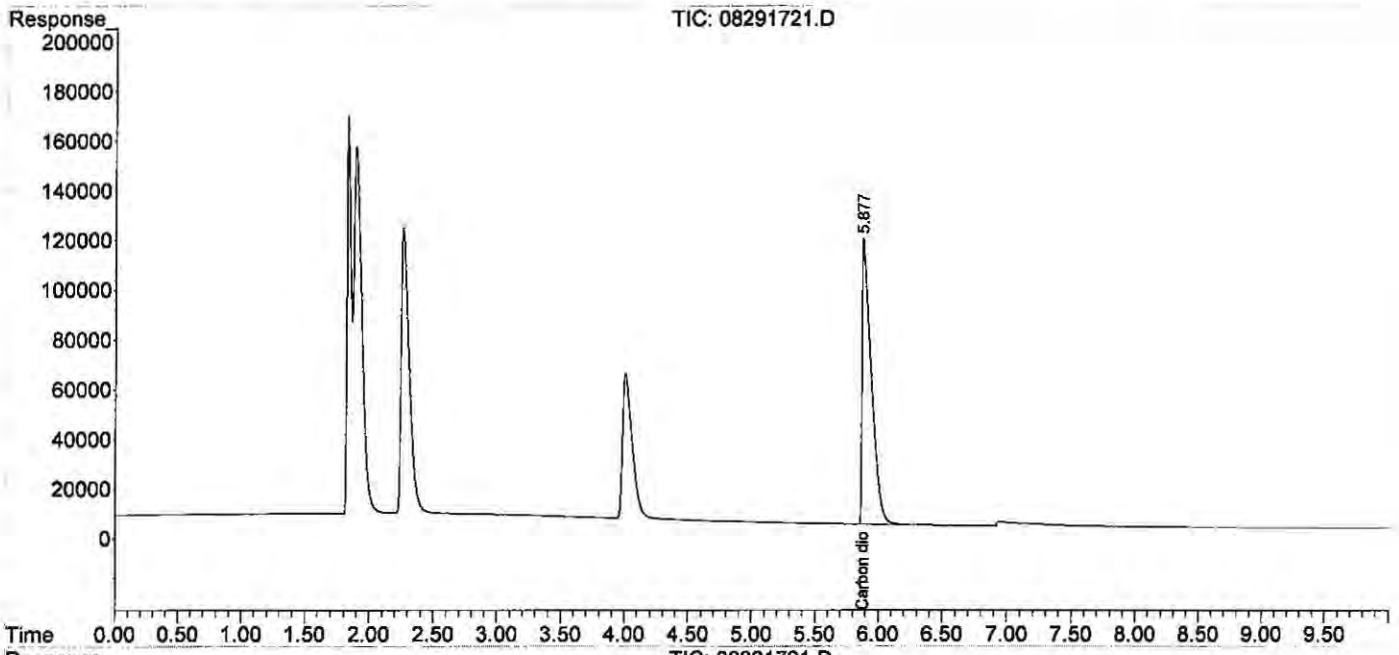
(f)=RT Delta > 1/2 Window (m)=manual int.

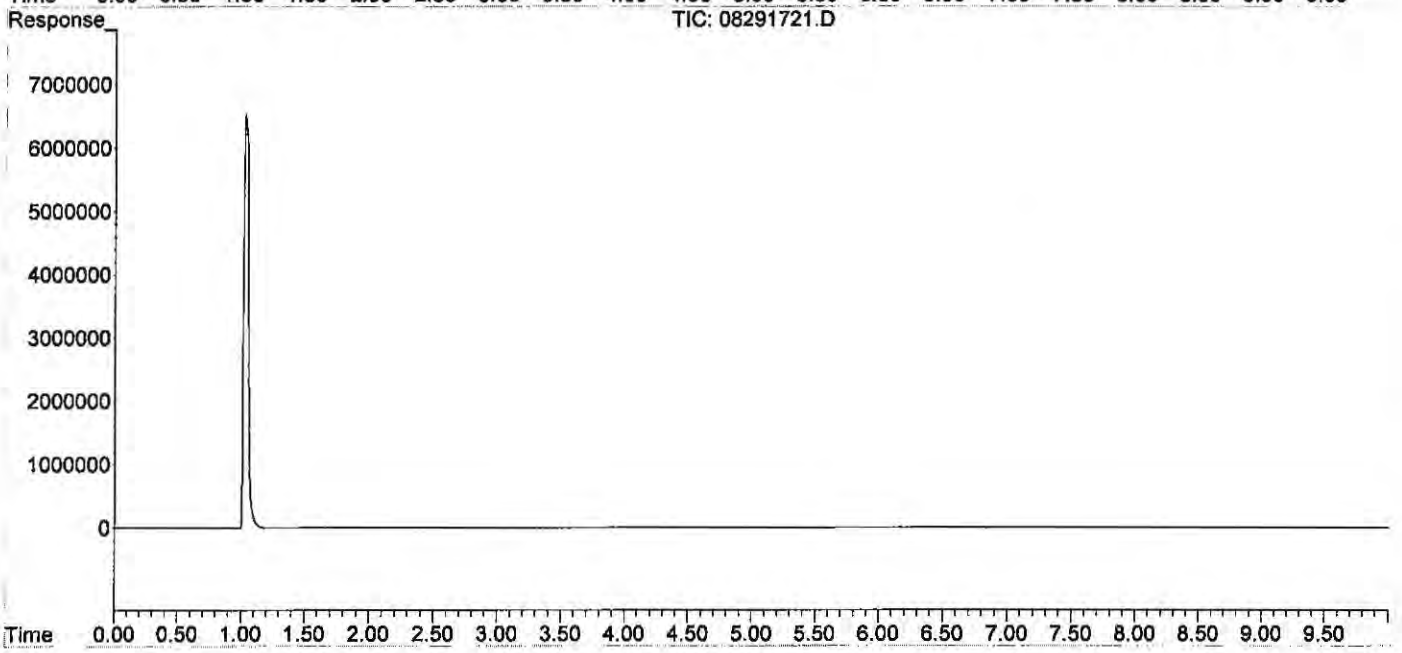
Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_08\29\
Data File : 08291721.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 29-Aug-2017, 16:00
Operator : MC
Sample : 25000ppm s32-08231701 0.5ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Aug 29 16:12:53 2017
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 15:57:37 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_08\29\
Data File : 08291723.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 29-Aug-2017, 16:35
Operator : MC
Sample : icv s30-07071701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Aug 29 16:54:07 2017
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.886	536422	0.113	ppm	Actual %D
2)	Carbon monoxide	1.886	536422	N.D.	ppm	
3)	Methane (TCD)	4.059f	626500	66244.710	ppm	
4)	Carbon dioxide	5.947	1163775	4957.948	ppm	5000 99.16
6)	Methane (FID)	1.062	37290742	3947.023	ppm	
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	0	N.D.	ppm	
9)	Propylene	0.000	0	N.D.	ppm	
10)	Propane	0.000	0	N.D.	ppm	
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	0.000	0	N.D.	ppm	
13)	n-Butane	0.000	0	N.D.	ppm	

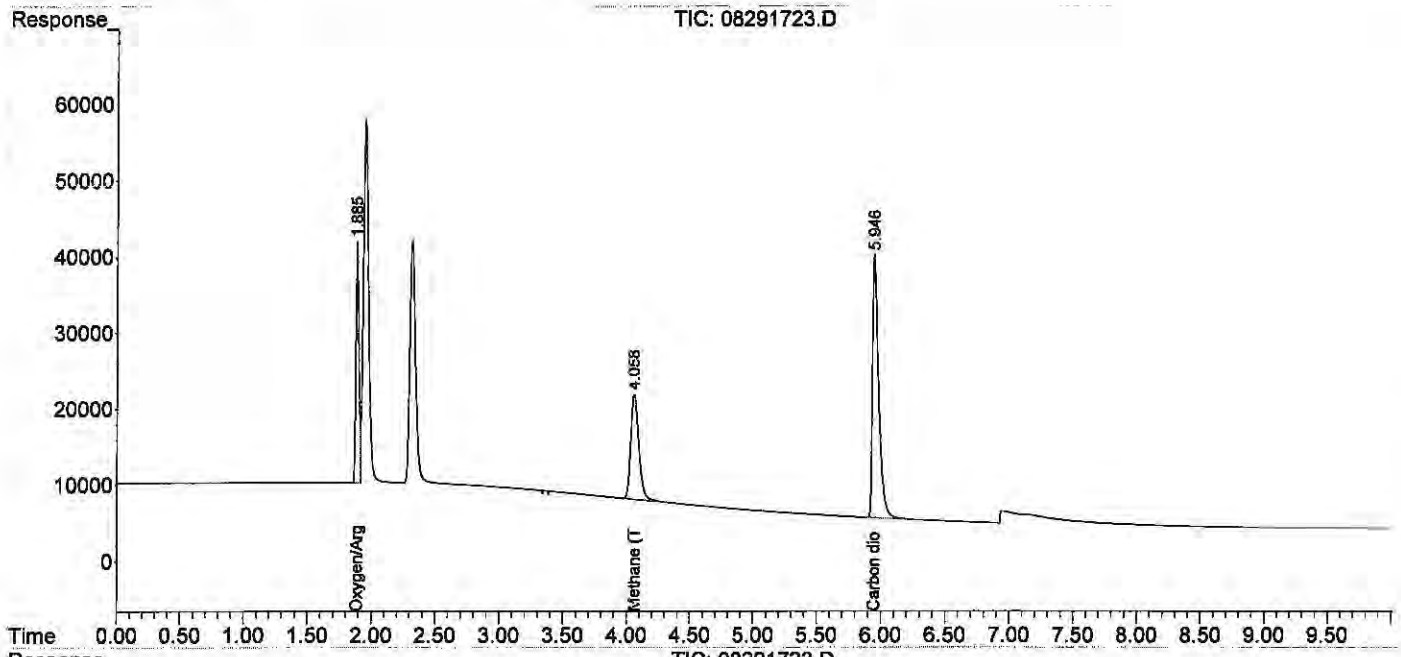
(f)=RT Delta > 1/2 Window (m)=manual int.

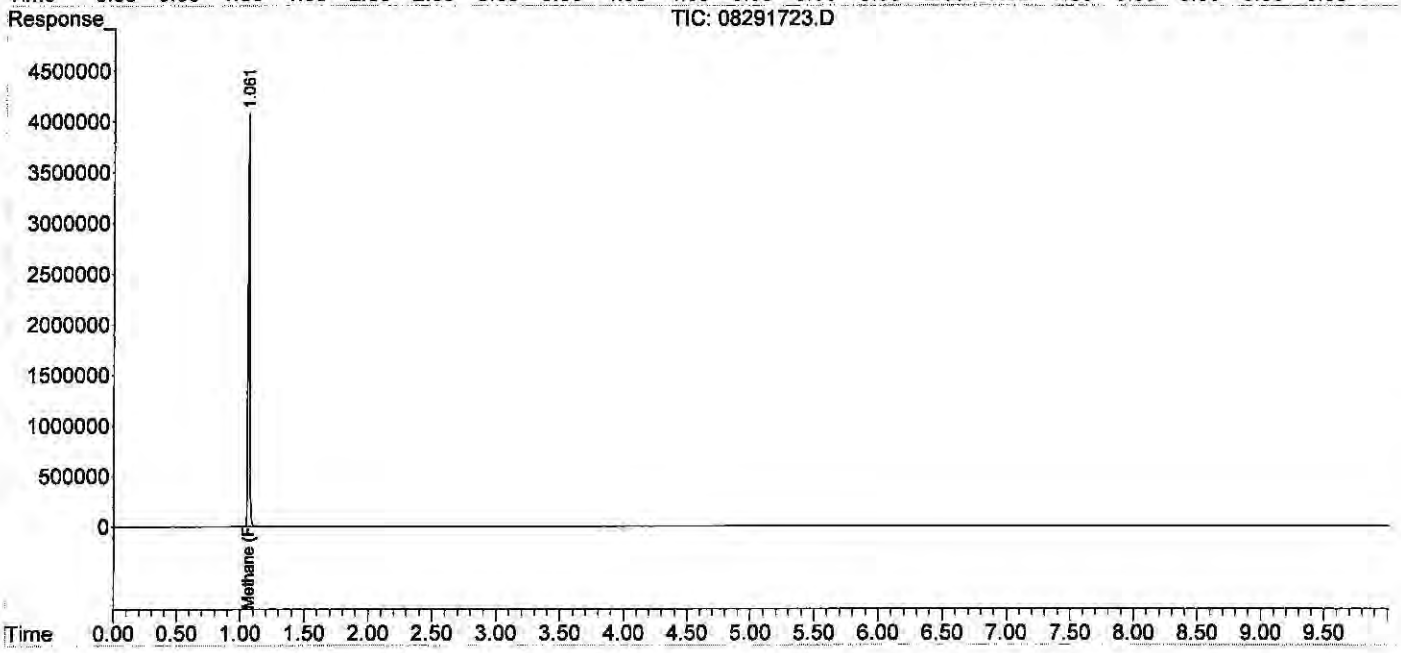
9/4/17

Data Path : J:\GC10\DATA\RSK_FID\2017_08\29\
Data File : 08291723.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 29-Aug-2017, 16:35
Operator : MC
Sample : icv s30-07071701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Aug 29 16:54:07 2017
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Dissolved Gases by RSK175

ALS Environmental

Method : RSK175 Headspace Method for Dissolved Hydrocarbon in Water by FID/TCD
Client : ALS Laboratory Group
Service Request: P1907040
Sample Vol. (ml) : 32.00 ml
Analyst : WH/LD
Date Analysis : 11/22/19
Head Space Vol.(ml) : 8.00 ml
Instrument : GC#10
Detector : FID#10, TCD#10
Gas Constant : 24.05684 (20°C)

HEAD SPACE RESULT (ppm)

Sample ID	Inj. Vol.	Carbon Dioxide
STD S32-10291901	0.100	5125.467
ACTUAL		5000.00
%Difference		2.5%
MCS 0.1ml	0.100	0.000
RB 0.1ml	0.100	0.000
LCS S32-08141901	0.100	867.235
LCSD S32-08141901	0.100	890.632
P1907040-001 0.1ml	0.100	1210.421
P1907040-002 0.1ml	0.100	4460.958
P1907040-003 0.1ml	0.100	3932.958
P1907040-004 0.1ml	0.100	8493.089
P1907040-004ms 0.1ml	0.100	8932.435
P1907040-004msd 0.1ml	0.100	9747.190
STD S32-10291901		5111.680
ACTUAL		5000.00
%Difference		2.2%

FINAL HEAD SPACE RESULT (ppm)

	Carbon Dioxide
WWt.	44.10
HENRY'S CONSTANT	1.42E+03
RL	100.00
MCS 0.1ml	0.000
LCS S32-08141901	8672.350
LCSD S32-08141901	8906.320
P1907040-001 0.1ml	12104.210
P1907040-002 0.1ml	44609.580
P1907040-003 0.1ml	39329.580
P1907040-004 0.1ml	84930.890
P1907040-004ms 0.1ml	89324.350
P1907040-004msd 0.1ml	97471.900

Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\22\
Data File : 11221901.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 22-Nov-2019, 10:14:15
Operator : WH/LD
Sample : STD S32-10291901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 22 09:27:35 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

LD
11/22

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

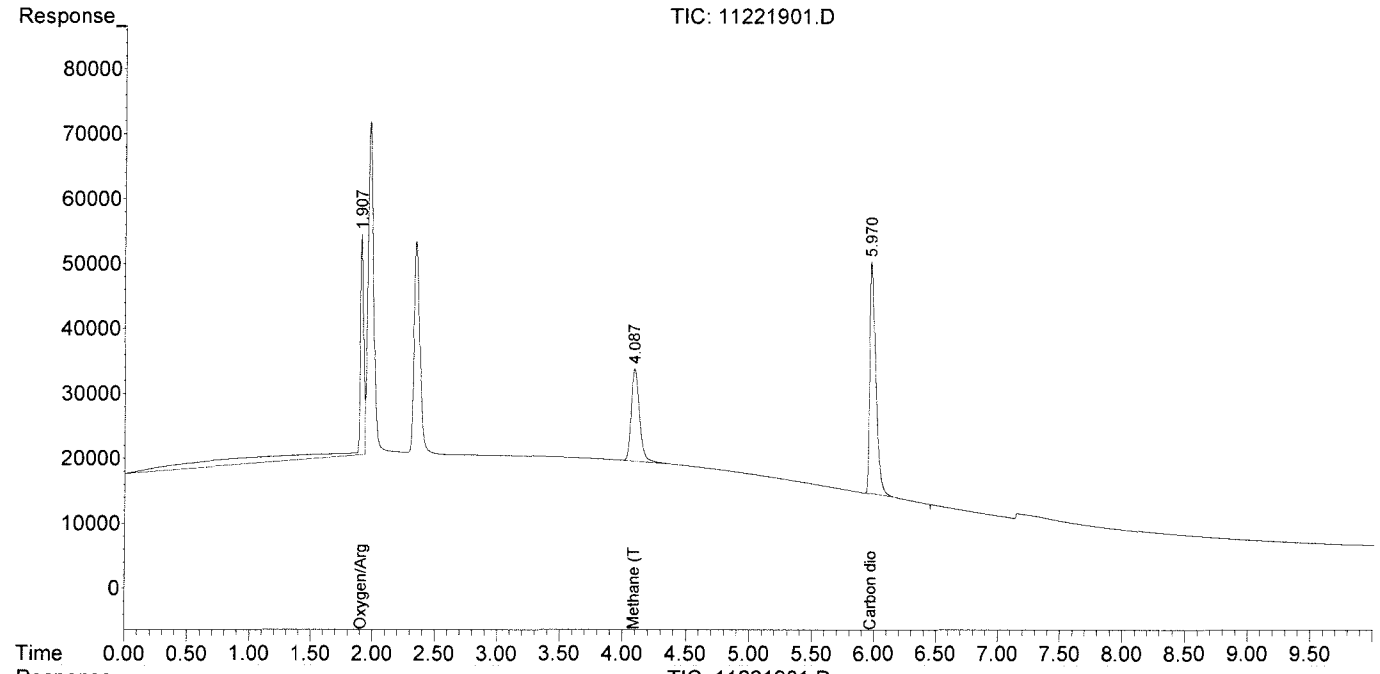
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.907f	1333782	0.280	ppm	
2)	Carbon monoxide	1.907f	1333782	N.D.	ppm	
3)	Methane (TCD)	4.088f	657984	69573.756	ppm	
4)	Carbon dioxide	5.970	1203097	5125.467	ppm	m
6)	Methane (FID)	0.000	0	N.D.	ppm	
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	0	N.D.	ppm	
9)	Propylene	0.000	0	N.D.	ppm	
10)	Propane	0.000	0	N.D.	ppm	
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	0.000	0	N.D.	ppm	
13)	n-Butane	0.000	0	N.D.	ppm	

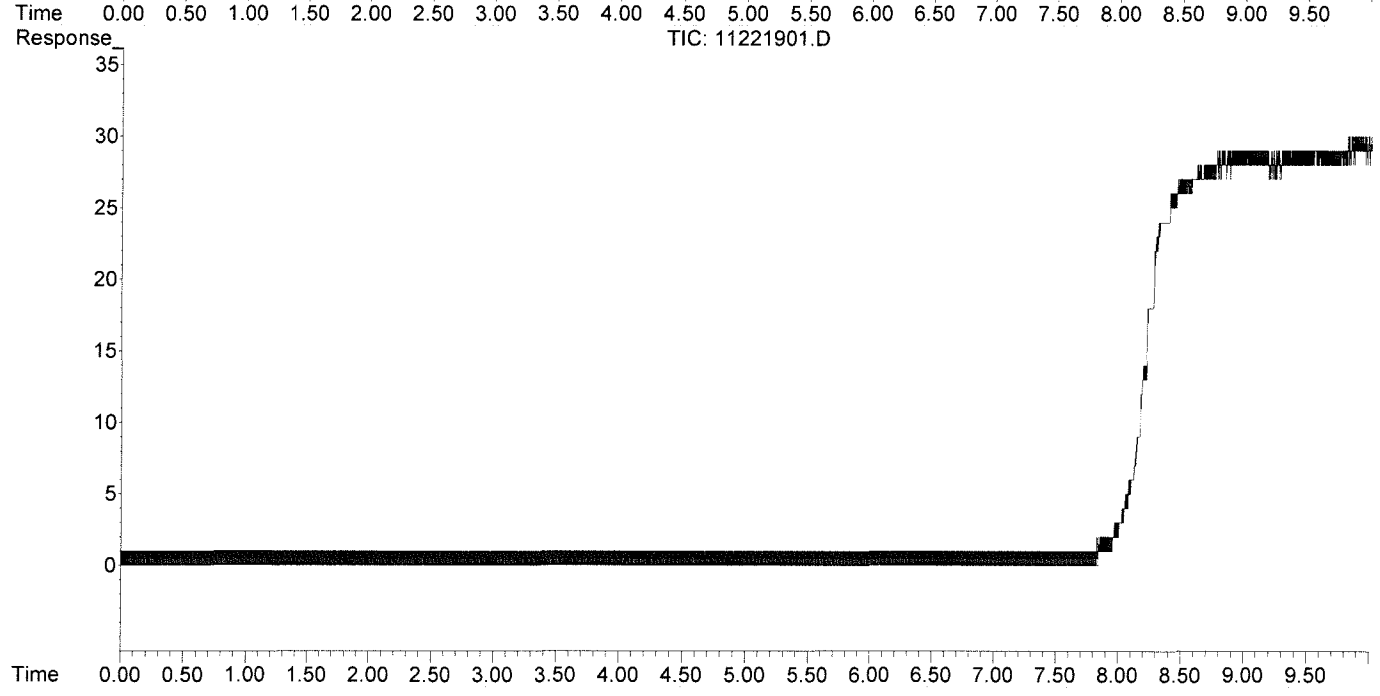
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\22\
Data File : 11221901.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 22-Nov-2019, 10:14:15
Operator : WH/LD
Sample : STD S32-10291901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 22 09:27:35 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



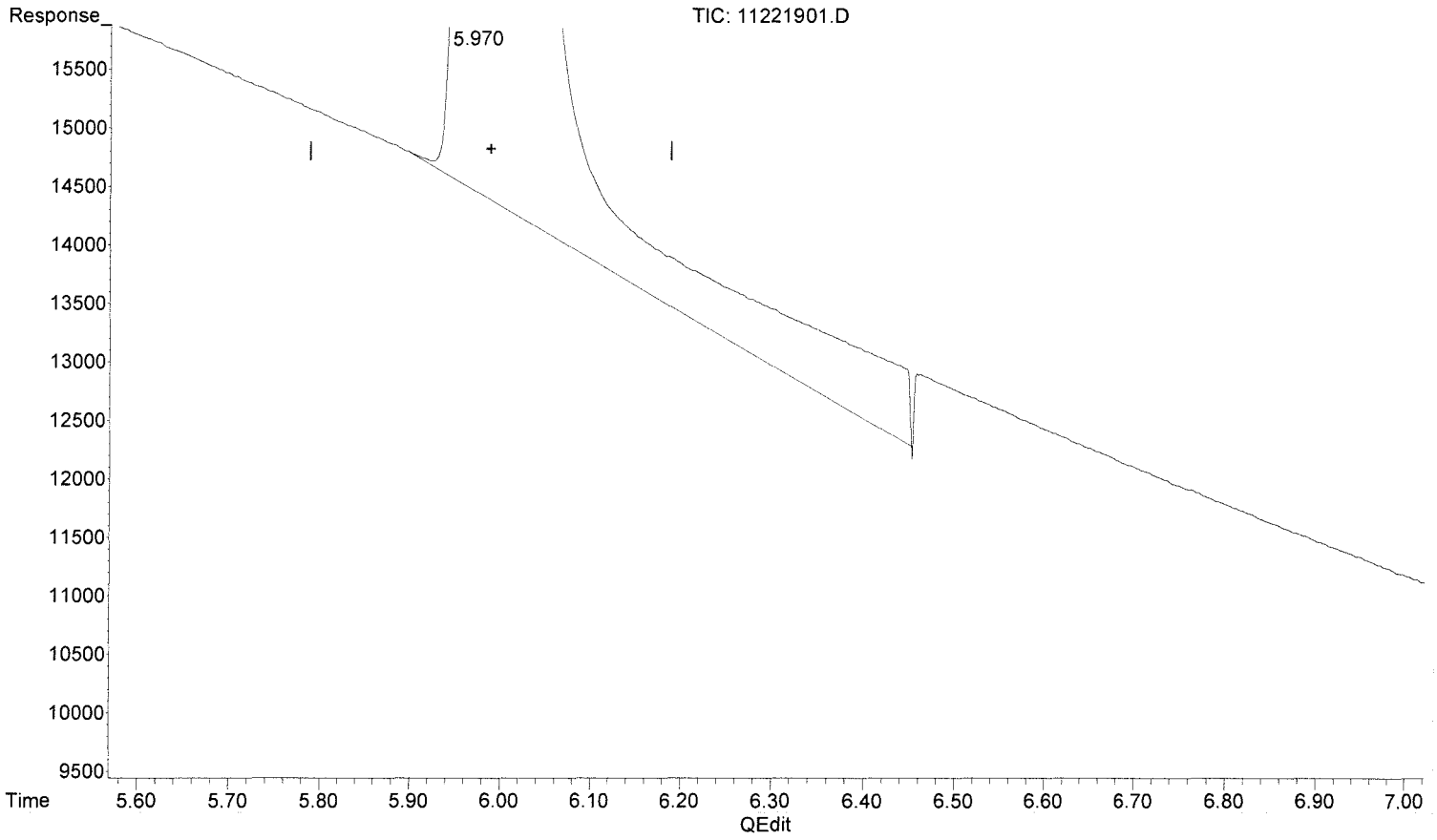


00988778

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\22\
Data File : 11221901.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 22-Nov-2019, 10:14:15
Operator : WH/LD
Sample : STD S32-10291901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 22 09:27:35 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



(4) Carbon dioxide

5.971min 5637.258 ppm

response 1323229

(+) = Expected Retention Time

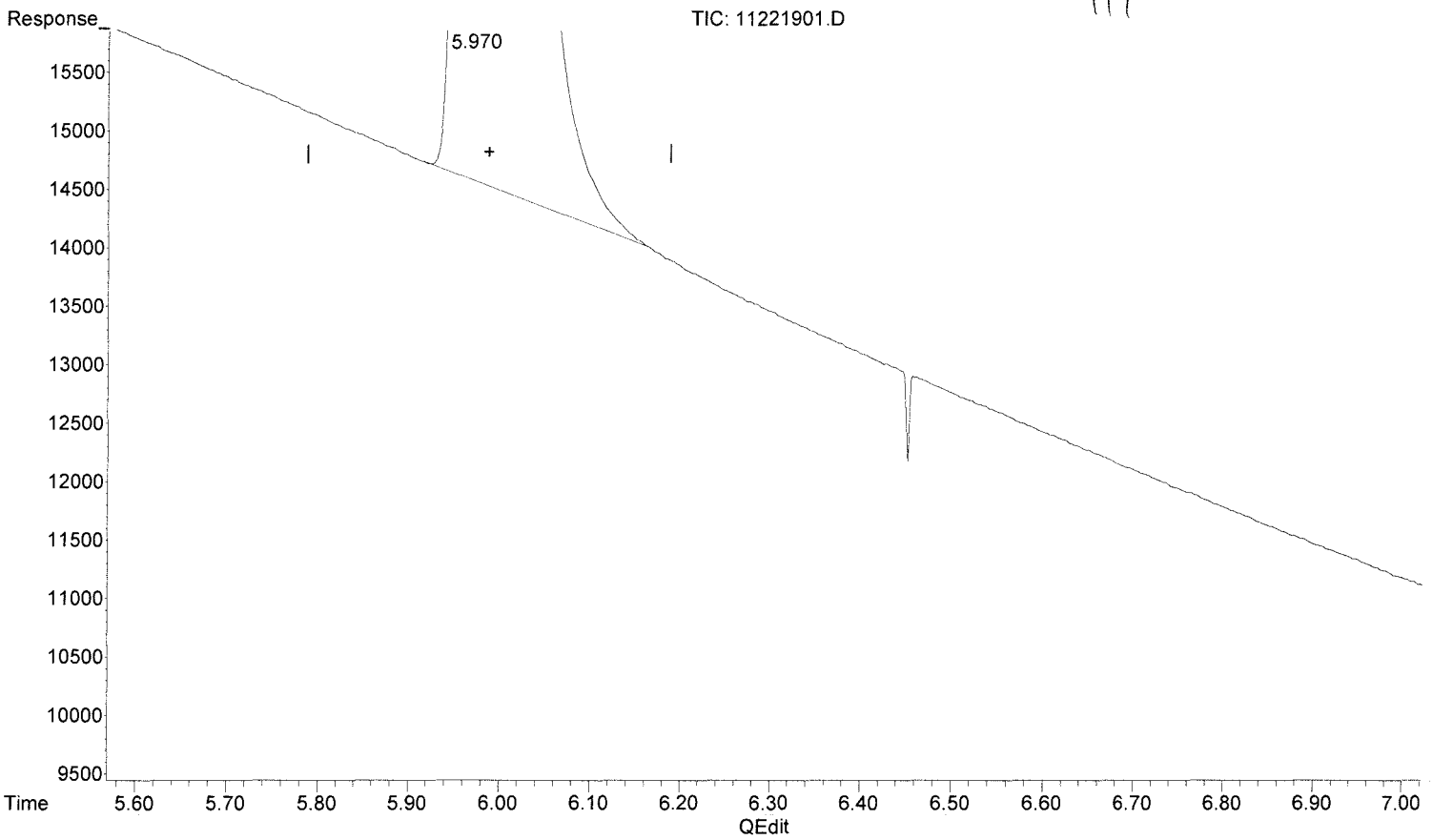
00988779

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\22\
Data File : 11221901.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 22-Nov-2019, 10:14:15
Operator : WH/LD
Sample : STD S32-10291901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 22 09:27:35 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

LD BLC 11/22



(4) Carbon dioxide

5.970min 5125.467 ppm m

response 1203097

11/22/19 MR 11/25/19

(+) = Expected Retention Time

Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\22\
Data File : 11221910.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 22-Nov-2019, 15:00:37
Operator : WH/LD
Sample : STD S32-10291901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 22 14:09:24 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

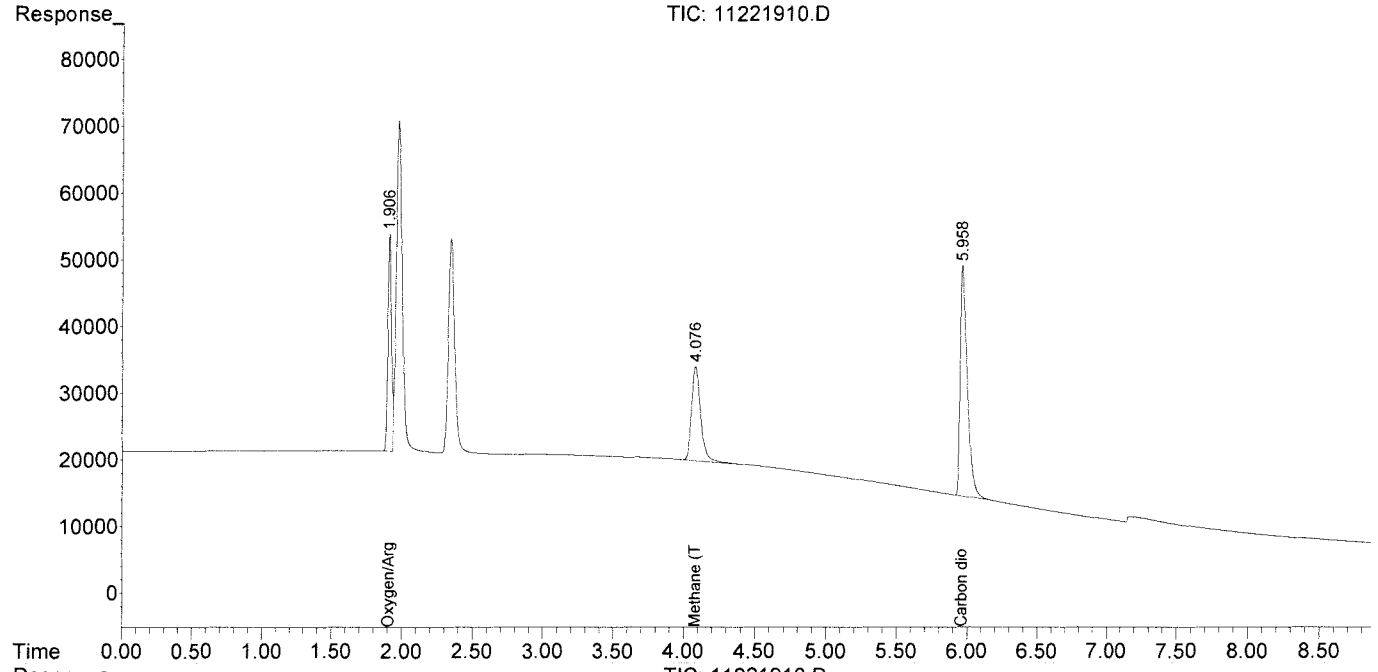
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.907f	567230	0.119	ppm	
2)	Carbon monoxide	1.907f	567230	N.D.	ppm	
3)	Methane (TCD)	4.077f	652521	68996.127	ppm	
4)	Carbon dioxide	5.958	1188740	5064.306	ppm	m
6)	Methane (FID)	0.000	0	N.D.	ppm	
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	0	N.D.	ppm	
9)	Propylene	0.000	0	N.D.	ppm	
10)	Propane	0.000	0	N.D.	ppm	
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	0.000	0	N.D.	ppm	
13)	n-Butane	0.000	0	N.D.	ppm	

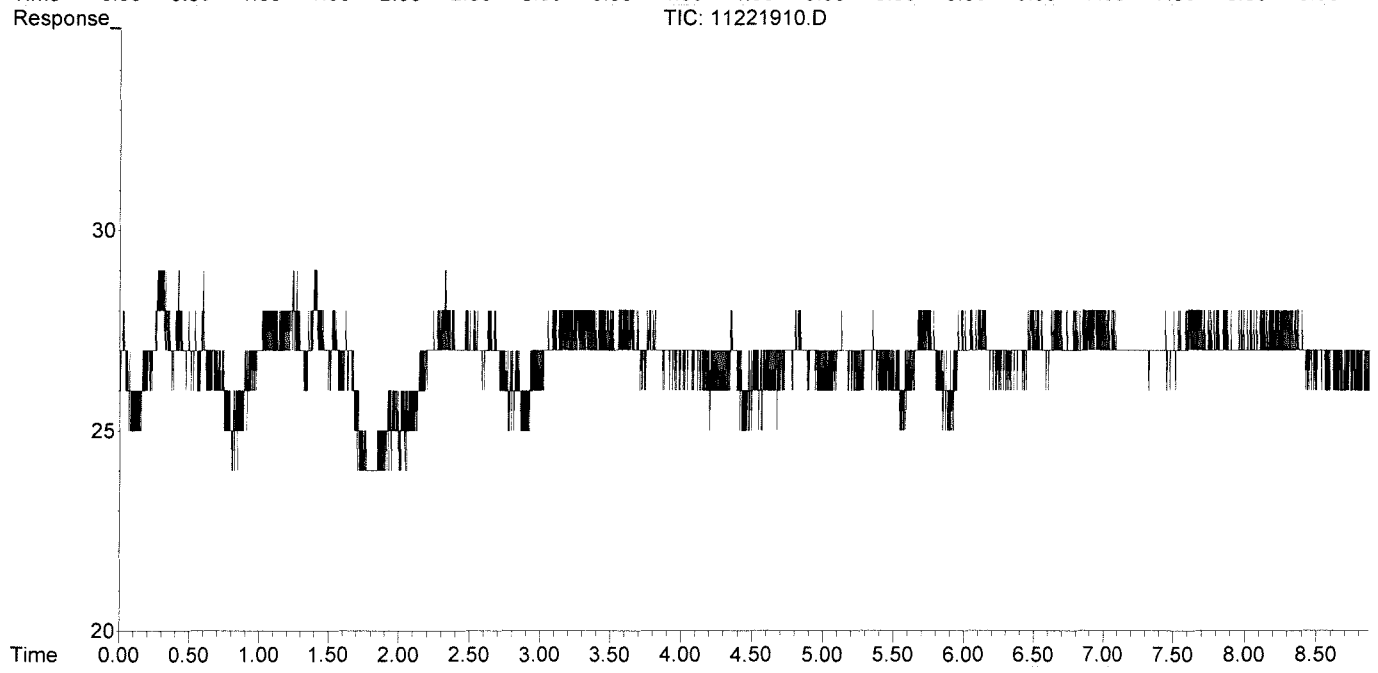
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\22\
Data File : 11221910.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 22-Nov-2019, 15:00:37
Operator : WH/LD
Sample : STD S32-10291901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 22 14:09:24 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



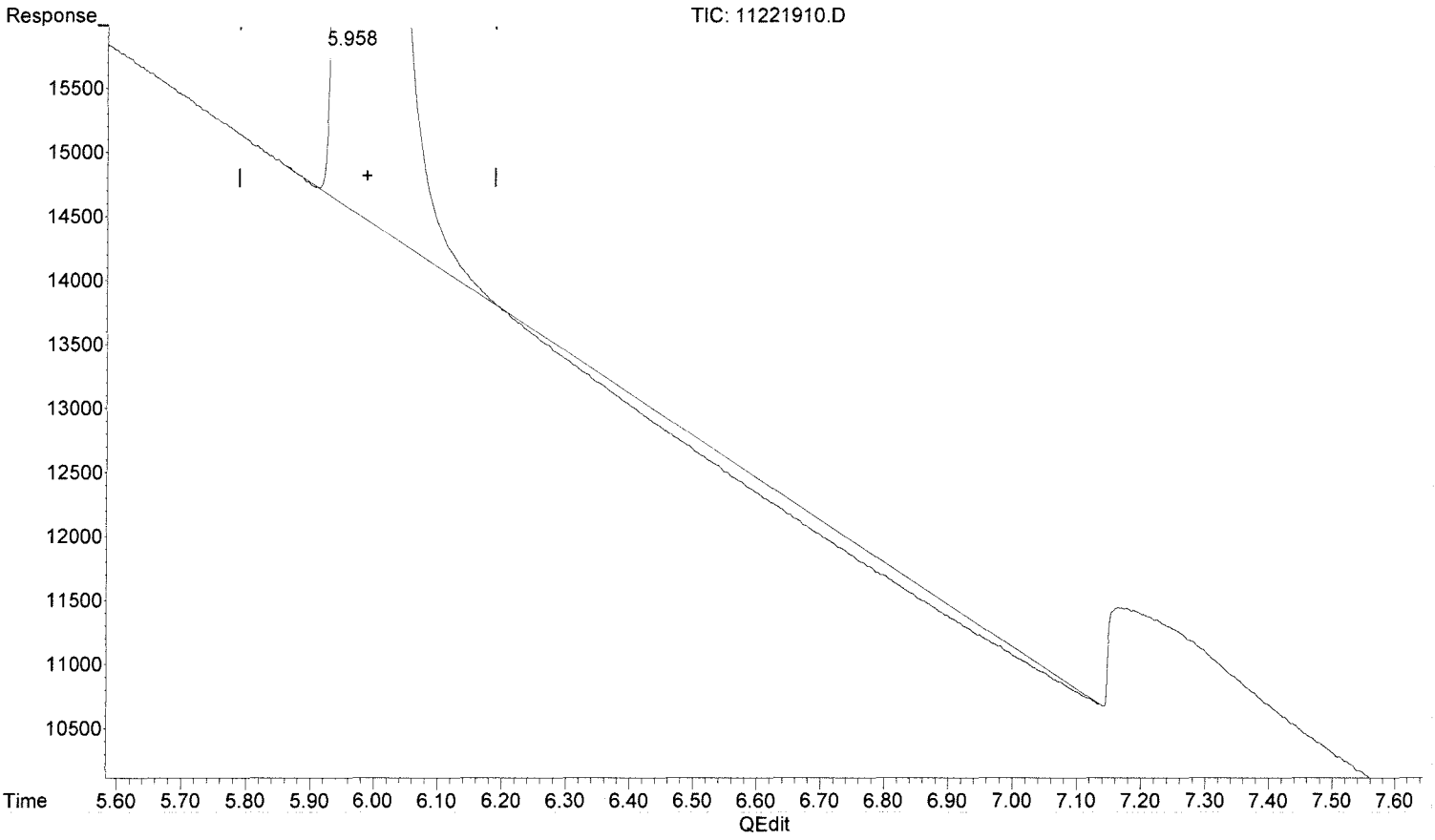


00988782

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\22\
Data File : 11221910.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 22-Nov-2019, 15:00:37
Operator : WH/LD
Sample : STD S32-10291901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 22 14:09:24 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



(4) Carbon dioxide

5.959min 4884.583 ppm

response 1146554

(+) = Expected Retention Time

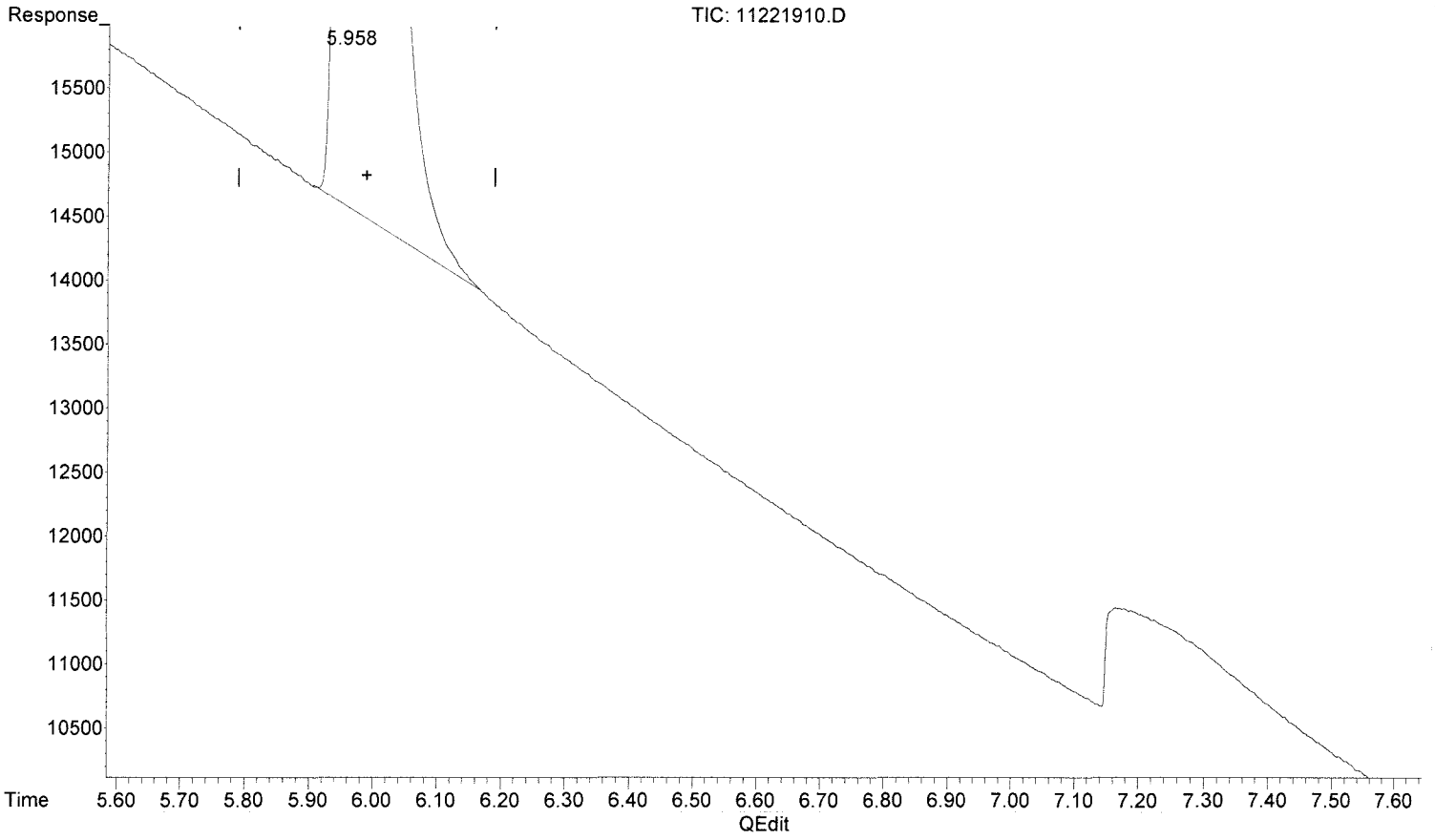
00988783

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\22\
Data File : 11221910.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 22-Nov-2019, 15:00:37
Operator : WH/LD
Sample : STD S32-10291901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 22 14:09:24 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

CD 11/22 BLC

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



(4) Carbon dioxide

5.958min 5064.306 ppm m

response 1188740

11/22/19

MK 11/23/19

(+) = Expected Retention Time
RS082817_CO2.M Fri Nov 22 14:09:48 2019

Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\22\
Data File : 11221914.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 22-Nov-2019, 18:57:21
Operator : WH/LD
Sample : STD S32-10291901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 25 09:56:29 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

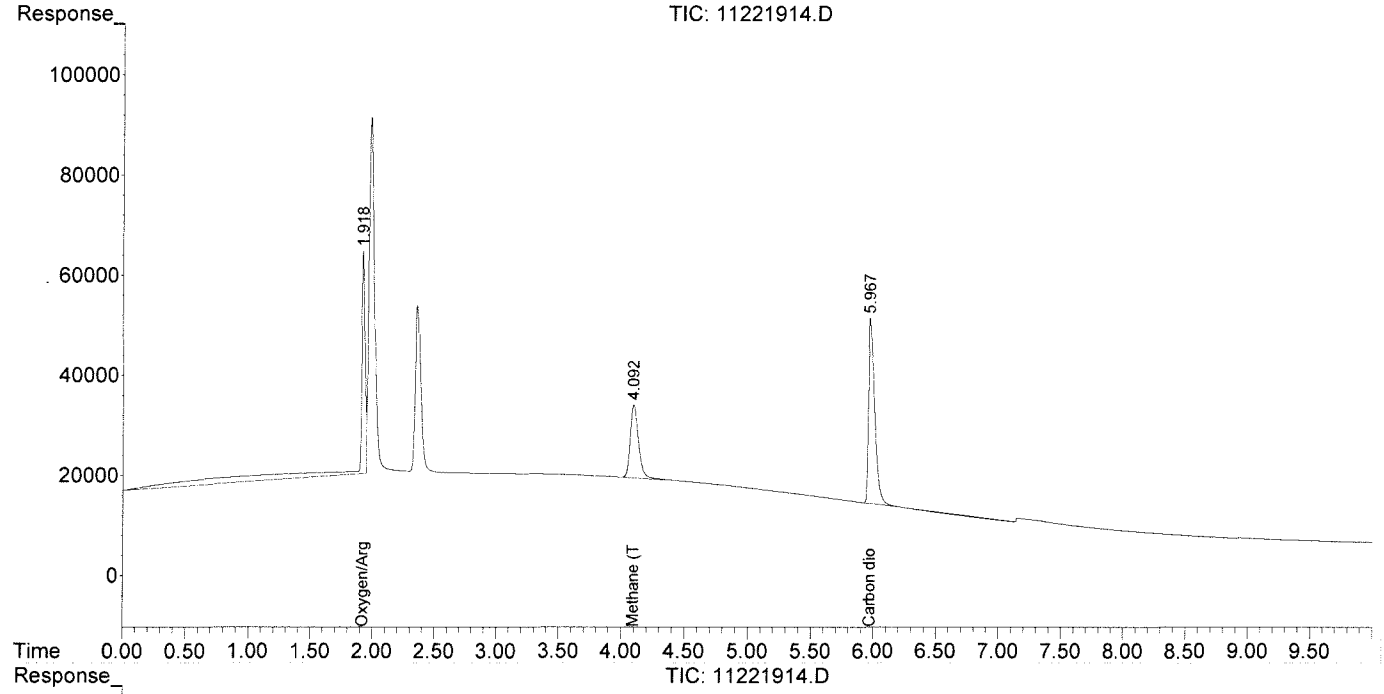
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.919f	1733540	0.364	ppm
2)	Carbon monoxide	1.919f	1733540	N.D.	ppm
3)	Methane (TCD)	4.093f	671120	70962.798	ppm
4)	Carbon dioxide	5.968	1199860	5111.680	ppm
6)	Methane (FID)	0.000	0	N.D.	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	0.000	0	N.D.	ppm
10)	Propane	0.000	0	N.D.	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	0.000	0	N.D.	ppm
13)	n-Butane	0.000	0	N.D.	ppm

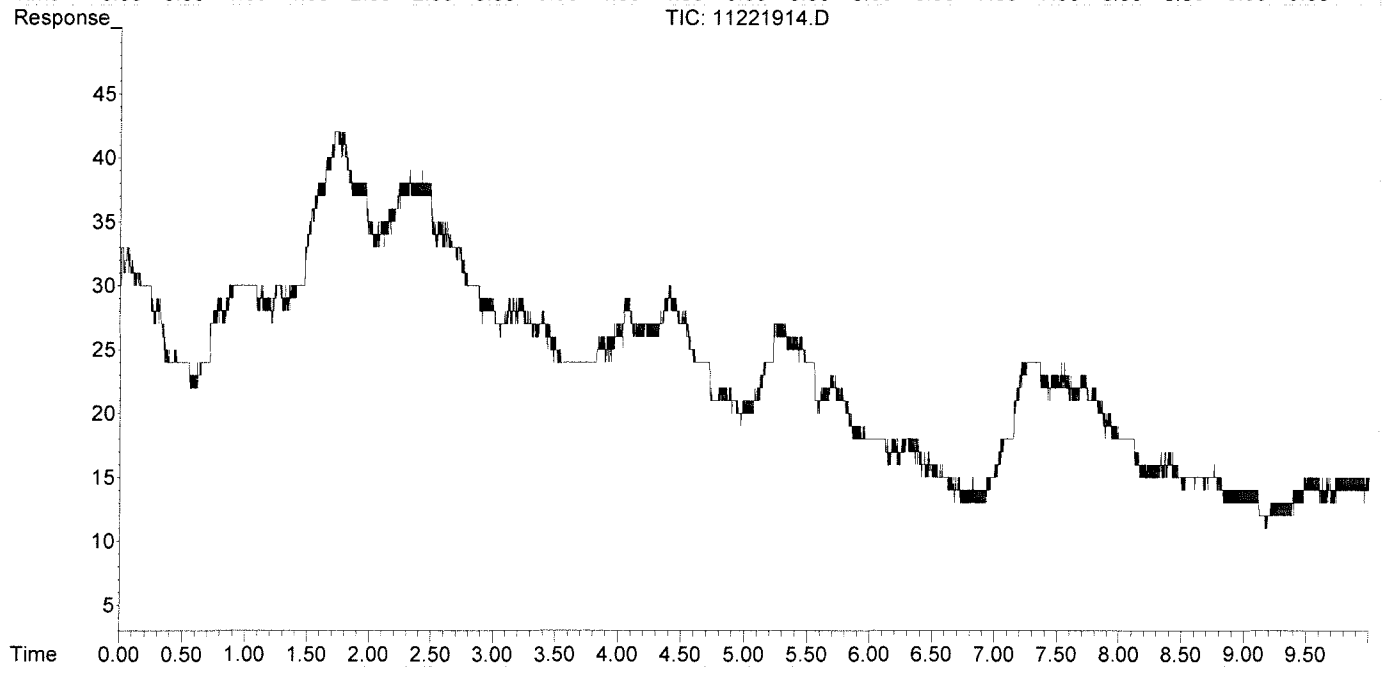
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_TCD\2019_11\22\
Data File : 11221914.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 22-Nov-2019, 18:57:21
Operator : WH/LD
Sample : STD S32-10291901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 25 09:56:29 2019
Quant Method : I:\GC10\METHODS\RS082817_CO2.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Tue Aug 29 16:13:13 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Injection Log

Directory: I:\GC10\DATA\RSK_FID\2017_08\29\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Acquisition Method	Comments
1	29-Aug-17, 07:58:00	08291701.D	std s30-06161601		MC	RSKBOTH.M	Pass
2	29-Aug-17, 08:11:02	08291702.D	mb 0.5ml		MC	RSKBOTH.M	Pass
3	29-Aug-17, 08:24:13	08291703.D	4089-001 0.5ml		MC	RSKBOTH.M	
4	29-Aug-17, 08:39:29	08291704.D	4089-002 0.5ml		MC	RSKBOTH.M	
5	29-Aug-17, 08:53:38	08291705.D	4089-003 0.5ml		MC	RSKBOTH.M	
6	29-Aug-17, 09:33:52	08291706.D	4089-004 0.5ml		MC	RSKBOTH.M	
7	29-Aug-17, 09:50:51	08291707.D	4089-005 0.5ml		MC	RSKBOTH.M	
8	29-Aug-17, 10:07:54	08291708.D	4089-006 0.5ml		MC	RSKBOTH.M	
9	29-Aug-17, 10:42:34	08291709.D	4089-007 0.5ml		MC	RSKBOTH.M	
10	29-Aug-17, 11:06:01	08291710.D	4089-008 0.5ml		MC	RSKBOTH.M	
11	29-Aug-17, 11:23:53	08291711.D	4089-009 0.5ml		MC	RSKBOTH.M	
12	29-Aug-17, 11:37:17	08291712.D	lcs s30-05241604		MC	RSKBOTH.M	Pass
13	29-Aug-17, 11:50:31	08291713.D	lcs s30-05241604		MC	RSKBOTH.M	Pass
14	29-Aug-17, 12:29:45	08291714.D	std s30-06161601		MC	RSKBOTH.M	Pass
15	29-Aug-17, 14:07:01	08291715.D	25ppm s32-08291701 0.25ml		MC	RSKBOTH.M	Curve
16	29-Aug-17, 14:22:12	08291716.D	100ppm s32-08291702 0.2ml		MC	RSKBOTH.M	Curve
17	29-Aug-17, 14:53:00	08291717.D	250ppm s32-08291702 0.5ml		MC	RSKBOTH.M	Curve
18	29-Aug-17, 15:07:43	08291718.D	mls inject		MC	RSKBOTH.M	
19	29-Aug-17, 15:23:21	08291719.D	2500ppm s32-08231701 50ul		MC	RSKBOTH.M	Curve
20	29-Aug-17, 15:44:54	08291720.D	5000ppm s32-08231701 0.1ml		MC	RSKBOTH.M	Curve
21	29-Aug-17, 16:00:09	08291721.D	25000ppm s32-08231701 0.5ml		MC	RSKBOTH.M	Curve
22	29-Aug-17, 16:15:43	08291722.D	mb 0.1ml		MC	RSKBOTH.M	Pass
23	29-Aug-17, 16:35:37	08291723.D	lcv s30-07071701		MC	RSKBOTH.M	Pass

Injection Log

Directory: I:\GC10\DATA\RSK_TCD\2019_11\22\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Acquisition Method	Comments
1	22-Nov-19, 10:14:15	11221901.D	STD S32-10291901		WH/LD	RSKBOTH.M	pass
2	22-Nov-19, 10:29:49	11221902.D	RB 0.1ml		WH/LD	RSKBOTH.M	pass
3	22-Nov-19, 12:56:11	11221903.D	MCS 0.1ml		WH/LD	RSKBOTH.M	pass
4	22-Nov-19, 13:10:20	11221904.D	LCS S32-08141901		WH/LD	RSKBOTH.M	pass
5	22-Nov-19, 13:23:19	11221905.D	LCSD S32-08141901		WH/LD	RSKBOTH.M	pass
6	22-Nov-19, 13:36:14	11221906.D	P1907040-001 0.1ml		WH/LD	RSKBOTH.M	
7	22-Nov-19, 13:49:08	11221907.D	P1907040-002 0.1ml		WH/LD	RSKBOTH.M	
8	22-Nov-19, 14:23:57	11221908.D	P1907040-003 0.1ml		WH/LD	RSKBOTH.M	
9	22-Nov-19, 14:44:44	11221909.D	P1907040-004 0.1ml		WH/LD	RSKBOTH.M	
10	22-Nov-19, 15:00:37	11221910.D	STD S32-10291901		WH/LD	RSKBOTH.M	pass

Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2019_11\25\
Data File : 11251908.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 25-Nov-2019, 13:39:41
Operator : WH/LD
Sample : P1907040-001 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 25 12:54:17 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

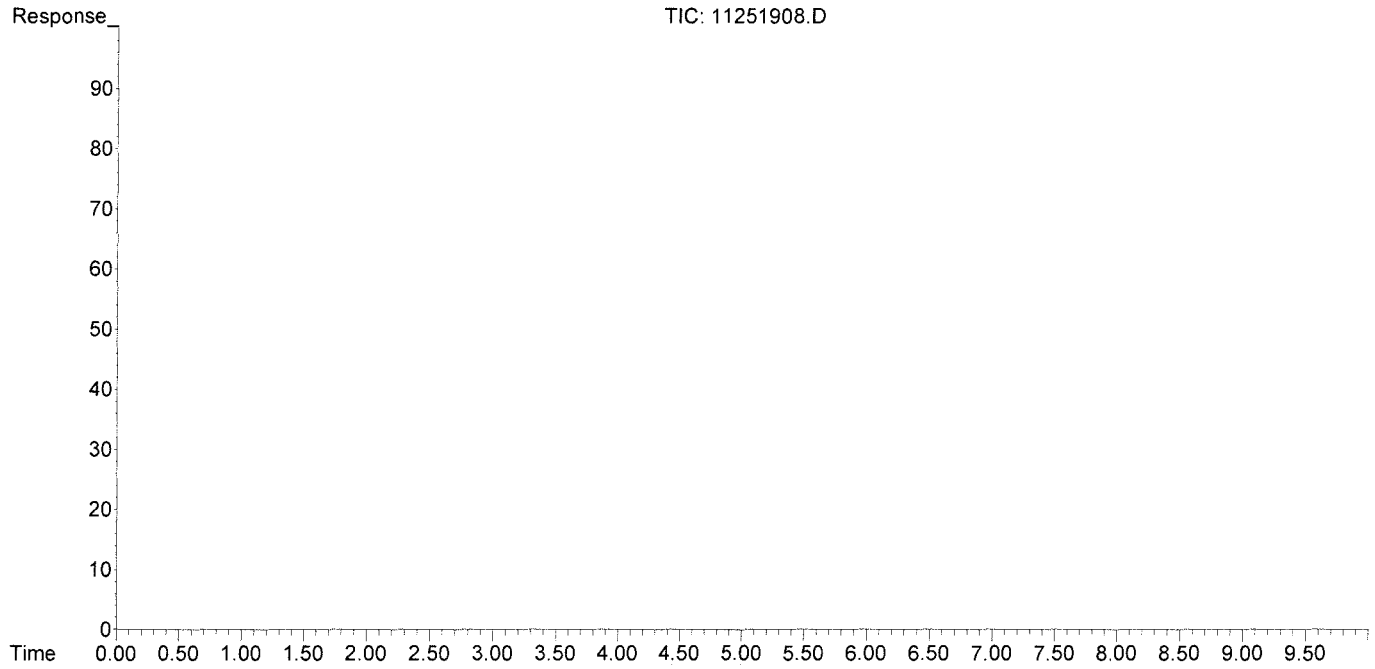
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.123	14169	1.562	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	0.000	0	N.D.	ppm
10)	Propane	0.000	0	N.D.	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	0.000	0	N.D.	ppm
13)	n-Butane	0.000	0	N.D.	ppm

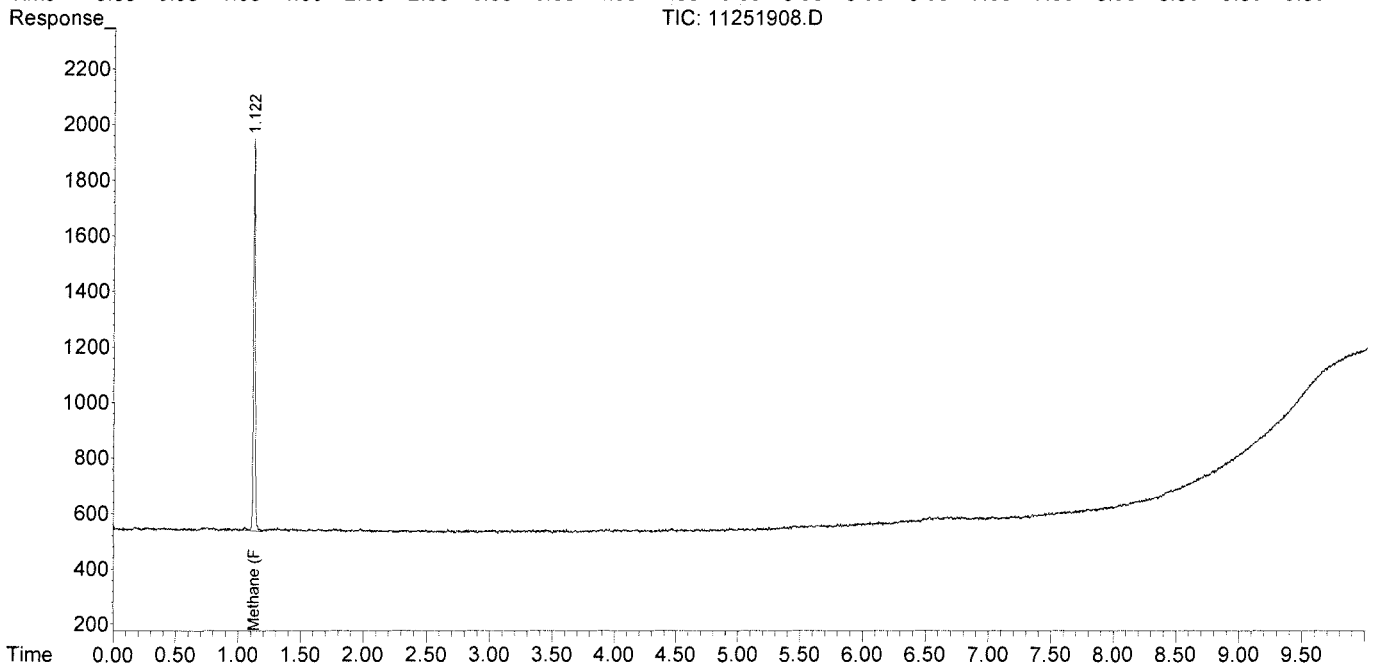
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2019_11\25\
Data File : 11251908.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 25-Nov-2019, 13:39:41
Operator : WH/LD
Sample : P1907040-001 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 25 12:54:17 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2019_11\25\
Data File : 11251909.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 25-Nov-2019, 13:54:05
Operator : WH/LD
Sample : P1907040-002 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 25 13:18:04 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

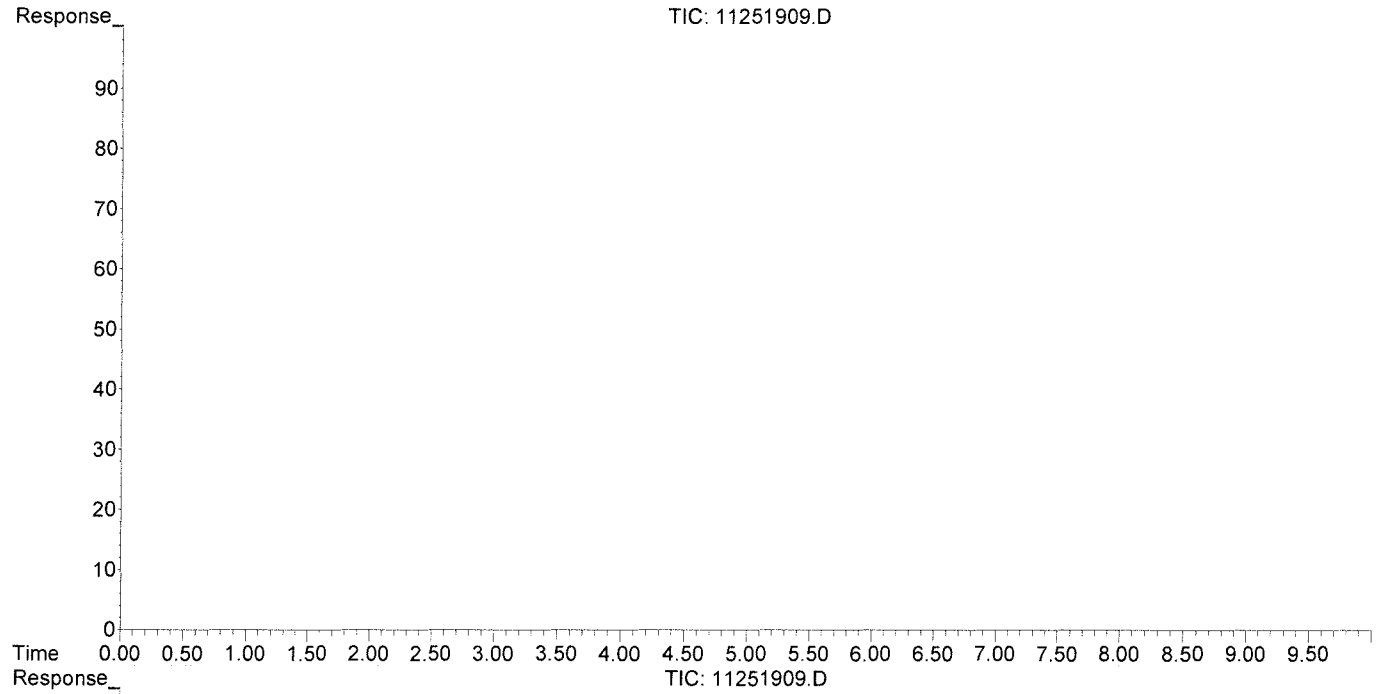
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.122	8793	0.969	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	0.000	0	N.D.	ppm
10)	Propane	0.000	0	N.D.	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	0.000	0	N.D.	ppm
13)	n-Butane	0.000	0	N.D.	ppm

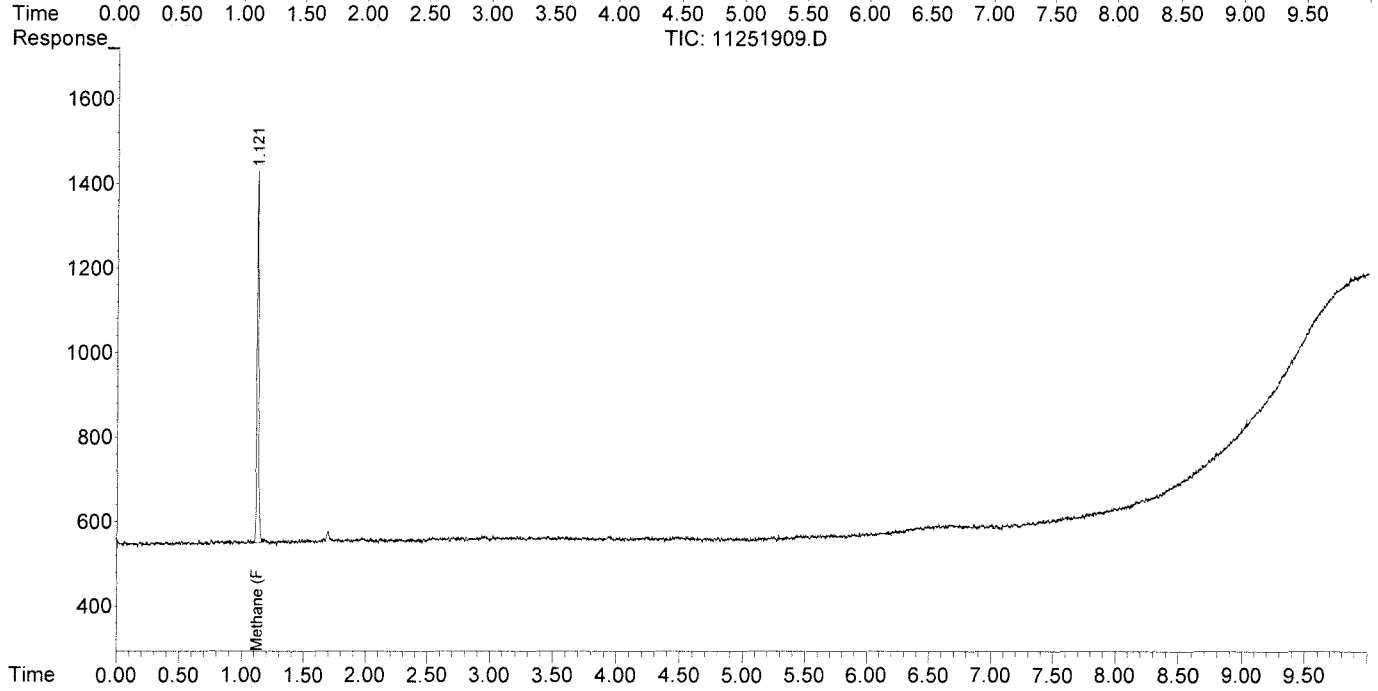
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2019_11\25\
Data File : 11251909.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 25-Nov-2019, 13:54:05
Operator : WH/LD
Sample : P1907040-002 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 25 13:18:04 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2019_11\25\
Data File : 11251910.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 25-Nov-2019, 14:07:13
Operator : WH/LD
Sample : P1907040-003 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 25 13:18:25 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

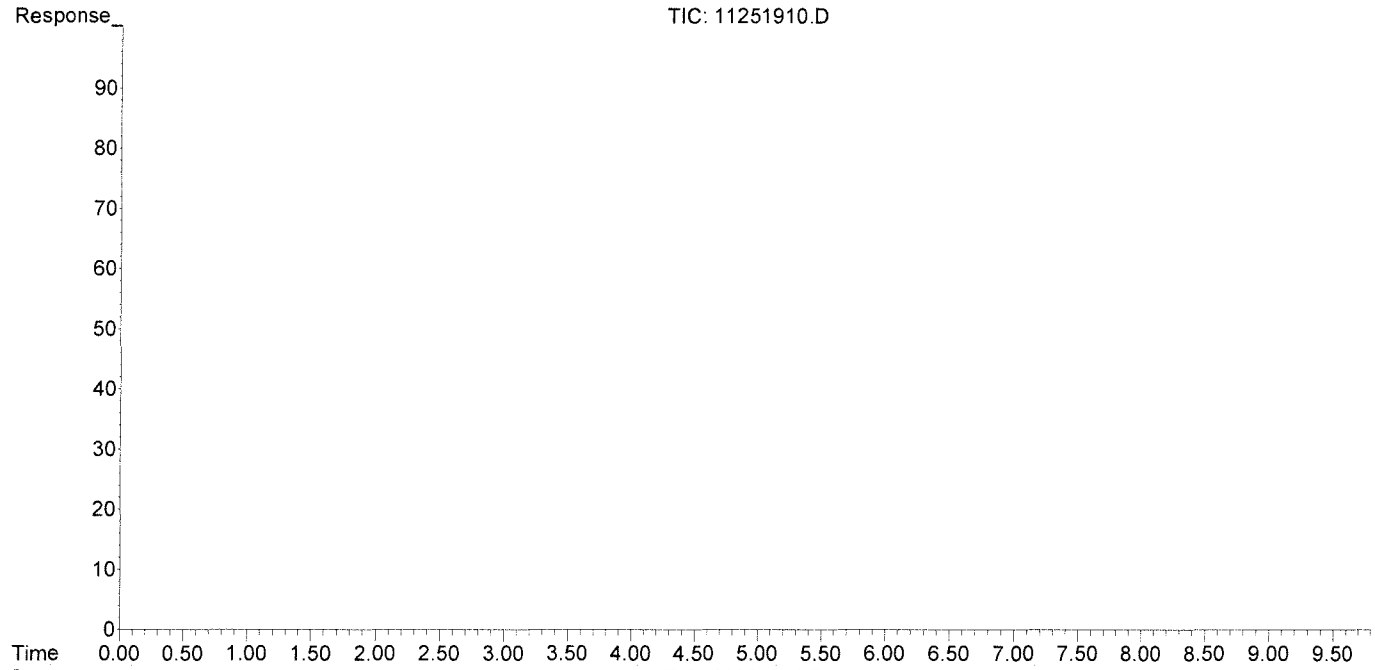
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.120	22318	2.460	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	0.000	0	N.D.	ppm
10)	Propane	0.000	0	N.D.	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	0.000	0	N.D.	ppm
13)	n-Butane	0.000	0	N.D.	ppm

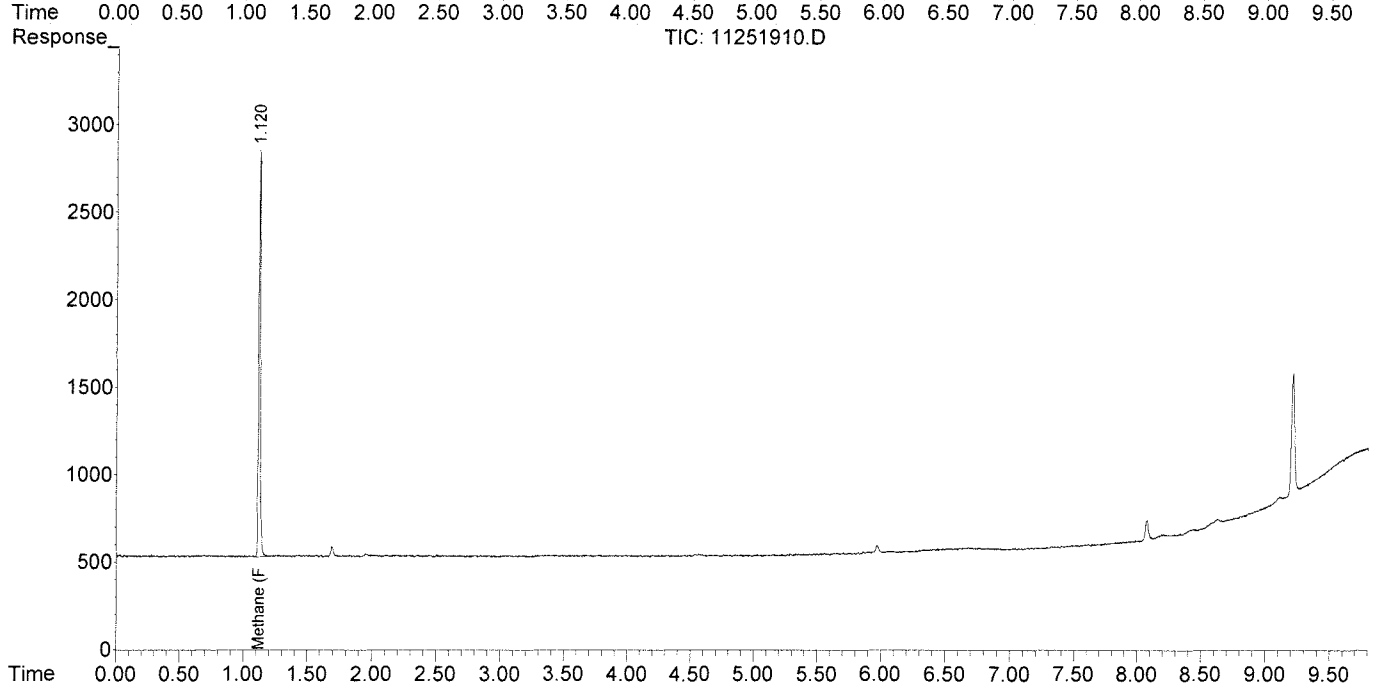
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2019_11\25\
Data File : 11251910.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 25-Nov-2019, 14:07:13
Operator : WH/LD
Sample : P1907040-003 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 25 13:18:25 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2019_11\25\
Data File : 11251911.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 25-Nov-2019, 14:20:05
Operator : WH/LD
Sample : P1907040-004 0.1
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 25 13:33:14 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

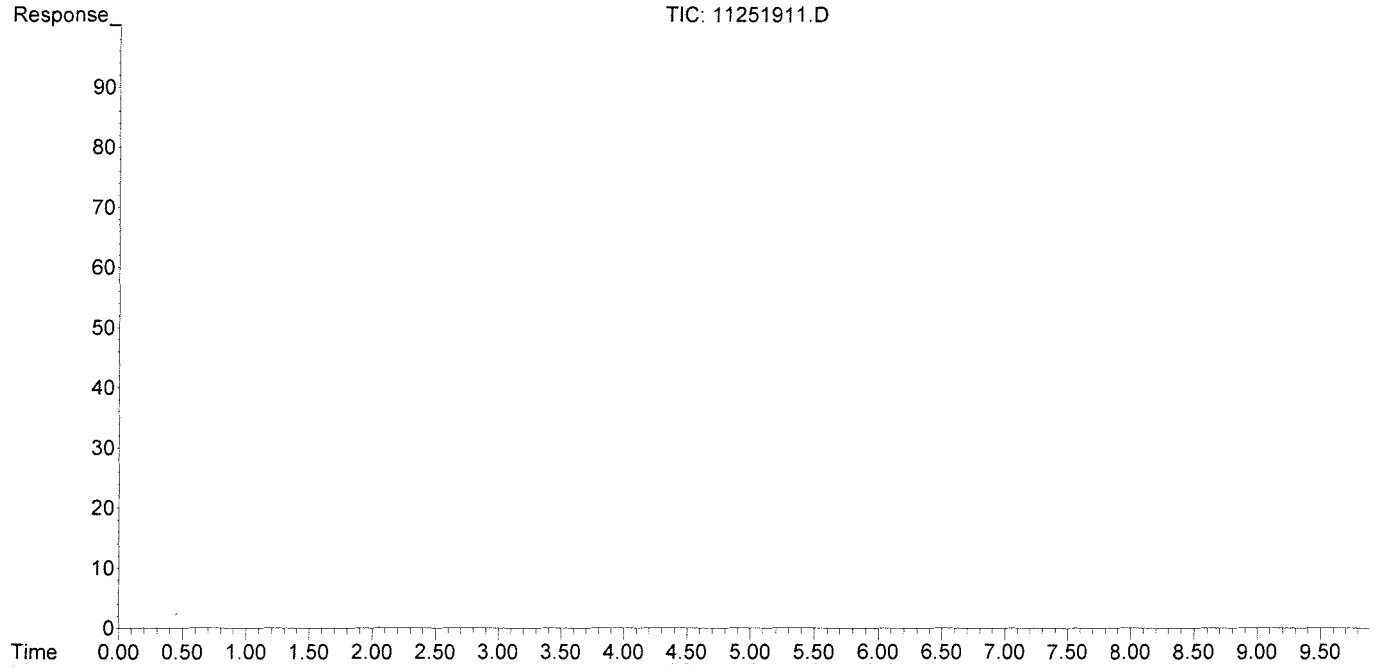
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	0.000	0	N.D.	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	4.431	76866	3.280	ppm
10)	Propane	4.431	76866	3.089	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	0.000	0	N.D.	ppm
13)	n-Butane	0.000	0	N.D.	ppm

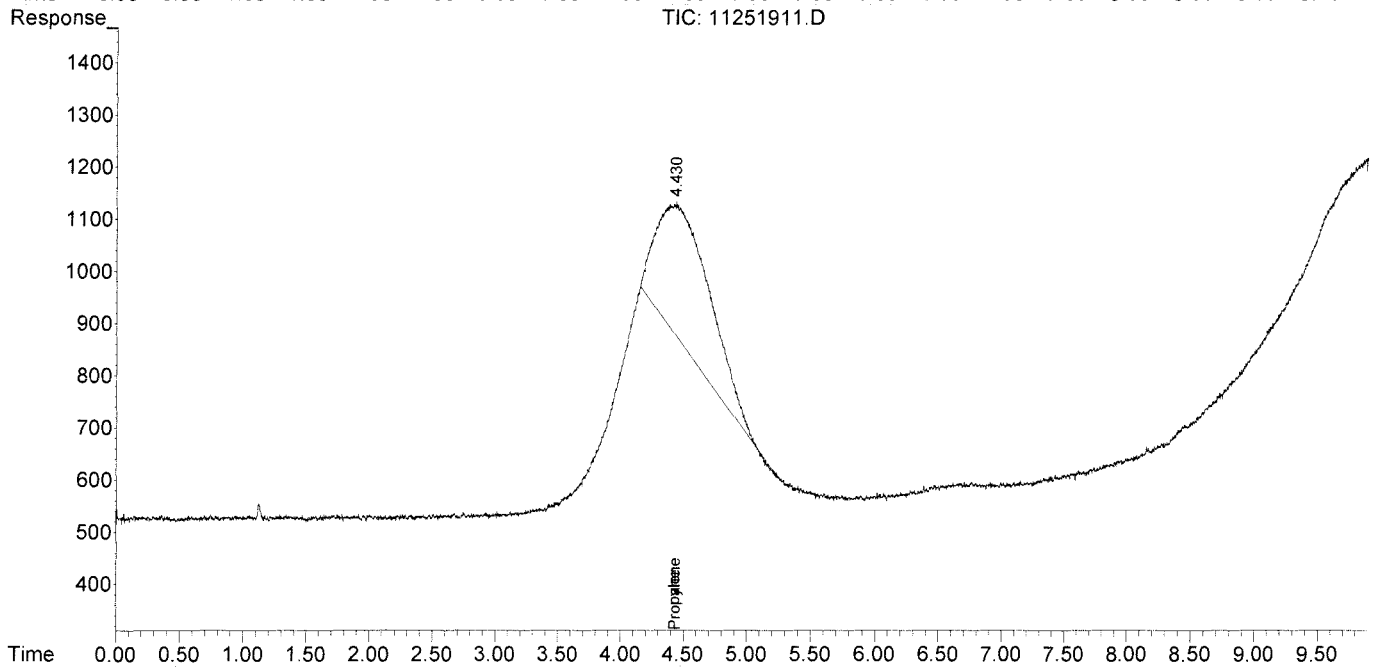
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2019_11\25\
Data File : 11251911.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 25-Nov-2019, 14:20:05
Operator : WH/LD
Sample : P1907040-004 0.1
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 25 13:33:14 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2019_11\25\
Data File : 11251903.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 25-Nov-2019, 12:23:25
Operator : WH/LD
Sample : MCS 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 25 11:57:21 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

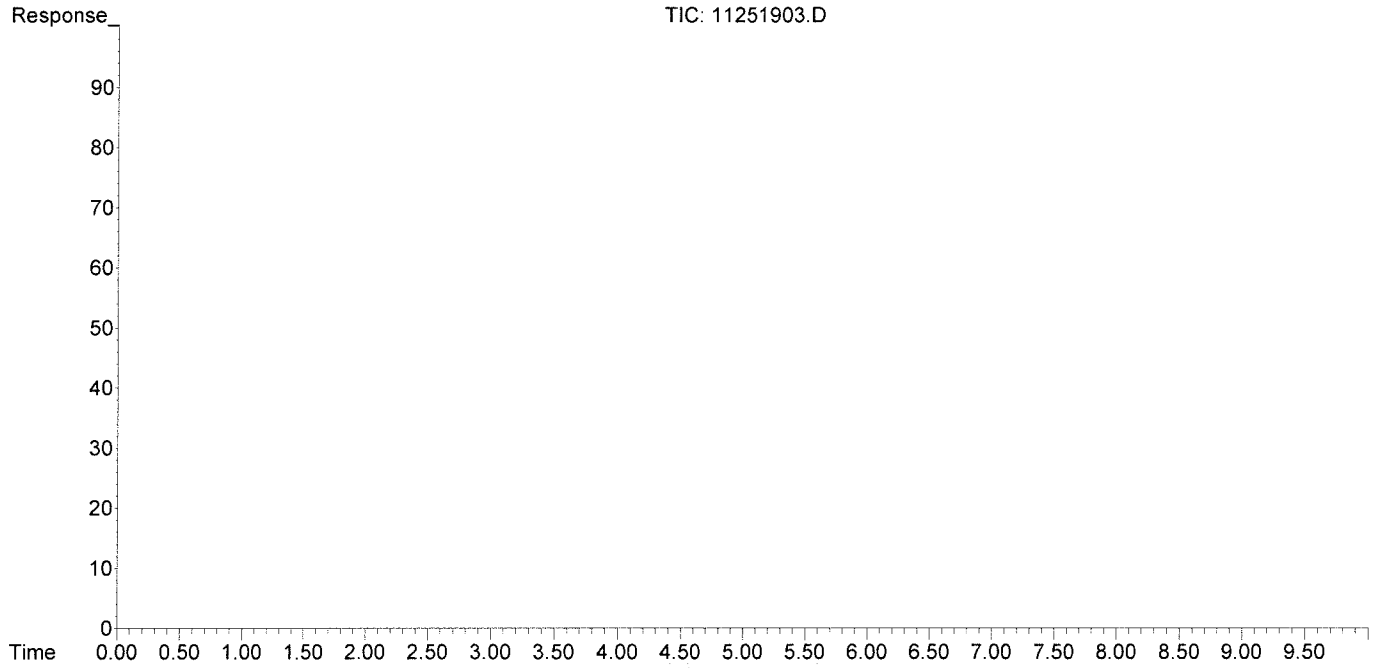
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.120	1262	0.139	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	0.000	0	N.D.	ppm
10)	Propane	0.000	0	N.D.	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	0.000	0	N.D.	ppm
13)	n-Butane	0.000	0	N.D.	ppm

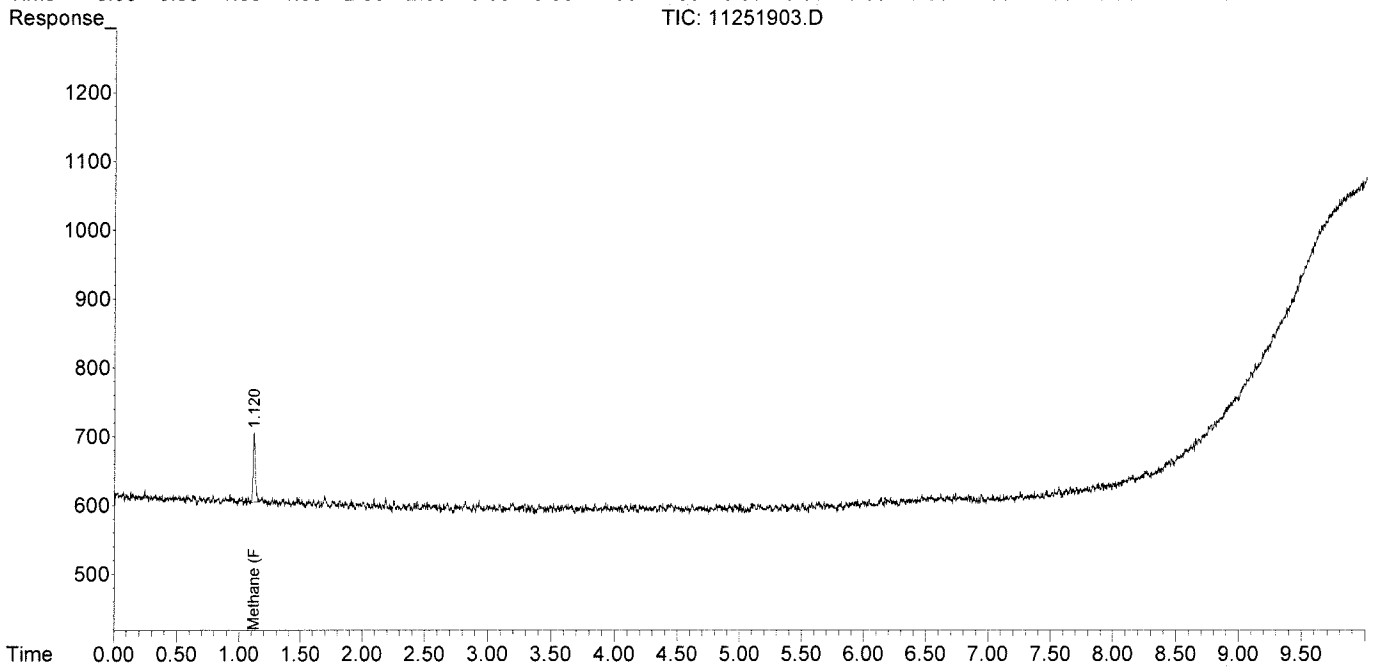
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2019_11\25\
Data File : 11251903.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 25-Nov-2019, 12:23:25
Operator : WH/LD
Sample : MCS 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 25 11:57:21 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2019_11\25\
Data File : 11251912.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 25-Nov-2019, 14:33:26
Operator : WH/LD
Sample : P1907040-004 MS 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 25 13:54:50 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.122	11325	1.249	ppm
7)	Ethylene	1.693	15254	0.912	ppm
8)	Ethane	1.960	19061	1.125	ppm
9)	Propylene	4.335	18557	0.792	ppm
10)	Propane	4.458	28588	1.149	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	6.658	36414	1.368	ppm
13)	n-Butane	6.658	36414	1.368	ppm

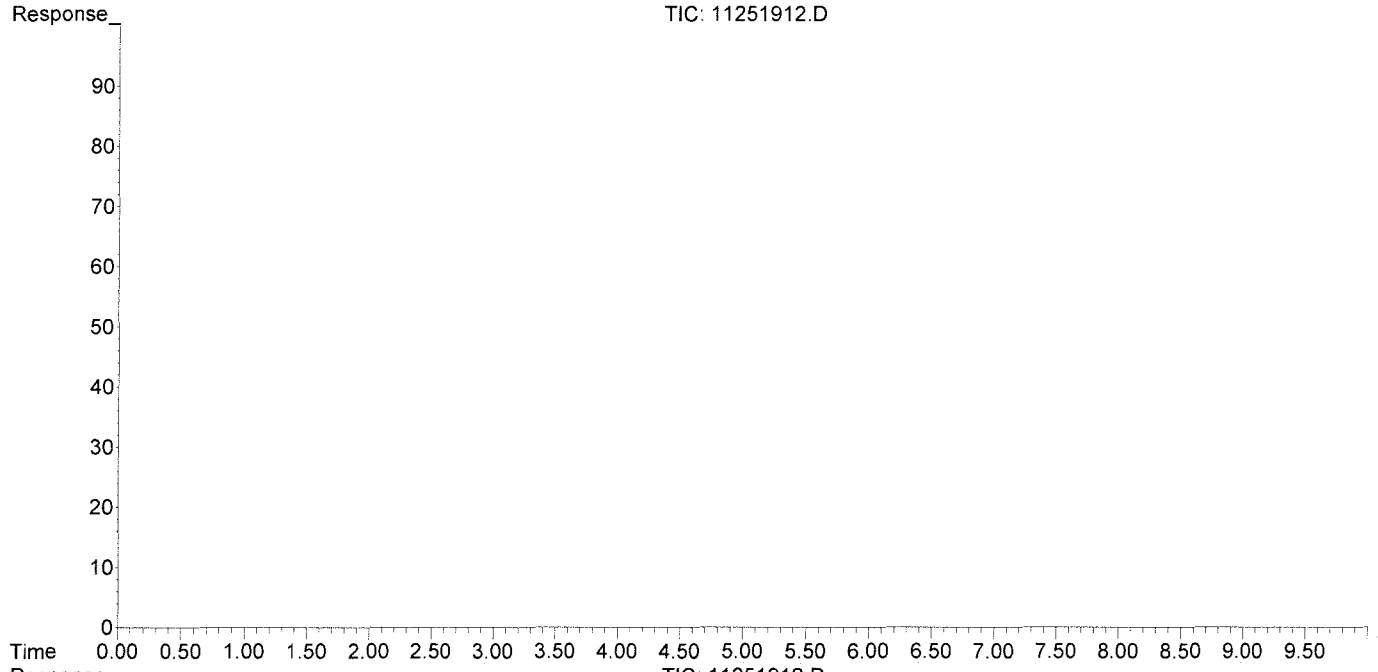
(f)=RT Delta > 1/2 Window (m)=manual int.

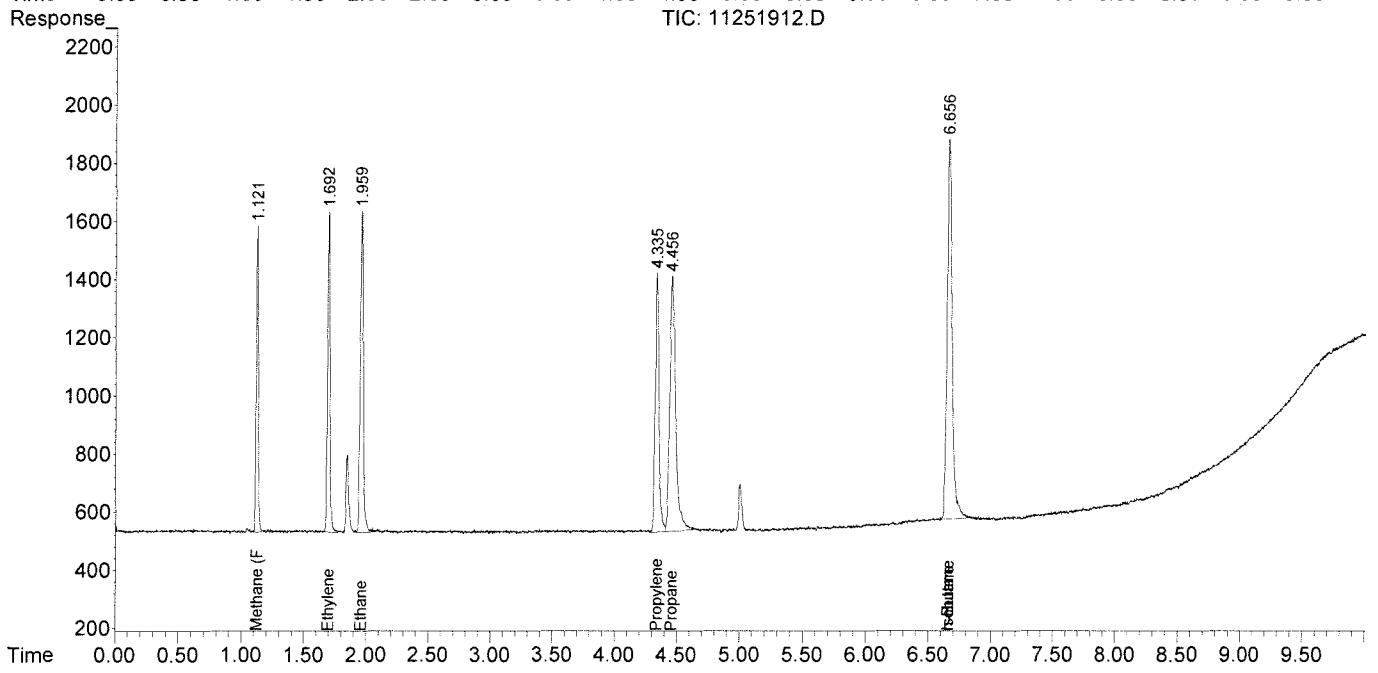
00988799

Data Path : J:\GC10\DATA\RSK_FID\2019_11\25\
Data File : 11251912.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 25-Nov-2019, 14:33:26
Operator : WH/LD
Sample : P1907040-004 MS 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 25 13:54:50 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2019_11\25\
Data File : 11251913.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 25-Nov-2019, 14:46:48
Operator : WH/LD
Sample : P1907040-004 MSD 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 25 13:56:38 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

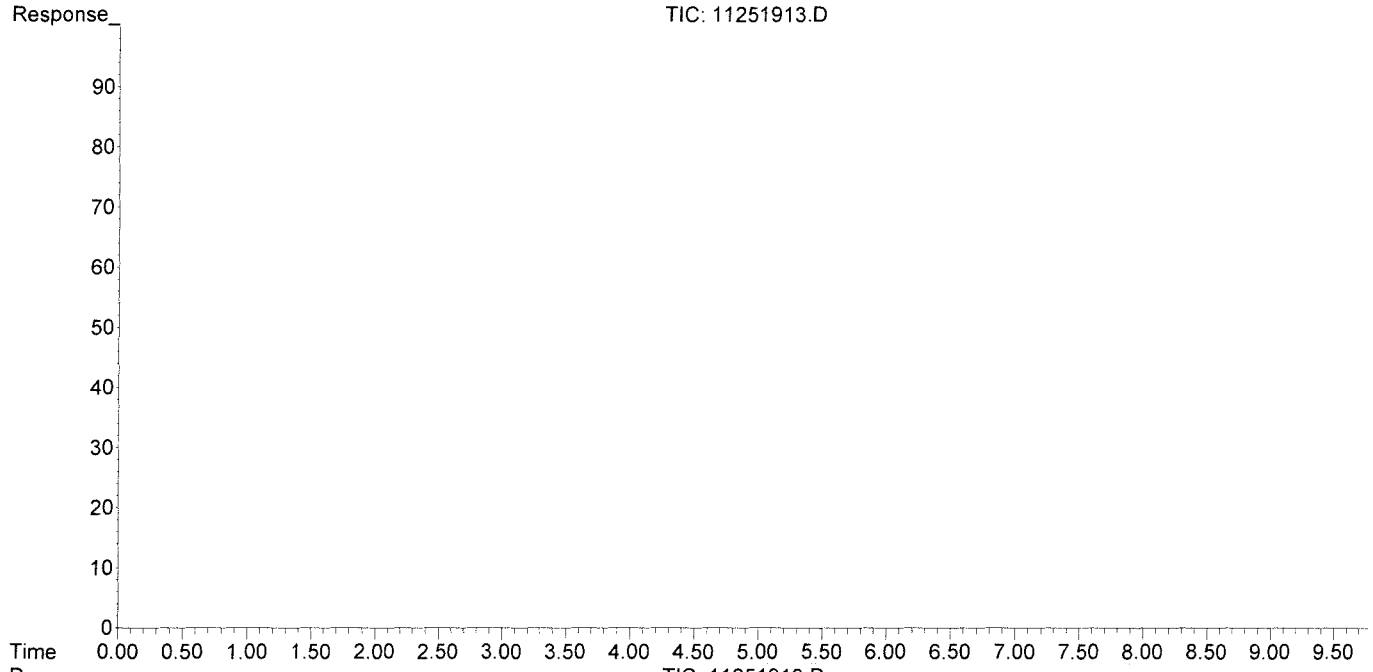
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.122	11178	1.232	ppm
7)	Ethylene	1.694	15965	0.954	ppm
8)	Ethane	1.962	19742	1.165	ppm
9)	Propylene	4.336	19070	0.814	ppm
10)	Propane	4.457	29758	1.196	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	6.657	39166	1.471	ppm
13)	n-Butane	6.657	39166	1.471	ppm

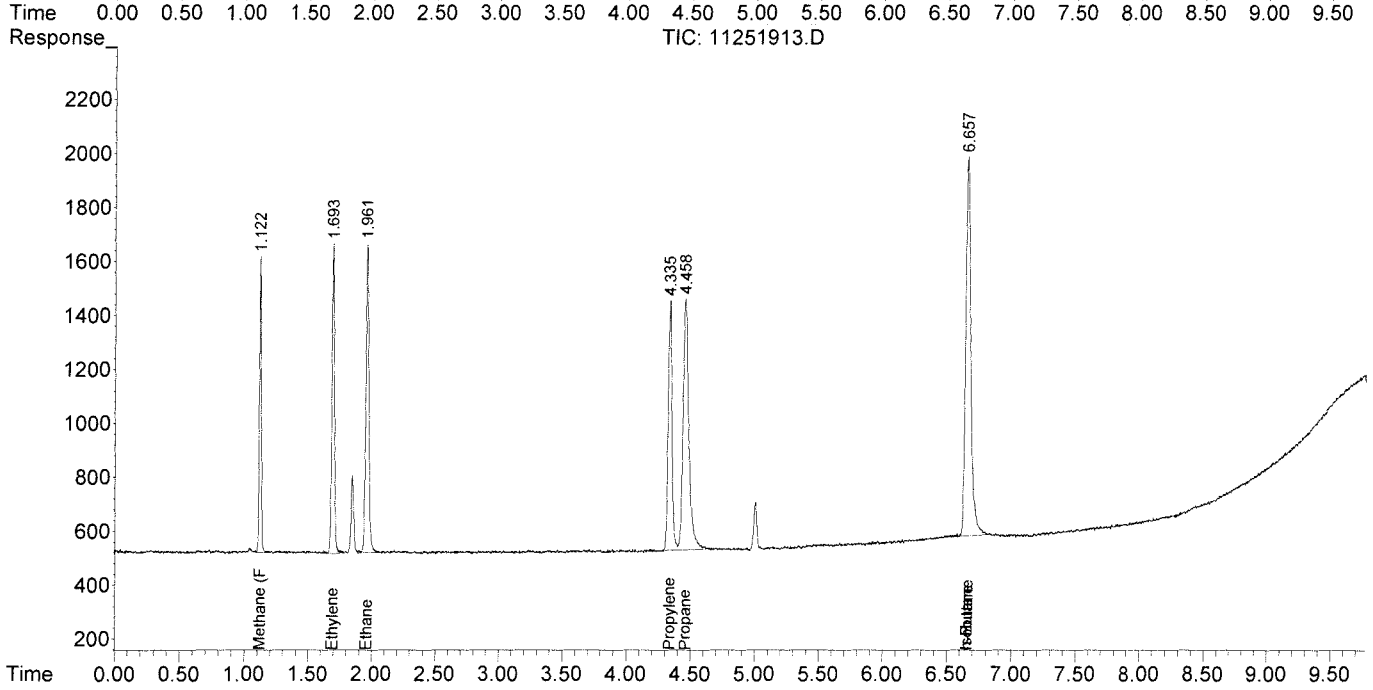
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2019_11\25\
Data File : 11251913.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 25-Nov-2019, 14:46:48
Operator : WH/LD
Sample : P1907040-004 MSD 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 25 13:56:38 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2019_11\25\
Data File : 11251906.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 25-Nov-2019, 13:13:54
Operator : WH/LD
Sample : LCS FID 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 25 12:22:48 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.118	13110	1.445	ppm
7)	Ethylene	1.691	16736	1.000	ppm
8)	Ethane	1.958	20791	1.227	ppm
9)	Propylene	4.333	22258	0.950	ppm
10)	Propane	4.456	31763	1.277	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	6.658	42071	1.581	ppm
13)	n-Butane	6.658	42071	1.581	ppm

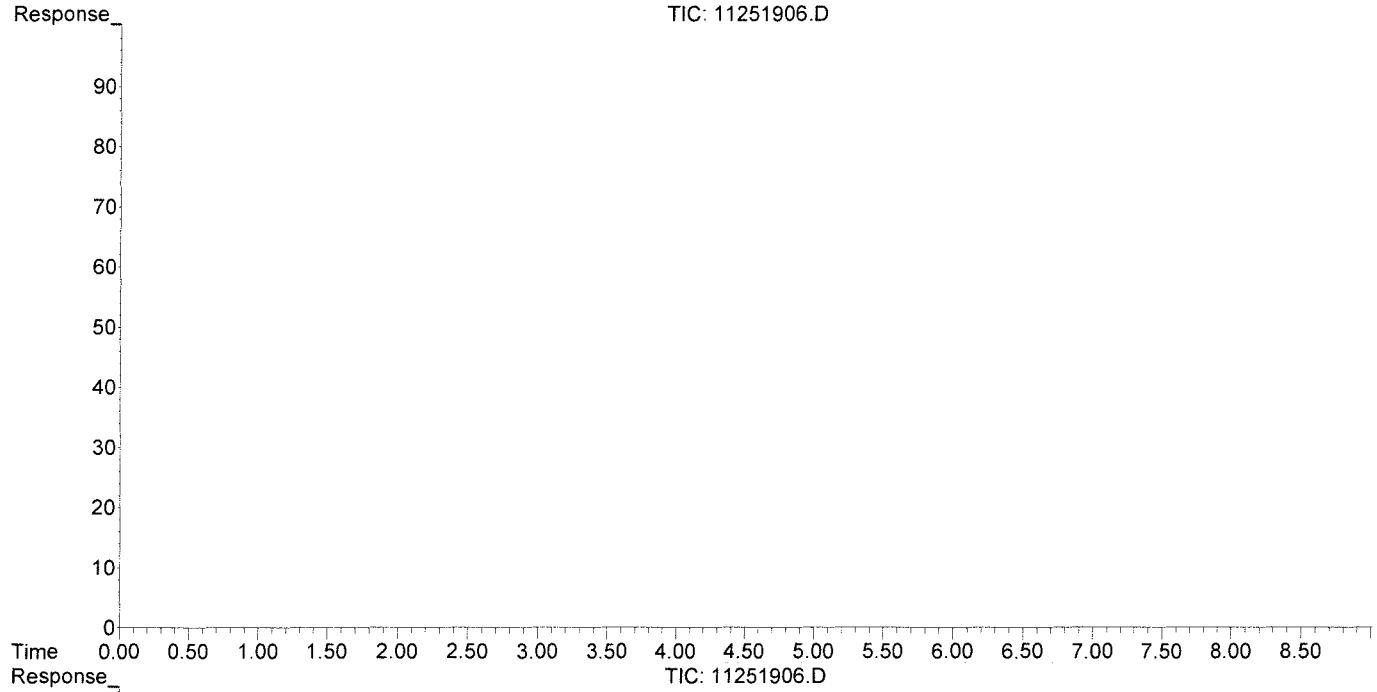
(f)=RT Delta > 1/2 Window (m)=manual int.

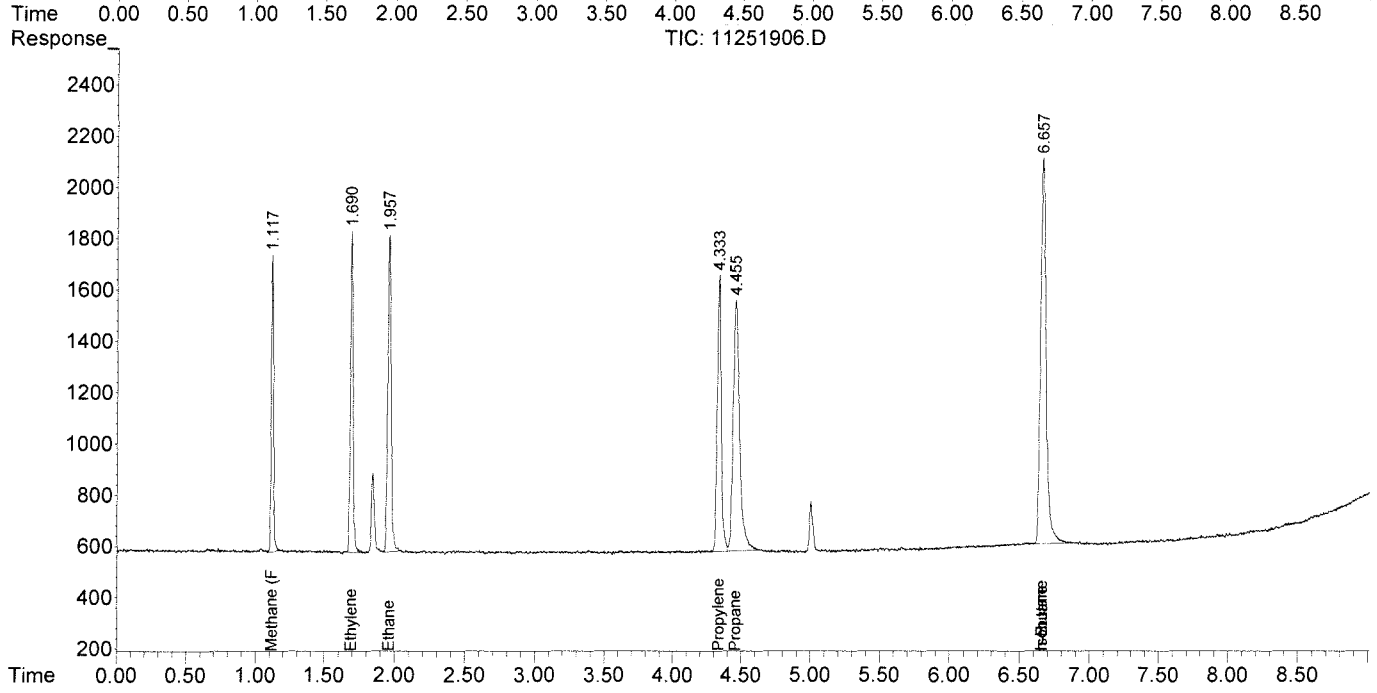
00988803

Data Path : J:\GC10\DATA\RSK_FID\2019_11\25\
Data File : 11251906.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 25-Nov-2019, 13:13:54
Operator : WH/LD
Sample : LCS FID 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 25 12:22:48 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2019_11\25\
Data File : 11251907.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 25-Nov-2019, 13:26:49
Operator : WH/LD
Sample : LCSD FID 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 25 12:36:31 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

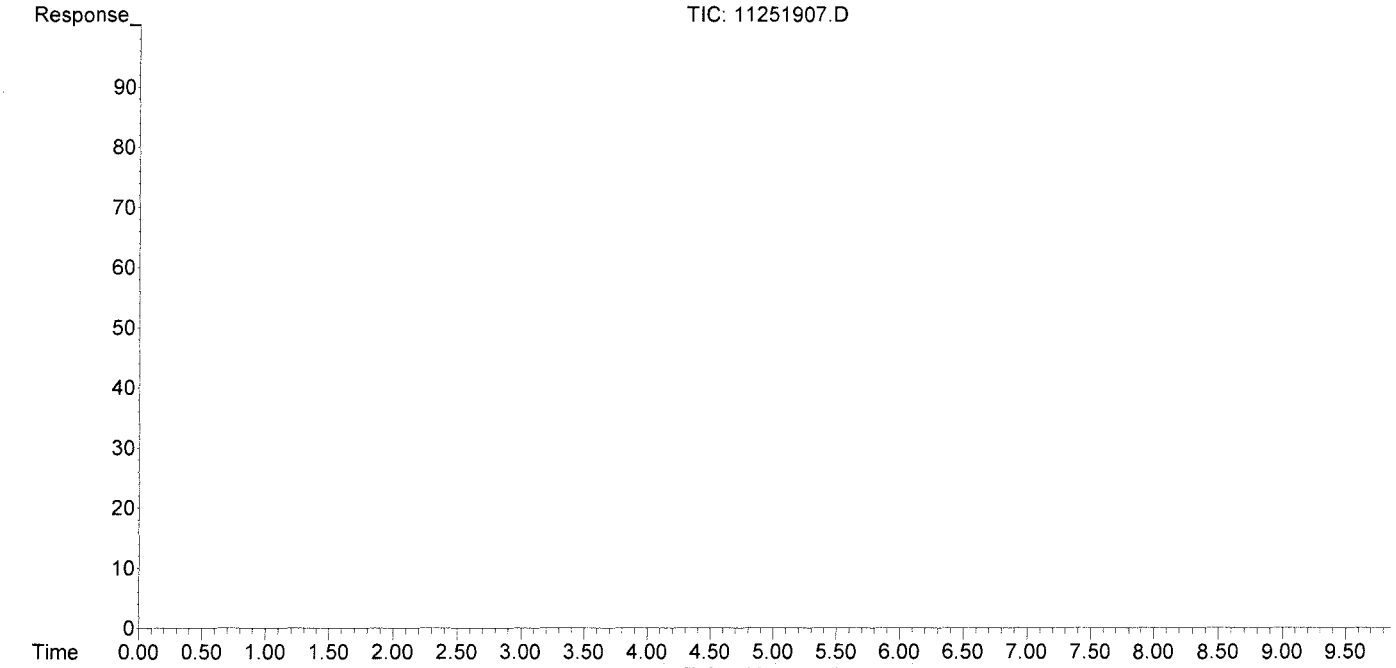
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.125	13333	1.470	ppm
7)	Ethylene	1.699	16844	1.007	ppm
8)	Ethane	1.966	20783	1.226	ppm
9)	Propylene	4.340	22438	0.958	ppm
10)	Propane	4.462	32401	1.302	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	6.661	41697	1.567	ppm
13)	n-Butane	6.661	41697	1.567	ppm

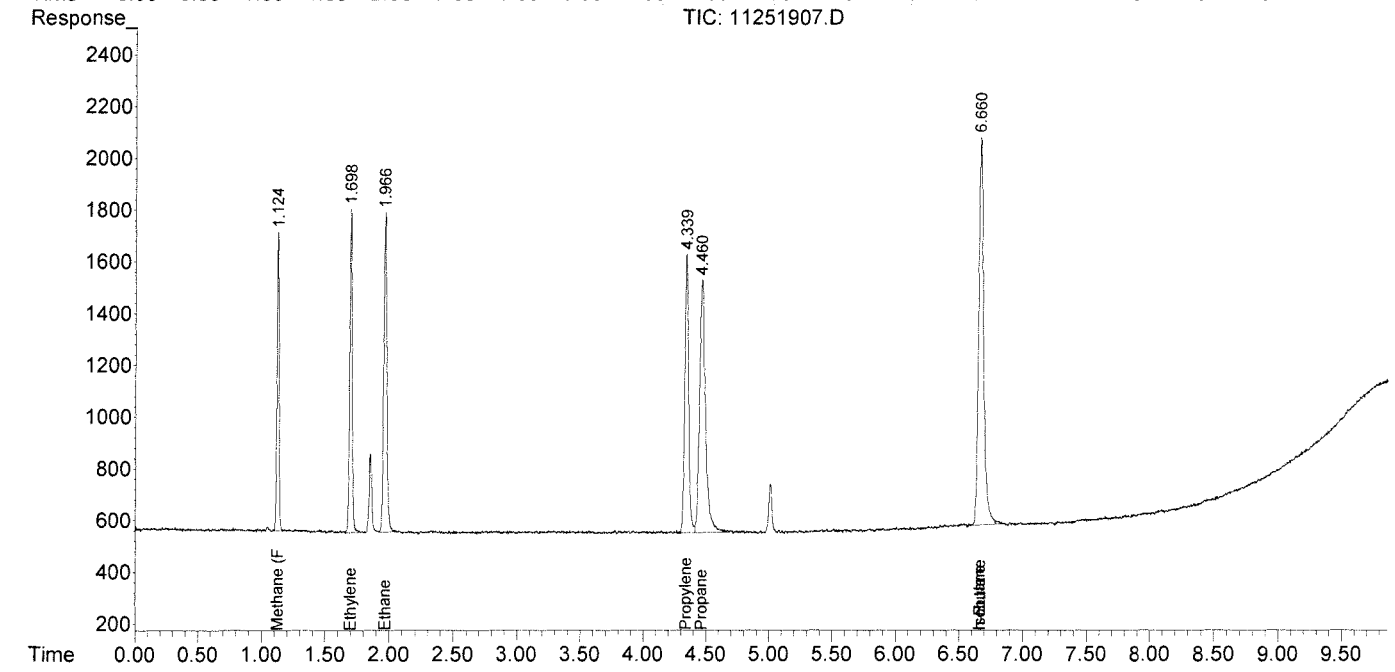
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2019_11\25\
Data File : 11251907.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 25-Nov-2019, 13:26:49
Operator : WH/LD
Sample : LCSD FID 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 25 12:36:31 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Response Factor Report HP5890

Method Path : J:\GC10\METHODS\
Method File : RS091217_R.M
Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
Last Update : Wed Sep 13 11:14:47 2017
Response Via : Initial Calibration

Calibration Files
1 =09121702.D 2 =09121703.D 3 =09121704.D
4 =09121705.D 5 =09121706.D 6 =09121707.D

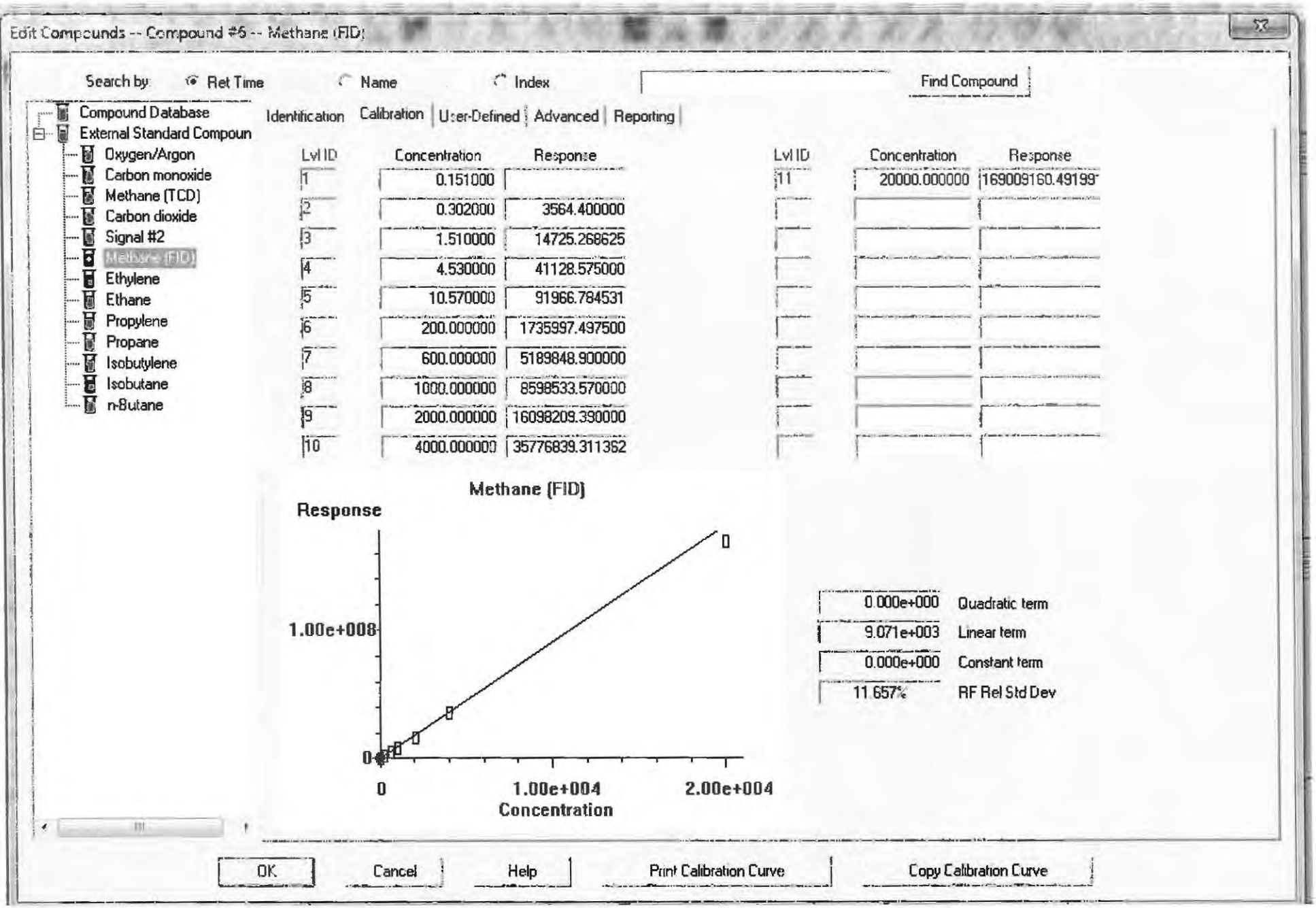
	Compound	1	2	3	4	5	6	Avg		%RSD
1)	Oxygen/Argon	3.739		1.014			0.001	0.793	E6	189.17
2)	Carbon monoxide	3.739		1.014			0.001	0.594	E6	221.92
3)	Methane (TCD)						2.161	0.951	E2	106.37
4)	Carbon dioxide	2.365	2.569	2.558	2.361	2.459	2.314	2.438	E2	4.44

Signal #2 Calibration Files
1 =09121702.D 2 =09121703.D 3 =09121704.D
4 =09121705.D 5 =09121706.D 6 =09121707.D

	Compound	1	2	3	4	5	6	Avg		%RSD
6)	Methane (FID)		1.180	0.975	0.908	0.870	0.868	0.907	E4	11.66
7)	Ethylene	1.736	1.638	1.780	1.720	1.628	1.670	1.673	E4	3.90
8)	Ethane	1.781	1.676	1.784	1.730	1.692	1.675	1.695	E4	3.83
9)	Propylene	2.505	2.296	2.592	2.480	2.346	2.252	2.343	E4	6.56
10)	Propane	2.439	2.283	2.645	2.555	2.433	2.522	2.488	E4	4.20
11)	Isobutylene							0.652	E1	138.46
12)	Isobutane	6.058	4.793	2.214	1.553	1.353		2.662	E4	86.17
13)	n-Butane	6.058	4.793	2.214	1.553	1.353		2.662	E4	86.17

(#) = Out of Range ### Number of calibration levels exceeded format ###

RS091217_R.M Wed Sep 13 15:11:48 2017


Edit Compounds -- Compound #6 -- Methane (FID)
Search by: Ret Time Name Index
Find Compound
Compound Database
External Standard Compoun
Oxygen/Argon
Carbon monoxide
Methane (TCD)
Carbon dioxide
Signal #2
Methane (FID)
Ethylene
Ethane
Propylene
Propane
Isobutylene
Isobutane
n-Butane
Identification Calibration User-Defined Advanced Reporting
Lvl ID Concentration Response
1 0.151000
2 0.302000 3564.400000
3 1.510000 14725.268625
4 4.530000 41128.575000
5 10.570000 91966.784531
6 200.000000 1735997.497500
7 600.000000 5189848.900000
8 1000.000000 8598533.570000
9 2000.000000 16098209.390000
10 4000.000000 35776839.311362
Lvl ID Concentration Response
11 20000.000000 169009160.49199
Methane (FID)
Response
1.00e+008
0
0
1.00e+004
2.00e+004
Concentration
0.000e+000 Quadratic term
9.071e+003 Linear term
0.000e+000 Constant term
11.657% RF Rel Std Dev
OK
Cancel
Help
Print Calibration Curve
Copy Calibration Curve

Edit Compounds -- Compound #7 -- Ethylene

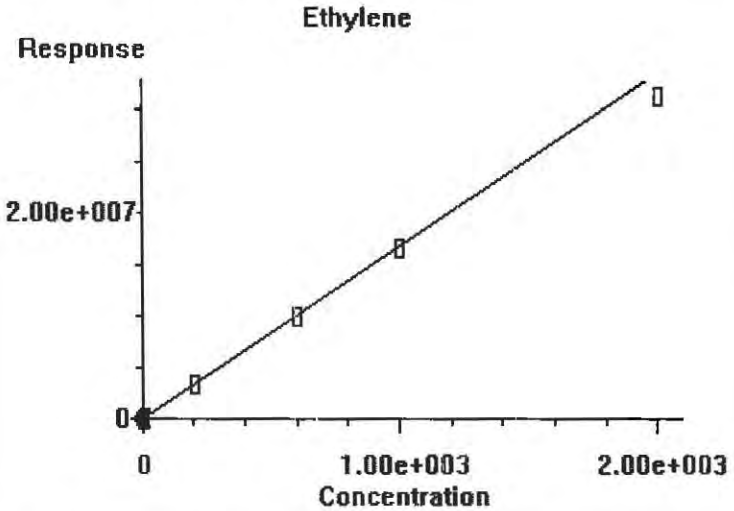
Search by: Ret Time | Name | Index — Find Compound

- Compound Database
- External Standard Compoun
  - Oxygen/Argon
  - Carbon monoxide
  - Methane (TCD)
  - Carbon dioxide
  - Signal #2
  - Methane (FID)
  - Ethylene
  - Ethane
  - Propylene
  - Propane
  - Isobutylene
  - Isobutane
  - n-Butane

Identification | Calibration | User-Defined | Advanced | Reporting

Lvl ID	Concentration	Response
1	0.151000	2621.970000
2	0.302000	4946.731301
3	1.510000	26884.746847
4	4.530000	77902.721497
5	10.570000	172085.529560
6	200.000000	3339702.313219
7	600.000000	10007758.776971
8	1000.000000	16608503.805988
9	2000.000000	31192443.898600
10	4000.000000	

Lvl ID	Concentration	Response
11	20000.000000	



0.000e+000	Quadratic term
1.673e+004	Linear term
0.000e+000	Constant term
3.897%	RF Rel Std Dev

OK | Cancel | Help | Print Calibration Curve | Copy Calibration Curve

Edit Compounds -- Compound #8 -- Ethane

Search by: Ret Time | Name | Index — Find Compound

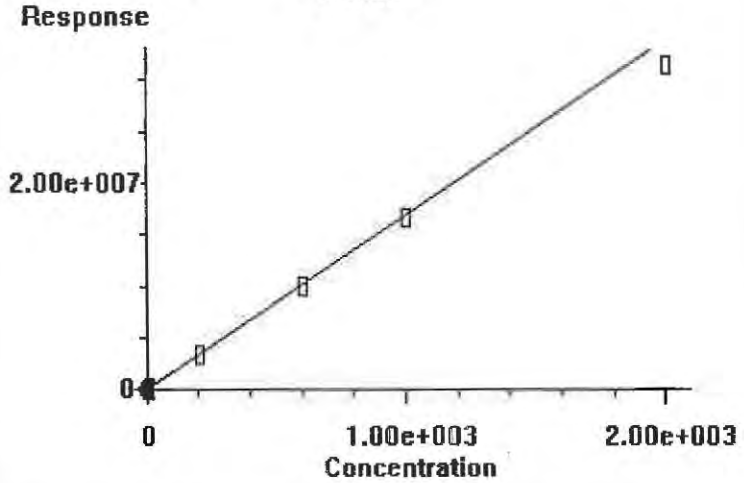
- Compound Database
- External Standard Compoun
  - Oxygen/Argon
  - Carbon monoxide
  - Methane (TCD)
  - Carbon dioxide
  - Signal #2
  - Methane (FID)
  - Ethylene
  - Ethane
  - Propylene
  - Propane
  - Isobutylene
  - Isobutane
  - n-Butane

Identification | Calibration | User-Defined | Advanced | Reporting

Lvl ID	Concentration	Response
1	0.151000	2689.928008
2	0.302000	5060.331943
3	1.510000	26943.667500
4	4.530000	78353.525045
5	10.570000	178840.731148
6	200.000000	3350442.319129
7	600.000000	10048964.218029
8	1000.000000	16703164.879012
9	2000.000000	31424217.938900
10	4000.000000	

Lvl ID	Concentration	Response
11	20000.000000	

Ethane



0.000e+000	Quadratic term
1.695e+004	Linear term
0.000e+000	Constant term
3.831%	RF Rel Std Dev

OK | Cancel | Help | Print Calibration Curve | Copy Calibration Curve

Edit Compounds -- Compound #9 -- Propylene

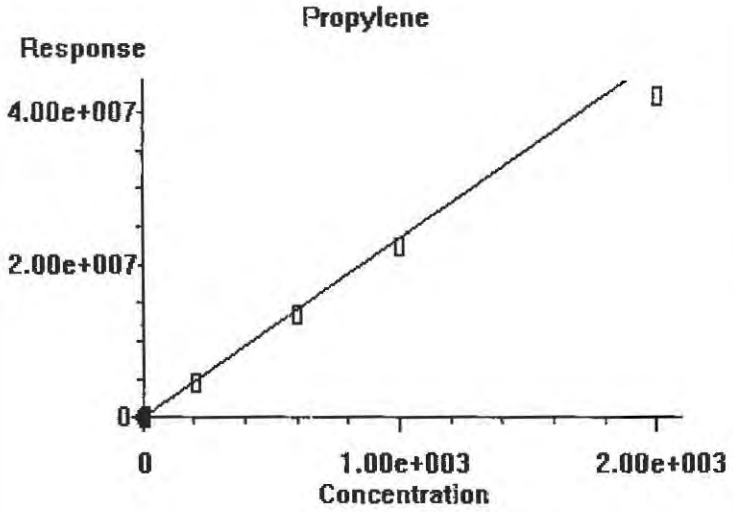
Search by: Ret Time | Name | Index | Find Compound

- Compound Database
- External Standard Compoun
  - Oxygen/Argon
  - Carbon monoxide
  - Methane (TCD)
  - Carbon dioxide
  - Signal #2
  - Methane (FID)
  - Ethylene
  - Ethane
  - Propylene
  - Propane
  - Isobutylene
  - Isobutane
  - n-Butane

Identification | Calibration | User-Defined | Advanced | Reporting

Lvl ID	Concentration	Response
1	0.151000	3782.537646
2	0.302000	6933.285530
3	1.510000	39139.518208
4	4.530000	112341.896872
5	10.570000	248003.903623
6	200.000000	4504060.086084
7	600.000000	13569342.761419
8	1000.000000	22494887.720990
9	2000.000000	42124689.656800
10	4000.000000	

Lvl ID	Concentration	Response
11	20000.000000	



0.000e+000	Quadratic term
2.343e+004	Linear term
0.000e+000	Constant term
6.559%	RF Rel Std Dev

OK | Cancel | Help | Print Calibration Curve | Copy Calibration Curve

Edit Compounds -- Compound #10 -- Propane

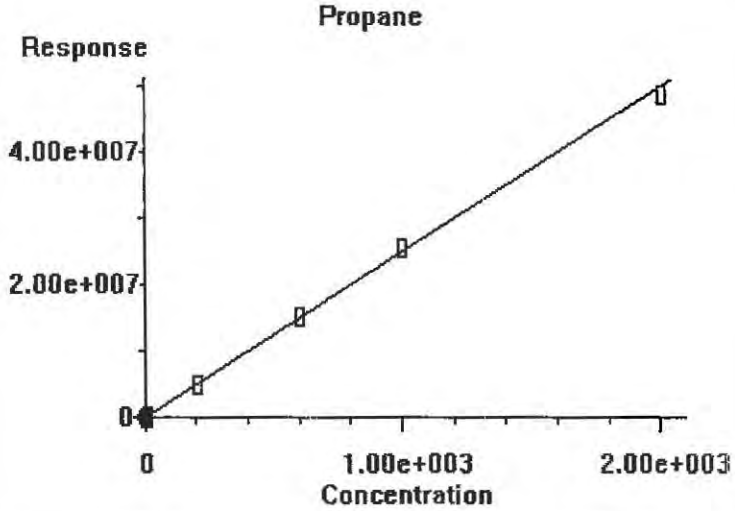
Search by: Ret Time | Name | Index — Find Compound

- Compound Database
- External Standard Compoun
  - Oxygen/Argon
  - Carbon monoxide
  - Methane (TCD)
  - Carbon dioxide
  - Signal #2
  - Methane (FID)
  - Ethylene
  - Ethane
  - Propylene
  - Propane
  - Isobutylene
  - Isobutane
  - n-Butane

Identification | Calibration | User-Defined | Advanced | Reporting

Lvl ID	Concentration	Response
1	0.151000	3682.897354
2	0.302000	6894.237803
3	1.510000	39934.166792
4	4.530000	115723.428128
5	10.570000	257124.432806
6	200.000000	5043035.663316
7	600.000000	15251325.797404
8	1000.000000	25459410.657938
9	2000.000000	48583085.287451
10	4000.000000	

Lvl ID	Concentration	Response
11	20000.000000	



0.000e+000	Quadratic term
2.488e+004	Linear term
0.000e+000	Constant term
4.200%	RF Rel Std Dev

OK | Cancel | Help | Print Calibration Curve | Copy Calibration Curve

Calibration Status Report HP5890

Method Path : J:\GC10\METHODS\
Method File : RS091217_R.M
Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
Last Update : Wed Sep 13 11:14:47 2017
Response Via : Initial Calibration

#	ID	Conc	ISTD Conc	Path\File
1	1	0	0	J:\GC10\DATA\RSK_FID\2017_09\12\09121702.D
2	2	0	0	J:\GC10\DATA\RSK_FID\2017_09\12\09121703.D
3	3	3	0	J:\GC10\DATA\RSK_FID\2017_09\12\09121704.D
4	4	10	0	J:\GC10\DATA\RSK_FID\2017_09\12\09121705.D
5	5	25	0	J:\GC10\DATA\RSK_FID\2017_09\12\09121706.D
6	6	125	0	J:\GC10\DATA\RSK_FID\2017_09\12\09121707.D
7	7	5000	0	J:\GC10\DATA\RSK_FID\2017_09\12\09121708.D
8	8	25000	0	J:\GC10\DATA\RSK_FID\2017_09\12\09121709.D
9	9	2000	0	J:\GC10\DATA\RSK_FID\2017_09\12\09121710.D
10	10	30000	0	J:\GC10\DATA\RSK_FID\2017_09\12\09121711.D
11	11	20000	0	J:\GC10\DATA\RSK_FID\2017_09\12\09121712.D

#	ID	Update Time	Quant Time	Acquisition Time
1	1	Sep 13 11:04 2017	Sep 12 15:03 2017	12-Sep-2017, 10:52
2	2	Sep 13 11:05 2017	Sep 13 11:05 2017	12-Sep-2017, 11:05
3	3	Sep 13 11:06 2017	Sep 13 11:05 2017	12-Sep-2017, 11:45
4	4	Sep 13 11:09 2017	Sep 13 11:06 2017	12-Sep-2017, 12:09
5	5	Sep 13 11:09 2017	Sep 13 11:09 2017	12-Sep-2017, 12:30
6	6	Sep 13 11:10 2017	Sep 13 11:10 2017	12-Sep-2017, 12:47
7	7	Sep 13 11:11 2017	Sep 13 11:10 2017	12-Sep-2017, 13:00
8	8	Sep 13 11:12 2017	Sep 13 11:11 2017	12-Sep-2017, 13:47
9	9	Sep 13 11:12 2017	Sep 13 11:12 2017	12-Sep-2017, 14:07
10	10	Sep 13 11:14 2017	Sep 13 11:13 2017	12-Sep-2017, 14:48
11	11	Sep 13 11:14 2017	Sep 13 11:14 2017	12-Sep-2017, 15:21

RS091217_R.M Wed Sep 13 15:11:22 2017

Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121702.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 10:52
Operator : MC
Sample : 0.151ppm 0.250ml s32-09121702
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 12 11:03:15 2017
Quant Method : I:\GC10\METHODS\RS082417.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Fri Aug 25 09:19:14 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.767	373920	0.128	ppm	
2)	Carbon monoxide	1.767	373920	N.D.	ppm	
3)	Methane (TCD)	0.000	0	N.D.	ppm	
4)	Carbon dioxide	0.000	0	N.D.	ppm	
6)	Methane (FID)	0.000	0	N.D.	ppm	d
7)	Ethylene	1.595	2622	0.156	ppm	
8)	Ethane	1.848	2690	0.156	ppm	
9)	Propylene	4.222	3783	0.154	ppm	
10)	Propane	4.348	3683	0.139	ppm	
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	6.582f	6058	NoCal	ppm	
13)	n-Butane	6.582f	6058	NoCal	ppm	

(f)=RT Delta > 1/2 Window (m)=manual int.

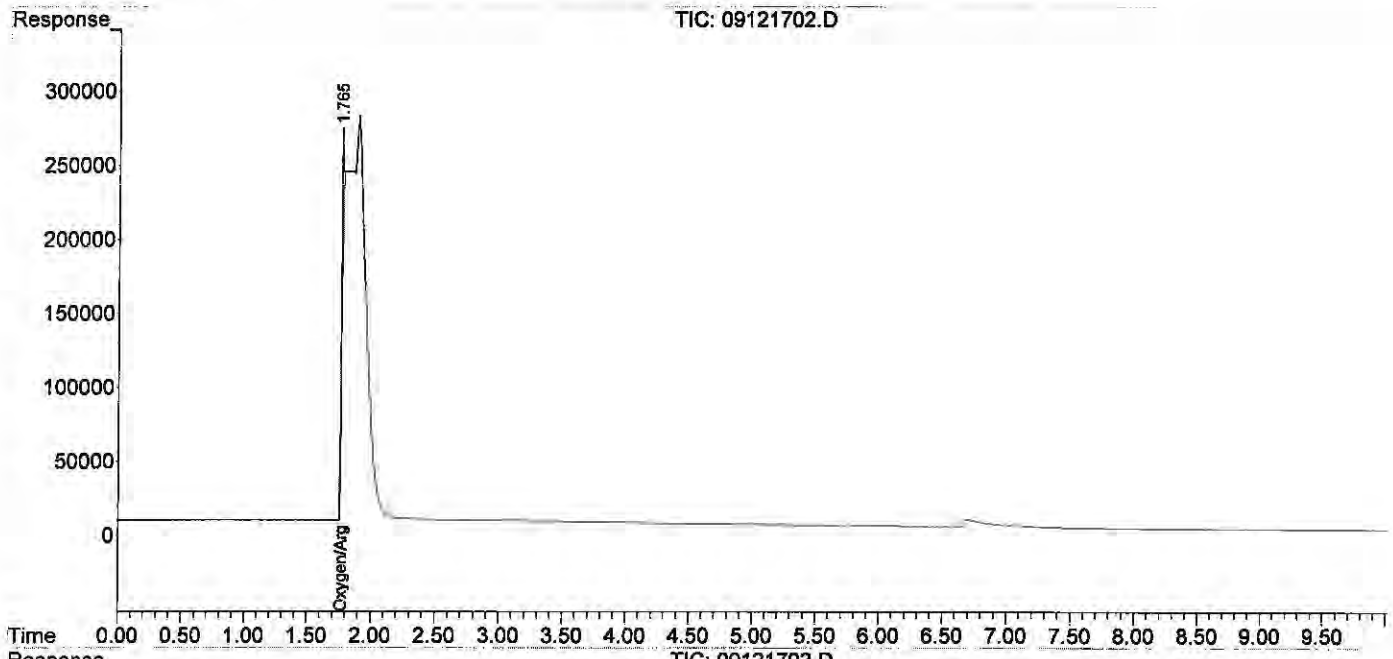
9/13/2

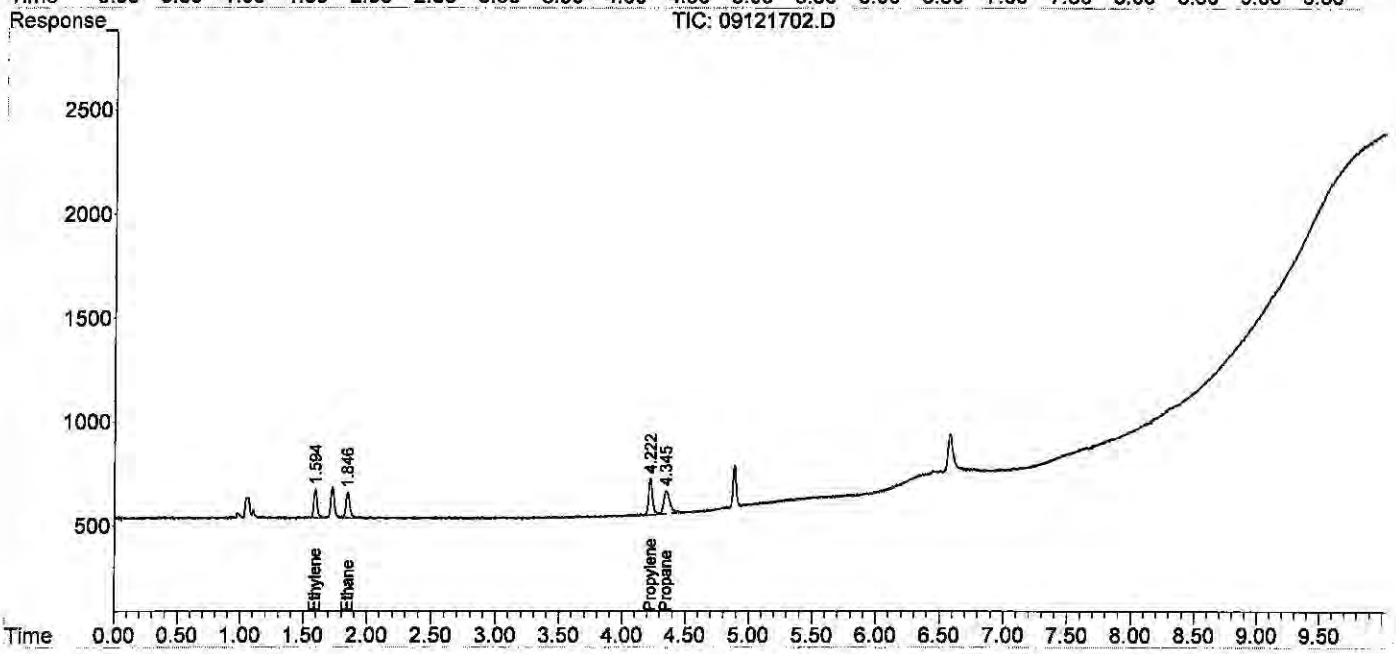
Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121702.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 10:52
Operator : MC
Sample : 0.151ppm 0.250ml s32-09121702
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 12 11:03:15 2017
Quant Method : I:\GC10\METHODS\RS082417.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Fri Aug 25 09:19:14 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121703.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 11:05
Operator : MC
Sample : 0.302ppm 0.5ml s32-09121702
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:05:03 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:04:50 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.913f	-25181981	N.D.	ppm	
2)	Carbon monoxide	1.913f	-25181981	1.089	ppm	
3)	Methane (TCD)	0.000	0	N.D.	ppm	
4)	Carbon dioxide	0.000	0	N.D.	ppm	
6)	Methane (FID)	1.049	3564	0.391	ppm	m
7)	Ethylene	1.577	4947	0.292	ppm	
8)	Ethane	1.828	5060	0.293	ppm	
9)	Propylene	4.207	6933	0.281	ppm	
10)	Propane	4.337	6894	0.268	ppm	
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	6.579f	9587	0.158	ppm	
13)	n-Butane	6.579f	9587	0.158	ppm	

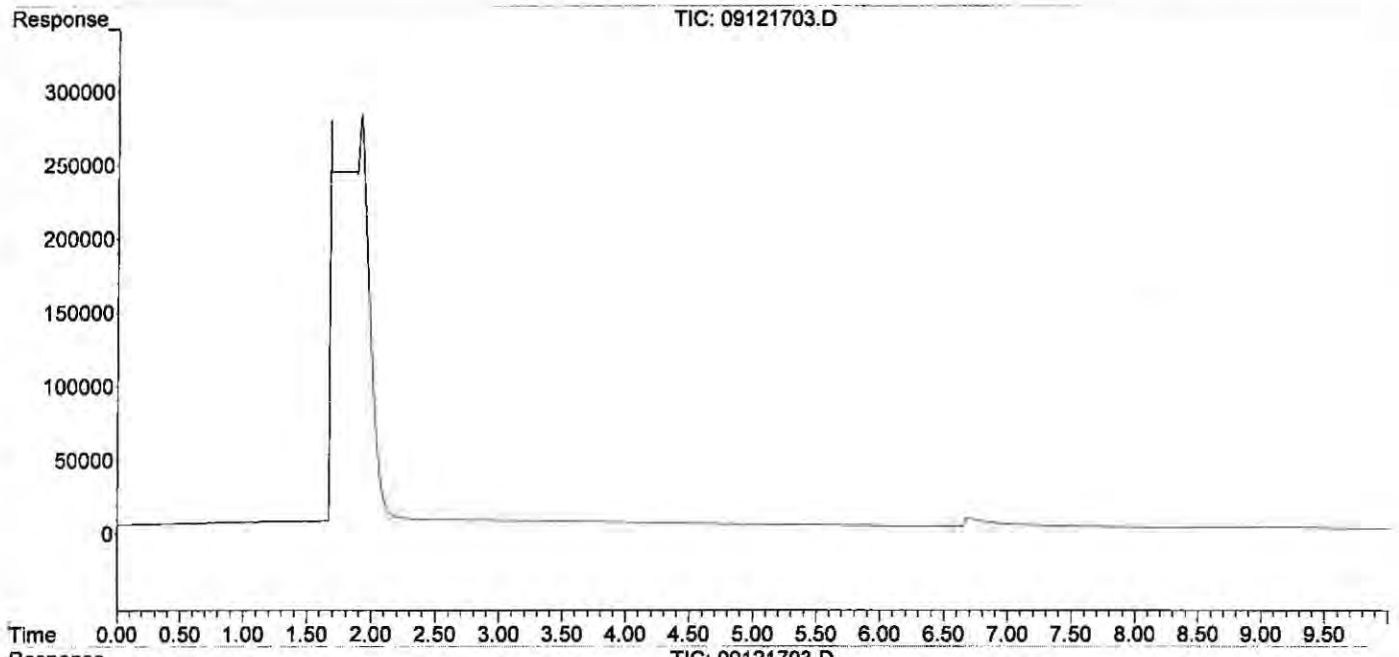
(f)=RT Delta > 1/2 Window (m)=manual int.

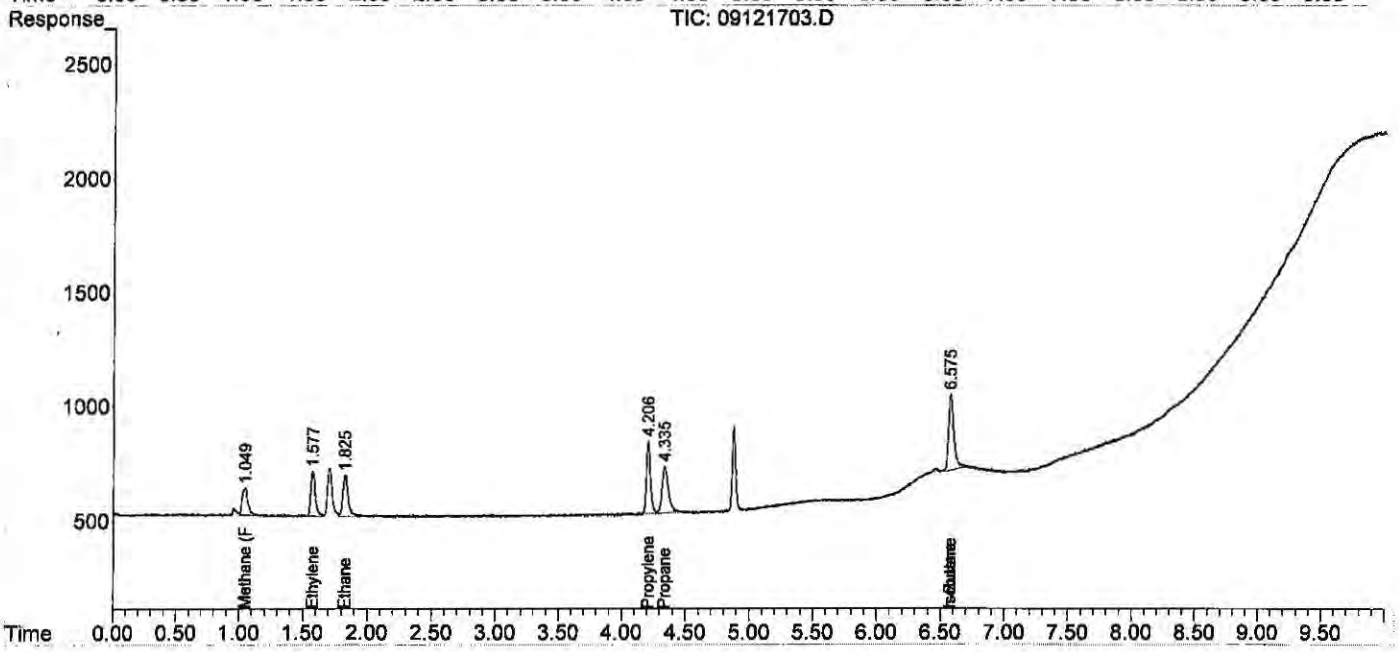
Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121703.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 11:05
Operator : MC
Sample : 0.302ppm 0.5ml s32-09121702
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:05:03 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:04:50 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



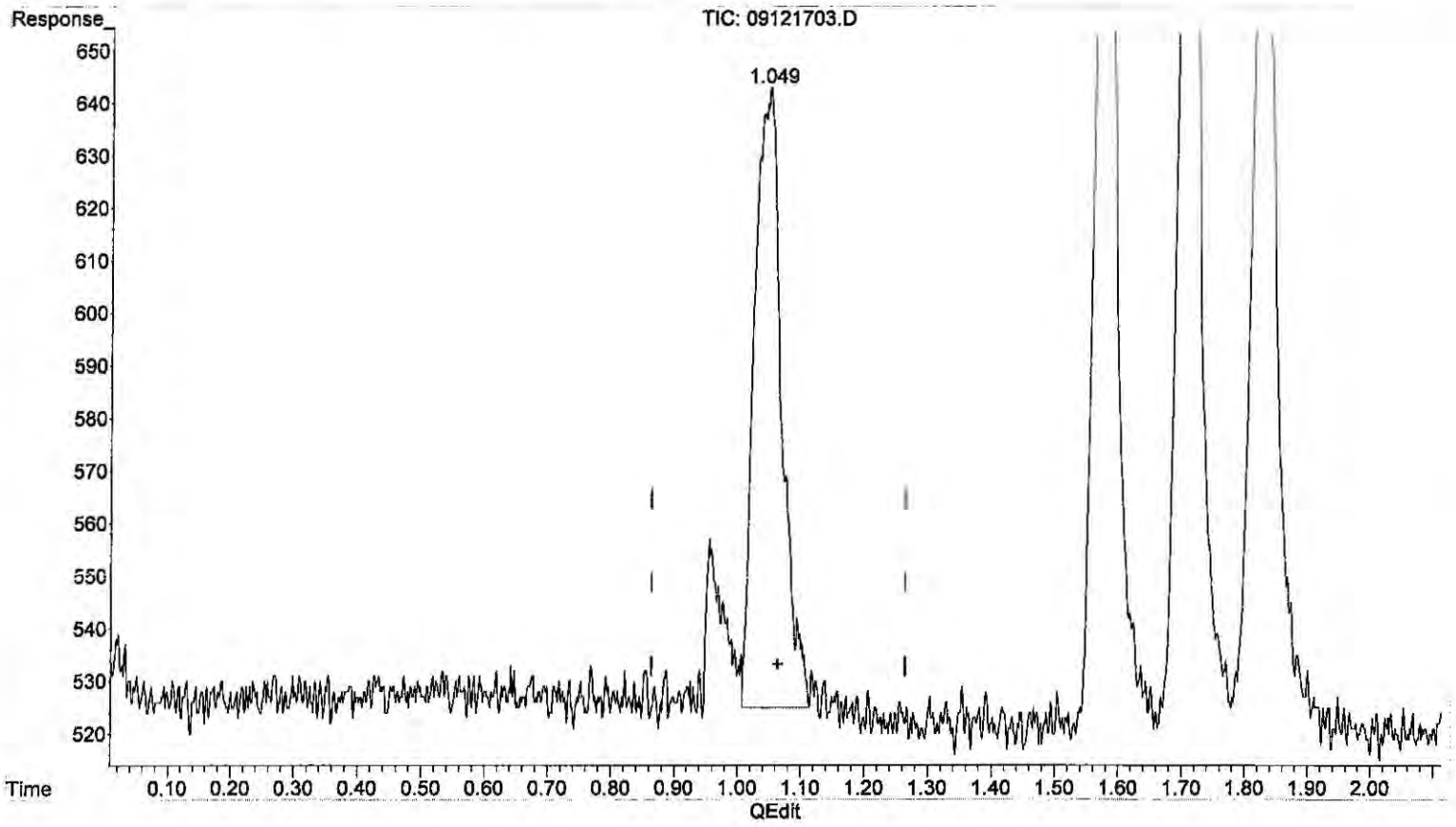


Quantitation Report (Qedit)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121703.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 11:05
Operator : MC
Sample : 0.302ppm 0.5ml s32-09121702
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:05:03 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:04:50 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase :
Signal #1 Info :
Signal #2 Phase:
Signal #2 Info :



(6) Methane (FID)
1.049min 0.391 ppm m
response 3564

(+) = Expected Retention Time
RS091217_R.M Wed Sep 13 15:00:03 2017

Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121704.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 11:45
Operator : MC
Sample : 1.51ppm 0.1ml s32-09051701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:05:55 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:04:50 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

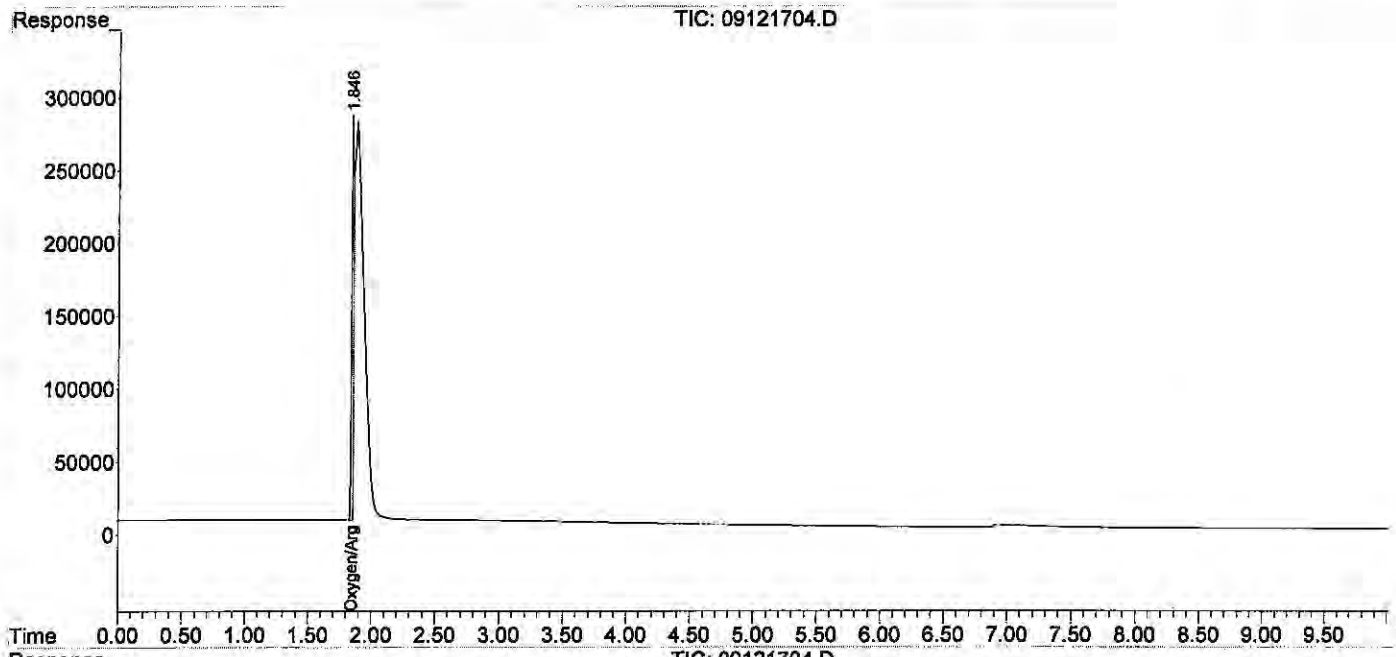
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.847	2536230	1.056	ppm
2)	Carbon monoxide	1.847	2536230	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.064	14725	1.613	ppm
7)	Ethylene	1.598	26885	1.582	ppm
8)	Ethane	1.851	26944	1.555	ppm
9)	Propylene	4.220	39140	1.589	ppm
10)	Propane	4.349	39934	1.596	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	6.578f	55348	1.020	ppm
13)	n-Butane	6.578f	55348	1.020	ppm

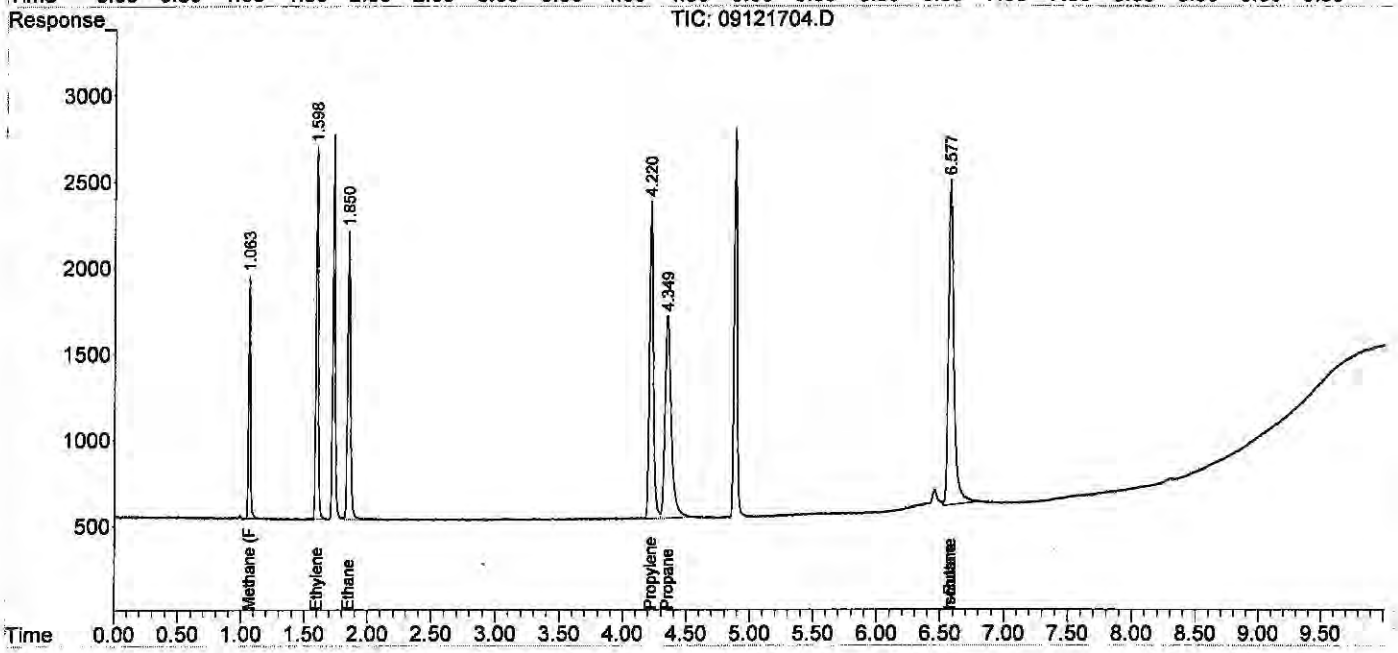
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121704.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 11:45
Operator : MC
Sample : 1.51ppm 0.1ml s32-09051701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:05:55 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:04:50 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121705.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 12:09
Operator : MC
Sample : 4.53ppm 0.3ml s32-09051701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:06:32 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:04:50 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

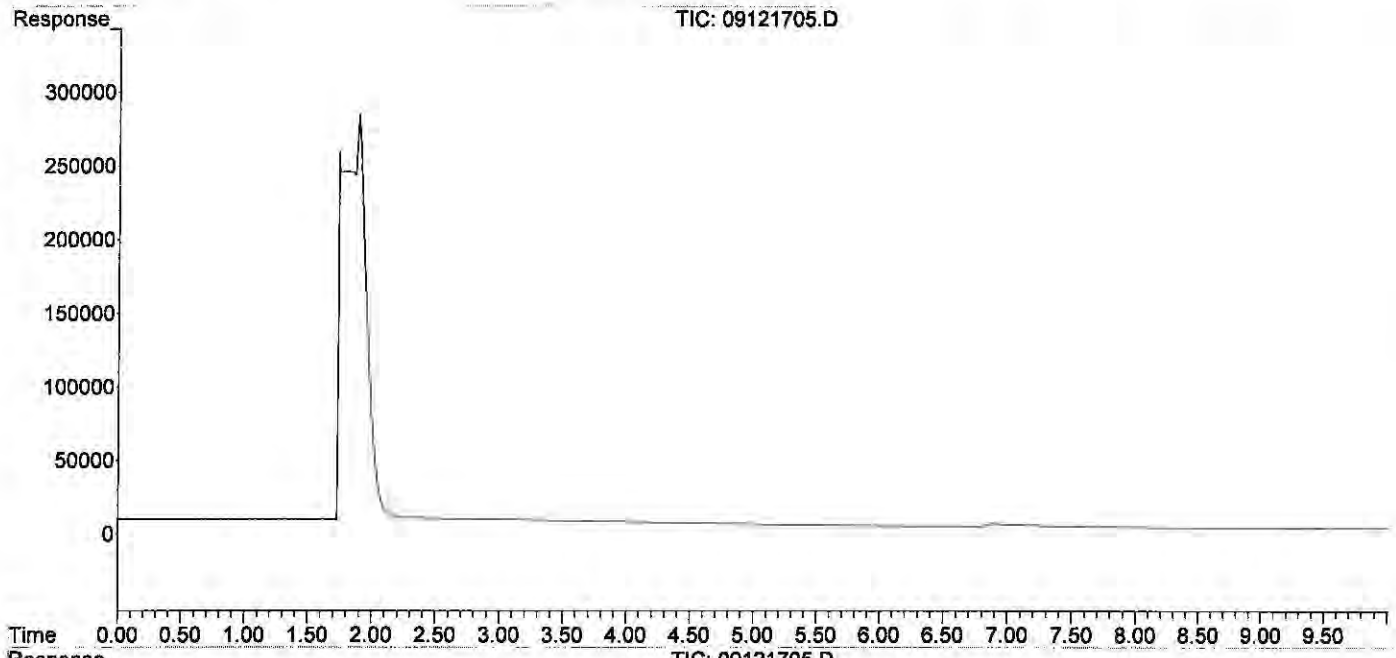
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.738	-331216	N.D.	ppm
2)	Carbon monoxide	1.738	-331216	0.019	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.052	41129	4.522	ppm
7)	Ethylene	1.586	77903	4.637	ppm
8)	Ethane	1.838	78354	4.558	ppm
9)	Propylene	4.218	112342	4.614	ppm
10)	Propane	4.347	115723	4.680	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	6.580f	155256	3.565	ppm
13)	n-Butane	6.580f	155256	3.565	ppm

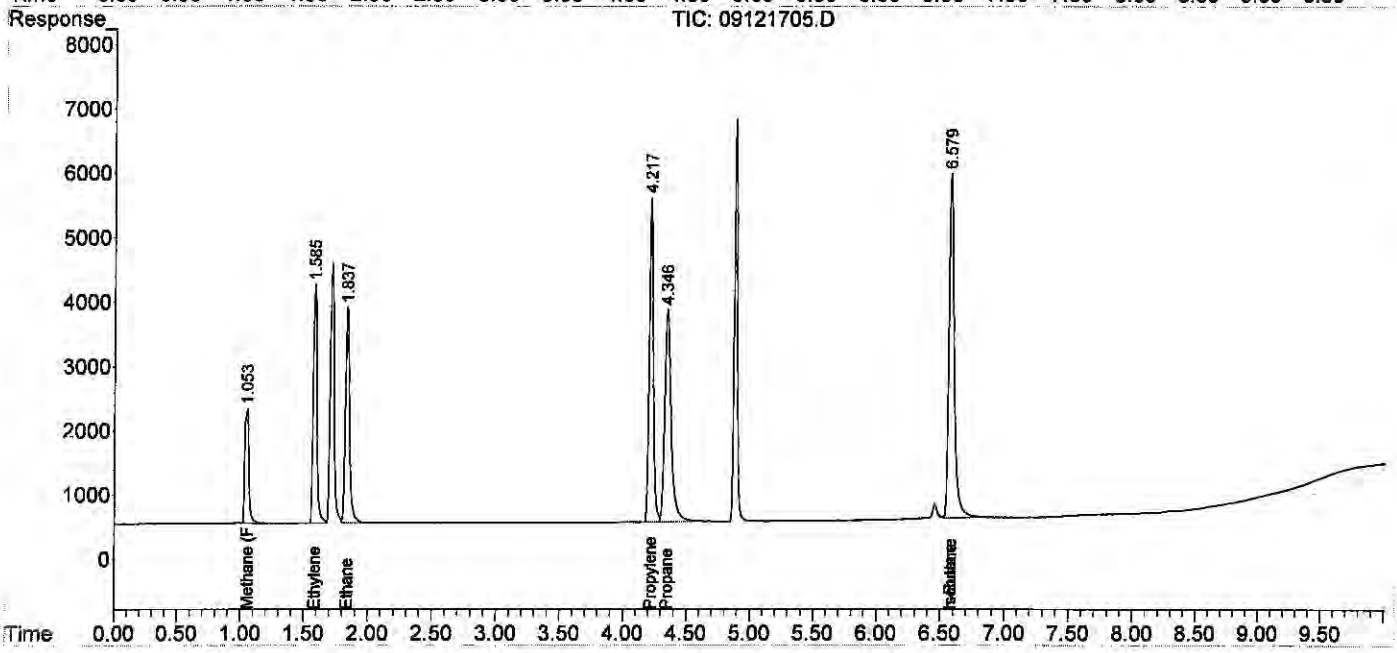
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121705.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 12:09
Operator : MC
Sample : 4.53ppm 0.3ml s32-09051701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:06:32 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:04:50 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121706.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 12:30
Operator : MC
Sample : 10.57ppm 0.7ml s32-09051701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:09:24 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:04:50 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.929f	-31871242	N.D.	ppm
2)	Carbon monoxide	1.929f	-31871242	1.818	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.025	91967	10.135	ppm
7)	Ethylene	1.568	172086	10.273	ppm
8)	Ethane	1.822	178841	10.441	ppm
9)	Propylene	4.214	248004	10.236	ppm
10)	Propane	4.344	257124	10.458	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	6.578f	338181	9.254	ppm
13)	n-Butane	6.578f	338181	9.254	ppm

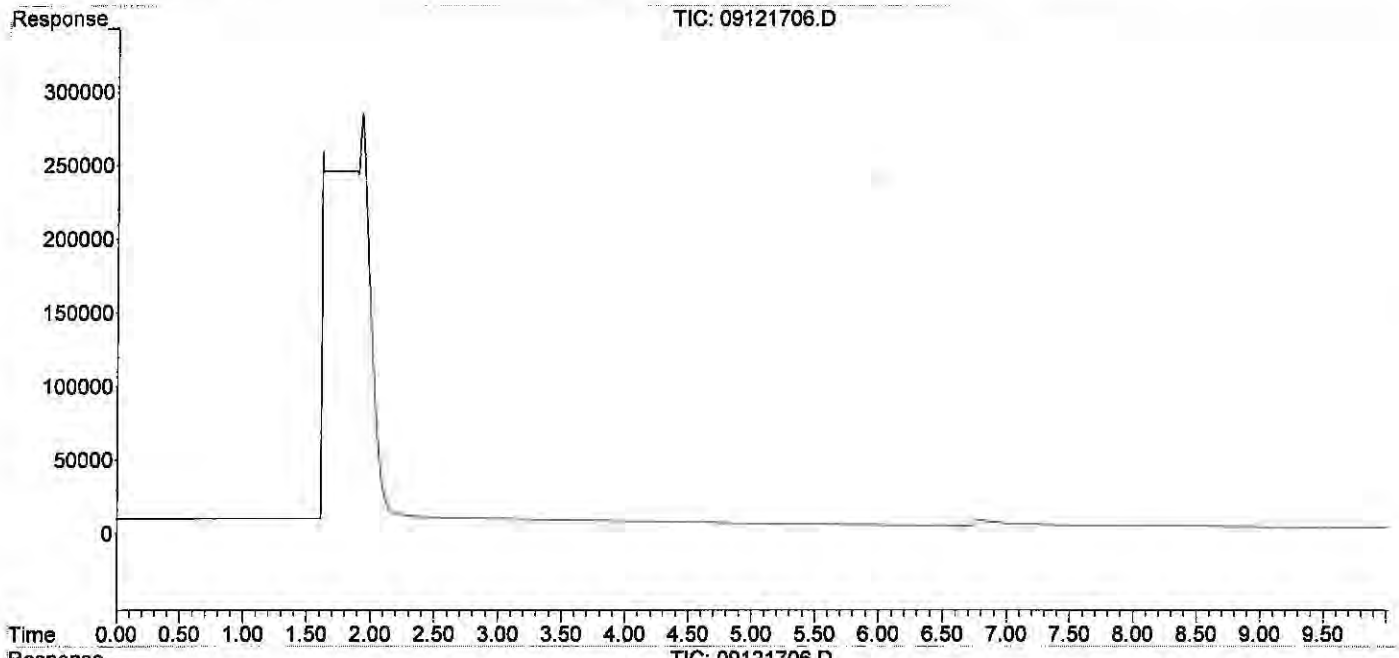
(f)=RT Delta > 1/2 Window (m)=manual int.

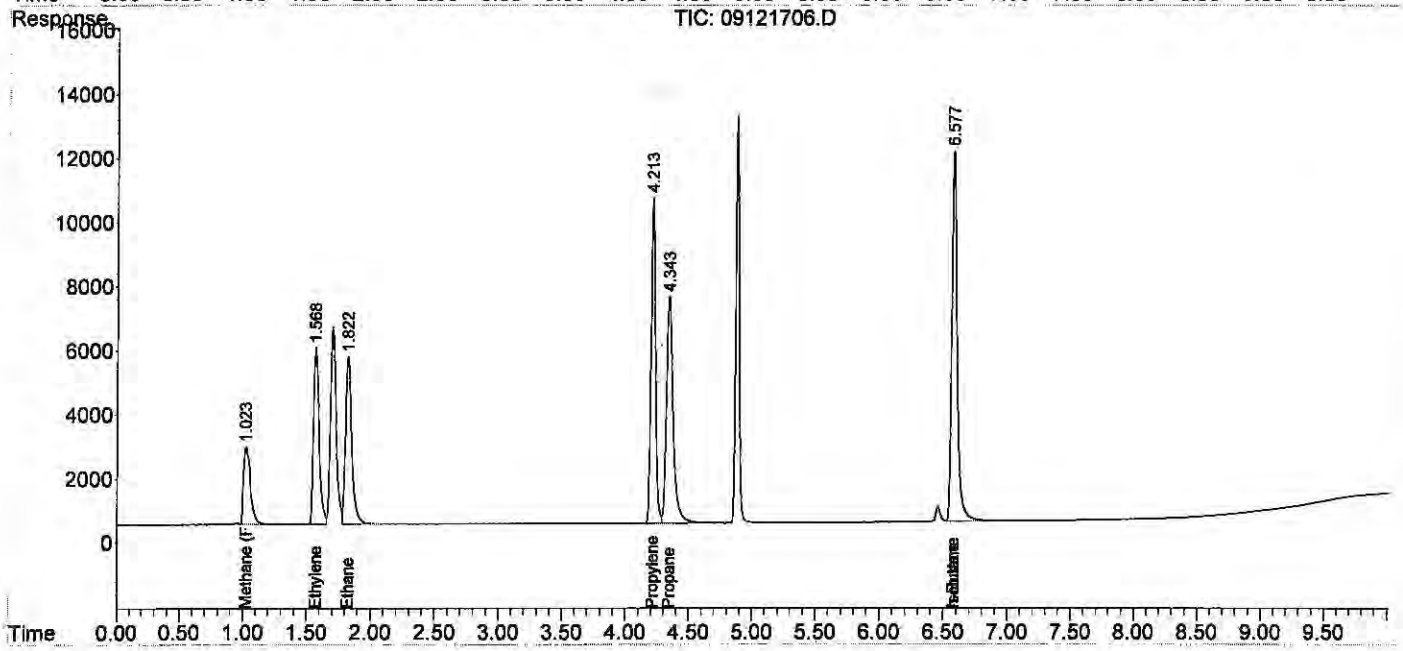
Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121706.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 12:30
Operator : MC
Sample : 10.57ppm 0.7ml s32-09051701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:09:24 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:04:50 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121707.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 12:47
Operator : MC
Sample : 200ppm 0.1ml s32-09121701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:09:59 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:04:50 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

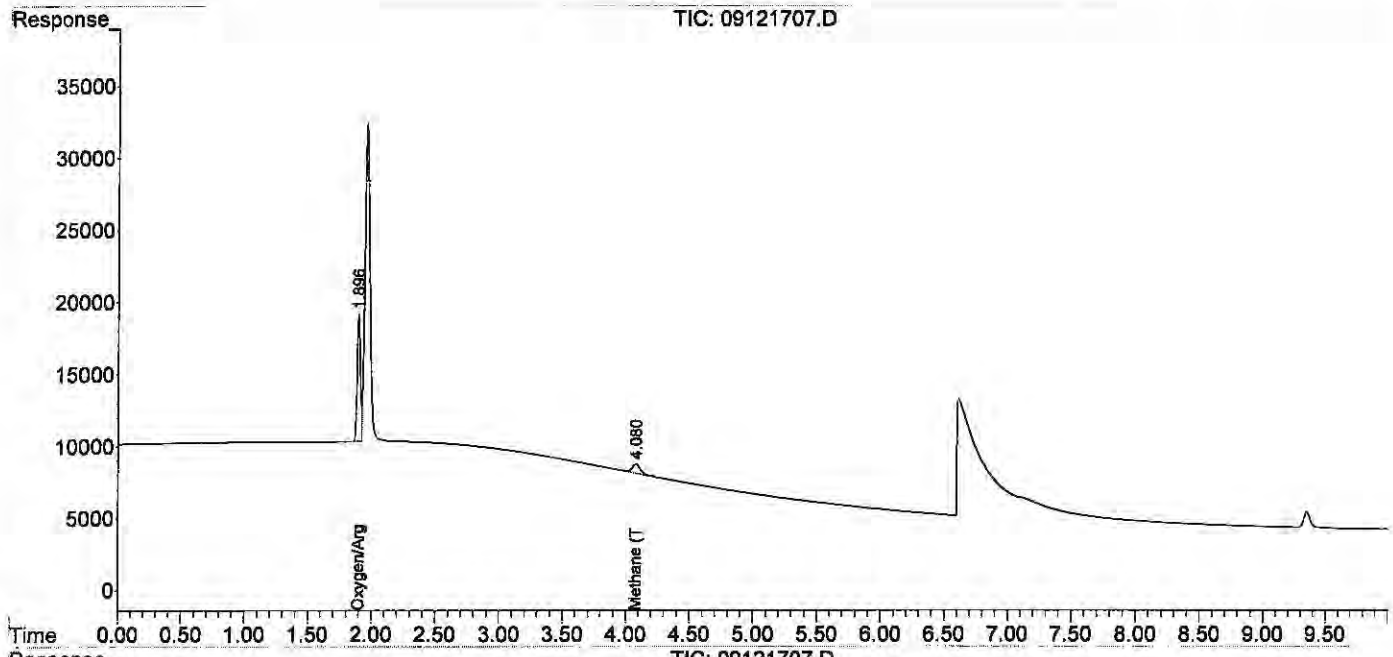
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.897	155286	0.065	ppm
2)	Carbon monoxide	1.897	155286	N.D.	ppm
3)	Methane (TCD)	4.079f	27015	2856.472	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.063	1735997	190.792	ppm
7)	Ethylene	1.597	3339702	198.758	ppm
8)	Ethane	1.849	3350442	194.597	ppm
9)	Propylene	4.201	4504060	185.706	ppm
10)	Propane	4.333	5043036	204.809	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	0.000	0	N.D.	ppm
13)	n-Butane	0.000	0	N.D.	ppm

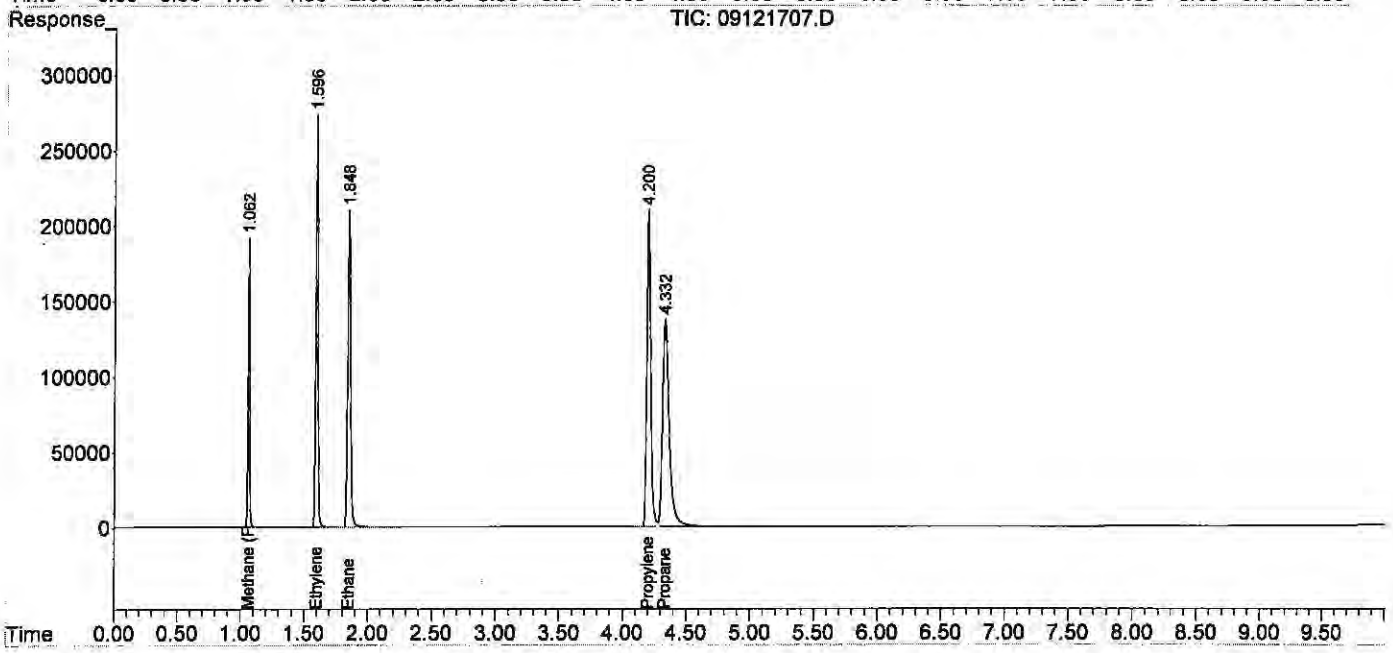
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121707.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 12:47
Operator : MC
Sample : 200ppm 0.1ml s32-09121701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:09:59 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:04:50 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121708.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 13:00
Operator : MC
Sample : 600ppm 0.3ml s32-09121701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:10:57 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:10:50 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.884	196022	0.124	ppm
2)	Carbon monoxide	1.884	196022	N.D.	ppm
3)	Methane (TCD)	4.070f	88282	782.730	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.044	5189849	539.759	ppm
7)	Ethylene	1.573	10007759	590.286	ppm
8)	Ethane	1.822	10048964	583.213	ppm
9)	Propylene	4.160	13569343	562.612	ppm
10)	Propane	4.300	15251326	615.171	ppm
11)	Isobutylene	6.143	9815	NoCal	ppm
12)	Isobutane	0.000	0	N.D.	ppm
13)	n-Butane	0.000	0	N.D.	ppm

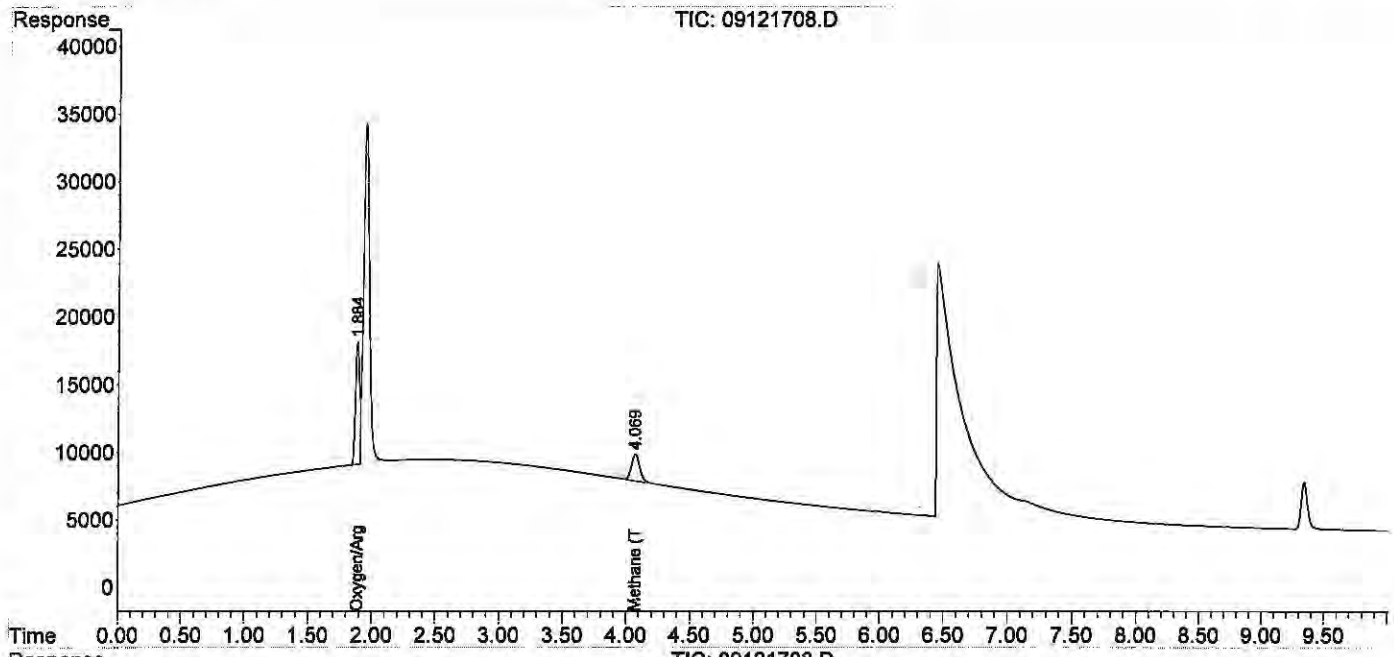
(f)=RT Delta > 1/2 Window (m)=manual int.

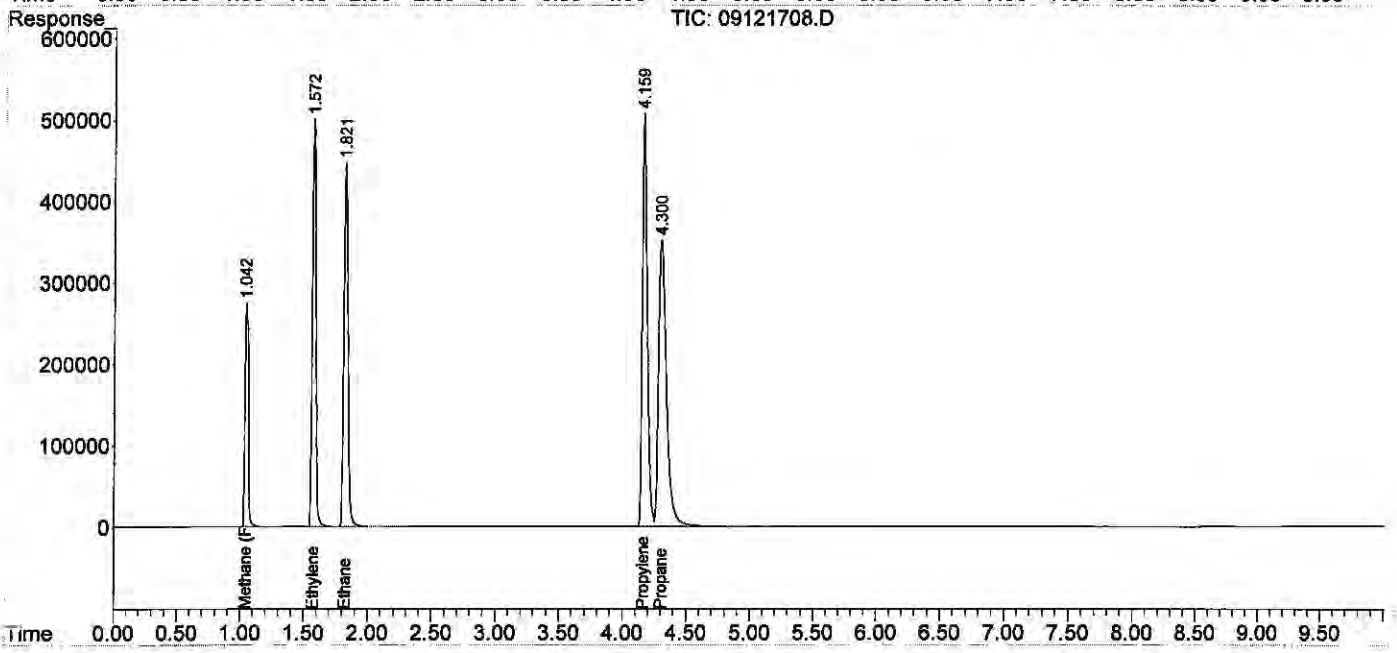
Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121708.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 13:00
Operator : MC
Sample : 600ppm 0.3ml s32-09121701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:10:57 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:10:50 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121709.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 13:47
Operator : MC
Sample : 1000ppm 0.5ml s32-09121701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:11:46 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:11:38 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.879	192611	0.162	ppm
2)	Carbon monoxide	1.879	192611	N.D.	ppm
3)	Methane (TCD)	4.070f	145492	1244.729	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.039	8598534	945.644	ppm
7)	Ethylene	1.576	16608504	981.887	ppm
8)	Ethane	1.827	16709165	973.644	ppm
9)	Propylene	4.161	22494888	941.060	ppm
10)	Propane	4.298	25459411	1023.223	ppm
11)	Isobutylene	6.138	16970	8645.243	ppm
12)	Isobutane	0.000	0	N.D.	ppm
13)	n-Butane	0.000	0	N.D.	ppm

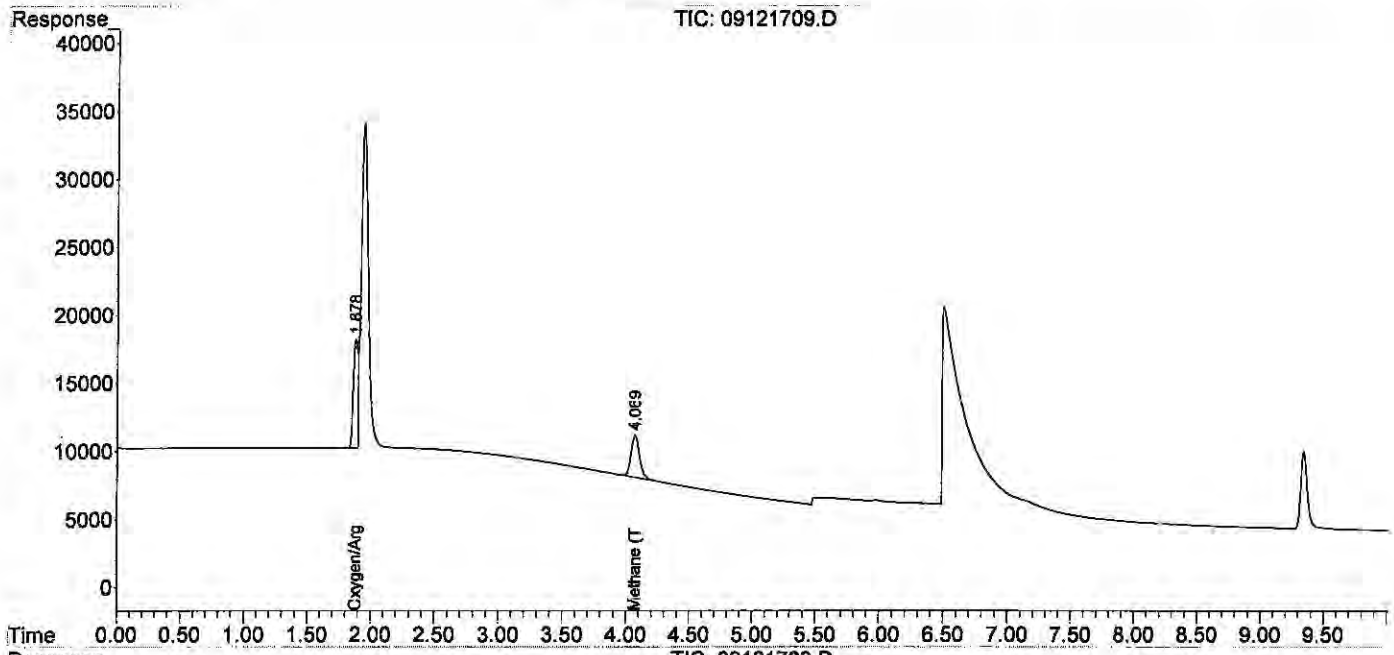
(f)=RT Delta > 1/2 Window (m)=manual int.

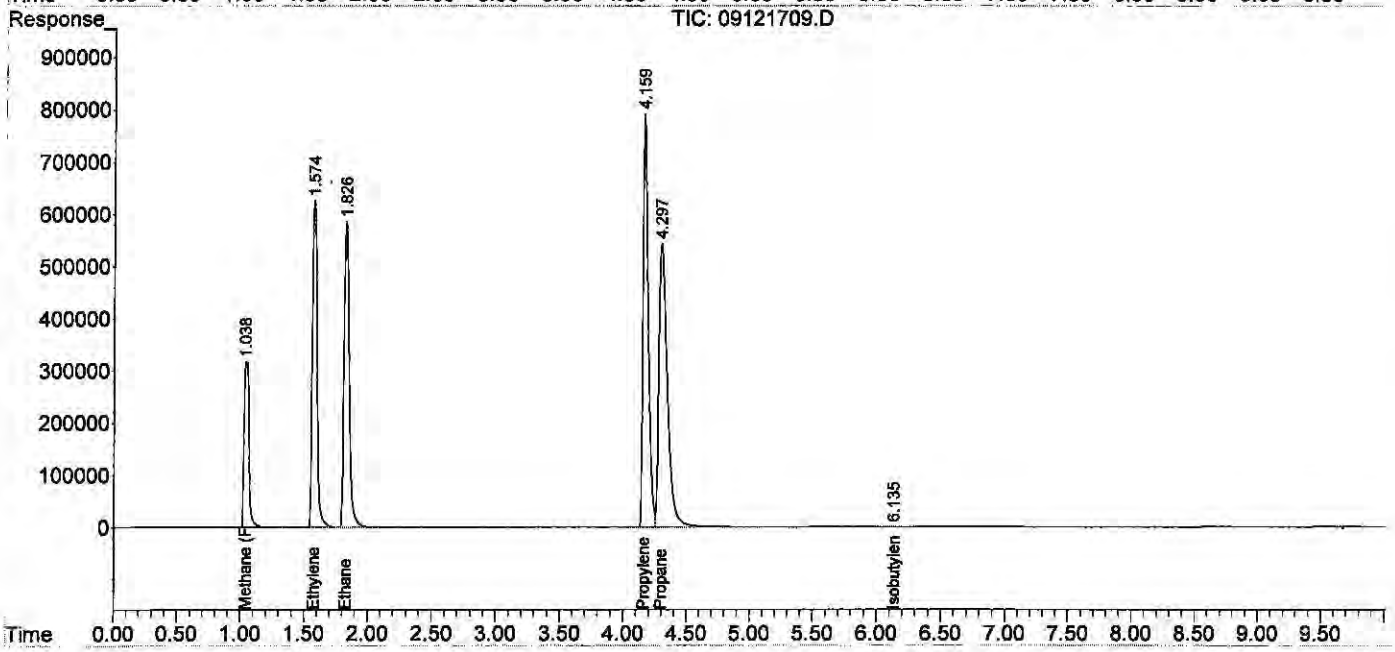
Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121709.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 13:47
Operator : MC
Sample : 1000ppm 0.5ml s32-09121701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:11:46 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:11:38 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121710.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 14:07
Operator : MC
Sample : 2000ppm 1ml s32-09121701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:12:33 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:12:25 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

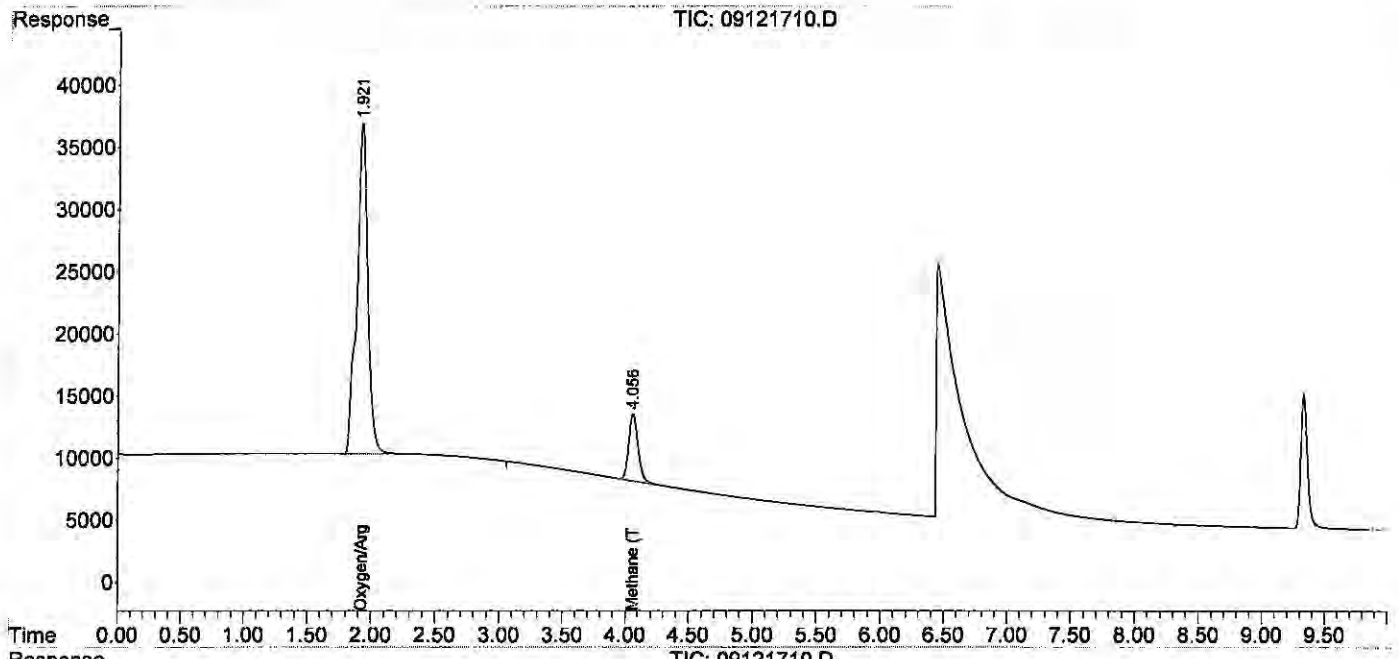
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.922f	1578147	1.659	ppm	
2)	Carbon monoxide	1.922f	1578147	N.D.	ppm	
3)	Methane (TCD)	4.057f	281651	3526.607	ppm	
4)	Carbon dioxide	0.000	0	N.D.	ppm	
6)	Methane (FID)	1.016	16098209	1763.622	ppm	
7)	Ethylene	1.552	31192444	1848.268	ppm	
8)	Ethane	1.801	31424218	1837.143	ppm	
9)	Propylene	4.129	42124690	1775.341	ppm	m
10)	Propane	4.269	48583085	1946.921	ppm	
11)	Isobutylene	6.136	33832	25613.603	ppm	
12)	Isobutane	6.576f	3845	0.120	ppm	
13)	n-Butane	6.576f	3845	0.120	ppm	

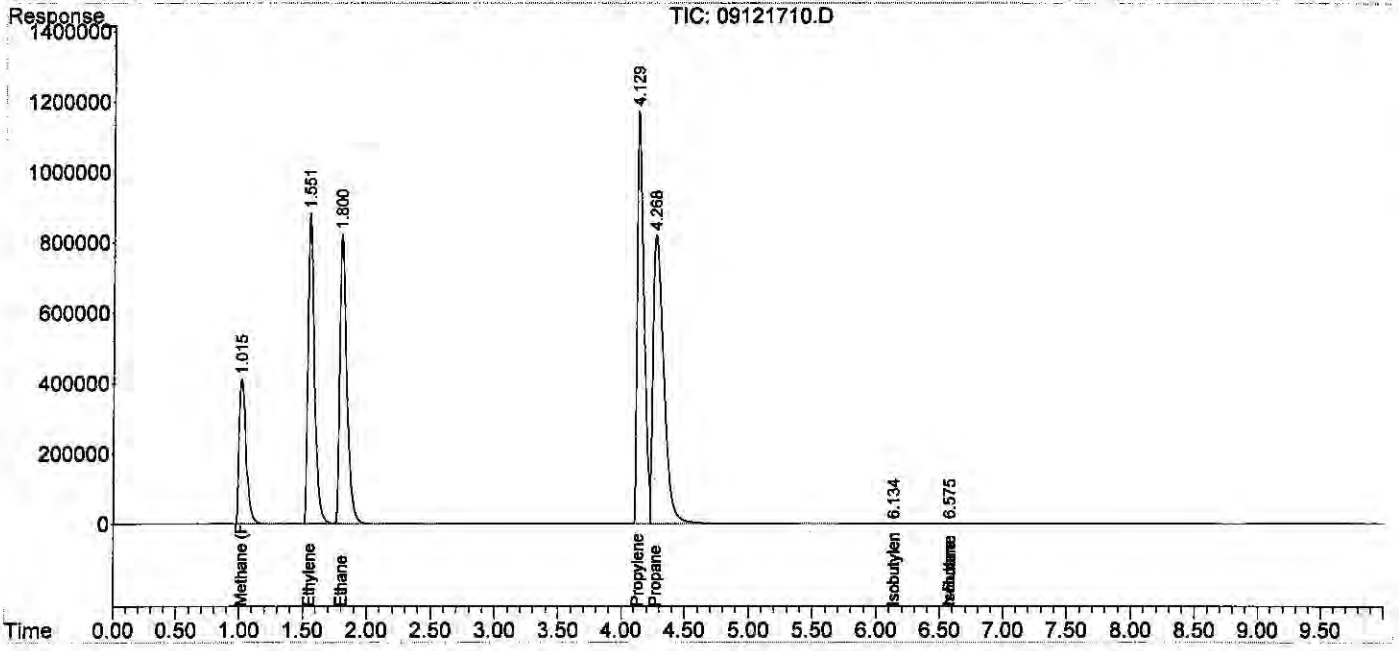
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121710.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 14:07
Operator : MC
Sample : 2000ppm 1ml s32-09121701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:12:33 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:12:25 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



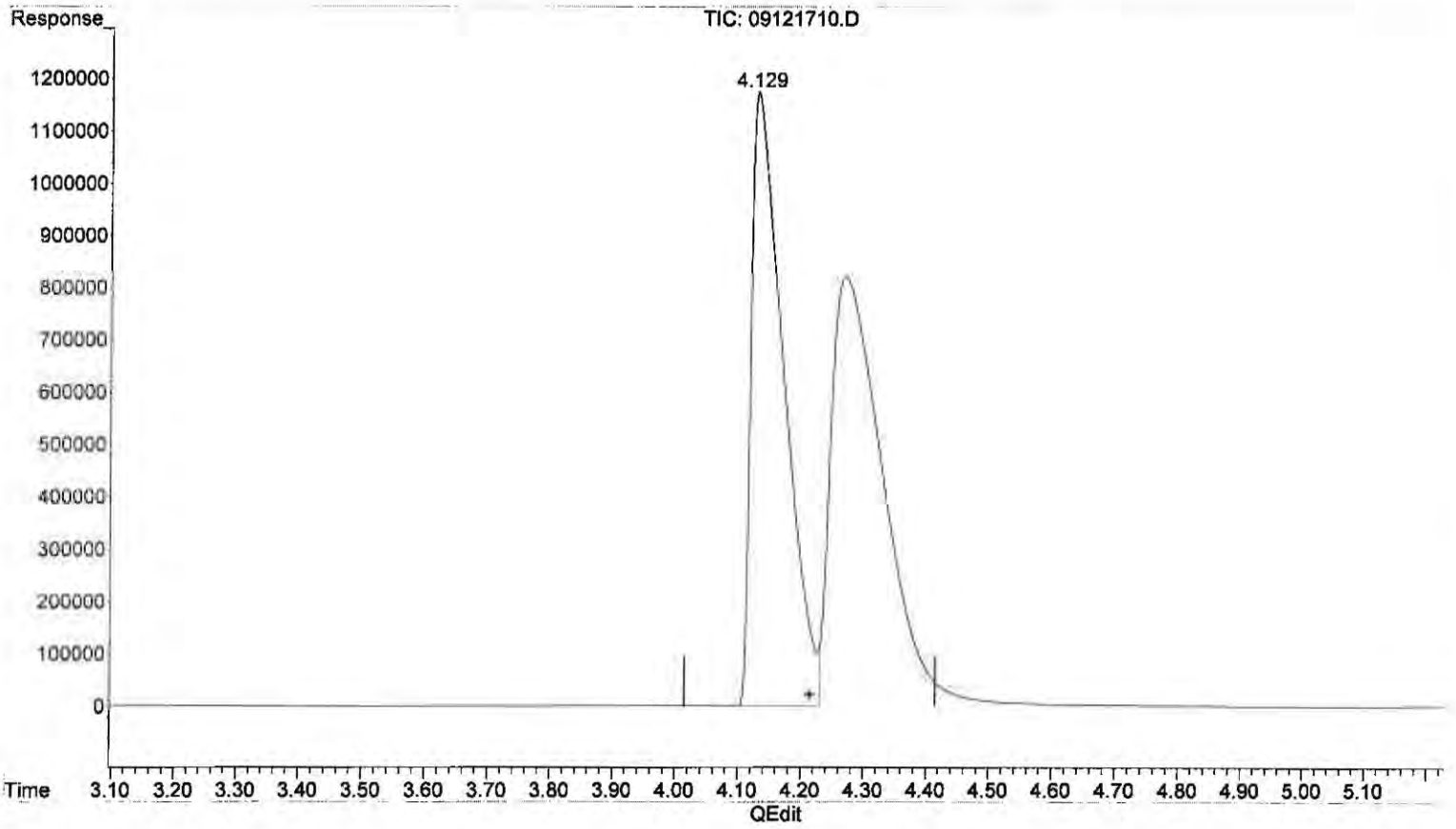


Quantitation Report (Qedit)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121710.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 14:07
Operator : MC
Sample : 2000ppm 1ml s32-09121701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:12:33 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:12:25 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



(9) Propylene
4.129min 1775.341 ppm m
response 42124690

(+) = Expected Retention Time
RS091217_R.M Wed Sep 13 15:08:03 2017

Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121711.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 14:48
Operator : MC
Sample : 4000ppm 0.1ml s32-08231701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:13:37 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:13:29 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

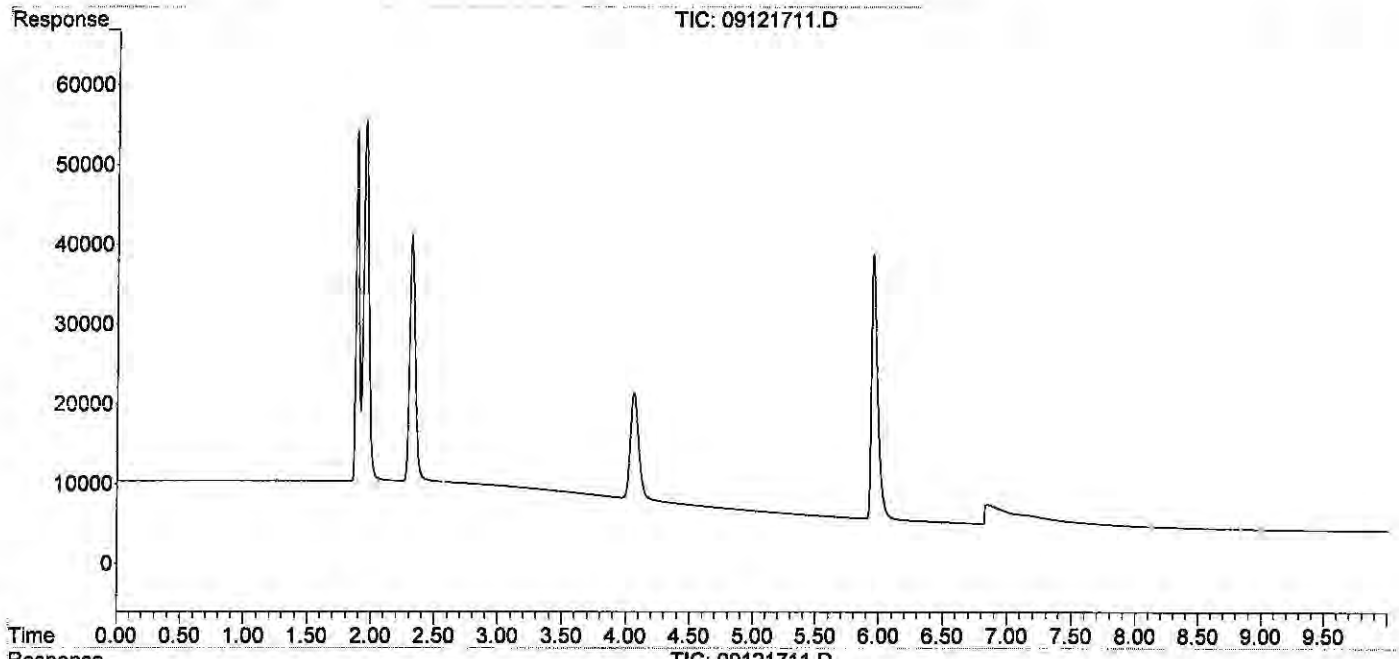
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	0.000	0	N.D.	ppm	d
2)	Carbon monoxide	0.000	0	N.D.	ppm	d
3)	Methane (TCD)	0.000	0	N.D.	ppm	d
4)	Carbon dioxide	0.000	0	N.D.	ppm	d
6)	Methane (FID)	1.059	35776839	3925.122	ppm	
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	0	N.D.	ppm	
9)	Propylene	0.000	0	N.D.	ppm	
10)	Propane	0.000	0	N.D.	ppm	
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	0.000	0	N.D.	ppm	
13)	n-Butane	0.000	0	N.D.	ppm	

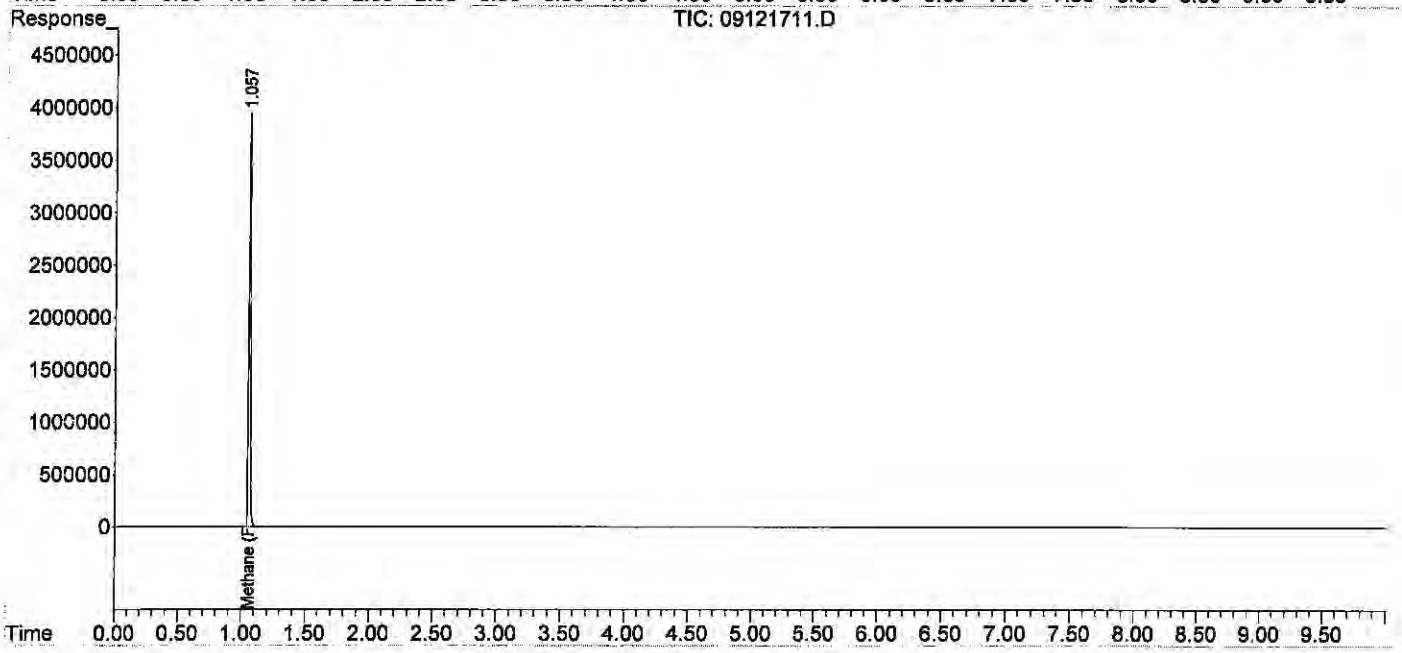
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121711.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 14:48
Operator : MC
Sample : 4000ppm 0.1ml s32-08231701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:13:37 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:13:29 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase :
Signal #1 Info :
Signal #2 Phase:
Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121712.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 15:21
Operator : MC
Sample : 20000ppm 0.5ml s32-08231701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:14:17 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:13:29 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	0.000	0	N.D.	ppm	d
2)	Carbon monoxide	1.836	3190788	N.D.	ppm	
3)	Methane (TCD)	0.000	0	N.D.	ppm	d
4)	Carbon dioxide	0.000	0	N.D.	ppm	d
6)	Methane (FID)	1.034	169009160	18492.064	ppm	
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	0	N.D.	ppm	
9)	Propylene	0.000	0	N.D.	ppm	
10)	Propane	0.000	0	N.D.	ppm	
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	0.000	0	N.D.	ppm	
13)	n-Butane	0.000	0	N.D.	ppm	

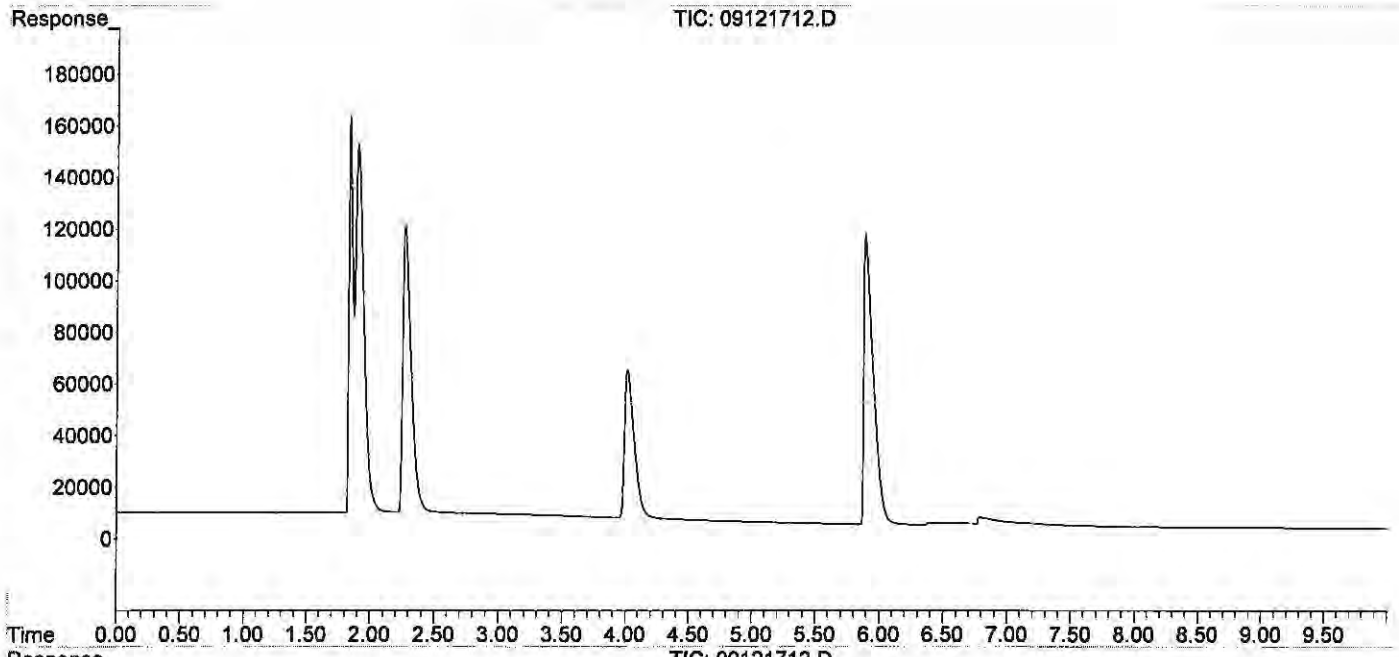
(f)=RT Delta > 1/2 Window (m)=manual int.

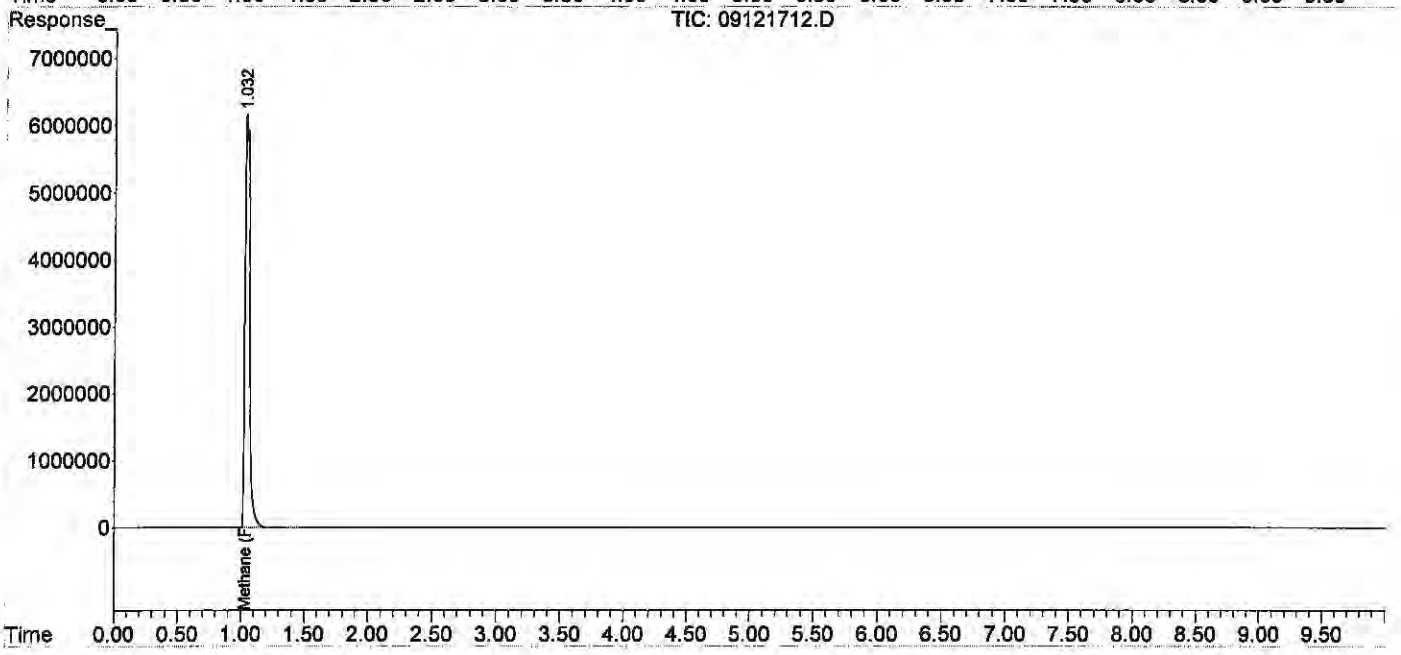
Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121712.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 15:21
Operator : MC
Sample : 20000ppm 0.5ml s32-08231701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:14:17 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:13:29 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121715.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 16:15
Operator : MC
Sample : icv s30-05241604
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:15:11 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:13:29 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

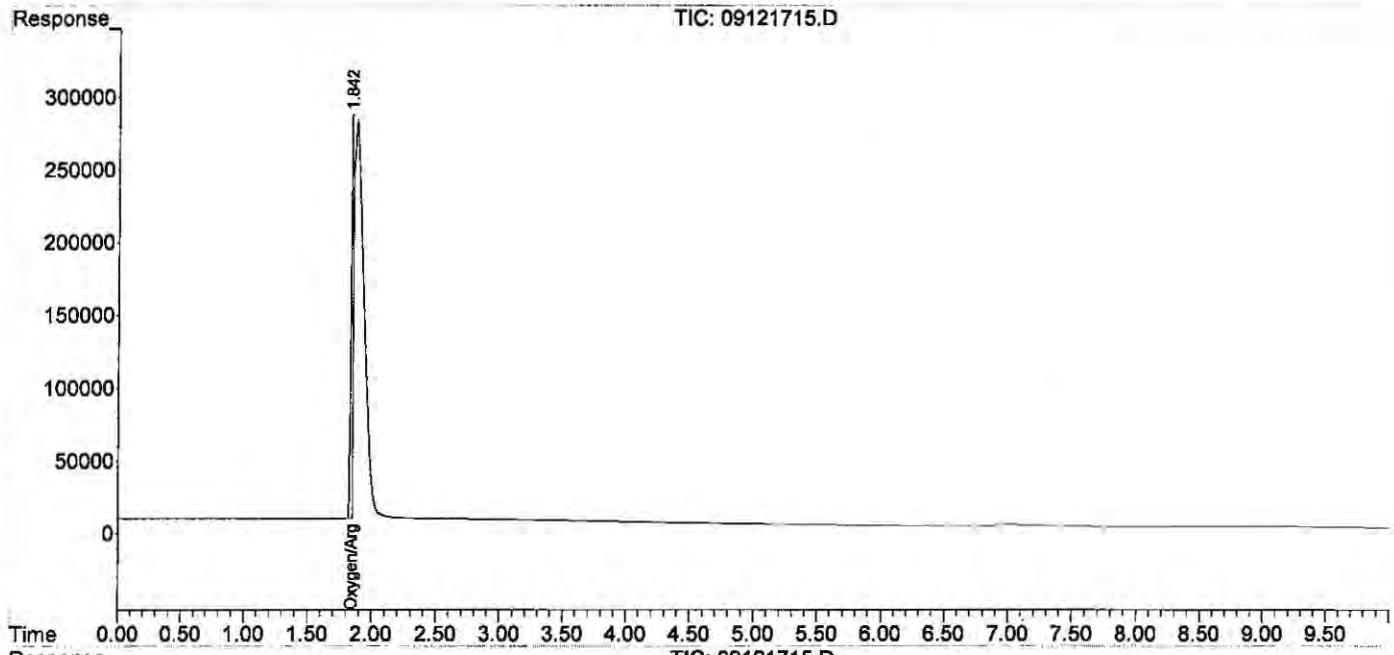
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.843	2922459	3.687	ppm	
2)	Carbon monoxide	1.843	2922459	N.D.	ppm	
3)	Methane (TCD)	0.000	0	N.D.	ppm	actual %D
4)	Carbon dioxide	0.000	0	N.D.	ppm	
6)	Methane (FID)	1.063	13748	1.516	ppm	~~1510~~ 1.50 101.1
7)	Ethylene	1.598	24153	1.443	ppm	~~1490~~ 1.50 96.2
8)	Ethane	1.850	24488	1.445	ppm	~~1500~~ 1.50 96.3
9)	Propylene	4.221	36004	1.537	ppm	~~1490~~ 1.50 102.5
10)	Propane	4.350	37738	1.517	ppm	~~1511~~ 1.51 100.5
11)	Isobutylene	0.000	0	N.D.	ppm	
12)	Isobutane	6.579f	48019	1.804	ppm	9/14/17
13)	n-Butane	6.579f	48019	1.804	ppm	

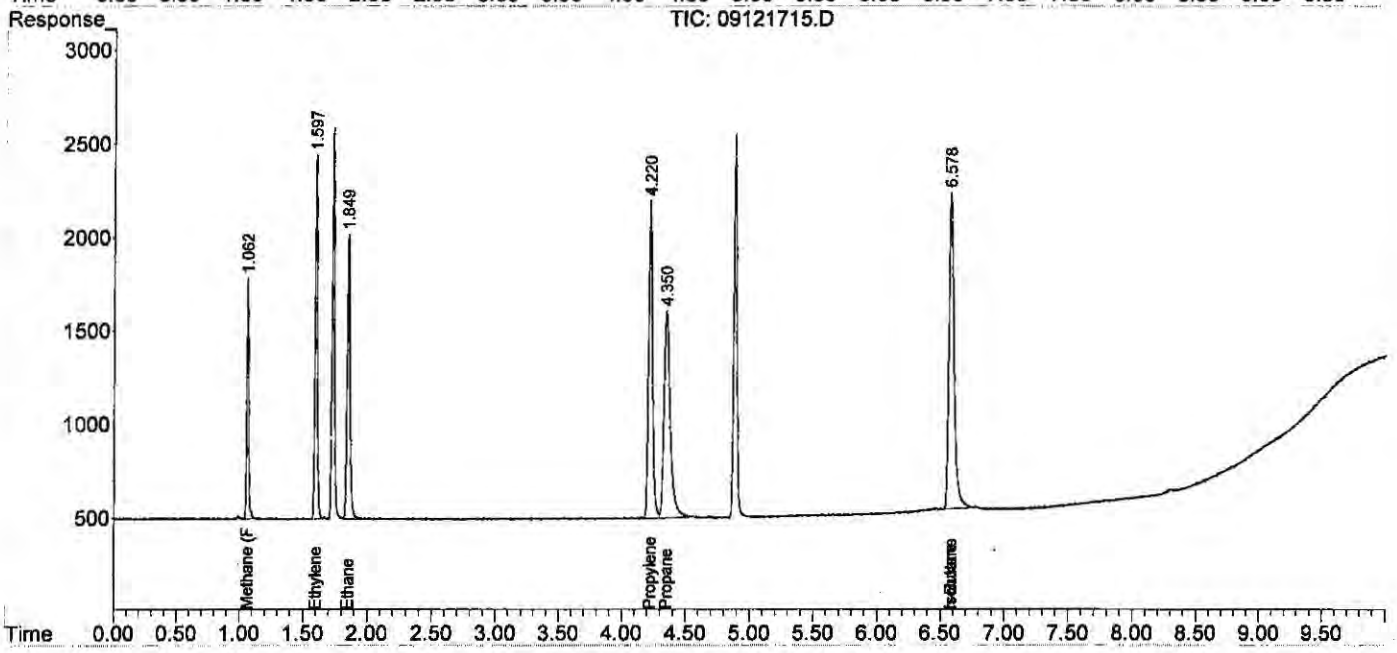
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2017_09\12\
Data File : 09121715.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 12-Sep-2017, 16:15
Operator : MC
Sample : icv s30-05241604
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Sep 13 11:15:11 2017
Quant Method : J:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:13:29 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Dissolved Gases by RSK175

ALS Environmental

Method : RSK175 Headspace Method for Dissolved Hydrocarbon in Water by FID/TCD
Client : ALS Laboratory Group
Service Request: P1907040
Sample Vol. (ml) : 32.00 ml
Analyst : WH/LD
Date Analysis : 11/25/19
Head Space Vol.(ml) : 8.00 ml
Instrument : GC#10
Detector : FID#10, TCD#10
Gas Constant : 24.05684 (20°C)

HEAD SPACE RESULT (ppm)

Sample ID	Inj. Vol.	Methane	Ethylene	Ethane
STD S32-05221901	0.100	89.437	94.895	94.157
ACTUAL		101.50	100.90	101.40
%Difference		11.9%	6.0%	7.1%
MCS 0.1ml	0.100	0.139	0.000	0.000
RB 0.1ml	0.100	0.000	0.000	0.000
LCS FID 0.1ml	0.100	1.445	1.000	1.227
LCSD FID 0.1ml	0.100	1.470	1.007	1.226
P1907040-001 0.1ml	0.100	1.562	0.000	0.000
P1907040-002 0.1ml	0.100	0.969	0.000	0.000
P1907040-003 0.1ml	0.100	2.460	0.000	0.000
P1907040-004 0.1	0.100	0.000	0.000	0.000
P1907040-004 MS 0.1ml	0.100	1.249	0.912	1.125
P1907040-004 MSD 0.1r	0.100	1.232	0.954	1.165
STD S32-05221901		90.916	96.270	95.571
ACTUAL		101.50	100.90	101.40
%Difference		10.4%	4.6%	5.7%

FINAL HEAD SPACE RESULT (ppm)

	Methane	Ethylene	Ethane
WWt.	16.04	28.05	30.07
HENRY'S CONSTANT	3.76E+04	1.02E+04	2.63E+04
RL	1.30	1.00	0.60
MCS 0.1ml	1.390	0.000	0.000
LCS FID 0.1ml	14.450	10.000	12.270
LCSD FID 0.1ml	14.700	10.070	12.260
P1907040-001 0.1ml	15.620	0.000	0.000
P1907040-002 0.1ml	9.690	0.000	0.000
P1907040-003 0.1ml	24.600	0.000	0.000
P1907040-004 0.1	0.000	0.000	0.000
P1907040-004 MS 0.1ml	12.490	9.120	11.250
P1907040-004 MSD 0.1ml	12.320	9.540	11.650

Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2019_11\25\
Data File : 11251901.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 25-Nov-2019, 11:58:00
Operator : WH/LD
Sample : STD S32-05221901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 25 11:07:37 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

LD
11/25

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

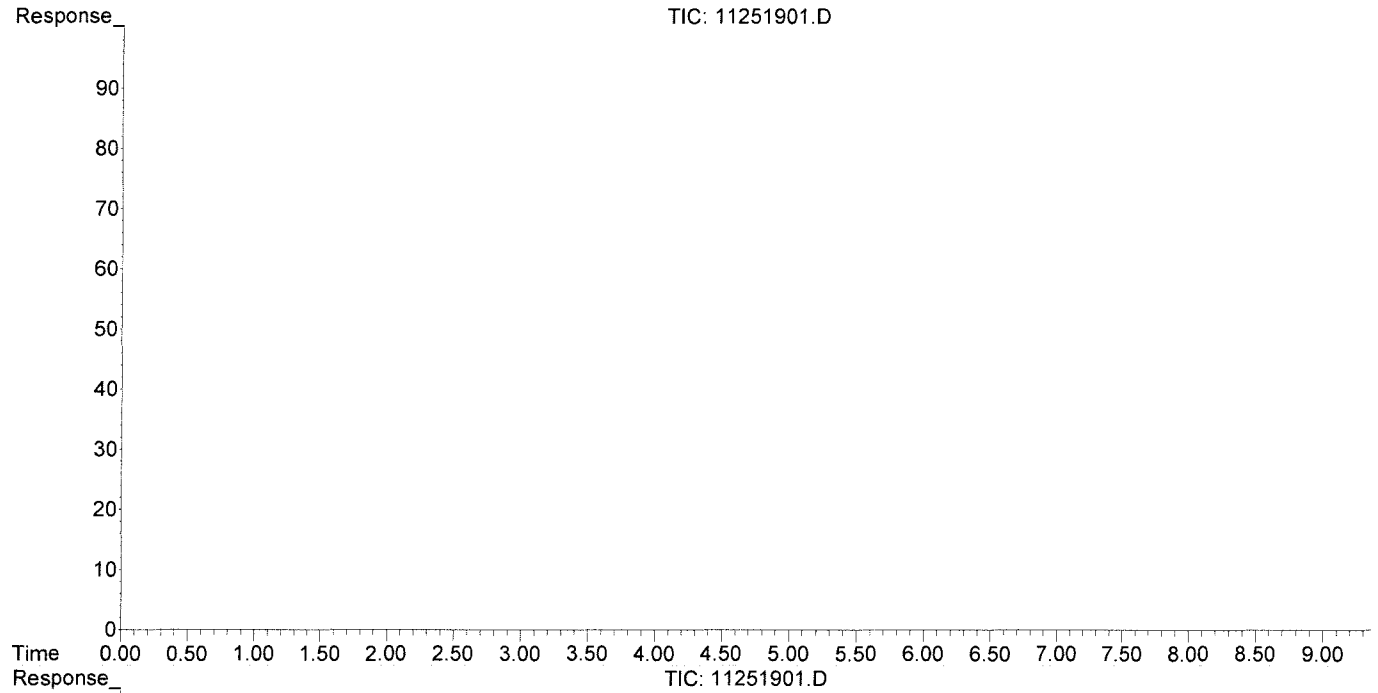
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.122	811249	89.437	ppm
7)	Ethylene	1.697	1587999	94.895	ppm
8)	Ethane	1.965	1595980	94.157	ppm
9)	Propylene	4.336	2314854	98.792	ppm
10)	Propane	4.459	2376881	95.533	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	0.000	0	N.D.	ppm
13)	n-Butane	0.000	0	N.D.	ppm

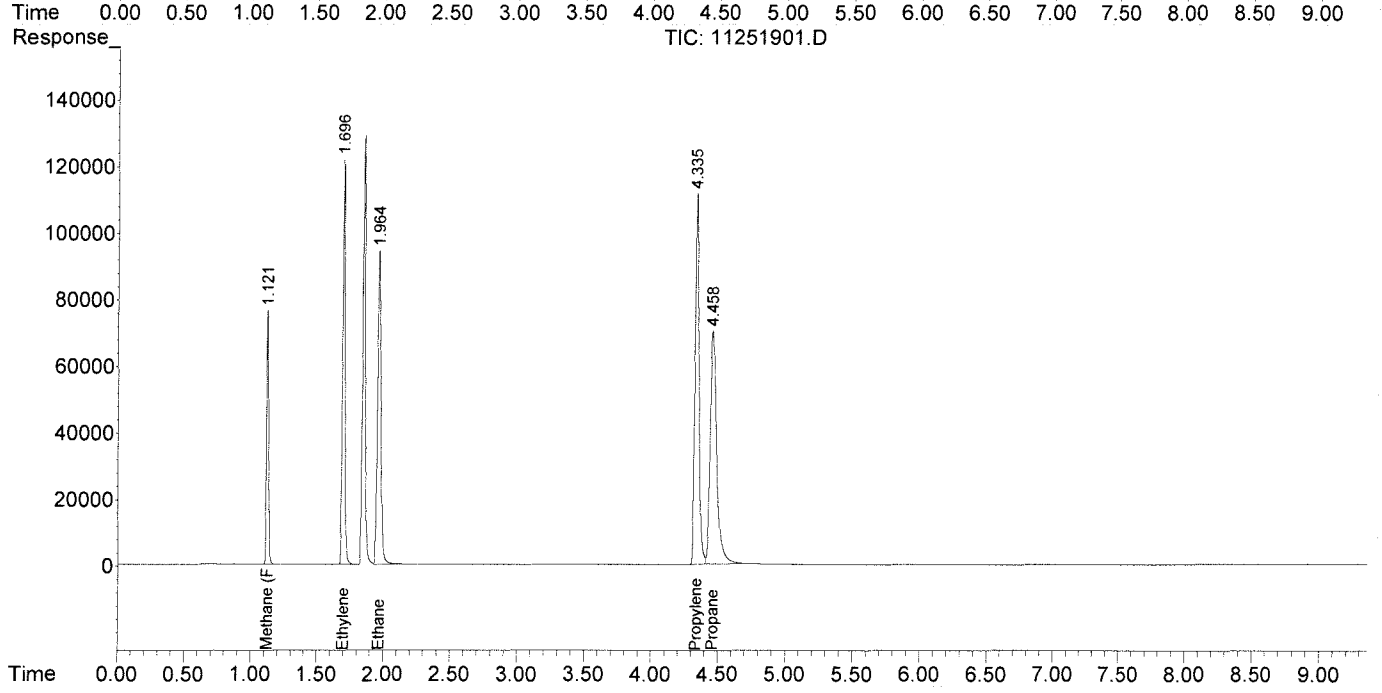
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2019_11\25\
Data File : 11251901.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 25-Nov-2019, 11:58:00
Operator : WH/LD
Sample : STD S32-05221901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 25 11:07:37 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Quantitation Report (QT Reviewed)

Data Path : J:\GC10\DATA\RSK_FID\2019_11\25\
Data File : 11251914.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 25-Nov-2019, 14:59:39
Operator : WH/LD
Sample : STD S32-05221901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 25 14:14:15 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

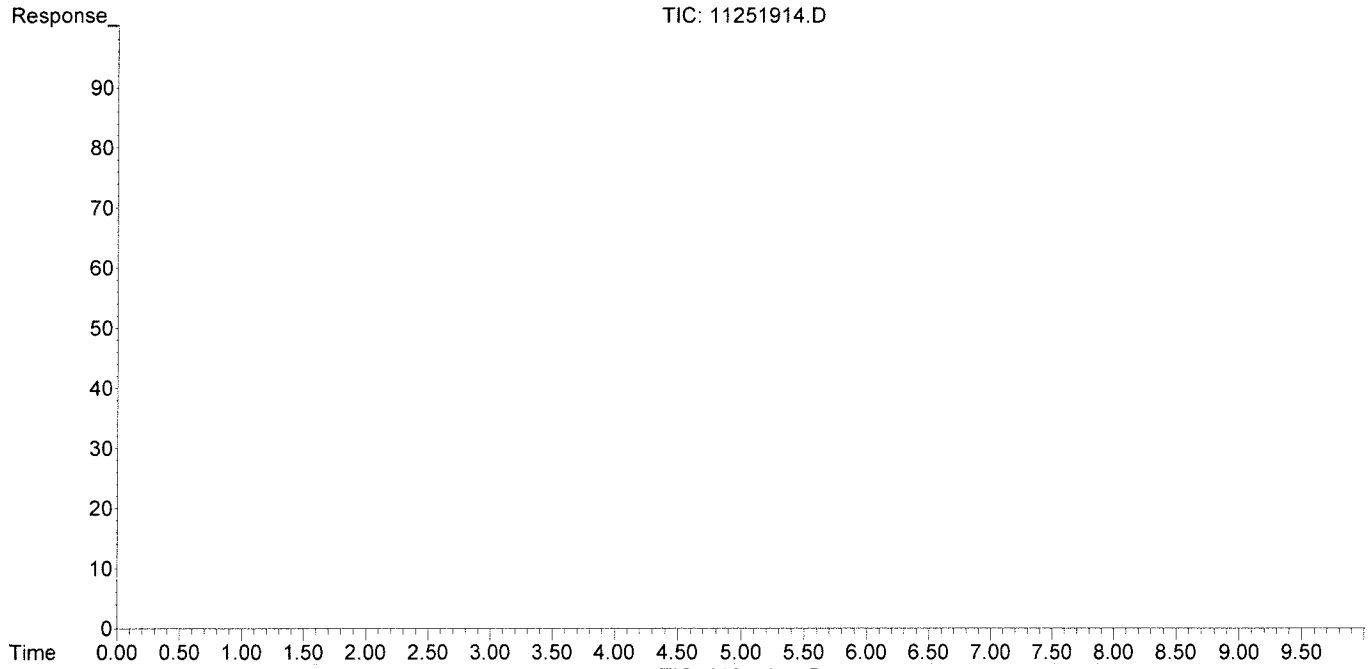
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.120	824669	90.916	ppm
7)	Ethylene	1.688	1611008	96.270	ppm
8)	Ethane	1.954	1619948	95.571	ppm
9)	Propylene	4.329	2346490	100.142	ppm
10)	Propane	4.452	2414278	97.036	ppm
11)	Isobutylene	0.000	0	N.D.	ppm
12)	Isobutane	0.000	0	N.D.	ppm
13)	n-Butane	0.000	0	N.D.	ppm

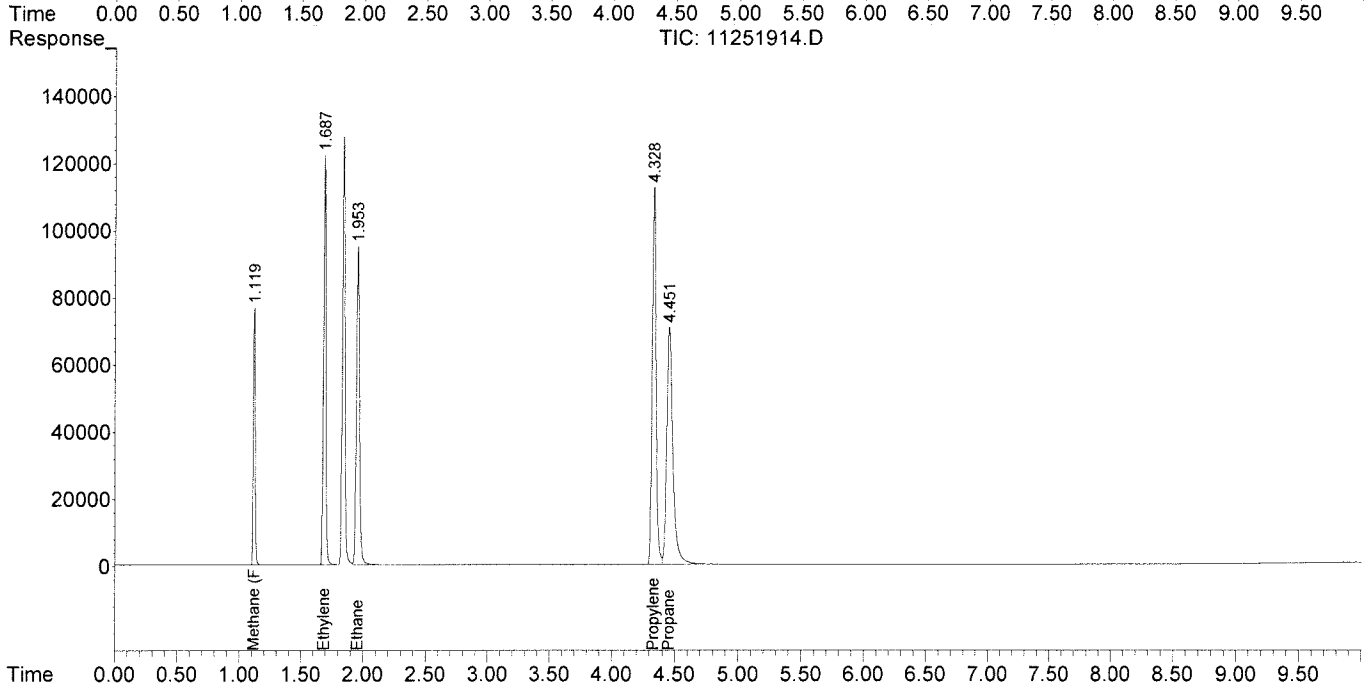
(f)=RT Delta > 1/2 Window (m)=manual int.

Data Path : J:\GC10\DATA\RSK_FID\2019_11\25\
Data File : 11251914.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 25-Nov-2019, 14:59:39
Operator : WH/LD
Sample : STD S32-05221901
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Nov 25 14:14:15 2019
Quant Method : I:\GC10\METHODS\RS091217_R.M
Quant Title : RSK175, VOA-DISGAS, VOA-TO3C1C6
QLast Update : Wed Sep 13 11:14:47 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





Injection Log

Directory: I:\GC10\DATA\RSK_FID\2017_09\12\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Acquisition Method	Comments
1	12-Sep-17, 08:38:08	09121701.D	test		MC	RSKBOTH.M	
2	12-Sep-17, 10:52:40	09121702.D	0.151ppm 0.250ml s32-09121702		MC	RSKBOTH.M	Curve
3	12-Sep-17, 11:05:49	09121703.D	0.302ppm 0.5ml s32-09121702		MC	RSKBOTH.M	Curve
4	12-Sep-17, 11:45:34	09121704.D	1.51ppm 0.1ml s32-09051701		MC	RSKBOTH.M	Curve
5	12-Sep-17, 12:09:33	09121705.D	4.53ppm 0.3ml s32-09051701		MC	RSKBOTH.M	Curve
6	12-Sep-17, 12:30:23	09121706.D	10.57ppm 0.7ml s32-09051701		MC	RSKBOTH.M	Curve
7	12-Sep-17, 12:47:18	09121707.D	200ppm 0.1ml s32-09121701		MC	RSKBOTH.M	Curve
8	12-Sep-17, 13:00:22	09121708.D	600ppm 0.3ml s32-09121701		MC	RSKBOTH.M	Curve
9	12-Sep-17, 13:47:48	09121709.D	1000ppm 0.5ml s32-09121701		MC	RSKBOTH.M	Curve
10	12-Sep-17, 14:07:58	09121710.D	2000ppm 1ml s32-09121701		MC	RSKBOTH.M	Curve
11	12-Sep-17, 14:48:48	09121711.D	4000ppm 0.1ml s32-08231701		MC	RSKBOTH.M	Curve
12	12-Sep-17, 15:21:51	09121712.D	20000ppm 0.5ml s32-08231701		MC	RSKBOTH.M	Curve
13	12-Sep-17, 15:38:59	09121713.D	mb 0.5ml		MC	RSKBOTH.M	Pass
14	12-Sep-17, 15:55:35	09121714.D	mb 0.1ml		MC	RSKBOTH.M	Pass
15	12-Sep-17, 16:15:26	09121715.D	icv s30-05241604		MC	RSKBOTH.M	Pass

Injection Log

Directory: I:\GC10\DATA\RSK_FID\2019_11\25\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Acquisition Method	Comments
1	25-Nov-19, 11:58:00	11251901.D	STD S32-05221901		WH/LD	RSKBOTH.M	pass
2	25-Nov-19, 12:09:26	11251902.D	RB 0.1ml		WH/LD	RSKBOTH.M	pass
3	25-Nov-19, 12:23:25	11251903.D	MCS 0.1ml		WH/LD	RSKBOTH.M	pass
4	25-Nov-19, 12:39:32	11251904.D	xxxxLCS FID 0.1ml		WH/LD	RSKBOTH.M	fail
5	25-Nov-19, 12:54:16	11251905.D	xxxLCS		WH/LD	RSKBOTH.M	fail
6	25-Nov-19, 13:13:54	11251906.D	LCS FID 0.1ml		WH/LD	RSKBOTH.M	pass
7	25-Nov-19, 13:26:49	11251907.D	LCSD FID 0.1ml		WH/LD	RSKBOTH.M	pass
8	25-Nov-19, 13:39:41	11251908.D	P1907040-001 0.1ml		WH/LD	RSKBOTH.M	
9	25-Nov-19, 13:54:05	11251909.D	P1907040-002 0.1ml		WH/LD	RSKBOTH.M	
10	25-Nov-19, 14:07:13	11251910.D	P1907040-003 0.1ml		WH/LD	RSKBOTH.M	
11	25-Nov-19, 14:20:05	11251911.D	P1907040-004 0.1		WH/LD	RSKBOTH.M	
12	25-Nov-19, 14:33:26	11251912.D	P1907040-004 MS 0.1ml		WH/LD	RSKBOTH.M	
13	25-Nov-19, 14:46:48	11251913.D	P1907040-004 MSD 0.1ml		WH/LD	RSKBOTH.M	
14	25-Nov-19, 14:59:39	11251914.D	STD S32-05221901		WH/LD	RSKBOTH.M	pass
15	25-Nov-19, 15:14:17	11251915.D	K1910833-001 0.1ml		WH/LD	RSKBOTH.M	
16	25-Nov-19, 15:26:59	11251916.D	K1910833-002 0.1ml		WH/LD	RSKBOTH.M	
17	25-Nov-19, 15:39:56	11251917.D	K1910833-003 0.1ml		WH/LD	RSKBOTH.M	
18	25-Nov-19, 15:52:52	11251918.D	K1910833-004 0.1ml		WH/LD	RSKBOTH.M	
19	25-Nov-19, 16:05:53	11251919.D	K1910833-005 0.1ml		WH/LD	RSKBOTH.M	
20	25-Nov-19, 16:18:50	11251920.D	K1910833-006 0.1		WH/LD	RSKBOTH.M	
21	25-Nov-19, 16:31:42	11251921.D	K1910833-007 0.1		WH/LD	RSKBOTH.M	
22	25-Nov-19, 17:03:12	11251922.D	K1910833-008 0.1		WH/LD	RSKBOTH.M	
23	25-Nov-19, 17:48:48	11251923.D	STD S32-05221901		WH/LD	RSKBOTH.M	pass

Appendix B

Data Quality Summary Report

APPENDIX B

QUALITY CONTROL SUMMARY REPORT

ACRONYMS AND ABBREVIATIONS

%	percent
%D	percent difference
ALS	ALS Environmental Laboratories
Bhate	Bhate Environmental Associates, Inc.
CCB	continuing calibration blank
DoD	U.S. Department of Defense
ELAP	Environmental Laboratory Accreditation Program
EPA	U.S. Environmental Protection Agency
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LHAAP	Longhorn Army Ammunition Plant
LOQ	limit of quantitation
MS	matrix spike
MSD	matrix spike duplicate
NELAP	National Environmental Laboratory Accreditation Program
QAPP	Final Installation-Wide Work Plan for Longhorn Army Ammunition Plant, Karnack Texas: Appendix A: Standard Operating Procedures and Appendix B: Basewide Uniform Federal Policy-Quality Assurance Project Plan
QC	quality control
QCSR	quality control summary report
QSM	Quality Systems Manual
RARC	*Remedial Action Completion Report*
RPD	relative percent difference
RRF	relative response factor
SDG	sample delivery group
SM	standard method
SOP	standard operating procedure
TOC	total organic carbon
USACE	U.S Army Corps of Engineer
VOC	volatile organic compound

1. QUALITY CONTROL SUMMARY REPORT

This Quality Control Summary Report (QCSR) describes the findings of the review of data for the baseline groundwater sampling activities conducted at Longhorn Army Ammunition Plant (LHAAP)-50 from November 8, 2019 through November 13, 2019, and is provided to document the quality of the analytical data used in the *(Remedial Action Completion Report, Contingency Remedy, LHAAP-50 Former Sump Water Tank, Longhorn Army Ammunition Plant, Karnack, Texas)*. Sampling procedures and overall quality control (QC) and quality assurance protocols for groundwater sampling are presented in the *Final Installation-Wide Work Plan for Longhorn Army Ammunition Plant, Karnack Texas (IWWP): Appendix A: Standard Operating Procedures and Appendix B: Basewide Uniform Federal Policy-Quality Assurance Project Plan (QAPP) (Bate Environmental Associates, Inc. [Bhate] 2018)*.

This QCSR focuses on the data quality and usability of the samples collected from the following sampling event:

- November 2019 Baseline Groundwater Sampling Event

During the period from November 8, 2019 through November 13, 2019, groundwater samples were collected and submitted to the primary laboratory ALS Environmental Laboratories (ALS) located in Houston, Texas. Groundwater samples were analyzed for the following parameters:

- Volatile Organic Compounds (VOC) – EPA Method 8260C
- Perchlorate – EPA Method 6850
- Total organic carbon (TOC) – Standard Method (SM) 5310C
- Anions (chloride, sulfate and nitrate) – EPA Method 9056A
- Dissolved gases (methane, ethane, ethylene and carbon dioxide) – RSK175

ALS in Houston, Texas performed VOC and anions analysis in house. The analysis of perchlorate, TOC, and dissolved gases was completed by ALS in Salt Lake, Utah, ALS in Kelso, Washington, and ALS in Simi Valley, California, respectively. ALS Laboratories in all four locations are accredited by the U.S. Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP) Version 5.3 and National Environmental Laboratory Accreditation Program (NELAP) in the State of Texas to perform the analyses throughout the project duration.

Specific analyses performed for each sample are presented on Appendix B **Table 1**. All analytical results from November 8, 2019 through November 13, 2019 sampling activities were received in sample delivery

groups (SDGs). Appendix A presents laboratory data packages. Appendix B **Table 1** (provided at the end of this report) summarizes SDG numbers, sample numbers, sample locations, sample collection dates, analysis methods, analysis dates, and laboratories. An APTIM project chemist manually performed EPA Level III data review on 100% of the groundwater sample results. EPA Level III data review was performed in accordance with the guidelines and control criteria specified in the following documents:

- QAPP (Bhate 2018)
- *Department of Defense Department of Energy Consolidated Quality Systems Manual (QSM) for Environmental Laboratories*, Version 5.3 (DoD 2019)
- *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (2006), SW-846* (EPA 1996 and updates)
- *Standard Methods for the Examination of Water and Wastewater (21st Edition)* (American Public Health Association et al. 2005)
- *USEPA Contract Laboratory Program, National Functional Guidelines for Organic Superfund Methods Data Review* (EPA 2017)
- *USEPA Contract Laboratory Program*, *National Functional Guidelines for Inorganic Superfund Methods Data Review*, *Final* (EPA 2017)

The following QC elements were included in the EPA Level III data review:

- Sample preservation and sample extraction and analysis holding times
- Laboratory method blanks
- Initial and continuing calibration blanks (anions and TOC analyses only)
- Laboratory control sample (LCS)/laboratory control sample duplicate (LCSD) recoveries
- Matrix spike (MS)/matrix spike duplicate (MSD) recoveries
- Relative percent differences (RPDs)
- Initial calibration and initial calibration verifications (ICVs)
- Continuing calibration verifications (CCVs)
- Field blanks

Analytical data were reviewed in terms of precision, bias, representativeness, comparability, and completeness as follows:

- *Bias* is demonstrated by recovery of target analytes from fortified blank and sample matrices, LCS/LCSD, and MS/MSD, respectively. For organic methods, bias is also demonstrated through

recovery of surrogates from each field and QC sample. The recovery of target analytes from fortified samples is compared with the acceptance criteria defined in the QAPP (Bhate, 2018) and DoD Quality Systems Manual (QSM). When the acceptance criteria are not available in the QAPP or DoD QSM, results are compared with the laboratory in-house control limits. When these criteria are not met, the data are qualified accordingly.

- *Precision* is expressed as the RPD between the results of replicate sample analyses: sample duplicates, LCSDs, and MSDs. When analyte RPDs exceed the acceptance criteria, the data are qualified accordingly.
- *Representativeness* of the samples submitted for analysis is ensured by adherence to standard sampling techniques and protocols.
- *Comparability* of sample results is ensured through the use of approved sampling and analysis methods.
- *Completeness* is expressed as a ratio of the number of usable data points to the total number of analytical data results.

The following sections present the EPA Level III data review findings. The discussion summarizes data quality exceedances and their potential impact on the data quality and usability of analytical results.

1.1 Data Quality Outliers

1.1.1 Sample Preservation and Sample Extraction and Analysis Holding Times (Reason Codes 02, 02A and 02B)

The sample coolers and samples contained within were received intact at the laboratory and were held within the required 0 to 6 degrees Celsius, and when required, were chemically preserved in accordance with EPA and SM preservation requirements.

Sample holding times were evaluated by comparing the sample collection dates to the sample extraction and analysis dates. Extraction and analysis holding times were reviewed for all samples to determine the validity of the sample results. The analysis holding time requirements were achieved for all samples and for all analyses.

1.1.2 Laboratory Method Blanks (Reason Code 06A)

The field sample results were evaluated with respect to the laboratory method blank prepared and analyzed for each analytical batch and for each analytical method. All laboratory method blanks were free of VOC, perchlorate, TOC, anions, and dissolved gases.

1.1.3 Initial and Continuing Calibration Blanks (Reason Code 06B)

In addition to the laboratory method blanks for anions and TOC analyses, initial and continuing calibration blank (CCB) results were reviewed to ensure that the instrument was free of contamination prior to the analysis. All initial and continuing calibration blanks were free of TOC and anions.

1.1.4 Laboratory Control Sample/Laboratory Control Sample Duplicate Recoveries and Precisions (Reason Codes 11, 11A, and 11B)

The LCS is an aliquot of analyte-free matrix spiked with target analytes that is prepared with each analytical batch and for each analytical method. The recovery of target analytes from the LCS analysis is a measurement of method performance in an interference-free sample matrix. The review indicated that LCS recoveries and precisions met the established QC requirements for VOC, perchlorate, TOC, anions, and dissolved gases analyses.

In addition to the LCS analysis, the laboratory performed sample duplicate analysis on project-specific groundwater samples to assess precisions of sample results. The laboratory duplicate analysis was performed for LHAAP-50 samples submitted for TOC analysis. Acceptable precision results were achieved for all laboratory duplicate samples.

1.1.5 Matrix Spike/Matrix Spike Duplicate Recoveries and Precisions (Reason Codes 08, 08A, and 08B)

The MS and MSD samples are a portion of a field sample spiked with target analytes that are prepared with each analytical batch and with each method. The MS/MSD results are used to evaluate any bias introduced to the method due to matrix interference, and to measure bias and precision for each analytical batch.

In accordance with the QAPP requirements (Bhate 2018), the MS/MSD samples are to be collected at a rate of 1 per 20 samples or 5%. During the LHAAP-50 November 2019 baseline groundwater sampling

event, 5% MS/MSD samples were collected achieving the MS/MSD sample frequency requirement. The following site-specific groundwater samples were spiked for MS/MSD analysis:

SDG Number	Sample Number	Sample Date	MS/MSD Analysis
HS19110644	50WW06-191112	11/12/2019	anions
HS19110644	50WW29-191111	11/11/2019	VOC
HS19110644/K1910795	50WW22-191112	11/12/2019	TOC
HS19110684/P1907040/32-1932352/K1910796	50WW23-191113	11/13/2019	VOC, anions, perchlorate, dissolved gases, and TOC

The majority of the MS results met the established bias and precision requirements; however, MS recovery biases were observed for VOC, anions, and dissolved gases analyses, which are summarized as follows:

Analytical Method	Spiked Sample	MS Recovery Outlier (%)	Control Limit (%)	Data Qualification
EPA8260C	50WW29-191111	1,1-Dichloroethene: 134/136	71-131	No qualification
		1,2-Dichloroethane: 137/138	73-128	No qualification
		Trichloroethene: 134/130	79-123	No qualification
		Vinyl Chloride: 141/141	58-137	No qualification
EPA9056A	50WW23-191113	Chloride: -164/82	87-111	No qualification
		Sulfate: 54/93	87-112	No qualification
RSK175	50WW23-191113	Carbon Dioxide: 44/122	80-122	No qualification

In the spike sample (50WW29-191111), high biased MS and MSD recoveries were reported for 1,1-dichloroethene, 1,2-dichloroethane, trichloroethene and vinyl chloride; however, the RPDs between the MS and MSD recoveries were within the precision goal. As the listed VOC were not detected in the spiked sample, the high biased MS results did not lead to any data qualification and did not have any impact on the data quality.

In addition to above, the reported MS recoveries were outside the accuracy specifications for chloride, sulfate, and carbon dioxide in the spiked sample (50WW23-191113). These non-compliant MS results could be attributed to a matrix effect. In the spiked sample, the parent concentrations of chloride, sulfate, and carbon dioxide far exceeded four times their respective spiked levels. These elevated sample concentrations produced matrix interference, which affected the accuracy of the MS analysis. Because the

parent concentrations were greater than four times the spiked levels, no data qualification was applied to the results of the chloride, sulfate, and carbon dioxide.

It should be noted that the associated LCS results were within control, indicating that batch accuracy and precision requirements were achieved for VOC, anions, and dissolved gases analyses.

1.1.6 Initial Calibration (Reason Codes 04, 04A, and 04B)

Instrument calibration is performed for VOC, perchlorate, TOC, anions, and dissolved gases analyses according to the EPA method requirements (EPA 1996). The linear analytical range is established for each method by analysis of calibration standards prepared at increasing concentrations that cover the expected sample concentrations. The acceptability of the initial calibration is determined by calculation of a percent relative standard deviation or coefficient. The initial calibration results were acceptable for all the listed analyses.

Immediately after the initial calibration for each analysis, initial calibration verification was conducted at the mid-point of instrument calibration range by using a second-source calibration standard to verify the accuracy of the initial calibration. The review indicated acceptable initial calibration verification results for VOC, perchlorate, TOC, anions, and dissolved gases analyses.

1.1.7 Continuing Calibration Verification (Reason Codes 05, 05A, and 05B)

Routinely during sample analysis, the stability of the analytical system is monitored by analysis of continuing calibration standards at concentrations near the mid-point of the instrument calibration range. The review indicated that CCVs were conducted at proper frequencies and that the percent difference (%D) values between the relative response factor (RRF) in the initial calibration and the RRF in the continuing calibration met the calibration requirements for VOC, perchlorate, TOC, anions, and dissolved gases analyses.

1.1.8 Trip Blanks (Reason Code 06D)

Trip blanks were prepared by the laboratory and stored with the groundwater samples collected for VOC analysis. During the LHAAP-50 November 2019 baseline sampling period, one trip blank per day was shipped with a cooler containing VOC groundwater samples, which resulted in a total of 3 trip blanks collected for the entire sampling event. All 3 trip blanks were free of VOC. The trip blank results demonstrated that acceptable sample storage and shipping procedures were implemented.

1.1.9 Field Duplicates

In accordance with the QAPP requirements (Bhate 2018), field duplicate samples are to be collected at a minimum rate of 10% of the total number of groundwater samples. Field duplicate samples are evaluated by calculating the RPD between the parent sample and its duplicate. The RPD is calculated using the following equation:

$$RPD = |(S-D)/[(S+D)/2]| x\ 100$$

Where:

S = sample result

D = duplicate result

Acceptable precision control criteria are established at less than or equal to 30% for water samples. The RPD is calculated between pairs of field duplicate samples when both results are reported at or above the limit of quantitation (LOQ).

A total of two field duplicates were collected from the LHAAP-50 November 2019 baseline groundwater sampling event, achieving the 10% field duplicate frequency requirement. The two field duplicates were collected from locations 50WW09 and 50WW12 using the same sampling technique, and analyzed for the same analytical parameters as their associated parent samples. Appendix B **Table 2** presents the field duplicate results. Target compounds detected above the LOQ consisted of:

- 50WW09: perchlorate, cis-12-dichloroethene, and trichloroethene
- 50WW12: carbon dioxide, methane, chloride, sulfate, TOC, perchlorate, 1,1-dichloroethene, 1,2-dichloroethane, and trichloroethene

The field RPDs for the listed target compounds ranged from 0 to 18.18% and met the field precision goal. Overall, the field duplicate results demonstrated acceptable field sampling and analytical precision for all analyses.

1.2 Completeness

The following sections present a discussion of technical completeness for the LHAAP-50 November 2019 baseline groundwater sampling event. Completeness results are calculated for groundwater and field duplicate samples that are used for project decisions. For information purposes, completeness results were also calculated for field QC samples. Completeness results are presented in Appendix B **Table 3**.

1.2.1 Technical Completeness

Technical completeness is a quantitative measure of the data usability based on the number of rejected data compared to the total number of sample results. The technical completeness goal for each method is established at equal to or greater than 95%. The technical completeness calculation considers all data that are not rejected to be usable. The technical completeness is calculated as follows:

$$\% \text{ Technical Completeness} = \frac{\text{Number of Usable Results}}{\text{Total Number of Results}} \times 100$$

As discussed in the previous sections, non-compliant MS results were observed for anions, VOC and carbon dioxide in the spiked samples. No data qualification was applied to the results of anions, VOC, and carbon dioxide, as the target compounds were either not detected or the concentrations of the parent samples far exceeded the spike levels. This data quality issue did not affect the data quality and data usability. With the exception of the MS outliers, all other QC elements were within the established QC requirements. The technical completeness was 100% for all methods for the LHAAP-50 November 2019 baseline groundwater sampling activities, exceeding the 95% technical completeness objective. Therefore, the project data quality objectives were achieved for all methods for the LHAAP-50 November 2019 groundwater sampling event.

1.3 Representativeness and Comparability

During sampling, samplers followed the approved QAPP requirements (Bhate 2018) and established sampling SOPs to collect, preserve, document, and ship samples to off-site laboratories, thus ensuring the representativeness of the groundwater samples collected for the sampling event.

Upon sample receipt, the laboratory reviewed sample conditions to ensure that sample containers, preservatives (when applicable), and requested analyses matched the chain-of-custody requirements. Discrepancies between the chain-of-custody forms and sample containers were brought to the attention of the APTIM project chemist and resolved prior to sample analysis.

ALS Laboratories are DoD ELAP and NELAP certified and adhered to the most current EPA Methods, QAPP (Bhate 2018), and DoD QSM (DoD 2019) requirements to prepare, analyze, and report the data. This ensures the comparability of the analytical results between different samples. APTIM project chemist performed EPA Level III data validation on 100% of the analytical data obtained from the LHAAP-50 November 2019 baseline groundwater sampling event to verify that the laboratories complied with the DoD QSM, QAPP, and method requirements. Analytical results that were outside the established QC requirements were qualified and the data quality and usability were discussed in the previous sections.

Based on a review of the chain-of-custody forms, sample receipt forms, and laboratory data packages, the analytical data reported for LHAAP-50 November 2019 baseline groundwater sampling event has met the comparability requirements.

1.4 Summary

The analytical data has been reviewed for precision, bias, representativeness, comparability, and completeness. With the exception of the MS outliers, all other QC elements met their respective QC requirements. The MS recovery outliers could be attributed to matrix interference; data qualification however was not warranted. The 95% technical completeness goal was exceeded for all methods for the LHAAP-50 November 2019 baseline groundwater sampling event. All data are usable for their intended purposes.

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ATTACHMENTS

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Appendix B Table 1: Summary of Samples Collected, Sample Date, Sample Location, and Analysis Method

Appendix B Table 2: Summary of Field Duplicate Results

Appendix B Table 3: Technical Completeness

Appendix B Table 1
Summary of Samples Collected, Sample Date, Sample Location, and Analysis Method
LHAAP-50 November 2019 Baseline Groundwater Sampling Event

SDG	Sample Location	Sample ID	Sample Date	Sample Type	Matrix	Analytical Method	Analysis Date	Laboratory
1932010	50WW05	50WW05-191108	11/08/2019	REG	GW	SW6850	11/19/2019	ALSS
HS19110486	50WW05	50WW05-191108	11/08/2019	REG	GW	SW8260C	11/13/2019	ALSHT
P1906981	50WW06	50WW06-191112	11/12/2019	REG	GW	RSK-175	11/19/2019	ALS
K1910759	50WW06	50WW06-191112	11/12/2019	REG	GW	SM5310C	11/21/2019	ALS
1932284	50WW06	50WW06-191112	11/12/2019	REG	GW	SW6850	11/22/2019	ALSS
HS19110644	50WW06	50WW06-191112	11/12/2019	REG	GW	SW8260C	11/15/2019	ALSHT
HS19110644	50WW06	50WW06-191112	11/12/2019	REG	GW	SW9056A	11/13/2019	ALSHT
P1906981	50WW08	50WW08-191112	11/12/2019	REG	GW	RSK-175	11/19/2019	ALS
K1910759	50WW08	50WW08-191112	11/12/2019	REG	GW	SM5310C	11/21/2019	ALS
1932284	50WW08	50WW08-191112	11/12/2019	REG	GW	SW6850	11/22/2019	ALSS
HS19110644	50WW08	50WW08-191112	11/12/2019	REG	GW	SW8260C	11/15/2019	ALSHT
HS19110644	50WW08	50WW08-191112	11/12/2019	REG	GW	SW9056A	11/13/2019	ALSHT
1932284	50WW09	50WW09-191111	11/11/2019	REG	GW	SW6850	11/22/2019	ALSS
HS19110644	50WW09	50WW09-191111	11/11/2019	REG	GW	SW8260C	11/15/2019	ALSHT
1932284	50WW09	50WW09-191111-FD	11/11/2019	FD	GW	SW6850	11/22/2019	ALSS
HS19110644	50WW09	50WW09-191111-FD	11/11/2019	FD	GW	SW8260C	11/15/2019	ALSHT
1932284	50WW10	50WW10-191111	11/11/2019	REG	GW	SW6850	11/22/2019	ALSS
HS19110644	50WW10	50WW10-191111	11/11/2019	REG	GW	SW8260C	11/15/2019	ALSHT
P1906981	50WW11	50WW11-191112	11/12/2019	REG	GW	RSK-175	11/19/2019	ALS
K1910759	50WW11	50WW11-191112	11/12/2019	REG	GW	SM5310C	11/21/2019	ALS
1932284	50WW11	50WW11-191112	11/12/2019	REG	GW	SW6850	11/22/2019	ALSS
HS19110644	50WW11	50WW11-191112	11/12/2019	REG	GW	SW8260C	11/15/2019	ALSHT
HS19110644	50WW11	50WW11-191112	11/12/2019	REG	GW	SW9056A	11/13/2019	ALSHT
P1906981	50WW12	50WW12-191112	11/12/2019	REG	GW	RSK-175	11/19/2019	ALS
K1910759	50WW12	50WW12-191112	11/12/2019	REG	GW	SM5310C	11/21/2019	ALS
1932284	50WW12	50WW12-191112	11/12/2019	REG	GW	SW6850	11/22/2019	ALSS
HS19110644	50WW12	50WW12-191112	11/12/2019	REG	GW	SW8260C	11/15/2019	ALSHT
HS19110644	50WW12	50WW12-191112	11/12/2019	REG	GW	SW9056A	11/13/2019	ALSHT
P1906981	50WW12	50WW12-191112-FD	11/12/2019	FD	GW	RSK-175	11/19/2019	ALS
K1910759	50WW12	50WW12-191112-FD	11/12/2019	FD	GW	SM5310C	11/21/2019	ALS
1932284	50WW12	50WW12-191112-FD	11/12/2019	FD	GW	SW6850	11/22/2019	ALSS
HS19110644	50WW12	50WW12-191112-FD	11/12/2019	FD	GW	SW8260C	11/15/2019	ALSHT
HS19110644	50WW12	50WW12-191112-FD	11/12/2019	FD	GW	SW9056A	11/13/2019	ALSHT
P1907040	50WW13	50WW13-191113	11/13/2019	REG	GW	RSK-175	11/25/2019	ALS
K1910796	50WW13	50WW13-191113	11/13/2019	REG	GW	SM5310C	11/23/2019	ALS
1932352	50WW13	50WW13-191113	11/13/2019	REG	GW	SW6850	11/22/2019	ALSS
HS19110684	50WW13	50WW13-191113	11/13/2019	REG	GW	SW8260C	11/19/2019	ALSHT
HS19110684	50WW13	50WW13-191113	11/13/2019	REG	GW	SW9056A	11/14/2019	ALSHT
P1907040	50WW14	50WW14-191113	11/13/2019	REG	GW	RSK-175	11/25/2019	ALS
K1910796	50WW14	50WW14-191113	11/13/2019	REG	GW	SM5310C	11/23/2019	ALS
1932352	50WW14	50WW14-191113	11/13/2019	REG	GW	SW6850	11/22/2019	ALSS
HS19110684	50WW14	50WW14-191113	11/13/2019	REG	GW	SW8260C	11/19/2019	ALSHT

Appendix B Table 1
Summary of Samples Collected, Sample Date, Sample Location, and Analysis Method
LHAAP-50 November 2019 Baseline Groundwater Sampling Event

SDG	Sample Location	Sample ID	Sample Date	Sample Type	Matrix	Analytical Method	Analysis Date	Laboratory
HS19110684	50WW14	50WW14-191113	11/13/2019	REG	GW	SW9056A	11/14/2019	ALSHT
1932010	50WW15	50WW15-191108	11/08/2019	REG	GW	SW6850	11/19/2019	ALSS
HS19110486	50WW15	50WW15-191108	11/08/2019	REG	GW	SW8260C	11/13/2019	ALSHT
P1907040	50WW16	50WW16-191113	11/13/2019	REG	GW	RSK-175	11/25/2019	ALS
K1910796	50WW16	50WW16-191113	11/13/2019	REG	GW	SM5310C	11/23/2019	ALS
1932352	50WW16	50WW16-191113	11/13/2019	REG	GW	SW6850	11/22/2019	ALSS
HS19110684	50WW16	50WW16-191113	11/13/2019	REG	GW	SW8260C	11/19/2019	ALSHT
HS19110684	50WW16	50WW16-191113	11/13/2019	REG	GW	SW9056A	11/14/2019	ALSHT
1932010	50WW17	50WW17-191108	11/08/2019	REG	GW	SW6850	11/19/2019	ALSS
HS19110486	50WW17	50WW17-191108	11/08/2019	REG	GW	SW8260C	11/13/2019	ALSHT
1932010	50WW18	50WW18-191108	11/08/2019	REG	GW	SW6850	11/19/2019	ALSS
HS19110486	50WW18	50WW18-191108	11/08/2019	REG	GW	SW8260C	11/13/2019	ALSHT
1932010	50WW21	50WW21-191108	11/08/2019	REG	GW	SW6850	11/19/2019	ALSS
HS19110486	50WW21	50WW21-191108	11/08/2019	REG	GW	SW8260C	11/13/2019	ALSHT
P1906981	50WW22	50WW22-191112	11/12/2019	REG	GW	RSK-175	11/19/2019	ALS
K1910759	50WW22	50WW22-191112	11/12/2019	REG	GW	SM5310C	11/21/2019	ALS
1932284	50WW22	50WW22-191112	11/12/2019	REG	GW	SW6850	11/22/2019	ALSS
HS19110644	50WW22	50WW22-191112	11/12/2019	REG	GW	SW8260C	11/15/2019	ALSHT
HS19110644	50WW22	50WW22-191112	11/12/2019	REG	GW	SW9056A	11/13/2019	ALSHT
P1907040	50WW23	50WW23-191113	11/13/2019	REG	GW	RSK-175	11/25/2019	ALS
K1910796	50WW23	50WW23-191113	11/13/2019	REG	GW	SM5310C	11/23/2019	ALS
1932352	50WW23	50WW23-191113	11/13/2019	REG	GW	SW6850	11/22/2019	ALSS
HS19110684	50WW23	50WW23-191113	11/13/2019	REG	GW	SW8260C	11/19/2019	ALSHT
HS19110684	50WW23	50WW23-191113	11/13/2019	REG	GW	SW9056A	11/14/2019	ALSHT
1932010	50WW24	50WW24-191108	11/08/2019	REG	GW	SW6850	11/19/2019	ALSS
HS19110486	50WW24	50WW24-191108	11/08/2019	REG	GW	SW8260C	11/13/2019	ALSHT
1932010	50WW27	50WW27-191108	11/08/2019	REG	GW	SW6850	11/19/2019	ALSS
HS19110486	50WW27	50WW27-191108	11/08/2019	REG	GW	SW8260C	11/13/2019	ALSHT
1932284	50WW29	50WW29-191111	11/11/2019	REG	GW	SW6850	11/22/2019	ALSS
HS19110644	50WW29	50WW29-191111	11/11/2019	REG	GW	SW8260C	11/15/2019	ALSHT
HS19110486	FIELDQC	TRIP BLANK-191108	11/08/2019	TB	WQ	SW8260C	11/13/2019	ALSHT
HS19110644	FIELDQC	TRIP BLANK-191111	11/11/2019	TB	WQ	SW8260C	11/15/2019	ALSHT
HS19110684	FIELDQC	TRIP BLANK-191113	11/13/2019	TB	WQ	SW8260C	11/19/2019	ALSHT

Notes:

ALS - ALS Environmental Laboratories in Kelso Washington or Simi Valley California

ALSHT - ALS Environmental Laboratories in Houston Texas

ALSS - ALS Environmental Laboratories in Salt Lake Utah

FD - field duplicate

GW - groundwater

REG - regular sample

SDG - sample delivery group

TB - trip blank

Appendix B Table 2
Summary of Field Duplicate Results
LHAAP-50 November 2019 Baseline Groundwater Sampling Event

				Location Code	50WW09				
				Sample Number	50WW09-191111		50WW09-191111-FD		
				Sample Date	11/11/2019		11/11/2019		
				Sample Purpose	REG		FD		
				Sample Type	GW		GW		
				Depth	0 - 0 feet		0 - 0 feet		
Test Group	Parameter	Units	Filtered	Result	VQ	Result	VQ	RPD%
PERCHLORATE	Perchlorate	µg/L	N	6.6		7.4		11.43
VOLATILES	1,1-Dichloroethene	µg/L	N	0.5	U	0.5	U	NC
	1,2-Dichloroethane	µg/L	N	0.5	U	0.5	U	NC
	cis-1,2-Dichloroethene	µg/L	N	4.1		4		2.47
	Tetrachloroethene	µg/L	N	0.5	U	0.5	U	NC
	Trichloroethene	µg/L	N	30		30		0.00
	Vinyl chloride	µg/L	N	0.5	U	0.5	U	NC

Appendix B Table 2
Summary of Field Duplicate Results
LHAAP-50 November 2019 Baseline Groundwater Sampling Event

			Location Code	50WW12				
			Sample Number	50WW12-191112		50WW12-191112-FD		
			Sample Date	11/12/2019		11/12/2019		
			Sample Purpose	REG		FD		
			Sample Type	GW		GW		
			Depth	0 - 0 feet		0 - 0 feet		
Test Group	Parameter	Units	Filtered	Result	VQ	Result	VQ	RPD%
GASES	Carbon dioxide	µg/L	N	250,000		300,000		18.18
	Ethane	µg/L	N	0.47	U	0.47	U	NC
	Ethylene	µg/L	N	0.55	U	0.55	U	NC
	Methane	µg/L	N	1.5		1.6		6.45
GEN CHEMISTRY	Chloride	µg/L	N	1,070		1,060		0.94
	Nitrate	µg/L	N	0.1	U	0.1	U	NC
	Sulfate	µg/L	N	531		533		0.38
	Total organic carbon	µg/L	N	1.11		1.19		6.96
PERCHLORATE	Perchlorate	µg/L	N	47,000		43,000		8.89
VOLATILES	1,1-Dichloroethene	µg/L	N	4.6		4.1		11.49
	1,2-Dichloroethane	µg/L	N	2.7		2.7		0.00
	cis-1,2-Dichloroethene	µg/L	N	0.5	U	0.76	J	NC
	Tetrachloroethene	µg/L	N	0.5	U	0.5	U	NC
	Trichloroethene	µg/L	N	280		260		7.41
	Vinyl chloride	µg/L	N	0.5	U	0.5	U	NC

Appendix B Table 2
Summary of Field Duplicate Results
LHAAP-50 November 2019 Baseline Groundwater Sampling Event

Notes:

µg/L - micrograms per liter

J - the analyte was detected below the limit of quantitation.

U - the analyte was analyzed for, but not detected at the limit of detection.

mg/L - milligrams per liter

FD - field duplicate

GW - groundwater

N - sample not filtered in the field or at the laboratory

NC - not calculated. Field precision results are calculated when target compounds are detected above the limit of quantitation in both primary and duplicate samples

REG - regular sample

VQ - validation qualifier

Appendix B Table 3
Technical Completeness
LHAAP-50 November 2019 Baseline Groundwater Sampling Event

Analytical Method	Number of Analytes	Number of Samples	Number of Results	Number of Rejected Results	Number of Useable Results	Technical Completeness [Goal = 95 %] (percent)
Groundwater Environmental Samples						
RSK-175	4	10	40	0	40	100
SM5310C	1	10	10	0	10	100
SW6850	1	21	21	0	21	100
SW8260C	6	21	126	0	126	100
SW9056A	3	10	30	0	30	100
Field Quality Control Samples						
SW8260C	6	3	18	0	18	100

Notes:

Not all samples have equal analytes per method.

Appendix C

Site Photographs

APPENDIX A

SITE PHOTOGRAPHS

Photo No.	Date	Task and Description
1	3/09/20	Injection Trailer and 8,000-gallon Tank at LHAAP-50
2	3/10/20	Injection Hoses Connected 50DPT07
3	3/10/20	Monitoring the creek for dissolved oxygen during injections
4	3/19/20	Grouting Completed DPT Locations



PHOTO 1: Injection Trailer and 8,000-gallon Tank at LHAAP-50
DATE: March 9, 2020



PHOTO 2: Injection Hoses Connected to 50DPT07
DATE: March 10, 2020

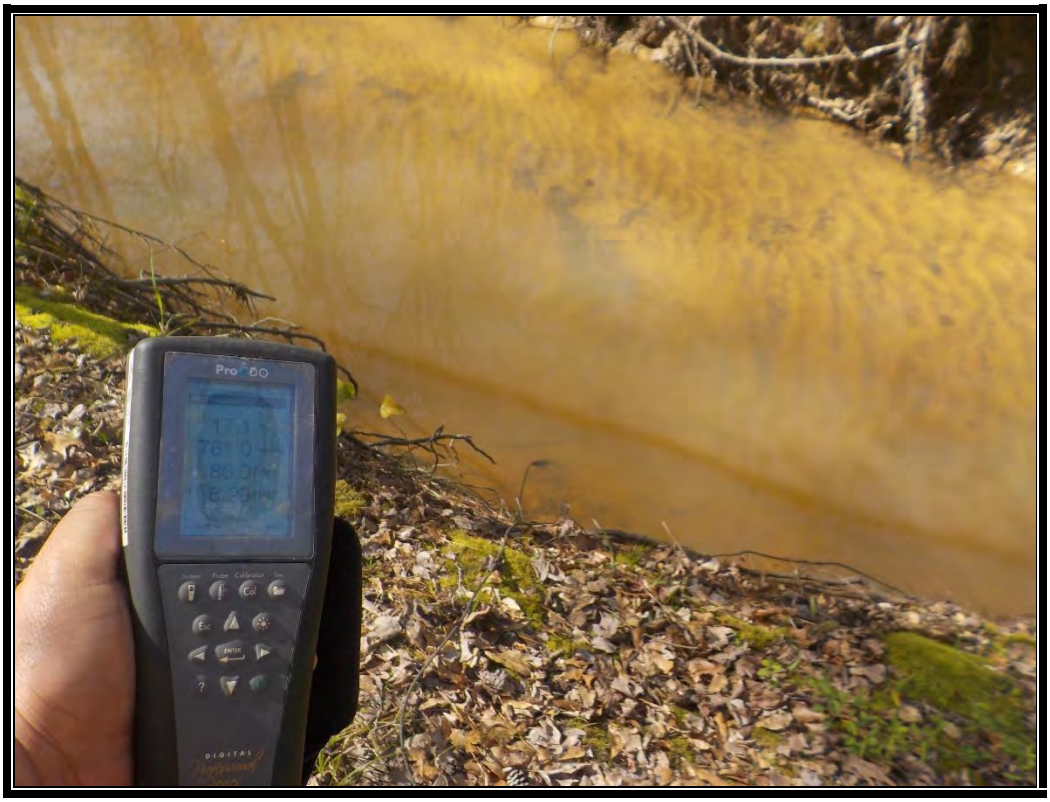


PHOTO 3: Monitoring the creek for Dissolved Oxygen during injections
DATE: March 10, 2020



PHOTO 4: Grouting Completed DPT Locations
DATE: March 19, 2020

Subject: **Final Monthly Managers' Meeting (MMM), Longhorn Army Ammunition Plant (LHAAP)**
Location of Meeting: **Teleconference**
Date of Meeting: **18 November 2020– 1:00 PM Central Standard Time (CST)**

Attendees:

Army BRAC:	Rose M. Zeiler (RMZ)
USEPA:	Bill Rhotenberry (BR), Lauren Paulos and Kent Becher (USGS Liaison)
AEC:	Andrew Maly (AM)
TCEQ:	April Palmie (AP)
USACE:	Aaron Williams (AW)
Bhate:	Kim Nemmers (KN) and Scott Beesinger (BS)
APTIM:	Bill Foss (BF), Rob Mayer (RM), Sowmya Suryanarayanan and Praveen Srivastav (PS)
TLI:	Kyra Donnell (KD)
USFWS:	Paul Bruckwicki (PB)

Defense Environmental Restoration Program (DERP) Performance-Based Remediation (PBR) Update

Data Validation Packages: Level II versus Level IV data packages were discussed further. RMZ said that she will speak with Army legal.

Action Item: RMZ to discuss data packages with Army legal prior to next meeting. Completed.

Groundwater Treatment Plant (GWTP) – KN said that there were no issues with the GWTP. KN said that there was no flow in the bayou so the INF Pond is filling up. SB said that the INF Pond would be within 2 feet (ft) of freeboard by about Friday or Saturday (7.2 ft on the gauge). SB said that the free board is increasing at a slower rate due to the pond being at the widest point now. RMZ mentioned the beaver dams that are reducing flow. SB said that in addition to beaver dams being present that there are trees in the creek. SB said that it would be a large undertaking to clear out the bayou to the lake. SB said that there would only be a day or two of flow at this point since the amount of water in the bayou is also low. SB said he didn't know how many beaver dams were located within the bayou.

AP asked if irrigation starts when a certain freeboard is reached in the INF Pond. SB said that he would wait until he absolutely had to. SB said that spill over is at 9.2 ft and that the INF Pond gauge is at 7.14 ft now. RMZ pointed out that the reading doesn't consider additional rainfall. It was agreed conceptually that irrigation would start when the freeboard reaches a little less than 9 ft (e.g.8.75 ft). RMZ said that an update in December 2020 MMM would be needed to see if irrigation is needed.

KN said that the beaver dams are on the agenda for discussion. PB said that eradication of the beaver dam depends on the habitat being affected. PB said that, if the beaver dam is in a swampy area, then there is not impact from the dams. However, if the dams are flooding at low area where there are hardwoods, then eradication would be performed. PB said he would talk to the other USFWS personnel to identify where the dams are located to decide if there was any action.

Field Work – SB said that LHAAP-04, LHAAP-37 and LHAAP-67 groundwater sampling was completed in November 2020.

LHAAP-17: KD said that the Work Plans are being prepared and that the start of field work is planned for May 2021. Excavations were being performed to remove soil contaminated with explosives when excavation activities were halted by the discovery of munitions and explosives of concern (MEC). KD explained that the prior excavations have filled with rainwater since that time and work (MEC investigation and soil excavation) cannot be safely excavated with standing water. The proposed

approach for water management is to pump the waters from the excavations directly to ground/nearby ditch. To support this proposed approach, KD explained that representative samples of the water need to be collected and analyzed for the constituents of concern (COCs) in soils, which are 2,4-dinitrotoluene (DNT), 2,6-DNT, trinitrotoluene (TNT) and perchlorate. This would be accomplished as soon as possible and is proposed to be completed under the existing Installation Wide Work Plan (IWWP). KD asked if it was reasonable/agreeable that the sampling can commence under the IWWP?

AP requested made to include groundwater contaminants of concern (COCs) in the sampling event (perchlorate, tricholoethylene [TCE], and TCE breakdown products). KD noted that the max dig was to 7.5 feet (ft) below ground surface (bgs), but that groundwater was reportedly encountered at 18 to 35 ft bgs in the shallow zone as reported in the Proposed Plan. There was input from several attendees that nearby wells indicated the water was shallower and also observations at the time of excavation were indicative of groundwater infiltration in at least one excavation. The team agreed to the expanded analyte list and agreed to move forward with sample collection under the existing IWWP.

If results are non-detect or below applicable criteria for these, then we move forward with direct discharge when the time comes (probably May). RMZ discussion regarding reporting of the results. KN said that the validated results be presented at the MMM and then included in the RACR.

KD explained that a draft technical memorandum (tech memo) has been prepared for Army review that calculates and proposes alternate discharge standards for the three explosive constituents. The tech memo mirrors the approach used to develop agreeable alternate discharge standards for perchlorate. Once approved by Army, KD said that the tech memo will be submitted for Regulatory acceptance. The revised tech memo will serve as a backup should the water in the excavations have detected COCs above the screening levels.

AP said that she would prefer to validate whether the Tech Memo is needed following receipt of the analytical results. AP said that the Tech Memo will need to be reviewed by the TCEQ Water Quality Standards division. She does not want to expend resources if their review is not needed. KD said that the Tech Memo will be prepared and will be submitted only if the results indicate a need for alternative discharge criteria for explosives.

In the event that concentrations of 2,4-DNT, 2,6-DNT, or TNT exceed either existing or alternate direct discharge standards, KD proposed to pump the water into a Frac tank to allow sediment to settle and then discharge the water to the GWTP. KD explained that it is not desirable to pump the water directly to the GWTP, as sediment could cause issues with the system. KD concluded with stating that the approach for water management will be in the Work Plan also.

KN asked everyone to refer to the Document and Issues Tracking Table dated 18 November 2020.

- **Task 1** (Project Management) – KN stated that minutes from the October 2020 MMM minutes were finalized. KN stated that the next Restoration Advisory Board (RAB) was planned for 20 January 2020, in person if possible. RMZ said the December 2020 MMM will discuss if the meeting can be held in person or if will need to be remote again.
- **Task 3** (LHAAP-03) – PS said that the Remedial Action Completion Report (RACR) is in progress for the soil excavation and should be provided to the Regulators in December 2020.
- **Task 4** (LHAAP-04) – PS stated that the Year 1 Quarter 4 performance sampling was completed in November 2020 and that the data should be available for the December 2020 meeting. PS stated that the Land Use Control (LUC) boundary will then be evaluated following receipt of the data. PS reminded everyone that the RACR is on hold pending that evaluation.
- **Task 5** (LHAAP-12) – PS stated that no reports are in progress. PS said that the next sampling event is planned for December 2020; the 2020 Annual Remedial Action Operation (RA-O) Report will follow.

- **Task 6** (LHAAP-16) – PS stated that the Year 1 Quarter 3 groundwater sampling was completed in October 2020, and the validated data from the sampling event will be provided for the December 2020 MMM. PS stated that the Draft Final RACR was submitted on 30 October 2020. If no comments are received, then the RACR will go final after 30 days.
- **Task 7** (LHAAP-17) – PS explained that backfill report is in progress and will be submitted to the regulators in December 2020
- **Task 9** (LHAAP-37) – PS stated that the Year 4, Semiannual Sampling Event 1 was completed in November 2020. PS said that the validated data from the sampling event will be provided at the January 2021 MMM. BF stated that the Year 3 Annual RA-O Report was submitted 4 November 2020 to the regulators.
- **Task 10** (LHAAP-46) – PS stated that Draft Final Year 5 Annual RA-O Report was finalized and will be placed into the AR. PS stated that the Year 6 Annual RA-O Report is in progress and will be submitted to the regulators in December 2020.
- **Task 11** (LHAAP-50) – PS stated the Year 1 Quarter 2 sampling was completed in early October 2020. Validated data are included with the November 2020 MMM files for the meeting. BF said that the analytical data did not reflect big changes in analyte concentrations from the baseline, which could be masked by seasonal fluctuations and the groundwater elevation changes. RM said that the field screening and analyte data indicated that the injections have facilitated reducing conditions. He reminded everyone that this is only the second data point and that the injections require additional time to achieve optimal conditions. RMZ asked why the total organic carbon (TOC) levels were low. RM said that the TOC levels may indicate a potential distribution issue. RM said that the TOC had not reached the monitoring wells from the injection points yet, and may indicate that the groundwater movement of the injectate was slower than expected.

  PS said that the Draft Final RACR was submitted to Regulators on 4 November 2020. If no comments are received within 30 days, the RACR will be considered final. PS stated that that the Year 6 RA-O Report is in progress and is expected to be submitted to the regulators in November 2020.

  RMZ asked if a construction complete is applicable on Explanation of Significant Difference (ESD) work. BR said that he would need to check, but he can find out.

  Action Item: BR will determine if a construction completion determination is made for ESD remedial activities.
- **Task 12** (LHAAP-58) –KN stated that comments on the Year 6 RA-O Report were received and are being addressed. Response to comments and the draft final Year 6 RA-O Report will be issued in December 2020. KN explained that the lock for the cap on monitoring well 35WW20 had been cut and the cap was off. However, the cap on the casing remained in place. KN said that SB found the issue when he was bush hogging and weed eating earlier in the week. KN said she just wanted to mention this because the monitoring well is a performance monitoring well. KN stated that the next sampling event was planned for December 2020.
- **Task 13** (LHAAP-67) – PS stated that the validated data from the November 2020 sampling event will be provided for the January 2020 MMM.
- **Task 14** (LHAAP-001-R and –003-R) – No discussion.
- **Task 16** (GWTP) **–**KN stated that the 3rd Quarter 2020 GWTP currently under Army review and would be provided to Regulators in December 2020.
- **Task 17** (LHAAP-18/24) – KN said that semi-annual groundwater sampling was planned for December 2020 and that SB was bush hogging the area this week.

- **Task 18** (Surface Water) – KN stated that there is no flow in the bayou but the 4th quarter sample will be collected when there is flow.
- **Task 19** (LUC Management Plan) – No discussion.
- **Administrative Record (AR) –** PS stated that the hard copies for the 2019 AR cutoff went to SB at LHAAP and DVDs (Digital Versatile Disc) were sent to the library, and to the Army and regulators. PS said that the January through March 2020 cutoff was being printed and was undergoing internal quality control review. PS said that documents from April through June 2020 and July through September 2020 were being compiled
- **Well Abandonments –**PS said that the State Plugging and Abandonment Reports were corrected by the driller. The well abandonment report was going through internal reviews and was planned for submittal to the Army shortly.

Update on other DERP Sites:

- **LHAAP 18/24 –** AW stated that the draft LHAAP-18/24 PDI Work Plan was due to the Regulators in January 2021. AW said that the PDI field work will be done in March/April timeframe with PDI Report submitted to the Regulators in October 2021.
- **LHAAP-29** – AW said that the LHAAP-29 PDI Work Plan was submitted to the Regulators on 2 November. AP said that she needed an extra week to review the draft LHAAP-29 PDI Work Plan and the LHAAP-47 Post-Screening Investigation Addendum No. 2 Report. AW said that field work will be completed in the February/March 2021 timeframe with the PDI Report submitted to the Regulators in June 2021.
- **LHAAP-47** – Federal Facility Agreement (FFA) parties discussed moving the date for delivery of the Draft LHAAP-47 Revised Feasibility Study (FS) to January 2021. RMZ said that AW is out for two weeks at Christmas. BR said that his last day is 31 December 2020. BR said that the USEPA had no reason to have the FS on 8 December and agreed with moving the review dates out. RMZ asked AP if she would need extra time to review the FS. AP responded that her review time depended on the consistency and quality of the FS. A separate phone call to discuss the other DERP sites and the associated document schedules was determined to be appropriate.

LHAAP-17 PBR: KD stated that the next scheduled deliverable for the new LHAAP-17 contract is the Work Plan for Geophysical Investigation, which is planned for submittal to the Regulators in January 2021. KD stated that TLI is working on the ESD to identify the new contamination of munitions and that the ESD is under Army review. KD said the ESD was planned for submittal to the Regulators in January 2021. Concurrently, the Remedial Design (RD)/Remedial Action Work Plan (RAWP) Addendum is being prepared to address the remaining excavation while providing MEC support. The RD/RAWP is expected to be submitted to the Regulators in March 2021 for review.

AW stated that USACE plans to give landfill personnel the 3R (Recognize, Retreat, Report) training. AW is awaiting the schedule from the Ordnance and Explosives Safety Specialist person, who will provide the training.

USFWS: No updates.

Schedule Next Managers' Meeting

The next MMM will be held on Wednesday, 16 December 2020 at 10:00 am CST via conference call.

Meeting concluded at approximately 2:07pm CST.

ACRONYM LIST

II	Roman Numeral Two
IV	Roman Numeral Four
µg/L	Micrograms per liter
AEC	Army Environmental Command
ALS	ALS Limited
AM	Andrew Maly
AP	April Palmie
APTIM	APTIM Federal Services, LLC
AR	Administrative Record
AW	Aaron Williams
BF	Bill Foss
Bhate	Bhate Environmental Associates, Inc.
BR	Bill Rhotenberry
BRAC	Base Realignment and Closure
CDT	Central Daylight Time
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COC	Contaminant of Concern
DERP	Defense Environmental Restoration Program
DNT	Dinitrotoluene
DoD	Department of Defense
DVD	Digital Versatile Disc
ESD	Explanation of Significant Difference
FFA	Federal Facility Agreement
GWTP	Groundwater Treatment Plant
KB	Kent Becher
KD	Kyra Donnell
KN	Kim Nemmers
LHAAP	Longhorn Army Ammunition Plant
LUC	Land Use Control
MEC	Munitions and explosives of concern
MMM	Monthly Managers' Meeting
PBR	Performance-Based Remediation
PDI	Pre-Design Investigation
PS	Praveen Srivastav
RAB	Restoration Advisory Board
RACR	Remedial Action Completion Report
RA-O	Remedial Action – Operation
RAWP	Remedial Action Work Plan
RD	Remedial Design
RM	Rob Mayer
RMZ	Rose M. Zeiler
SB	Scott Beesinger
TCE	Trichloroethylene
TCEQ	Texas Commission on Environmental Quality
Tech Memo	Technical Memorandum.
TLI	TLI Solutions, Inc.
TNT	Trinitrotoluene
USACE	United States Army Corps of Engineers

USEPA	United States Environmental Protection Agency
USFWS	United Fish and Wildlife Service
USGS	United States Geological Survey

LHAAP Data Validated
November MMM Validated Data

GWTP Effluent	*Weekly Perchlorate Sampling – October 2020* Perchlorate (6850)
GWTP Effluent	*Weekly, Bi-Weekly, and Monthly Sampling – October 2020* Ammonia (350.3) Ortho-Phosphate (365.3) Total Organic Carbon (SM5310C) VOC (8260C) Metals (6020A) Hexavalent Chromium (7196A) 1,4-Dioxane (8270D-SIM) Anions (9056)
GWTP Influent	*Monthly Sampling – October 2020* Metals (6020A) Perchlorate (6850) Hexavalent Chromium (7196A)
LHAAP-50	*October 2020 Remedial Performance Monitoring (Year 1, Quarter 2)* Volatile Organic Compounds (8260C) Perchlorate (EPA 6850) Alkalinity (SM2320B) Chloride, Nitrate, Nitrite, and Sulfate (SW9056A) Total Organic Carbon (SM5310B) Field Measurements (Dissolved Oxygen, Oxidation Reduction Potential, Ferrous Iron, and pH)

GWTP Weekly/Effluent Perchlorate Sampling - October 2020

Location ID: Sample Date:	Units	Daily Maximum Conc	PCL	LH18/24-SP650_100620 BIX 10/6/20	LH18/24-SP650_100620-AIX 10/6/20	LH18/24-SP650_101320_AIX 10/13/20	LH18/24-SP650_101320-AIX 10/13/20	LH18/24-SP650_102120-AIX 10/21/20	LH18/24-SP650_102720-Between 10/27/20	LH18/24-SP650_102720-AIX* 10/27/20
Location Description				Weekly	Weekly	Monthly EFF	Weekly	Weekly	Weekly	Weekly
Perchlorate (6850)										
Perchlorate	µg/L	589	17	< 0.500 U	< 0.500 U	**1.04**	**0.964**	< 0.500 U	**6.64**	< 0.500 U

µg/L - micrograms per liter

U- Undetected: The analyte was analyzed for, but not detected and reported to the limit of detection.

BIX - before ion exchange

J -estimated value between the detection limit and limit of quantitation and/or due to quality contol issues

AIX - after first ion exchange vessel; the two ion exchange vessels are in series

* Sample collected after the second ion excahnge vessel in series.

GWTP Weekly Sampling - October 2020

Location ID: Sample Date:	Units	Daily Maximum Conc	LH18/24-SP650_100620 10/6/20	LH18/24-SP650_101320 10/13/20	LH18/24-SP650_102120 10/21/20	LH18/24-SP650_102720 10/27/20
Location Description			**GWTP – Collected from a spigot between the two IX vessels in series. Sampled Weekly.**			
Ammonia as N (350.3)						
Ammonia as N	mg/L	NV	**11**	**16**	**7.8**	**12**
Ortho-Phosphate (365.3)						
Ortho-Phosphate	mg/L	NV	**2.86**	**3.03**	**2.11**	**2.93**
Organic Carbon (SM5310C)						
Total Organic Carbon (TOC)	mg/L	NV	**2.13**	**1.58**	**0.93**	**1.68**

mg/L - milligrams per liter

NV - No Value

GWTP Bi-Weekly Sampling - October 2020

Location ID: / Sample Date:	Units	(Bayou) Daily Maximum Conc	(INF pond) MCL	LH18/24-SP650_100620 10/6/20	LH18/24-SP650_102120 10/21/20
Location Description				**GWTP – Collected from a spigot between the two IX vessels in series. Sampled Biweekly.**	
Volatile Organic Compounds (8260C)					
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	< 1.0 U	< 1.0 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	**16**	**13**
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	**2.8**	**2.2**
Vinyl chloride	µg/L	72	2	**0.46 J**	< 0.50 U
Anions (9056)					
Chloride	mg/L	NV	NV	**583**	**561**
Sulfate	mg/L	NV	NV	**33.8**	**32.2**

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

NA -not analyzed

J -estimated value between the detection limit and limit of quantitation and/or due to quality contol issues

GWTP Monthly Effluent Sampling - October 2020

Location ID: / Sample Date:	Units	Daily Maximum Conc	(INF pond) MCL	LH18/24-SP650_101320 10/13/20
Location Description				**GWTP – Collected from a spigot between the two IX vessels in series.**
Volatile Organic Compounds (8260C)				
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	< 1.0 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	**15**
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	< 1.0 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	**1.3**
Vinyl chloride	µg/L	72	2	< 0.50 U
Metals (6020A)				
Barium	mg/L	2	2	**0.181**
Lead	mg/L	0.0046	0.015	< 0.00100 U
Selenium	mg/L	0.012	0.05	< 0.00250 U
Silver	mg/L	0.003	0.1	< 0.000500 U
Hexavalent Chromium (7196A)				
Hexavalent Chromium	mg/L	0.1244	NV	< 0.0100 U
Semi-Volatile Organic Compounds (8270D SIM)				
1,4-Dioxane	µg/L	134.2	NV	**3**

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

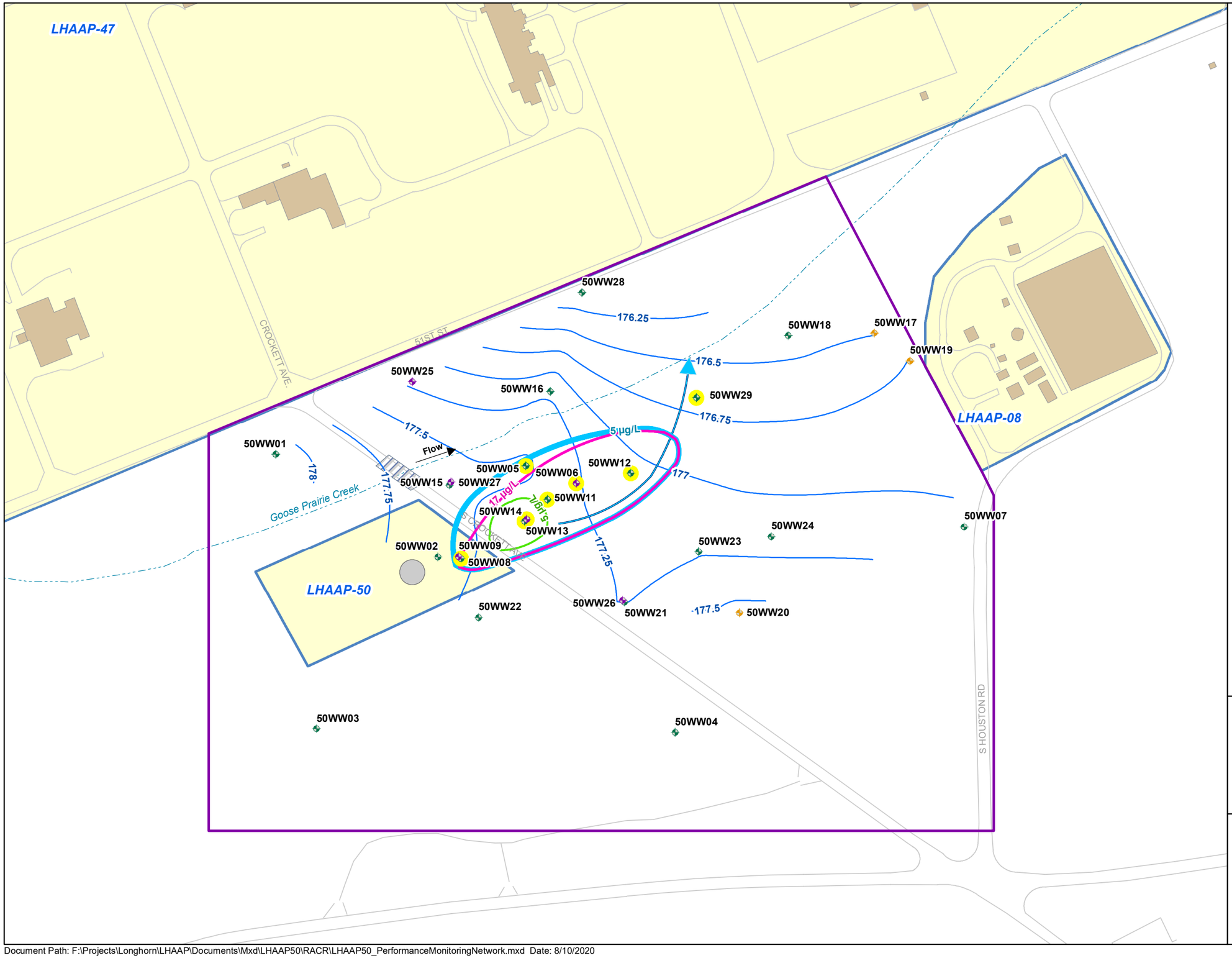
GWTP Monthly Influent Sampling - October 2020

Location ID: Sample Date:	Units	LH18/24-SP140_101320 10/13/20
Location Description		**GWTP – Collected from a spigot on the influent to TK-140. Sampled Monthly.**
Metals (6020A)		
Selenium	mg/L	< 0.00250 U
Silver	mg/L	< 0.000500 U
Hexavalent Chromium (7196A)		
Hexavalent Chromium	mg/L	< 0.0100 U
Perchlorate (6850)		
Perchlorate	µg/L	**6,260**

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.



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

bhate APTIM

Figure 4-1

Performance Monitoring Network
Remedial Action Completion Report,
Contigency Remedy, LHAAP-50

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

Document Path: F:\Projects\Longhorn\LHAAP\Documents\Mxd\LHAAP50\RACR\LHAAP50_PerformanceMonitoringNetwork.mxd Date: 8/10/2020

Performance Monitoring
Year 1, Quarter 2
October 2020

		Location Code	50WW05		50WW06		50WW08		50WW09		50WW11			
		Sample ID	50WW05-201001		50WW06-201001		50WW08-201005		50WW09-201005		50WW11-201001		50WW11-201001-FD	
		Sample Date	10/1/2020		10/1/2020		10/5/2020		10/5/2020		10/1/2020		10/1/2020	
		Sample Purpose	Reg		Reg		Reg		Reg		Reg		FD	
		Location Description	Site 50 - NE, lower shallow, outside site boundary.		Site 50 - ENE, outside site boundary.		Site 50 - E, upper shallow, inside site boundary.		Site 50 - E, lower shallow, inside site boundary.		Site 50 - ENE, upper shallow, outside site boundary.		Site 50 - ENE, upper shallow, outside site boundary.	
Analyte	**Units**	**MCL/PCL**	**Result**	**Val Qual**	**Result**	**Val Qual**	**Result**	**Val Qual**	**Result**	**Val Qual**	**Result**	**Val Qual**	**Result**	**Val Qual**
Dechlorinating Bacteria (Census)														
Dehalococcoides	cells/mL	NV	NA		0.2	J	NA		NA		4		NA	
Field Measurements														
Dissolved oxygen	mg/L	NV	0.37		0.06		3.17		0.43		1.12		1.12	
Ferrous Iron	mg/L	NV	NM		0.22		NM		NM		0.57		0.57	
Oxidation-Reduction Potential	mV	NV	105		95		220		219		94		94	
pH	Std Units	NV	6.71		6.31		6.02		6.20		6.70		6.70	
Dissolved Gases (RSK-175)														
Carbon dioxide	µg/L	NV	NA		93,000		NA		NA		74,000		79,000	
Ethane	µg/L	NV	NA		< 0.47	U	NA		NA		< 0.47	U	< 0.47	U
Ethylene	µg/L	NV	NA		< 0.55	U	NA		NA		< 0.55	U	< 0.55	U
Methane	µg/L	NV	NA		3.8		NA		NA		4.6		5.1	
General Chemistry (2320B/SM5310B/SW9056A)														
Chloride	mg/L	NV	NA		41.8		NA		NA		305		301	
Nitrate	mg/L	NV	NA		< 0.1	U	NA		NA		< 0.1	U	< 0.1	U
Sulfate	mg/L	NV	NA		17.9		NA		NA		475		403	
Total organic carbon	mg/L	NV	NA		6.09		NA		NA		1.82		1.86	
Perchlorate (EPA 6850)														
Perchlorate	µg/L	17	0.621		**1,660**		**172**		< 0.5	U	**6,630**		**7,940**	
Volatile Organic Compounds (8260C)														
1,1-Dichloroethene	µg/L	7	7		< 0.5	U	1		< 0.5	U	**35**		**34**	
1,2-Dichloroethane	µg/L	5	3.1		< 0.5	U	2.2		< 0.5	U	**26**		**25**	
cis-1,2-Dichloroethene	µg/L	70	**280**		< 0.5	U	57		2.8		**74**		**74**	
Tetrachloroethene	µg/L	5	0.75	J	< 0.5	U	1.4		< 0.5	U	**6.8**		**7.1**	
Trichloroethene	µg/L	5	**370**		**14**		**500**		**21**		**3,300**		**3,500**	
Vinyl chloride	µg/L	2	< 0.5	U	< 0.5	U	< 0.5	U	< 0.5	U	**3.4**		**3.5**	

Performance Monitoring
Year 1, Quarter 2
October 2020

			Location Code	50WW12		50WW13		50WW14		50WW15		50WW16	
			Sample ID	50WW12-201001		50WW13-201001		50WW14-201001		50WW15-201005		50WW16-201005	
			Sample Date	10/1/2020		10/1/2020		10/1/2020		10/5/2020		10/5/2020	
			Sample Purpose	Reg		Reg		Reg		Reg		Reg	
			Location Description	Site 50 - ENE, upper shallow, outside site boundary.		Site 50 - E, upper shallow, outside site boundary.		Site 50 - E, lower shallow, outside site boundary, along S. Crockett Ave.		Site 50 - NNE, upper shallow, outside site boundary, along Goose Prairie Creek bridge.		Site 50 - NE, upper shallow, outside site boundary, along Goose Prairie Creek.	
Analyte	**Units**	**MCL/PCL**		**Result**	**Val Qual**	**Result**	**Val Qual**	**Result**	**Val Qual**	**Result**	**Val Qual**	**Result**	**Val Qual**
Dechlorinating Bacteria (Census)													
Dehalococcoides	cells/mL	NV		1.4		3.8		2.1		NA		NA	
Field Measurements													
Dissolved oxygen	mg/L	NV		0.27		0.14		0.15		0.83		0.26	
Ferrous Iron	mg/L	NV		0.36		0.44		1.75		NM		NM	
Oxidation-Reduction Potential	mV	NV		96		86		7		172		201	
pH	Std Units	NV		6.46		6.06		6.26		6.42		5.60	
Dissolved Gases (RSK-175)													
Carbon dioxide	µg/L	NV		140,000		310,000		170,000		NA		NA	
Ethane	µg/L	NV		< 0.47	U	< 0.47	U	< 0.47	U	NA		NA	
Ethylene	µg/L	NV		< 0.55	U	< 0.55	U	< 0.55	U	NA		NA	
Methane	µg/L	NV		0.83	J	4.2		2.2		NA		NA	
General Chemistry (2320B/SM5310B/SW9056A)													
Chloride	mg/L	NV		1,080		316		393		NA		NA	
Nitrate	mg/L	NV		< 0.2	U	< 0.1	U	< 0.1	U	NA		NA	
Sulfate	mg/L	NV		595		356		375		NA		NA	
Total organic carbon	mg/L	NV		1.14		3.54		1.58		NA		NA	
Perchlorate (EPA 6850)													
Perchlorate	µg/L	17		**41,600**		**4,390**		1.37		< 0.5	U	0.0701	J
Volatile Organic Compounds (8260C)													
1,1-Dichloroethene	µg/L	7		5.2		**17**		< 0.5	U	< 0.5	U	< 0.5	U
1,2-Dichloroethane	µg/L	5		3		**47**		< 0.5	U	< 0.5	U	< 0.5	U
cis-1,2-Dichloroethene	µg/L	70		0.87	J	**300**		2.9		5.4		< 0.5	U
Tetrachloroethene	µg/L	5		< 1	U	**8.6**		< 0.5	U	1.8		< 0.5	U
Trichloroethene	µg/L	5		**380**		**8,300**		**74**	J+	**8.4**		0.62	J
Vinyl chloride	µg/L	2		< 0.5	U	**3.3**	J	< 0.5	U	1.1		< 0.5	U

Performance Monitoring
Year 1, Quarter 2
October 2020

			Location Code	50WW18				50WW22		50WW23		50WW29	
			Sample ID	50WW18-201005		50WW18-201005-FD		50WW22-201005		50WW23-201005		50WW29-201001	
			Sample Date	10/5/2020		10/5/2020		10/5/2020		10/5/2020		10/1/2020	
			Sample Purpose	Reg		FD		Reg		Reg		Reg	
			Location Description	Site 50 - NE, upper shallow, outside site boundary, along Goose Prairie Creek.		Site 50 - NE, upper shallow, outside site boundary, along Goose Prairie Creek.		Site 50 - SE, upper shallow, outside site boundary.		Site 50 - E, upper shallow, outside site boundary.		Site 50 - ENE, upper shallow, outside site boundary	
Analyte	**Units**	**MCL/PCL**		**Result**	**Val Qual**	**Result**	**Val Qual**	**Result**	**Val Qual**	**Result**	**Val Qual**	**Result**	**Val Qual**
Dechlorinating Bacteria (Census)													
Dehalococcoides	cells/mL	NV		NA		NA		NA		NA		NA	
Field Measurements													
Dissolved oxygen	mg/L	NV		0.15		0.15		0.95		1.1		0.06	
Ferrous Iron	mg/L	NV		NM		NM		NM		NM		NM	
Oxidation-Reduction Potential	mV	NV		172		172		223		216		142	
pH	Std Units	NV		6.67		6.67		5.99		6.30		5.62	
Dissolved Gases (RSK-175)													
Carbon dioxide	µg/L	NV		NA		NA		NA		NA		NA	
Ethane	µg/L	NV		NA		NA		NA		NA		NA	
Ethylene	µg/L	NV		NA		NA		NA		NA		NA	
Methane	µg/L	NV		NA		NA		NA		NA		NA	
General Chemistry (2320B/SM5310B/SW9056A)													
Chloride	mg/L	NV		NA		NA		NA		NA		NA	
Nitrate	mg/L	NV		NA		NA		NA		NA		NA	
Sulfate	mg/L	NV		NA		NA		NA		NA		NA	
Total organic carbon	mg/L	NV		NA		NA		NA		NA		NA	
Perchlorate (EPA 6850)													
Perchlorate	µg/L	17		< 0.5	U	< 0.5	U	< 0.5	U	< 0.5	U	5.96	
Volatile Organic Compounds (8260C)													
1,1-Dichloroethene	µg/L	7		< 0.5	U	< 0.5	U	< 0.5	U	< 0.5	U	< 0.5	U
1,2-Dichloroethane	µg/L	5		< 0.5	U	< 0.5	U	< 0.5	U	< 0.5	U	< 0.5	U
cis-1,2-Dichloroethene	µg/L	70		< 0.5	U	< 0.5	U	< 0.5	U	< 0.5	U	< 0.5	U
Tetrachloroethene	µg/L	5		< 1	U	< 0.5	U	< 0.5	U	< 1	U	< 1	U
Trichloroethene	µg/L	5		< 0.5	U	< 0.5	U	< 0.5	U	< 0.5	U	< 0.5	U
Vinyl chloride	µg/L	2		< 0.5	U	< 0.5	U	< 0.5	U	< 0.5	U	< 0.5	U

Performance Monitoring
Year 1, Quarter 2
October 2020

Notes:

Blue Highlighting Indicates the concentration exceeds the MCL/PCL

Some samples have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

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

J+ - The analyte was positively identified; the associated numerical value is its approximate concentration in the sample, with a high bias.

U - Undetected: The analyte was analyzed for, but not detected.

MCL - Maximum Contaminant Limit

PCL – Texas Risk Reduction Program (TRRP) Tier 1 Groundwater Residential Protective Concentration Level (used for perchlorate,where no MCL has been established)

mg/L - milligrams per liter

ug/L - micrograms per liter

ID - Identification

REG - Regular sample

FD - Field duplicate sample

< - The analyte was not detected above the concentration shown

NV - No MCL/PCL is shown for analytes that are not contaminants of concern

NA - not analyzed

NM - not measured

Std Units - Standard pH Units

mV - millivolts

cells/mL - cells per milliliter

Val Qual - validation qualifier

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

December 3, 2020

DAIN-ODB-LO

Mr. William Rhotenberry
U.S. Environmental Protection Agency
1201 Elm Street, Suite 500
Dallas, TX 75270-2002

Re: Draft Sixth Annual Remedial Action Operation Report, LHAAP-50, Former Sump Water Tank, Longhorn Army Ammunition Plant, Karnack, Texas, December 2020

Dear Mr. Rhotenberry,

An electronic copy of the above referenced document has been added to the project portal's "Documents" folder at the following address for your review: (https://docs.cbifederalservices.com/sites/501032/regulators/Shared%20Documents/Forms/AllItems.aspx). An electronic copy of this letter and download instructions for the electronic file have been sent via email. Review comments are requested by January 5, 2021.

The document was prepared by Bhate Environmental Associates, Inc., (Bhate) team, on behalf of the Army as part of Bhate's Performance Based Remediation contract for the facility. I ask that Kim Nemmers, Bhate's Project Manager, be copied on any communications related to the project.

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

Sincerely,

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

Copies furnished:
A. Palmie, TCEQ, Austin, TX (letter)
P. Bruckwicki, Caddo Lake NWR, TX (1 hard copy and 1 CD)
R. Smith USACE, Tulsa District, OK (1 hard copy and 1 CD)
A. Williams, USACE, Tulsa District, OK (1 CD)
A. Maly USAEC, San Antonio, TX (1 CD)
K. Nemmers, Bhate, Lakewood, CO (1 hard copy and 1 CD)
P. Srivastav, APTIM, Houston, TX (letter)

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

December 3, 2020

DAIN-ODB-LO

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

Re: Draft Sixth Annual Remedial Action Operation Report, LHAAP-50, Former Sump Water Tank, Longhorn Army Ammunition Plant, Karnack, Texas, December 2020

Dear Ms. Palmie,

An electronic copy of the above referenced document has been added to the project portal's "Documents" folder at the following address for your review: (https://docs.cbifederalservices.com/sites/501032/regulators/Shared%20Documents/Forms/AllItems.aspx). An electronic copy of this letter and download instructions for the electronic file have been sent via email. Review comments are requested by January 5, 2021.

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

Sincerely,

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

Copies furnished (letter only):
W. Rhotenberry, USEPA Region 6, Dallas, TX
P. Bruckwicki, Caddo Lake NWR, TX
R. Smith, USACE, Tulsa District, OK
A. Williams, USACE, Tulsa District, OK
A. Maly, USAEC, San Antonio, TX (1 CD)
K. Nemmers, Bhate, Lakewood, CO
P. Srivastav, APTIM, Houston, TX

QUARTERLY EVALUATION REPORT
3RD QUARTER (APRIL-SEPTEMBER) 2020
GROUNDWATER TREATMENT PLANT
LONGHORN ARMY AMMUNITION PLANT

KARNACK, TEXAS

DECEMBER 2020

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:

bhate

1608 13th Avenue South, Suite 300
Birmingham, Alabama 35205
1-800-806-4001 • www.bhate.com

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Appendix B Groundwater Elevation Contour Maps
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Attachment 2: PID Readings and Calibration Logs
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ACRONYMS AND ABBREVIATIONS

AECOM	AECOM Technical Services, Inc.
AMCV(s)	Air Monitoring Comparison Value
amsl	Above mean sea level
bgs	Below ground surface
Bhate	Bhate Environmental Associates, Inc.
CD	Compact disc
COD	Chemical oxygen demand
ESD	Explanation of Significant Difference
ESL(s)	Effects Screening Level
FBR	Fluidized bed reactor
ft	Feet or foot
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
lbs/hr	Pounds per hour
LHAAP	Longhorn Army Ammunition Plant
µg/L	Micrograms per liter
$Mg(OH)_2$	Magnesium hydroxide
mV	Millivolts
NA	Not applicable
NaOH	Sodium hydroxide
No.	Number
NM	Not measured
ORP	Oxidation-reduction potential
PID	Photoionization detector

ppmv	Parts per million by volume
psi	Pounds per square inch
PVC	Polyvinyl chloride
ROD	Record of Decision
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
tpy	Tons per year
UEP	Unlined Evaporation Pond
USEPA	United States Environmental Protection Agency
VOC(s)	Volatile Organic Compound(s)

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 contribute groundwater to the GWTP. Groundwater extraction, treatment, and monitoring activities consist of:

- Continuous extraction of groundwater from multiple interception-collection trenches (ICTs) and extraction wells at both LHAAP-18/24 and LHAAP-16;
- 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 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 release of treated water 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 depicts the monthly total volume of groundwater that was extracted from the ICTs and extraction wells at LHAAP-18/24 and LHAAP-16 between January 2014 and September 2020.

The GWTP was not operational during June, July, and August 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 1:00 PM 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 fluidized bed reactor (FBR) to revive the FBR after 3 months of dormancy. Treated groundwater and air samples were collected and analyzed respectively for perchlorate, metals, and Volatile Organic Compounds (VOCs); and 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 3rd quarter 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 4th quarter of 2012, as pumping equipment was gradually repaired/replaced. The GWTP operated under normal conditions until September 2015.

On 14 September 2015, at 11:15 AM, 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 ICT 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.

On 12 December 2016, flange bolts at TK-380 failed and allowed hydrochloric acid (HCl) to drain into the sump. The containment area was washed down and the sump contents were transferred into the 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.

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 ICT-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.

On 27 December 2018, severe storms caused a power outage in Karnack, Texas including LHAAP. When electrical service was restored, the main transformer failed due to a manufacturing defect. A portable emergency generator was brought on-site on 28 December 2018, to allow the FBR to operate in full recycle mode. After a temporary generator was connected to the well field on 11 February 2019, extraction began from LHAAP-18/24, and the GWTP was put into normal operation.

From 11 to 17 June 2019, a double walled pipe in the burning grounds (ICT-14C and ICT-14D) was found to be leaking at a joint and repaired. In addition, the line to 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 18WW17 was installed.

Groundwater is no longer extracted from LHAAP-16 because injections were completed as part of the final remedial action, which commenced in September 2019. The only groundwater treated and discussed within this report is from LHAAP-18/24.

On 11 January 2020, a 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. 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 Electric was called to the site to replace the fuse and power was restored to the GWTP the same day.

As shown on **Figure ES-1**, the total extracted groundwater volume from LHAAP-18/24 during the 3rd quarter of 2020 was within normal range. 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. Extraction quantities from LHAAP-18/24 were 478,441 gallons in July 2020; 583,216 gallons in August 2020; and 551,755 gallons in September 2020.

The average discharge flow rate from the GWTP to the Harrison Bayou was calculated as approximately 12 gallons per minute (gpm) during the 3rd quarter of 2020. Approximately 1,618,474 gallons of groundwater treated by the GWTP was discharged to the Harrison Bayou. The average discharge flow rate from the GWTP to the INF pond was 11 gpm.

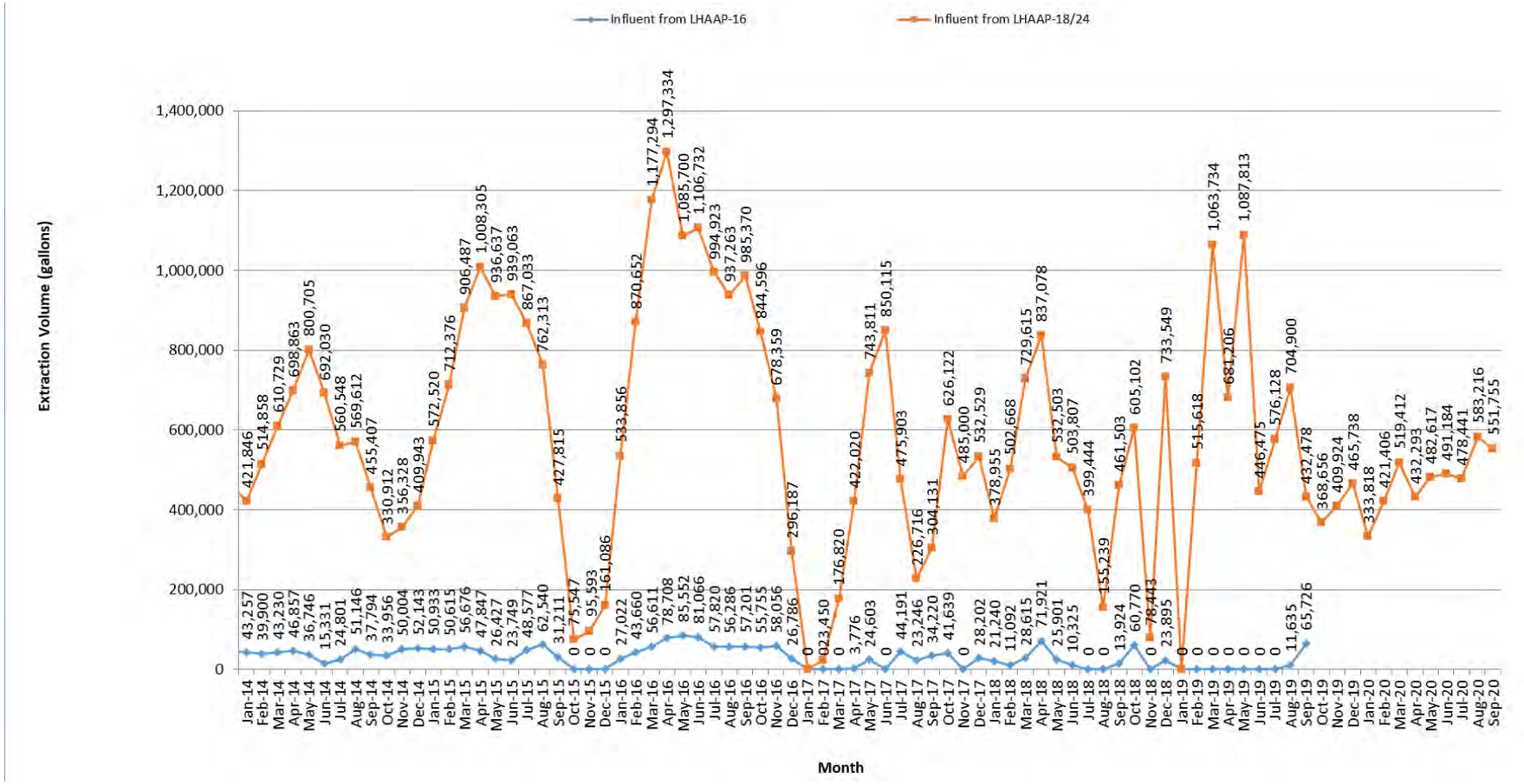
Grab perchlorate samples from the GWTP influent were collected on 14 July, 11 August, and 15 September 2020, and the following concentrations were reported: 6,780 micrograms per liter (µg/L); 8,310 µg/L; and 8,350 µg/L, respectively. A quarterly influent sample was collected and analyzed for perchlorate on 25 August 2020, and had a detection of 11,500 µg/L. Considering all four perchlorate results, the average perchlorate concentration in the GWTP influent during the quarter was 8,735 µg/L. No perchlorate concentrations in any effluent (TK-650) samples discharged to the Harrison Bayou exceeded the daily maximum effluent limit of 589 µg/L during the quarter.

As shown in **Table ES-1**, 634,081 gallons of treated groundwater was discharged directly to the Harrison Bayou and 984,393 gallons was discharged from the INF Pond to the Harrison Bayou during the 3rd quarter of 2020. **Table ES-1** also presents the INF Pond staff gauge readings by date, which is used to determine the freeboard available in the pond.

The groundwater volume extracted for treatment at the GWTP ranged from a low of 478,441 gallons in July 2020 to a high of 583,216 gallons in August 2020. The total water extracted for treatment by the GWTP in the 3rd quarter of 2020 was approximately 1,613,412 gallons. The 3-month average was approximately 537,804 gallons per month. The total treated water quantities discharged to either the Harrison Bayou or INF Pond each month, since June 2012, are shown on **Figure ES-2**. The total volume of water extracted based upon the sum of the individual extraction wells and ICTs from LHAAP-18/24 in the 3rd quarter of 2020 (1,613,412 gallons) is slightly higher than the volume of water discharged to the Harrison Bayou and the INF Pond combined (1,424,885). This variance is due to the water remaining within the GWTP tanks and system at the time of the final discharge readings.

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Figure ES-1. Groundwater Recovery Between January 2014 and September 2020 for LHAA-18/24 and 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 September 2020

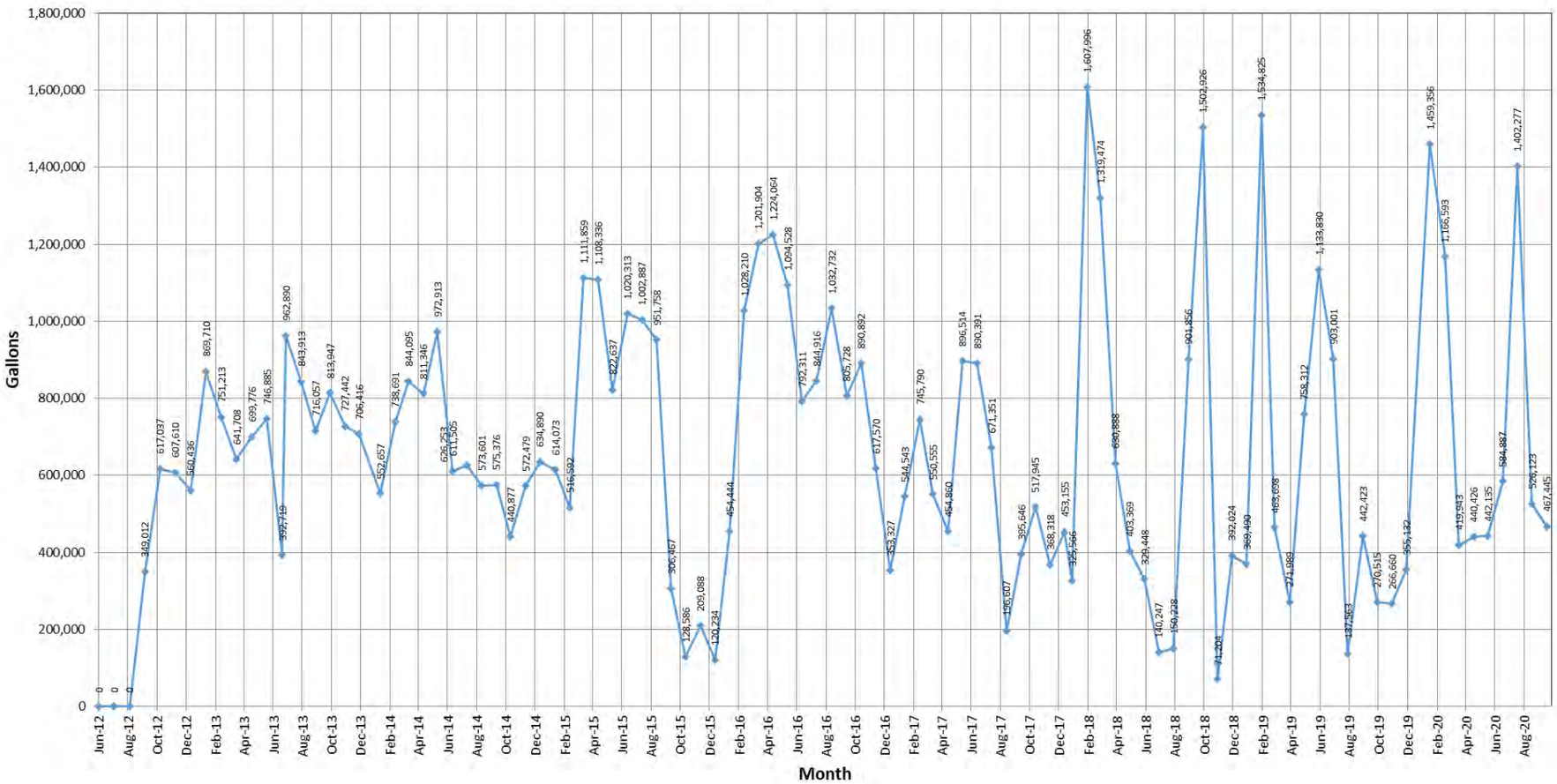


Table ES-1. Discharge Information to Harrison Bayou During 3rd Quarter 2020

DATE	HB 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 (feet) (6.20 = 3 ft. Freeboard)
07/01/2020	4,290	1,435	17,833	0	0	17,833	5.62
07/02/2020	3,925	1,295	0	0	0	0	5.60
07/03/2020	3,540	1,168	0	0	0	0	5.70
07/04/2020	3,109	1,025	0	0	0	0	5.68
07/05/2020	FLOOD STAGE	MAXIMUM	0	0	0	0	6.02
07/06/2020	FLOOD STAGE	MAXIMUM	0	0	0	0	6.00
07/07/2020	FLOOD STAGE	MAXIMUM	0	192,150	0	192,150	5.45
07/08/2020	FLOOD STAGE	MAXIMUM	53,263	223,493	0	276,756	4.80
07/09/2020	FLOOD STAGE	MAXIMUM	0	246,750	0	246,750	4.00
07/10/2020	12,359	4,078	0	0	0	0	3.99
07/11/2020	8,876	2,929	0	0	0	0	3.98
07/12/2020	6,125	2,021	0	0	0	0	3.97
07/13/2020	4,933	1,650	75,611	0	0	75,611	3.96
07/14/2020	4,348	1,454	15,603	169,650	0	185,253	3.05
07/15/2020	3,422	1,145	16,902	152,350	0	169,252	2.45
07/16/2020	2,524	844	14,976	0	0	14,976	2.43
07/17/2020	2,245	740	0	0	0	0	2.41
07/18/2020	1,653	545	0	0	0	0	2.40
07/19/2020	1,298	428	0	0	0	0	2.38

DATE	HB 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 (feet) (6.20 = 3 ft. Freeboard)
07/20/2020	1,021	341	68,540	0	0	68,540	2.37
07/21/2020	857	286	13,569	0	0	13,569	2.35
07/22/2020	672	225	16,061	0	0	16,061	2.34
07/23/2020	771	257	13,621	0	0	13,621	2.34
07/24/2020	723	238	0	0	0	0	2.32
07/25/2020	675	222	0	0	0	0	2.30
07/26/2020	601	198	0	0	0	0	2.28
07/27/2020	544	182	69,028	0	0	69,028	2.26
07/28/2020	445	148	13,880	0	0	13,880	2.24
07/29/2020	324	108	15,632	0	0	15,632	2.22
07/30/2020	282	94	13,365	0	0	13,365	2.20
07/31/2020	254	83	0	0	0	0	2.18
08/01/2020	467	154	0	0	0	0	2.17
08/02/2020	403	132	0	0	0	0	2.16
08/03/2020	359	120	51,437	0	0	51,437	2.14
08/04/2020	317	106	13,951	0	0	13,951	2.12
08/05/2020	266	89	19,517	0	0	19,517	2.11
08/06/2020	304	101	17,498	0	0	17,498	2.09
08/07/2020	270	89	0	0	0	0	2.07
08/08/2020	229	75	0	0	0	0	2.05

DATE	HB 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 (feet) (6.20 = 3 ft. Freeboard)
08/09/2020	193	63	0	0	0	0	2.04
08/10/2020	163	54	69,428	0	0	69,428	2.02
08/11/2020	113	37	28,166	0	0	28,166	2.00
08/12/2020	77	25	16,200	0	0	16,200	1.99
08/13/2020	NA	NA	0	0	14,727	0	2.50
08/14/2020	NA	NA	0	0	0	0	2.57
08/15/2020	NA	NA	0	0	0	0	2.63
08/16/2020	NA	NA	0	0	0	0	2.67
08/17/2020	NA	NA	0	0	70,915	0	2.70
08/18/2020	NA	NA	0	0	16,948	0	2.74
08/19/2020	NA	NA	0	0	14,750	0	2.77
08/20/2020	NA	NA	0	0	18,914	0	2.79
08/21/2020	NA	NA	0	0	0	0	2.81
08/22/2020	NA	NA	0	0	0	0	2.84
08/23/2020	NA	NA	0	0	0	0	2.87
08/24/2020	NA	NA	0	0	75,020	0	2.90
08/25/2020	NA	NA	0	0	17,856	0	2.94
08/26/2020	NA	NA	0	0	25,261	0	2.98
08/27/2020	NA	NA	0	0	0	0	3.19
08/28/2020	NA	NA	0	0	30,492	0	3.23

DATE	HB 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 (feet) (6.20 = 3 ft. Freeboard)
08/29/2020	NA	NA	0	0	0	0	3.27
08/30/2020	NA	NA	0	0	0	0	3.33
08/31/2020	NA	NA	0	0	38,476	0	3.38
09/01/2020	NA	NA	0	0	16,535	0	3.41
09/02/2020	NA	NA	0	0	17,618	0	3.45
09/03/2020	NA	NA	0	0	15,680	0	4.02
09/04/2020	NA	NA	0	0	0	0	4.20
09/05/2020	NA	NA	0	0	0	0	4.26
09/06/2020	NA	NA	0	0	0	0	4.30
09/07/2020	NA	NA	0	0	0	0	4.35
09/08/2020	NA	NA	0	0	73,032	0	4.40
09/09/2020	NA	NA	0	0	23,011	0	4.45
09/10/2020	NA	NA	0	0	19,274	0	4.50
09/11/2020	NA	NA	0	0	0	0	4.73
09/12/2020	NA	NA	0	0	0	0	4.78
09/13/2020	NA	NA	0	0	0	0	4.83
09/14/2020	NA	NA	0	0	64,795	0	4.88
09/15/2020	NA	NA	0	0	14,886	0	4.91
09/16/2020	NA	NA	0	0	15,317	0	4.95
09/17/2020	NA	NA	0	0	11,446	0	4.99

DATE	HB 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 (feet) (6.20 = 3 ft. Freeboard)
09/18/2020	NA	NA	0	0	0	0	5.02
09/19/2020	NA	NA	0	0	0	0	5.05
09/20/2020	NA	NA	0	0	0	0	5.08
09/21/2020	NA	NA	0	0	65,632	0	5.11
09/22/2020	NA	NA	0	0	11,821	0	5.18
09/23/2020	NA	NA	0	0	13,233	0	5.28
09/24/2020	NA	NA	0	0	10,787	0	5.37
09/25/2020	NA	NA	0	0	0	0	5.41
09/26/2020	NA	NA	0	0	0	0	5.45
09/27/2020	NA	NA	0	0	0	0	5.49
09/28/2020	NA	NA	0	0	62,184	0	5.56
09/29/2020	NA	NA	0	0	16,064	0	5.60
09/30/2020	NA	NA	0	0	16,130	0	5.64
			634,081	984,393	790,804	1,618,474	

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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 (UEP) 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, 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.

1.1 Treatment Configuration

The process flow diagram for the GWTP is presented in **Appendix A, Figure A-2**. 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 ion exchange vessels were installed in November 2018 following the fluidized bed reactor (FBR) to further remove perchlorate prior to discharging to the INF pond.

Malfunction of the blower on the air stripper (BL-340) on 14 September 2015, and on 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 4th 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 remained predominantly on a batch basis throughout January 2016.

In December 2016, an HCl spill caused plant operations to shut down until the issue could be properly addressed. The FBR performance was challenged by the increased chlorides in the

neutralized wastewater, but performance gradually returned to normal in the 1st quarter of 2017. Groundwater extraction was gradually increased to full rates during the 2nd 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 ICT-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.

On 27 December 2018, severe storms caused a power outage in Karnack, Texas. When electrical service was restored, the main 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 backfeeding 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 28 October through 31 October 2019, Palmetto Services was onsite to install new double walled pipe to 18WW17. The previous pipe had a leak and so the line had been stubbed off on 17 June 2019.

On 11 January 2020, a 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. 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 Electric 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 5 July 2020, a tree fell across the power line disconnecting power. The tree was cleared on 6 July 2020, repairs were made on 8 July 2020, and power was restored on 8 July 2020.

On 18 July 2020, the acetic acid pump lost prime causing the ORP to increase to -299 milliVolts (mV). The acetic acid pump was reprimed and ORP was restored to normal range.

On 11 September 2020, the acetic acid pump shut down due to heavy rain. The pump was fixed, the FBR was brought back online the same day (11 September 2020).

Flow rates for the treatment processes for metals and Volatile Organic Compounds (VOCs) ranged between 170 and 210 gallons per minute (gpm) with an average of approximately 185 gpm for the operating hours (i.e., this flow rate does not represent continuous flows). The GWTP operated for 210.75 hours during the quarter. The treatment configuration of the plant at these rates (with minor variations) is as follows:

GWTP Metals Precipitation Operating Parameters

Pretreatment Settings	Tank 200-A $Mg(OH)_2$ 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 $Mg(OH)_2$	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, $Mg(OH)_2$ - magnesium hydroxide, NA - not applicable				

GWTP Air Compressors Operating Parameters

Air Compressors	K-700A	K-700B	K-701
Air Pressure Settings	88 psi	88 psi	105 psi
Note: psi - pounds per square inch			

GWTP Stripper Operating Parameters

Stripper Tower	
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

Fluidized Bed Reactor	
Carbon Bed Height	12 feet & 8 to 11 inches
Recycle Flow Rate	200 gpm
pH	7.1 to 7.4
Recycle oxidation-reduction potential (ORP)	<-430 mV
Note: mV – millivolts	

1.2 Work Performed at the GWTP

Work performed at the GWTP during the 3rd quarter of 2020 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:

- 8 July 2020: Ark-La-Tex Electric was onsite to repair downed power lines
- 26 August 2020: Ark-La-Tex was onsite to remove a broken power pole on the old power line at Site 04

1.2.2 Routine Maintenance

The following routine maintenance items were completed at the GWTP during this quarterly reporting period:

- Performed housekeeping in GWTP office
- Performed housekeeping in Army trailer
- Performed housekeeping around GWTP and containment area
- Performed housekeeping in GWTP Shop
- Performed housekeeping around FBR area
- Installed a new 4-inch basket strainer to replace the media capture tank
- Installed new LMI caustic feed pump (P-225)
- Worked on repairing leak on paddle wheel auger on clarifier
- Mowed and cut weeds around directional signs
- Mowed around GWTP, GWTP office, and Army trailer
- Rebuild Grundfos pumps
- Scraped, wire brushed, and painted tanks TK-200A, 200B & 200C in GWTP
- Performed acid wash of media in air stripper
- Repaired broken ¼-inch tubing on suction side of P-104
- Backwashed GAC vessel
- Bush-hogged around ICT wells that need pumps replaced
- Installed new pump P-270
- Installed new air regulator on P-270
- Replace some plugged 1-inch PVC piping on discharge of P-270
- Replaced belt on K-700A and performed associated preventive maintenance
- Bush-hogged and cut weeds around discharge location at Harrison Bayou

- Collected quarterly surface water samples

1.2.2.1 Safety

No safety activities were performed during this reporting period.

1.2.2.2 Lubrication

No lubrication maintenance was conducted during the reporting period.

1.2.2.3 Air Compressors

No air compressor maintenance was conducted during the reporting period.

1.2.2.4 Belt Press and Waste Disposal

No belt press or waste disposal was conducted during the reporting period.

1.2.2.5 Sand Filter

No maintenance or repairs were conducted on the sand filter during the reporting period.

1.2.2.6 Well Field at LHAAP-18/24

- Collected monthly water levels

1.2.2.7 Miscellaneous Activities

- 8 July 2020: Ark-La-Tex Electric was onsite to repair downed power lines
- 26 August 2020: Ark-La-Tex was onsite to remove a broken power pole on the old power line at Site 04
- 11 September 2020: the acetic acid pump shut down due to heavy rain but was restarted and the FBR was brought back online the same day

1.2.3 Routine Maintenance (Potable Water Wells)

- Flushed potable water lines

1.3 Filter Cake Operations and Management

No filter cake operations took place during this reporting period.

1.4 Fluidized Bed Reactor Operations

The operating parameters for the GWTP FBR are presented in **Table 1**. There were some instances noted in gray in the table below where either the pH or the ORP fell outside of the optimal range. From 5 July to 7 July 2020, the FBR was shutdown. It was offline due to a power outage.

Table 1. Enhanced Fluidized Bed Reactor Operating Parameters – 3rd Quarter 2020

Date	pH (S.U.) (7.1-7.4)	ORP (mV) (<-430mV)	Temperature (°F)
7/1/2020	7.2	-449	82
7/2/2020	7.2	-435	82
7/3/2020	7.2	-440	82
7/4/2020	7.2	-451	83
7/5/2020	No Power	No Power	No Power
7/6/2020	No Power	No Power	No Power
7/7/2020	No Power	No Power	No Power
7/8/2020	7.2	-429	83
7/9/2020	7.1	-443	84
7/10/2020	7.1	-453	84
7/11/2020	7.1	-449	85
7/12/2020	7.1	-441	86
7/13/2020	7.1	-466	86
7/14/2020	7.1	-429	85
7/15/2020	7.1	-460	86
7/16/2020	7.1	-429	85
7/17/2020	7.1	-433	87
7/18/2020	7.1	-440	88
7/19/2020	7.0	-439	89
7/20/2020	7.0	-445	86
7/21/2020	7.0	-433	84
7/22/2020	7.0	-430	85
7/23/2020	7.0	-429	83
7/24/2020	7.0	-431	84
7/25/2020	7.0	-429	85
7/26/2020	7.0	-433	86
7/27/2020	7.0	-439	84
7/28/2020	7.0	-447	83
7/29/2020	7.0	-428	84
7/30/2020	7.0	-429	83
7/31/2020	7.0	-445	84
8/1/2020	7.0	-450	84
8/2/2020	7.0	-457	84
8/3/2020	7.0	-460	86
8/4/2020	7.0	-427	82
8/5/2020	7.0	-429	80
8/6/2020	7.0	-428	79
8/7/2020	7.0	-431	81
8/8/2020	7.0	-440	83
8/9/2020	7.0	-445	84
8/10/2020	7.0	-479	86
8/11/2020	7.0	-445	84
8/12/2020	7.0	-447	84
8/13/2020	7.0	-446	84

Date	pH (S.U.) (7.1-7.4)	ORP (mV) (<-430mV)	Temperature (°F)
8/14/2020	7.0	-443	85
8/15/2020	7.0	-429	86
8/16/2020	7.0	-431	87
8/17/2020	7.0	-428	84
8/18/2020	7.0	-434	83
8/19/2020	7.0	-432	84
8/20/2020	7.0	-444	81
8/21/2020	7.0	-441	83
8/22/2020	7.0	-435	85
8/23/2020	7.0	-431	86
8/24/2020	7.0	-451	84
8/25/2020	7.0	-439	82
8/26/2020	7.0	-425	82
8/27/2020	7.0	-430	82
8/28/2020	7.0	-447	82
8/29/2020	7.0	-433	83
8/30/2020	7.0	-445	84
8/31/2020	7.1	-451	86
9/1/2020	7.4	-453	84
9/2/2020	7.3	-466	84
9/3/2020	7.3	-436	81
9/4/2020	7.3	-430	81
9/5/2020	7.2	-433	82
9/6/2020	7.2	-432	83
9/7/2020	7.2	-429	84
9/8/2020	7.4	-446	83
9/9/2020	7.3	-433	82
9/10/2020	7.4	-446	82
9/11/2020	7.4	-440	82
9/12/2020	7.4	-431	83
9/13/2020	7.3	-434	84
9/14/2020	7.4	-438	82
9/15/2020	7.4	-432	81
9/16/2020	7.4	-431	82
9/17/2020	7.3	-439	82
9/18/2020	7.3	-429	82
9/19/2020	7.3	-432	82
9/20/2020	7.3	-430	82
9/21/2020	7.2	-441	76
9/22/2020	7.4	-431	74
9/23/2020	7.4	-432	75
9/24/2020	7.4	-440	73
9/25/2020	7.4	-435	73
9/26/2020	7.4	-430	74
9/27/2020	7.4	-429	75

Date	pH (S.U.) (7.1-7.4)	ORP (mV) (<-430mV)	Temperature (^{o}F)
9/28/2020	7.4	-461	75
9/29/2020	7.4	-469	74
9/30/2020	7.4	-470	74

Notes:
Shaded cells represent results outside of optimal ranges for FBR operation.
mV = millivolt
pH = Potential of Hydrogen
ORP = Oxidation/Reduction Potential
S.U. = Standard Units
^{o}F = degrees Fahrenheit

While the pH was slightly below the optimal range 7.0 on many of the days in the 3rd quarter 2020, this low level deviation does not affect the FBR performance. Similar deviations from the optimal ORP range of <-430 mV were noted but does not alone affect the performance of the FBR. The failure of the acetic acid pump on 18 July 2020 is not reflected in the ORP readings due to the timing of the daily readings. However, the impact of the acetic acid pump likely did affect the performance of the FBR briefly.

1.5 Process Chemical Usage at GWTP

Approximate chemical consumption and the quantities delivered during the 3rd quarter of 2020 are shown in **Table 2**.

Table 2. Chemical Usage and Delivery Table

Chemical	Usage 3rd Quarter 2020	Quantity Delivered 3rd Quarter 2020
Hydrochloric acid	570 gallons	0
Sodium hydroxide (35%)	950 gallons	0
Acetic acid (50%)	1 3/4 drums = 97 gallons	0
Phosphoric acid (75%)	52.0 liters	0
Magnesium hydroxide	230 gallons	0
Urea	368.8 lbs.	0
Polymer (magnafloc 110-L)	10.0 liters	0

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 feet (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 in ICTs 12 and 13, located on the western and northern boundaries of LHAAP-18/24, respectively. The locations of the liners are shown on **Figure A-1** in **Appendix A**. **Table A-1** in **Appendix A** presents the depths of the ICTs.

2.1 Groundwater Elevation

Water levels from 94 monitoring wells and 11 piezometers (piezometer 12 was damaged and plugged and abandoned in May 2013) are measured monthly to generate potentiometric surface maps that assist in monitoring the effectiveness of the groundwater extraction system on plume containment. 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 to LHAAP-18/24 grounds via the existing irrigation system occurred during the 3rd quarter of 2020. Potentiometric surface maps are presented in **Appendix B** and groundwater elevations from the 3rd quarter of 2020 are discussed in Section 2.2.

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 containment zone, 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 Texas Commission on Environmental Quality (TCEQ) and the United States Environmental Protection Agency (USEPA), the Army ceased operations of ICTs 1, 3, 5, 10, and 12A 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. 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 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 29 July 2020, 24 August 2020, and 28 September 2020, 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, were interpreted as groundwater flow barriers. The potentiometric surface maps for July through September 2020 continue to reflect high groundwater elevations in the northern/northwestern portion of the site with groundwater flow occurring radially from groundwater highs at monitoring well AWD-2 (174.66 ft above mean sea level [amsl] in July 2020, 174.23 ft amsl in August 2020, and 174.28 ft amsl in September 2020) inside the ICT containment area.

The elevated potentiometric surface contours within the ICTs compared to the lower potentiometric surface contours on the outside of the ICTs is likely due to a no flow boundary condition caused by the ICT liners and groundwater extraction along the ICTs. From the groundwater high at monitoring well AWD-2, groundwater flows radially towards the surrounding ICTs which include ICT 13 to the north and northwest, and ICT 12 to the west and southwest.

Groundwater extraction volumes from the ICTs were 417,441 gallons in July 2020; 583,216 gallons in August 2020; and 551,755 gallons in September 2020. Rainfall amounts recorded at the GWTP were 4.92 inches in July 2020, 2.99 inches in August 2020, and 7.52 inches in September 2020. This amount of rainfall resulted in over 161,281 gallons of additional water treated and discharged but not metered with the influent totals.

During the reporting period, approximately 634,081 gallons of treated groundwater was discharged to Harrison Bayou from the GWTP. In addition, approximately 984,393 gallons of water was released from the INF pond to the Harrison Bayou. No treated groundwater from the GWTP was returned to LHAAP-18/24 via the sprinkler system. From 13 August 2020 through the end of the third quarter (30 September 2020), a total of 790,804 gallons of treated groundwater was discharged from the GWTP to the INF Pond. **Table 4** presents the daily discharge rates and volume for the 3rd quarter of 2020.

Groundwater levels in Wilcox Formation wells (generally > 40 to 50 ft bgs) were measured during the 3rd quarter of 2020 groundwater gauging events. Wilcox Formation wells correspond generally 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. Generally, 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 Wilcox Formation. **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 July, August, and September 2020 gauging events, respectively. Groundwater in the Wilcox Formation generally flows in a northerly direction, towards Caddo Lake and there is a downward

vertical gradient between the overlying shallow zone and the Wilcox Formation. However, a groundwater high in the Wilcox Formation occurs in the area of MW-14.

2.3 Quantity of Water Extracted from LHAAP-18/24

The average daily extraction rates from the ICTs were 15,434 gallons per day (gpd) in July 2020, approximately 18,813 gpd in August 2020, and approximately 18,392 gpd in September 2020. The volume of groundwater removed from LHAAP-18/24 during the 3rd quarter of 2020 measured approximately 1,613,412 gallons, based on total flow measured from the extraction wells and ICT wells. Figure 2-1 shows the historical trends of extracted volumes by quarter.

In contrast to the approximate total extracted volume based on total flow measured at the GWTP, the total estimated volume discharged to the INF pond and/or Harrison Bayou (**Table 4**) following treatment by the GWTP was 417,884 gallons in July 2020; 539,556 gallons in August 2020; and 467,445 gallons in September 2020 for a total of 1,424,885 gallons discharged in the 3rd quarter of 2020. The difference between the influent and effluent volumes is approximately 12.4%. However, this evaluation does not consider the 359,011 gallons of water within the treatment plant as of 30 September 2020 in the influent/effluent evaluation.

2.4 ICT Production and Repairs

As indicated by **Table 5**, 16 of 27 ICTs and wells produced water for the entirety of the 3rd quarter of 2020. As presented in Section 2.2, ICTs 1, 3, 5, and 10 no longer operate. ICT EW-01 is a shallow, former monitoring well that is not connected to a trench and does not produce sufficient water for extraction in months with low precipitation. ICT 18WW17 is also a former monitoring well which also produces less extracted groundwater in months with low precipitation. ICTs 2, 13C, and 13D produced water in July and August 2020 but not in September 2020. ICTs 18WW17 and 14A have electrical issues which will be resolved in the 4th Quarter 2020. Pumps were replaced in ICTs 14C and 14E in October 2020, but pump replacements are still required for ICTs 2, 12E, 13A, and 14D, which is planned for 1st Quarter 2021. ICT 13D requires a motor and pump replacement, which will also be completed in the 1st Quarter 2021.

2.5 Groundwater Monitoring at LHAAP-18/24

No groundwater was sampled for offsite analysis at LHAAP-18/24 in the 3rd quarter of 2020. The next sampling event will be completed in the 4th quarter of 2020.

2.6 Groundwater Treatment Plant Sampling and Analysis

As part of the GWTP operations, samples from various water streams are required to be collected and analyzed for the parameters in accordance with the *Final Revised Sampling and Analysis Plan for Groundwater Treatment Plan and Well Fields* (AECOM Technical Services, Inc. [AECOM], September 2017), which was developed in accordance with the Interim Record of Decision (ROD) and the TCEQ letter dated January 8, 2002 (see Administrate Record Volume 1 of 4 in 2002, Document A). Besides the 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 ion exchange vessels) process. Sections 2.5.1 through 2.5.4 present the results of analyses conducted during the 3rd quarter of 2020. The complete laboratory results are provided on a compact disc (CD) (**Appendix C**).

2.6.1 Perchlorate Sampling

Table 6 presents the weekly effluent perchlorate results for the 3rd quarter of 2020. None of the effluent samples exceeded the protocol for discharge (**Appendix D**) for perchlorate. All of the GWTP effluent was discharged to the Harrison Bayou for the entirety of the 3rd quarter. Samples presented in **Table 6** also include samples collected before the ion exchange to verify that the FBR properly treated water for perchlorate. Treated groundwater from the GWTP was discharged to Harrison Bayou during the current quarter when effluent perchlorate concentrations were less than the daily maximum concentration of 589 µg/L and adequate flow in the bayou was observed.

Table 6 also presents the effluent concentration of ammonia as N and ortho-phosphate, which are soluble nutrients used by the microbes in the metabolic process within the FBR. Effluent samples at the reactor outlet are analyzed to verify that trace amounts of these are present, which indicates that there is enough to sustain the biomass. If there is bypassing or short circuiting in the reactor and perchlorate is not being fully degraded, elevated levels of these nutrients may be present at the FBR outlet. Ortho-phosphate levels stayed relatively stagnant for the entire quarter.

Three monthly grab samples from the influent to the GWTP (TK-140) and one quarterly grab sample (total of four influent samples) were collected in 3rd quarter of 2020. The perchlorate concentrations in these samples ranged from 6,780 µg/L to 11,500 µg/L.

2.6.2 VOC Sampling

Tables 7, 8 and, 9 present the effluent VOC results for July, August, and September 2020. Sampling of the effluent for VOCs was conducted on a biweekly basis beginning on 9 July 2020. The results, where applicable, were below the discharge limits. The tables also provide monthly influent concentrations for VOCs and perchlorate.

2.6.3 Monthly Metals Sampling

As per the Final Installation-Wide Work Plan (Bhate Environmental Associates, Inc. [Bhate], May 2018), the monthly metals sampling is reported in **Tables 7, 8, and 9**. None of the metals exceeded the effluent discharge limits.

2.6.4 Quarterly Sampling

Sampling of the effluent for VOCs, anions, chemical oxygen demand (COD), oil and grease, metals, 1,4-dioxane and perchlorate was conducted during this quarter and the results were below the discharge limits. **Table 10** presents the analytical results for the 3rd quarter of 2020.

Figure 2-1. Quarterly Extraction Rate

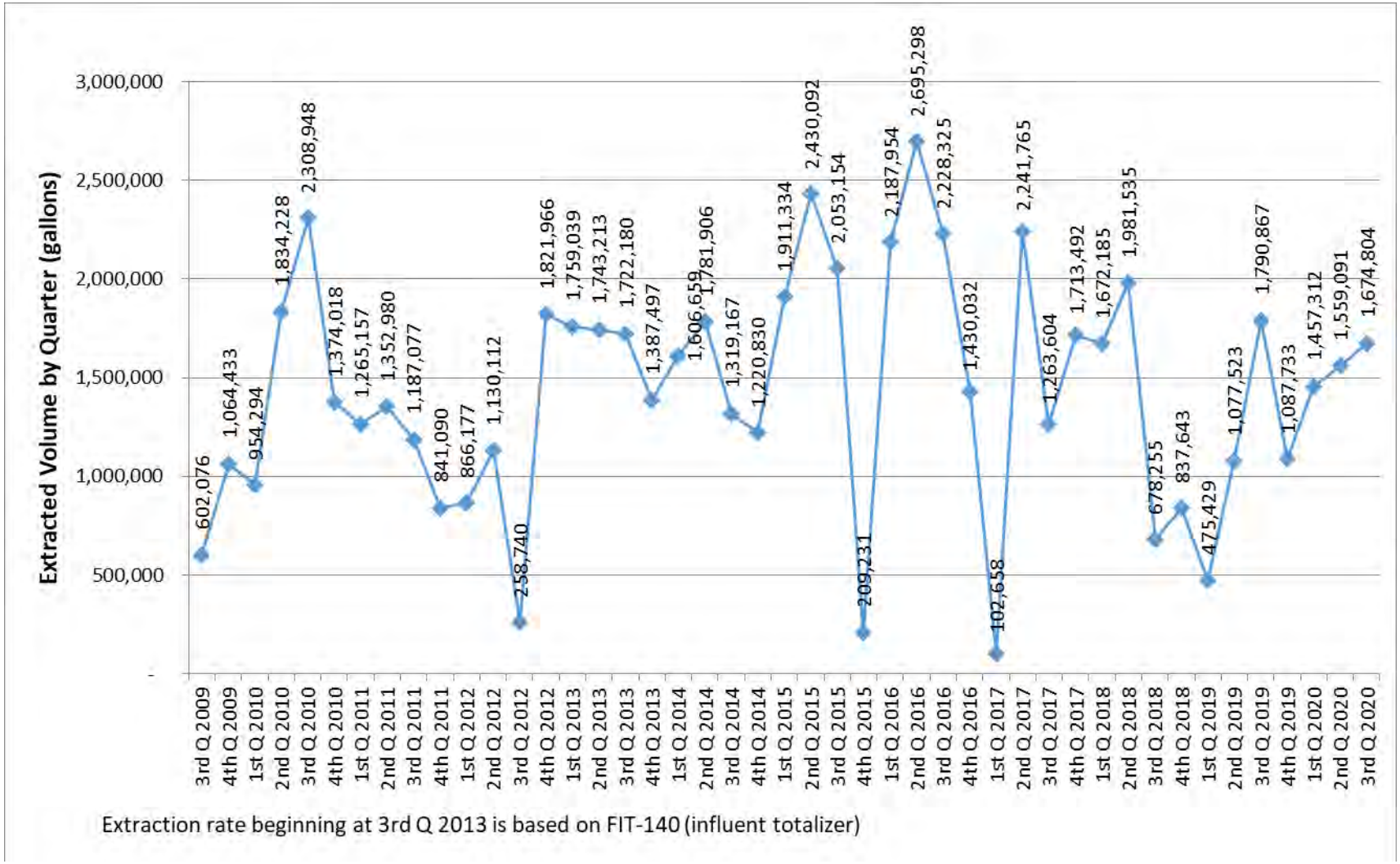


Table 3. Groundwater Elevations at LHAAP-18/24 Piezometers, Monitoring Wells, and Surface Water

Location Identification	Type	Reference Elevation (feet amsl)	Depth to Water (feet) 7/29/2020	Groundwater Elevation (feet amsl) 7/29/2020	Depth to Water (feet) 8/24/2020	Groundwater Elevation (feet amsl) 8/24/2020	Depth to Water (feet) 9/28/2020	Groundwater Elevation (feet amsl) 9/28/2020
BGPZ-1	Piezometer	184.99	6.51	178.48	7.03	177.96	6.95	178.04
BGPZ-2	Piezometer	184.39	13.91	170.48	14.15	170.24	14.07	170.32
BGPZ-3	Piezometer	180.35	7.39	172.96	7.61	172.74	7.57	172.78
BGPZ-4	Piezometer	177.77	7.05	170.72	7.29	170.48	7.25	170.52
BGPZ-5	Piezometer	180.76	12.10	168.66	12.35	168.41	12.30	168.46
BGPZ-6	Piezometer	197.82	26.77	171.05	26.98	170.84	26.90	170.92
BGPZ-7	Piezometer	195.96	26.55	169.41	26.80	169.16	26.75	169.21
BGPZ-8	Piezometer	197.08	28.33	168.75	28.59	168.49	28.54	168.54
BGPZ-9	Piezometer	196.45	27.09	169.36	27.37	169.08	27.30	169.15
BGPZ-10	Piezometer	197.00	27.40	169.60	27.69	169.31	27.62	169.38
BGPZ-11	Piezometer	196.99	27.37	169.62	27.64	169.35	27.59	169.40
BGPZ-12	Piezometer	188.17	NM	Plugged	NM	Plugged	NM	Plugged
AWD-1	Monitoring Well	182.27	7.49	174.78	7.81	174.46	7.75	174.52
AWD-2	Monitoring Well	186.78	12.12	174.66	12.55	174.23	12.50	174.28
AWD-3	Monitoring Well	200.13	26.89	173.24	27.10	173.03	27.03	173.10
AWD-4	Monitoring Well	193.89	21.05	172.84	21.34	172.55	21.30	172.59
MW-1	Monitoring Well	199.22	25.83	173.39	26.09	173.13	26.02	173.20
MW-2	Monitoring Well	196.73	25.88	170.85	26.15	170.58	26.09	170.64
MW-3	Monitoring Well	196.54	25.13	171.41	25.40	171.14	25.39	171.15

Location Identification	Type	Reference Elevation (feet amsl)	Depth to Water (feet) 7/29/2020	Groundwater Elevation (feet amsl) 7/29/2020	Depth to Water (feet) 8/24/2020	Groundwater Elevation (feet amsl) 8/24/2020	Depth to Water (feet) 9/28/2020	Groundwater Elevation (feet amsl) 9/28/2020
MW-4	Monitoring Well	197.27	25.35	171.92	25.72	171.55	25.70	171.57
MW-5	Monitoring Well	194.97	23.27	171.70	23.59	171.38	23.55	171.42
MW-6	Monitoring Well	192.18	21.07	171.11	21.33	170.85	21.28	170.90
MW-7	Monitoring Well	188.47	17.36	171.11	17.73	170.74	17.67	170.80
MW-8	Monitoring Well	187.13	15.31	171.82	15.69	171.44	15.63	171.50
MW-9	Monitoring Well	184.73	12.50	172.23	12.88	171.85	12.80	171.93
MW-10	Monitoring Well	178.12	6.85	171.27	7.57	170.55	7.52	170.60
MW-11	Monitoring Well	184.65	14.28	170.37	14.75	169.90	14.66	169.99
MW-12	Monitoring Well	178.33	7.41	170.92	7.85	170.48	7.74	170.59
MW-13	Monitoring Well	176.72	5.62	171.10	6.57	170.15	6.49	170.23
MW-14	Monitoring Well	186.19	11.65	174.54	11.97	174.22	11.90	174.29
MW-16	Monitoring Well	178.59	7.73	170.86	8.11	170.48	8.01	170.58
MW-17	Monitoring Well	179.03	7.80	171.23	8.18	170.85	8.10	170.93
MW-18	Monitoring Well	178.58	7.42	171.16	7.90	170.68	7.82	170.76
MW-19	Monitoring Well	178.60	7.49	171.11	7.98	170.62	7.90	170.70
MW-20	Monitoring Well	186.64	8.53	178.11	8.90	177.74	8.79	177.85
MW-21	Monitoring Well	198.70	31.69	167.01	31.87	166.83	31.85	166.85
MW-22	Monitoring Well	197.51	27.29	170.22	27.60	169.91	27.54	169.97
MW-23	Monitoring Well	198.79	26.98	171.81	27.27	171.52	27.20	171.59
101	Monitoring Well	197.53	6.42	191.11	7.12	190.41	7.02	190.51

Location Identification	Type	Reference Elevation (feet amsl)	Depth to Water (feet) 7/29/2020	Groundwater Elevation (feet amsl) 7/29/2020	Depth to Water (feet) 8/24/2020	Groundwater Elevation (feet amsl) 8/24/2020	Depth to Water (feet) 9/28/2020	Groundwater Elevation (feet amsl) 9/28/2020
102	Monitoring Well	193.94	17.80	176.14	18.08	175.86	18.00	175.94
109	Monitoring Well	197.02	27.68	169.34	27.95	169.07	27.87	169.15
120	Monitoring Well	184.19	10.55	173.64	10.91	173.28	10.82	173.37
123	Monitoring Well	186.21	12.79	173.42	13.05	173.16	12.97	173.24
125	Monitoring Well	196.28	25.33	170.95	25.70	170.58	25.60	170.68
126	Monitoring Well	199.37	27.45	171.92	27.79	171.58	27.73	171.64
129	Monitoring Well	197.24	25.53	171.71	25.90	171.34	25.85	171.39
130	Monitoring Well	177.73	6.07	171.66	7.77	169.96	7.65	170.08
C-01	Monitoring Well	193.89	22.40	171.49	22.75	171.14	22.70	171.19
C-02	Monitoring Well	175.95	4.52	171.43	5.87	170.08	5.75	170.20
C-03	Monitoring Well	196.34	25.44	170.90	25.75	170.59	25.68	170.66
C-04	Monitoring Well	194.64	23.60	171.04	23.94	170.70	23.90	170.74
C-04A	Monitoring Well	194.61	23.51	171.10	23.86	170.75	23.81	170.80
C-05	Monitoring Well	180.74	10.03	170.71	10.65	170.09	10.54	170.20
C-06	Monitoring Well	192.22	22.88	169.34	23.13	169.09	23.07	169.15
C-07	Monitoring Well	196.80	27.61	169.19	27.95	168.85	27.90	168.90
C-08	Monitoring Well	193.10	23.58	169.52	23.91	169.19	23.83	169.27
C-09	Monitoring Well	202.35	31.65	170.70	31.93	170.42	31.90	170.45
C-10	Monitoring Well	201.86	30.99	170.87	31.28	170.58	31.23	170.63
17WW08	Monitoring Well	179.72	8.59	171.13	9.06	170.66	8.95	170.77

Location Identification	Type	Reference Elevation (feet amsl)	Depth to Water (feet) 7/29/2020	Groundwater Elevation (feet amsl) 7/29/2020	Depth to Water (feet) 8/24/2020	Groundwater Elevation (feet amsl) 8/24/2020	Depth to Water (feet) 9/28/2020	Groundwater Elevation (feet amsl) 9/28/2020
18WW01	Monitoring Well	201.31	30.41	170.90	NM	NM	NM	NM
18WW02	Monitoring Well	179.30	8.47	170.83	8.89	170.41	8.81	170.49
18WW03	Monitoring Well	195.59	25.37	170.22	25.69	169.90	25.62	169.97
18WW04	Monitoring Well	183.74	14.79	168.95	15.05	168.69	14.98	168.76
18WW05	Monitoring Well	189.59	20.31	169.28	20.68	168.91	20.60	168.99
18WW06	Monitoring Well	179.70	9.11	170.59	9.55	170.15	9.47	170.23
18WW07	Monitoring Well	183.67	NM	NM	NM	NM	NM	NM
18WW08	Monitoring Well	177.77	6.81	170.96	7.31	170.46	7.22	170.55
18WW09	Monitoring Well	177.51	6.53	170.98	7.00	170.51	6.91	170.60
18WW10	Monitoring Well	182.26	10.05	172.21	10.40	171.86	10.29	171.97
18WW11	Monitoring Well	182.29	10.48	171.81	10.85	171.44	10.73	171.56
18WW14	Monitoring Well	186.47	14.35	172.12	14.72	171.75	14.65	171.82
18WW15	Monitoring Well	186.24	14.18	172.06	14.54	171.70	14.48	171.76
18WW16	Monitoring Well	201.88	31.38	170.50	NM	NM	NM	NM
18WW18	Monitoring Well	196.82	26.27	170.55	26.61	170.21	26.52	170.30
18WW19	Monitoring Well	179.56	9.05	170.51	9.59	169.97	9.45	170.11
18WW20	Monitoring Well	180.42	9.67	170.75	10.03	170.39	9.90	170.52
18WW21	Monitoring Well	195.20	25.29	169.91	25.65	169.55	25.58	169.62
18WW22	Monitoring Well	195.37	24.51	170.86	24.89	170.48	24.80	170.57
18WW24	Monitoring Well	176.40	5.63	170.77	6.51	169.89	6.32	170.08

Location Identification	Type	Reference Elevation (feet amsl)	Depth to Water (feet) 7/29/2020	Groundwater Elevation (feet amsl) 7/29/2020	Depth to Water (feet) 8/24/2020	Groundwater Elevation (feet amsl) 8/24/2020	Depth to Water (feet) 9/28/2020	Groundwater Elevation (feet amsl) 9/28/2020
18WW25	Monitoring Well	175.15	5.88	169.27	6.80	168.35	6.60	168.55
18CPTMW01SW	Monitoring Well	198.20	26.19	172.01	26.57	171.63	26.50	171.70
18CPTMW01DW	Monitoring Well	197.92	27.32	170.60	27.80	170.12	27.73	170.19
18CPTMW03SW	Monitoring Well	198.53	27.38	171.15	27.79	170.74	27.70	170.83
18CPTMW04	Monitoring Well	196.60	22.64	173.96	22.98	173.62	22.92	173.68
18CPTMW04SW	Monitoring Well	196.42	25.45	170.97	25.86	170.56	25.80	170.62
18CPTMW06	Monitoring Well	198.12	27.21	170.91	27.59	170.53	27.51	170.61
18CPTMW07	Monitoring Well	197.32	26.33	170.99	26.81	170.51	26.74	170.58
18CPTMW08SW	Monitoring Well	196.38	25.12	171.26	25.63	170.75	25.55	170.83
18CPTMW08DW	Monitoring Well	196.59	25.69	170.90	26.05	170.54	25.97	170.62
18CPTMW10SW	Monitoring Well	186.98	16.03	170.95	16.49	170.49	16.40	170.58
18CPTMW10DW	Monitoring Well	187.38	16.85	170.53	17.20	170.18	17.09	170.29
18CPTMW12SW	Monitoring Well	190.90	19.81	171.09	20.14	170.76	20.06	170.84
18CPTMW12DW	Monitoring Well	190.25	19.28	170.97	19.65	170.60	19.58	170.67
18CPTMW14	Monitoring Well	196.69	26.23	170.46	26.62	170.07	26.57	170.12
18CPTMW15	Monitoring Well	179.79	9.44	170.35	9.83	169.96	9.70	170.09
18CPTMW16	Monitoring Well	175.37	5.96	169.41	6.83	168.54	6.61	168.76
18CPTMW18	Monitoring Well	194.53	26.42	168.11	26.79	167.74	26.70	167.83
18CPTMW19	Monitoring Well	193.59	20.47	173.12	20.84	172.75	20.78	172.81
18CPTMW19SW	Monitoring Well	193.29	22.16	171.13	22.55	170.74	22.47	170.82

Location Identification	Type	Reference Elevation (feet amsl)	Depth to Water (feet) 7/29/2020	Groundwater Elevation (feet amsl) 7/29/2020	Depth to Water (feet) 8/24/2020	Groundwater Elevation (feet amsl) 8/24/2020	Depth to Water (feet) 9/28/2020	Groundwater Elevation (feet amsl) 9/28/2020
18CPTMW22SW	Monitoring Well	187.79	16.97	170.82	17.37	170.42	17.30	170.49
18CPTMW22R	Monitoring Well	187.23	6.08	181.15	6.71	180.52	6.58	180.65
18CPTMW22DW	Monitoring Well	188.00	17.22	170.78	17.59	170.41	17.50	170.50
18CPTMW23	Monitoring Well	177.47	5.95	171.52	6.60	170.87	6.44	171.03
18CPTMW23SW	Monitoring Well	177.43	6.60	170.83	7.18	170.25	7.01	170.42
18CPTMW24	Monitoring Well	194.89	25.47	169.42	25.84	169.05	25.75	169.14
18CPTMW26	Monitoring Well	182.60	15.37	167.23	15.75	166.85	15.73	166.87
18CPTMW26SW	Monitoring Well	182.00	11.09	170.91	11.45	170.55	11.56	170.44
1824HBSW7	Surface Water Sample	167.92	1.15	166.77	0.65	167.27	0.97	166.95

Notes:
amsl - above mean sea level
NM-not measured

Table 4. Treated Groundwater Discharged – July through September 2020

DATE	HB 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 (feet) (6.20 = 3 ft. Freeboard)
07/01/2020	4,290	1,435	17,833	0	0	17,833	5.62
07/02/2020	3,925	1,295	0	0	0	0	5.60
07/03/2020	3,540	1,168	0	0	0	0	5.70
07/04/2020	3,109	1,025	0	0	0	0	5.68
07/05/2020	FLOOD STAGE	MAXIMUM	0	0	0	0	6.02
07/06/2020	FLOOD STAGE	MAXIMUM	0	0	0	0	6.00
07/07/2020	FLOOD STAGE	MAXIMUM	0	192,150	0	192,150	5.45
07/08/2020	FLOOD STAGE	MAXIMUM	53,263	223,493	0	276,756	4.80
07/09/2020	FLOOD STAGE	MAXIMUM	0	246,750	0	246,750	4.00
07/10/2020	12,359	4,078	0	0	0	0	3.99
07/11/2020	8,876	2,929	0	0	0	0	3.98
07/12/2020	6,125	2,021	0	0	0	0	3.97
07/13/2020	4,933	1,650	75,611	0	0	75,611	3.96
07/14/2020	4,348	1,454	15,603	169,650	0	185,253	3.05
07/15/2020	3,422	1,145	16,902	152,350	0	169,252	2.45
07/16/2020	2,524	844	14,976	0	0	14,976	2.43
07/17/2020	2,245	740	0	0	0	0	2.41
07/18/2020	1,653	545	0	0	0	0	2.40
07/19/2020	1,298	428	0	0	0	0	2.38

DATE	HB 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 (feet) (6.20 = 3 ft. Freeboard)
07/20/2020	1,021	341	68,540	0	0	68,540	2.37
07/21/2020	857	286	13,569	0	0	13,569	2.35
07/22/2020	672	225	16,061	0	0	16,061	2.34
07/23/2020	771	257	13,621	0	0	13,621	2.34
07/24/2020	723	238	0	0	0	0	2.32
07/25/2020	675	222	0	0	0	0	2.30
07/26/2020	601	198	0	0	0	0	2.28
07/27/2020	544	182	69,028	0	0	69,028	2.26
07/28/2020	445	148	13,880	0	0	13,880	2.24
07/29/2020	324	108	15,632	0	0	15,632	2.22
07/30/2020	282	94	13,365	0	0	13,365	2.20
07/31/2020	254	83	0	0	0	0	2.18
08/01/2020	467	154	0	0	0	0	2.17
08/02/2020	403	132	0	0	0	0	2.16
08/03/2020	359	120	51,437	0	0	51,437	2.14
08/04/2020	317	106	13,951	0	0	13,951	2.12
08/05/2020	266	89	19,517	0	0	19,517	2.11
08/06/2020	304	101	17,498	0	0	17,498	2.09
08/07/2020	270	89	0	0	0	0	2.07
08/08/2020	229	75	0	0	0	0	2.05

DATE	HB 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 (feet) (6.20 = 3 ft. Freeboard)
08/09/2020	193	63	0	0	0	0	2.04
08/10/2020	163	54	69,428	0	0	69,428	2.02
08/11/2020	113	37	28,166	0	0	28,166	2.00
08/12/2020	77	25	16,200	0	0	16,200	1.99
08/13/2020	NA	NA	0	0	14,727	0	2.50
08/14/2020	NA	NA	0	0	0	0	2.57
08/15/2020	NA	NA	0	0	0	0	2.63
08/16/2020	NA	NA	0	0	0	0	2.67
08/17/2020	NA	NA	0	0	70,915	0	2.70
08/18/2020	NA	NA	0	0	16,948	0	2.74
08/19/2020	NA	NA	0	0	14,750	0	2.77
08/20/2020	NA	NA	0	0	18,914	0	2.79
08/21/2020	NA	NA	0	0	0	0	2.81
08/22/2020	NA	NA	0	0	0	0	2.84
08/23/2020	NA	NA	0	0	0	0	2.87
08/24/2020	NA	NA	0	0	75,020	0	2.90
08/25/2020	NA	NA	0	0	17,856	0	2.94
08/26/2020	NA	NA	0	0	25,261	0	2.98
08/27/2020	NA	NA	0	0	0	0	3.19
08/28/2020	NA	NA	0	0	30,492	0	3.23
08/29/2020	NA	NA	0	0	0	0	3.27

DATE	HB 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 (feet) (6.20 = 3 ft. Freeboard)
08/30/2020	NA	NA	0	0	0	0	3.33
08/31/2020	NA	NA	0	0	38,476	0	3.38
09/01/2020	NA	NA	0	0	16,535	0	3.41
09/02/2020	NA	NA	0	0	17,618	0	3.45
09/03/2020	NA	NA	0	0	15,680	0	4.02
09/04/2020	NA	NA	0	0	0	0	4.20
09/05/2020	NA	NA	0	0	0	0	4.26
09/06/2020	NA	NA	0	0	0	0	4.30
09/07/2020	NA	NA	0	0	0	0	4.35
09/08/2020	NA	NA	0	0	73,032	0	4.40
09/09/2020	NA	NA	0	0	23,011	0	4.45
09/10/2020	NA	NA	0	0	19,274	0	4.50
09/11/2020	NA	NA	0	0	0	0	4.73
09/12/2020	NA	NA	0	0	0	0	4.78
09/13/2020	NA	NA	0	0	0	0	4.83
09/14/2020	NA	NA	0	0	64,795	0	4.88
09/15/2020	NA	NA	0	0	14,886	0	4.91
09/16/2020	NA	NA	0	0	15,317	0	4.95
09/17/2020	NA	NA	0	0	11,446	0	4.99
09/18/2020	NA	NA	0	0	0	0	5.02

DATE	HB 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 (feet) (6.20 = 3 ft. Freeboard)
09/19/2020	NA	NA	0	0	0	0	5.05
09/20/2020	NA	NA	0	0	0	0	5.08
09/21/2020	NA	NA	0	0	65,632	0	5.11
09/22/2020	NA	NA	0	0	11,821	0	5.18
09/23/2020	NA	NA	0	0	13,233	0	5.28
09/24/2020	NA	NA	0	0	10,787	0	5.37
09/25/2020	NA	NA	0	0	0	0	5.41
09/26/2020	NA	NA	0	0	0	0	5.45
09/27/2020	NA	NA	0	0	0	0	5.49
09/28/2020	NA	NA	0	0	62,184	0	5.56
09/29/2020	NA	NA	0	0	16,064	0	5.60
09/30/2020	NA	NA	0	0	16,130	0	5.64
TOTAL			**634,081**	**984,393**	**790,804**	**1,618,474**	

Table 5. Monthly Groundwater Extraction Quantities – July through September 2020

ICT or Well Number	July 2020 (gallons)	August 2020 (gallons)	September 2020 (gallons)	Total (gallons)
1	0	0	0	0
2	27,144	42,996	0	70,140
3	0	0	0	0
4	2	59,996	4,826	64,824
5	0	0	0	0
EW-01	81	0	0	81
7	232	8,311	2,502	11,045
8	117,772	97,729	103,573	319,074
18WW17	0	0	0	0
10	0	0	0	0
11	26,772	22,977	4,627	54,376
12A	4,405	6,319	7,620	18,344
12B	27,541	27,542	24,148	79,231
12C	32,733	35,352	7,106	75,191
12D	2,575	499	716	3,790
12E	35,237	24,649	25,372	85,258
13A	519	9	35	563
13B	47,224	47,816	55,186	150,226
13C	4,138	14	0	4,152
13D	102	3	0	105
13E	9,627	3,232	4,328	17,187
13F	6,613	2,704	1,422	10,739
14A	364	75	375	814
14B	2,154	69	687	2,910
14C	0	0	0	0
14D	133,206	202,924	309,232	645,362
14E	0	0	0	0
LHAAP-18/24 Total	*478,441*	*583,216*	*551,755*	*1,613,412*
Site 16				0
LHAAP-16 Total	*0*	*0*	*0*	*0*
	478,441	***583,216***	***551,755***	***1,613,412***

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Table 6. Weekly Perchlorate Sample Results

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)	DVQ		Ammonia as N (350.3) (mg/L)	Ortho-Phosphate (365.3) (mg/L)	Organic Carbon (SM5310C) (mg/L)
LH18/24-SP650_070920/BIX	HS20070398	7/9/2020	TK-650	589	17	0.1	NA	0.975		Yes	13	2.17	2.28
LH18/24-SP650_071420_BIX (monthly)	HS20070623	7/14/2020	TK-650	589	17	0.1	NA	0.106		Yes	--	--	--
LH18/24-SP140_071420 (monthly)	HS20070621	7/14/2020	TK-140	--	--	NA	6,780	NA		NA	--	--	--
LH18/24-SP650_071420/BIX	HS20070615	7/14/2020	TK-650	589	17	0.1	NA	1.08		Yes	12	1.87	2.13
LH18/24-SP650_072120/BIX	HS20070982	7/21/2020	TK-650	589	17	0.1	NA	0.627		Yes	12	1.65	2.02
LH18/24-SP650_072820/BIX	HS20071309	7/28/2020	TK-650	589	17	0.1	NA	35.9		Yes	15	2.57	2.77
LH18/24-SP650_080520/BIX	HS20080196	8/5/2020	TK-650	589	17	0.1	NA	0.923	J	Yes	9.9	2.20	2.01
LH18/24-SP650_081120_BIX (monthly)	HS20080473	8/11/2020	TK-650	589	17	0.1	NA	0.256	J	Yes	--	--	--
LH18/24-SP140_081120 (monthly)	HS20080475	8/11/2020	TK-140	--	--	NA	8,310	NA		NA	--	--	--
LH18/24-SP650_081120/BIX	HS20080474	8/11/2020	TK-650	589	17	0.1	NA	< 0.0500	U	Yes	12	2.76	2.11
LH18/24-SP650_081820-AIX	HS20080794	8/18/2020	TK-650	589	17	0.1	NA	0.207		Yes	11	2.58	1.85
LH18/24-SP650_082520_AIX(quarterly)	HS20081151	8/25/2020	TK-650	589	17	0.1	NA	0.319		Yes	--	--	--
LH18/24-SP140_082520 (quarterly)	HS20081150	8/25/2020	TK-140	--	--	NA	11,500	NA		NA	--	--	--
LH18/24-SP650_082520/AIX	HS20081133	8/25/2020	TK-650	589	17	0.1	NA	1.08		Yes	11	2.65	1.13
LH18/24-SP650_090120/AIX	HS20090080	9/1/2020	TK-650	589	17	0.1	NA	0.157	J	Yes	10	3.94	2.14
LH18/24-SP650_090920/AIX	HS20090475	9/9/2020	TK-650	589	17	0.1	NA	2.49		Yes	9.1	2.64	2.43
LH18/24-SP650_091520/AIX (monthly)	HS20090748	9/15/2020	TK-650	589	17	0.1	NA	5.69		Yes	--	--	--
LH18/24-SP140_091520 (monthly)	HS20090744	9/15/2020	TK-140	--	--	NA	8,350	NA		NA	--	--	--
LH18/24-SP650_091520/BIX	HS20090747	9/15/2020	TK-650	589	17	0.1	NA	0.583		Yes	15	3.06	2.34
LH18/24-SP650_091520-AIX	HS20090747	9/15/2020	TK-650	589	17	0.1	NA	6.49		Yes	--	--	--
LH18/24-SP650_092220/AIX	HS20091027	9/22/2020	TK-650	589	17	0.1	NA	2.09		Yes	19	3.50	3.60
LH18/24-SP650_092920/BIX	HS20091394	9/29/2020	TK-650	589	17	0.1	NA	< 0.0500	U	Yes	15	3.20	2.17

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)	DVQ		Ammonia as N (350.3) (mg/L)	Ortho-Phosphate (365.3) (mg/L)	Organic Carbon (SM5310C) (mg/L)
LH18/24-SP650_092920-Between	HS20091394	9/29/2020	TK-650	589	17	0.1	NA	0.591	J	Yes	--	--	--
LH18/24-SP650_092920-AIX	HS20091394	9/29/2020	TK-650	589	17	0.1	NA	< 0.0500	U	Yes	--	--	--

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
NA - not applicable
U - non detect and reported to the limit of detection
BIX - before ion exchange/AIX - after ion exchange
mg/L - milligrams per liter

Table 7. Bi-Weekly GWTP Analytical Sampling Results for July 2020

			Sample Location	EFFLUENT - Biweekly		EFFLUENT - Monthly		INFLUENT - Monthly*		EFFLUENT - Biweekly		Does Concentration Meet Effluent Discharge Limits? (Yes/No)
			Sample Identification	LH18/24-SP650_070920		LH18/24-SP650_071420		LH18/24-SP140_071420		LH18/24-SP650_072120		
			Lab Package	HS20070399		HS20070623		HS20070621		HS20070984		
			Sample Date	7/9/2020		7/14/2020		7/14/2020		7/21/2020		
			Sample Type	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		µg/L		µg/L		µg/L		
1,1,1-Trichloroethane	3,417	7,230	200	0.5	U	0.5	U	NA		0.5	U	Yes
1,1,2-Trichloroethane	102.5	216.9	5	1.0	U	1.0	U	NA		1.0	U	Yes
1,1-Dichloroethane	6,633	14,032	NV	0.5	U	0.5	U	NA		0.5	U	Yes
1,1-Dichloroethene	119	253	7	0.5	U	0.5	U	NA		0.5	U	Yes
1,2-Dichloroethane	85	181	5	**0.89**	J	**0.77**	J	NA		**0.75**	J	Yes
1,2-Dichloropropane	NA	NA	5	1.0	U	1.0	U	NA		1.0	U	Yes
Acetone	1,132	2,395	NV	1.0	U	1.0	U	NA		1.0	U	Yes
Benzene	85	181	5	0.5	U	0.5	U	NA		0.5	U	Yes
Carbon Tetrachloride	85	181	5	1.0	U	1.0	U	NA		1.0	U	Yes
Chlorobenzene	22,300	47,180	100	1.0	U	1.0	U	NA		1.0	U	Yes
Chloroform	1,708	3,615	NV	0.5	U	0.5	U	NA		0.5	U	Yes
cis-1,2-Dichloroethene	NV	NV	70	**16**		**15**		NA		**19**		Yes
Ethylbenzene	26,954	57,025	700	1.0	U	1.0	U	NA		1.0	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	1.0	U	1.0	U	NA		1.0	U	Yes
o-Xylene	39.5	83.6	NV	1.0	U	1.0	U	NA		1.0	U	Yes
Styrene	2,829	5,987	100	1.0	U	1.0	U	NA		1.0	U	Yes
Tetrachloroethene	85.4	180.7	5	1.0	U	1.0	U	NA		1.0	U	Yes
Toluene	1,980	4,189	10	0.5	U	0.5	U	NA		0.68	UB	Yes
Trichloroethene	85	181	5	**2.8**		**3.4**		NA		**3.8**		Yes

				Sample Location	EFFLUENT - Biweekly		EFFLUENT - Monthly		INFLUENT - Monthly*		EFFLUENT - Biweekly		Does Concentration Meet Effluent Discharge Limits? (Yes/No)
				Sample Identification	LH18/24-SP650_070920		LH18/24-SP650_071420		LH18/24-SP140_071420		LH18/24-SP650_072120		
				Lab Package	HS20070399		HS20070623		HS20070621		HS20070984		
				Sample Date	7/9/2020		7/14/2020		7/14/2020		7/21/2020		
				Sample Type	GRAB		GRAB		GRAB		GRAB		
	Effluent Limitation for Discharge (µg/L) per Table 2 of ROD												
	Daily Average Concentration	Daily Maximum Concentration	INF Pond MCL	Result	DVQ	Result	DVQ	Result	DVQ	Result	DVQ	
Vinyl Chloride	34	72	2	0.5	U	0.5	U	NA		0.5	U	Yes
ANIONS	**mg/L**	**mg/L**	**mg/L**	**mg/L**		**mg/L**		**mg/L**		**mg/L**		
Chloride	NV	NV	NV	**301**		NA		NA		**294**		NA
Sulfate	NV	NV	NV	**31.4**		NA		NA		**31.8**		NA
PERCHLORATE	**µg/L**	**µg/L**	**µg/L**	**µg/L**		**µg/L**		**µg/L**		**µg/L**		
Perchlorate	278	589	17	NA		**0.1060**		**6,780**		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		0.0100	U	0.0100	UJ	NA		Yes
Barium	1	2	2	NA		**0.276**		NA		NA		Yes
Lead	0.0022	0.0046	0.015	NA		0.00100	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**	NV	134.2	NV	NA		**15**		NA		NA		Yes

Notes:
µg/L - micrograms per liter
mg/L - milligrams per liter
DVQ - data validation qualifier
U - not detected and reported to the limit of detection
UJ - estimated - not detected due to QC discrepancies and reported to the limit of detection
J - estimated concentration and/or due to QC discrepancies
NV - no value
NA - not applicable or not analyzed
ROD - Record of Decision
GWTP - Groundwater Treatment Plant
Grab samples are compared to the daily maximum and composite samples to the daily average.
*Influent sample not compared to discharge limits
** Calculated Effluent Limit

Table 8. Bi-Weekly GWTP Analytical Sampling Results for August 2020

			Sample Location	EFFLUENT - Biweekly		EFFLUENT - Monthly		INFLUENT - Monthly*		EFFLUENT - Biweekly		Does Concentration Meet Effluent Discharge Limits? (Yes/No)
			Sample Identification	LH18/24-SP650_080520		LH18/24-SP650_081120		LH18/24-SP140_081120		LH18/24-SP650_081820		
			Lab Package	HS20080212		HS20080473		HS20080475		HS20080801		
			Sample Date	8/5/2020		8/11/2020		8/11/2020		8/18/2020		
			Sample Type	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**		**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		1.0	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	**0.74**	J	**0.70**	J	NA		**0.64**	J	Yes
1,2-Dichloropropane	NA	NA	5	1.0	U	1.0	U	NA		1.0	U	Yes
Acetone	1,132	2,395	NV	1.0	U	1.0	U	NA		1.0	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		1.0	U	Yes
Chlorobezene	22,300	47,180	100	1.0	U	1.0	U	NA		1.0	U	Yes
Chloroform	1,708	3,615	NV	0.50	U	0.50	U	NA		0.50	U	Yes
cis-1,2-Dichloroethene	NV	NV	70	**20**		**17**		NA		**16**		Yes
Ethylbenzene	26,954	57,025	700	1.0	U	1.0	U	NA		1.0	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	1.0	U	1.0	U	NA		1.0	U	No
o-Xylene	39.5	83.6	NV	1.0	U	1.0	U	NA		1.0	U	Yes
Styrene	2,829	5,987	100	1.0	U	1.0	U	NA		1.0	U	Yes
Tetrachloroethene	85.4	180.7	5	1.0	U	1.0	U	NA		1.0	U	Yes
Toluene	1,980	4,189	10	0.50	U	0.50	U	NA		0.50	U	Yes
Trichloroethene	85	181	5	**4.6**	J	**3.7**	J	NA		**3.4**	J	No
Vinyl Chloride	34	72	2	0.50	U	0.50	U	NA		0.50	U	Yes

				Sample Location	EFFLUENT - Biweekly		EFFLUENT - Monthly		INFLUENT - Monthly*		EFFLUENT - Biweekly		Does Concentration Meet Effluent Discharge Limits? (Yes/No)
				Sample Identification	LH18/24-SP650_080520		LH18/24-SP650_081120		LH18/24-SP140_081120		LH18/24-SP650_081820		
				Lab Package	HS20080212		HS20080473		HS20080475		HS20080801		
				Sample Date	8/5/2020		8/11/2020		8/11/2020		8/18/2020		
				Sample Type	GRAB		GRAB		GRAB		GRAB		
	Effluent Limitation for Discharge (µg/L) per Table 2 of ROD												
	Daily Average Concentration	Daily Maximum Concentration	INF Pond MCL	Result	DVQ	Result	DVQ	Result	DVQ	Result	DVQ	
ANIONS	**mg/L**	**mg/L**	**mg/L**	**mg/L**		**mg/L**		**mg/L**		**mg/L**		
Chloride	NV	NV	NV	**312**		NA		NA		**332**		NA
Sulfate	NV	NV	NV	**31.3**		NA		NA		**32.8**		NA
PERCHLORATE	**µg/L**	**µg/L**	**µg/L**	**µg/L**		**µg/L**		**µg/L**		**µg/L**		
Perchlorate	278	589	17	NA		**0.256**	J	**8,310**		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		0.0100	U	0.0100	U	NA		Yes
Barium	1	2	2	NA		**0.553**		NA		NA		Yes
Lead	0.0022	0.0046	0.015	NA		0.00100	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**	NV	134.2	NV	NA		**2.2**		NA		NA		Yes

Notes:
µg/L - micrograms per liter
mg/L - milligrams per liter
DVQ - data validation qualifier
NA - not applicable or not analyzed
U - not detected and reported to the limit of detection
J - estimated concentration and/or due to QC discrepancies

GWTP - Groundwater Treatment Plant
ROD - Record of Decision
*Influent sample not compared to discharge limits
** Calculated Effluent Limit
Grab samples are compared to the daily maximum and composite samples to the daily average.

Table 9. Bi-Weekly GWTP Analytical Sampling Results for September 2020

			Sample Location	EFFLUENT - Biweekly		INFLUENT - Monthly*		EFFLUENT - Monthly		EFFLUENT - Biweekly		Does Concentration Meet Effluent Discharge Limits? (Yes/No)
			Sample Identification	LH18/24-SP650_090920		LH18/24-SP140_091520		LH18/24-SP650_091520		LH18/24-SP650_092220		
			Lab Package	HS20090534		HS20090744		HS20090748		HS20091030		
			Sample Date	9/9/2020		9/15/2020		9/15/2020		9/22/2020		
			Sample Type	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	NA		0.50	U	0.50	U	Yes
1,1,2-Trichloroethane	102.5	216.9	5	1.0	U	NA		1.0	U	1.0	U	Yes
1,1-Dichloroethane	6,633	14,032	NV	0.50	U	NA		0.50	U	0.50	U	Yes
1,1-Dichloroethene	119	253	7	0.50	U	NA		0.50	U	0.50	U	Yes
1,2-Dichloroethane	85	181	5	0.50	U	NA		0.50	U	0.50	U	Yes
1,2-Dichloropropane	NA	NA	5	1.0	U	NA		1.0	U	1.0	U	Yes
Acetone	1,132	2,395	NV	1.0	U	NA		1.0	U	1.0	U	Yes
Benzene	85	181	5	0.50	U	NA		0.50	U	0.50	U	Yes
Carbon Tetrachloride	85	181	5	1.0	U	NA		1.0	U	1.0	U	Yes
Chlorobenzene	22,300	47,180	100	1.0	U	NA		1.0	U	1.0	U	Yes
Chloroform	1,708	3,615	NV	0.50	U	NA		0.50	U	0.50	U	Yes
cis-1,2-Dichloroethene	NV	NV	70	**22**		NA		**20**		**19**		Yes
Ethylbenzene	26,954	57,025	700	1.0	U	NA		1.0	U	1.0	U	Yes
m,p-Xylenes	39.5	83.6	NV	1.0	U	NA		1.0	U	1.0	U	Yes
Methylene Chloride	803	1,699	5	1.0	U	NA		1.0	U	1.0	U	Yes
o-Xylene	39.5	83.6	NV	1.0	U	NA		1.0	U	1.0	U	Yes
Styrene	2,829	5,987	100	1.0	U	NA		1.0	U	1.0	U	Yes
Tetrachloroethene	85.4	180.7	5	1.0	U	NA		1.0	U	1.0	U	Yes
Toluene	1,980	4,189	10	0.50	U	NA		0.50	U	0.50	U	Yes
Trichloroethene	85	181	5	**4.1**		NA		**1.3**		**1.0**		Yes
Vinyl Chloride	34	72	2	**0.89**	J	NA		0.50	U	0.50	U	Yes

				Sample Location	**EFFLUENT - Biweekly**		**INFLUENT - Monthly***		**EFFLUENT - Monthly**		**EFFLUENT - Biweekly**		**Does Concentration Meet Effluent Discharge Limits? (Yes/No)**
				Sample Identification	**LH18/24-SP650_090920**		**LH18/24-SP140_091520**		**LH18/24-SP650_091520**		**LH18/24-SP650_092220**		
				Lab Package	**HS20090534**		**HS20090744**		**HS20090748**		**HS20091030**		
				Sample Date	**9/9/2020**		**9/15/2020**		**9/15/2020**		**9/22/2020**		
				Sample Type	**GRAB**		**GRAB**		**GRAB**		**GRAB**		
	Effluent Limitation for Discharge (µg/L) per Table 2 of ROD												
	Daily Average Concentration	**Daily Maximum Concentration**	**INF Pond MCL**	**Result**	**DVQ**	**Result**	**DVQ**	**Result**	**DVQ**	**Result**	**DVQ**	
ANIONS	**mg/L**	**mg/L**	**mg/L**	**mg/L**		**mg/L**		**mg/L**		**mg/L**		
Chloride	NV	NV	NV	**422**		NA		NA		**570**		NA
Sulfate	NV	NV	NV	**34.5**		NA		NA		**46.6**		NA
PERCHLORATE	**µg/L**	**µg/L**	**µg/L**	**µg/L**		**µg/L**		**µg/L**		**µg/L**		
Perchlorate	278	589	17	NA		**8,350**		**5.69**		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		0.0100	U	0.0100	U	NA		Yes
Barium	1	2	2	NA		NA		**0.155**		NA		Yes
Lead	0.0022	0.0046	0.015	NA		NA		0.000679	UB	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	UJ	NA		Yes
SEMI-VOLATILES	**µg/L**	**µg/L**	**µg/L**	**µg/L**		**µg/L**		**µg/L**		**µg/L**		
1,4-Dioxane**	NV	134.2	NV	NA		NA		**5.7**		NA		Yes

Notes:
µg/L - micrograms per liter
mg/L - milligrams per liter
DVQ - data validation qualifier
UB - considered an artifact of blank contamination
UJ - estimated non-detect
U - Non detect reported to the limit of detection
J - estimated concentration between the detection limit and limit of quantitation and/or due to quality control discrepancy
NA - not applicable or not analyzed
GWTP - Groundwater Treatment Plant
*Influent sample not compared to discharge limits
** Calculated Effluent Limit
Grab samples are compared to the daily maximum and composite samples to the daily average.
ROD - Record of Decision

Table 10. Quarterly GWTP Analytical Sampling Results for 3rd Quarter 2020

			Sample Location	EFFLUENT		INFLUENT*		Does Concentration Meet Discharge Limits? (Yes/No)
			Sample Identification	LH18/24-SP650_082520		LH18/24-SP140_082520		
			Lab Package	HS20081151		HS20081150		
			Sample Date	8/25/2020		8/25/2020		
			Sample Type	GRAB		GRAB		
	Effluent Limitation for Discharge (µg/L) per Protocol			Result	DVQ	Result	DVQ	
	Daily Average Concentration	Daily Maximum Concentration	Reporting Limit					
VOLATILES	**µg/L**	**µg/L**	**µg/L**	**µg/L**		**µg/L**		
1,1,1-Trichloroethane	3,417	7,230	1	0.5	U	2.5	U	Yes
1,1,2-Trichloroethane	102.5	216.9	1	1.0	U	3.3	J	Yes
1,1-Dichloroethane	6,633	14,032	1	0.5	U	17		Yes
1,1-Dichloroethene	119	253	1	0.5	U	2.5	U	Yes
1,2-Dichloroethane	85	181	1	**0.52**	**J**	**66**		Yes
1,2-Dichloropropane	NA	NA	1	1.0	U	5.0	U	Yes
Acetone	1,132	2,395	2	1.0	U	5.0	U	Yes
Benzene	85	181	1	0.5	U	**4.0**	J	Yes
Carbon Tetrachloride	85	181	1	1.0	U	**8.2**		Yes
Chlorobenzene	22,300	47,180	1	1.0	U	5.0	U	Yes
Chloroform	1,708	3,615	1	0.5	U	20		Yes
cis-1,2-Dichloroethene	NV	NV	1	**21**	**J**	**6300**		NA
Ethylbenzene	26,954	57,025	1	1.0	U	5.0	U	Yes
m,p-Xylenes	39.5	83.6	2	1.0	U	5.0	U	Yes
Methylene Chloride	803	1,699	2	1.0	U	**3,200**		Yes
o-Xylene	39.5	83.6	1	1.0	U	5.0	U	Yes
Styrene	2,829	5,987	1	1.0	U	5.0	U	Yes
Tetrachloroethene	85.4	180.7	1	1.0	U	**81**		Yes
Toluene	1,980	4,189	1	0.5	U	**3.6**	**J**	Yes
Trichloroethene	85	181	1	**3.4**	**J**	**9,200**		Yes

			Sample Location	EFFLUENT		INFLUENT*		Does Concentration Meet Discharge Limits? (Yes/No)
			Sample Identification	LH18/24-SP650_082520		LH18/24-SP140_082520		
			Lab Package	HS20081151		HS20081150		
			Sample Date	8/25/2020		8/25/2020		
			Sample Type	GRAB		GRAB		
	Effluent Limitation for Discharge (µg/L) per Protocol			Result	DVQ	Result	DVQ	
	Daily Average Concentration	Daily Maximum Concentration	Reporting Limit					
Vinyl Chloride	34	72	1	0.5	U	130		Yes
ANIONS	**mg/L**	**mg/L**	**mg/L**	**mg/L**		**mg/L**		
Chloride	NA	NA	10	350		383		NA
Sulfate	NA	NA	10	24.7		32.2		NA
PERCHLORATE	**µg/L**	**µg/L**	**µg/L**	**µg/L**		**µg/L**		
Perchlorate	278	589	4	0.3190		11,500		Yes
METALS	**mg/L**	**mg/L**	**mg/L**	**mg/L**		**mg/L**		
Aluminum	0.777	1.644	0.0100	0.00864	UB	**0.0427**		Yes
Antimony	NA	NA	0.00200	**0.000883**	**J**	0.00100	U	NA
Arsenic	0.365	0.772	0.00200	**0.000732**	**J**	**0.00127**	**J**	Yes
Barium	1	2	0.00400	**0.702**		**0.737**		Yes
Beryllium	NA	NA	0.00200	0.000500	U	0.000500	U	NA
Cadmium	0.0016	0.0034	0.00200	0.000500	U	0.000500	U	Yes
Calcium	NA	NA	0.500	**41.6**		**36.1**		**NA**
Chromium	0.355	0.752	0.00400	**0.000428**	**J**	**0.00138**	**J**	Yes
Cobalt	5.433	11.495	0.00500	**0.000288**	**J**	**0.00855**		Yes
Iron	1.132	2.395	0.200	**0.0815**	**J**	**0.998**		Yes
Lead	0.0022	0.0046	0.00200	0.00100	U	0.00100	U	Yes
Magnesium	NA	NA	0.200	**28.9**		**26.5**		NA
Manganese	7.323	15.494	0.00500	**0.0565**		**0.559**		Yes
Nickel	0.087	0.184	0.00200	**0.00124**	**J**	**0.00928**		Yes
Potassium	NA	NA	0.200	**1.20**		**1.23**		NA

	Sample Location	EFFLUENT		INFLUENT*		Does Concentration Meet Discharge Limits? (Yes/No)
	Sample Identification	LH18/24-SP650_082520		LH18/24-SP140_082520		
	Lab Package	HS20081151		HS20081150		
	Sample Date	8/25/2020		8/25/2020		
	Sample Type	GRAB		GRAB		
	Effluent Limitation for Discharge (µg/L) per Protocol					
	Daily Average Concentration	Daily Maximum Concentration	Reporting Limit	Result	DVQ	Result	DVQ	
Selenium	0.0057	0.012	0.00200	0.00250	U	0.00250	U	Yes
Silver	0.0014	0.003	0.00200	0.000500	U	0.000500	U	Yes
Sodium	NA	NA	1.00	**173**		**180**		NA
Thallium	NA	NA	0.00200	0.000500	U	0.000500	U	NA
Vanadium	1.698	3.592	0.00500	0.00100	U	**0.000758**	**J**	Yes
Zinc	0.146	0.31	0.00400	**0.0129**		**0.0263**		No
Mercury	NA	NA	0.000200	0.000100	U	0.000100	U	NA
1,4-DIOXANE	**µg/L**	**µg/L**	**µg/L**	**µg/L**		**µg/L**		
1,4-Dioxane	NA	134.2	1	**6.4**		1.0	U	Yes
CHEMICAL OXYGEN DEMAND (COD)	**mg/L**	**mg/L**	**mg/L**	**mg/L**		**mg/L**		
COD	NA	200	75	**8.00**	**J**	**15.0**		Yes
OIL AND GREASE (O&G)	**mg/L**	**mg/L**	**mg/L**	**mg/L**		**mg/L**		
O&G	NA	15	2	1.0	U	1.0	U	Yes

Notes:
µg/L - micrograms per liter
mg/L - milligrams per liter
DVQ - data validation qualifier
UB - considered an artifact of blank contamination
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
Grab samples are compared to the daily maximum and composite samples to the daily average
* only Effluent sample is compared to discharge limits
NA - not applicable
GWTP - Groundwater Treatment Plant
NV - no value

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3 QUALITY CONTROL

This report summarizes the data for samples collected during July, August, and September 2020. 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 capture zone, 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 3rd quarter of 2020 were rejected due to quality control problems.

ALS Environmental analyzed the compliance samples collected from the GWTP. Independent data verification and validation was performed on the Level II packages by the Bhate project chemist as described in the Quality Control Summary Report in **Appendix E**. If any quality control problem arises, the Level IV packages can be referenced for raw data inspection. Level II packages, which include select laboratory quality control results, are included in this report and Level IV packages, which include chromatograms, will be uploaded to the AR. The laboratory reports for the 3rd quarter of 2020 are included in **Appendix C** on a CD. Air monitoring data is presented in **Appendix F, Attachment 3**.

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4 TREATED GROUNDWATER DISCHARGED

Reinjection of groundwater in ICT 6 and ICT 9 was discontinued as of 15 July 2012. The last injection occurred on 24 May 2012, immediately prior to the scrubber system malfunction which caused GWTP operation to cease temporarily.

Treated groundwater that met the perchlorate discharge criteria was discharged to Harrison Bayou in accordance with the Protocol for Discharging GWTP Effluent (**Appendix D**). **Table 4** summarizes 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 3rd quarter of 2020. Approximately 417,884 gallons of treated groundwater was discharged from the GWTP to the Harrison Bayou in July 2020 and 216,197 gallons in August 2020. No treated groundwater was discharged to the Harrison Bayou in September 2020. In July 2020, 984,393 gallons were discharged from the INF Pond to the Harrison Bayou. No treated groundwater was discharged from the INF Pond in August or September due to the continuous flow of the Harrison Bayou.

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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 between September 2012 and September 2013, on a monthly basis between September 2013 and September 2014, and on a quarterly basis since that time. 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[1]. 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 (ppmv) 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 F** (**Attachment 1; Tables 1 and 2 and Attachment 2; Table 1**) includes a summary of analytical results and PID readings, calculations of emission rates from the emission point, 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, 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 AMCVs or ESLs.

[1] 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.

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) §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 3rd Quarter 2020

During the 3rd quarter of 2020, air sampling was completed on August 17 and 18, 2020. A summary of the air sampling results is presented in **Appendix F, Attachment 1 Tables 1 and 2**. All results met the criteria described in Section 6.1.

5.2.1 Summa Canister Monitoring Results

The sampling event was conducted on August 17 and 18, 2020, for presentation during the 3rd Quarter 2020 reporting period using Summa canisters. The samples were collected and analyzed as described in Section 6.1 and per the approved air monitoring plan dated 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 6.1.

5.2.1.1 Ambient Air Results

Acetone; benzene; cis-1,2-dichloroethene; trichloroethene; n-hexane; toluene; ethylbenzene; m,p-xylenes; o-xylene; propene; CFC 12; ethanol; CFC 11; CFC 113; alpha-pinene and d-limonene were detected in August 2020 in ambient air downwind of the GWTP.

Certain compounds like n-hexane, CFC 12, and CFC 11, with similar concentrations in both GWTP ambient air and downwind ambient air are suspected to be present in the ambient (background) air. The ambient air results during the quarter met the ambient air criteria, as presented in **Attachment 1; Table 1** within **Appendix F**.

5.2.1.2 Air Stripper Effluent Results

The VOCs present in groundwater that are removed via the air stripper include 1,2-dichloroethane; 1,1-dichloroethene; cis-1,2-dichloroethene; methylene chloride; tetrachloroethene; trichloroethene; vinyl chloride; n-hexane; ethanol; and CFC 113. These compounds are frequently reported in groundwater at the site, with the exception of CFC 113 which is not typically a groundwater analyte at LHAAP. 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.

All air stripper effluent concentrations were below the emission criteria, as presented in **Attachment 1; Table 2** within **Appendix F**.

5.2.2 PID Results

Along with collection of Summa canister air samples, PID measurements from the same sources/areas are 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. Ambient air PID measurements during this quarter at the GWTP were reported at 0.0 parts per million. The stripper PID location detected between 20.2 and 25.2 parts per million at each sampling event. The results of the PID readings collected during GWTP operations are presented in **Table 1; Attachment 2** within **Appendix F**.

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6 COMMENTS AND RESPONSES

The 2nd quarter 2020 GWTP report was provided to the regulators on 27 August 2020. No comments were received by the USEPA. The following comment was received from the TCEQ on 29 September 2020:

TCEQ Comment 1: Please provide an explanation of 18WW17 perchlorate results and corrective measures. Please explain why the sample was diluted at such a high factor and note the next time this well will be sampled. These results are an order of magnitude higher than expected. Also explain how we can prevent such high dilutions in the future for more reliable sample results that meet the level of required performance.

Response to TCEQ Comment 1: The LHAAP 1824 well 18WW17, collected June 15, 2020, was originally analyzed without a dilution. No internal standard recovery was reported due to matrix interference. A 10,000x dilution was performed, however the area count for perchlorate was outside calibration range of the instrument. To bring the sample within calibration range, a 20,000x dilution was performed giving a final result of 763,000 µg/L. This well typically sees results for perchlorate in the high 10's of thousands.

The next sampling event is scheduled for December 2020. The sample will first be analyzed without a dilution. If matrix interference is present a dilution will be performed at the lowest level possible. Additionally, analysis of a method blank is used to demonstrate no artifact/interference is present.

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APPENDIX A
ICT LAYOUT AND GWTP PROCESS FLOW DIAGRAM

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0 100 200 400 Feet

N

Harrison Bayou

ICT-13G
ICT-13F
ICT-13E
ICT-13D
ICT-13C
ICT-13B
ICT-13A
ICT-12E
ICT-12D
ICT-12C
ICT-12B
ICT-12A
ICT-14A
ICT-14B
ICT-14C
ICT-14D
ICT-14E
ICT-7
ICT-5
ICT-6
ICT-1
ICT-2
ICT-3
ICT-4
ICT-8
ICT-9
ICT-10
ICT-11
EW-1

LHAAP-24
LHAAP-18
LHAAP-39
LHAAP-17

18WW17

Open Burning Pan 157
Open Burning Cage 155

33-X
35-X
37-X
41-X
21-X
27-X
22-X
22-X-1
20-X
24-X
25-X

Groundwater Treatment Plant

Ditch

AVE "Q"
SCUDDAY AVE
LONG POINT RD

Legend:
- Extraction Location
- Deactivated ICT Sump
- Injection Point – Inactive since May 24, 2012
- ICT Location
- HDPE Liner Installed outside of the ICT
- Installation Restoration Program (IRP) Area
- Stream / Ditch Centerline
- Road Line
- 401 Building Number
- 717 Former Building Location and Number

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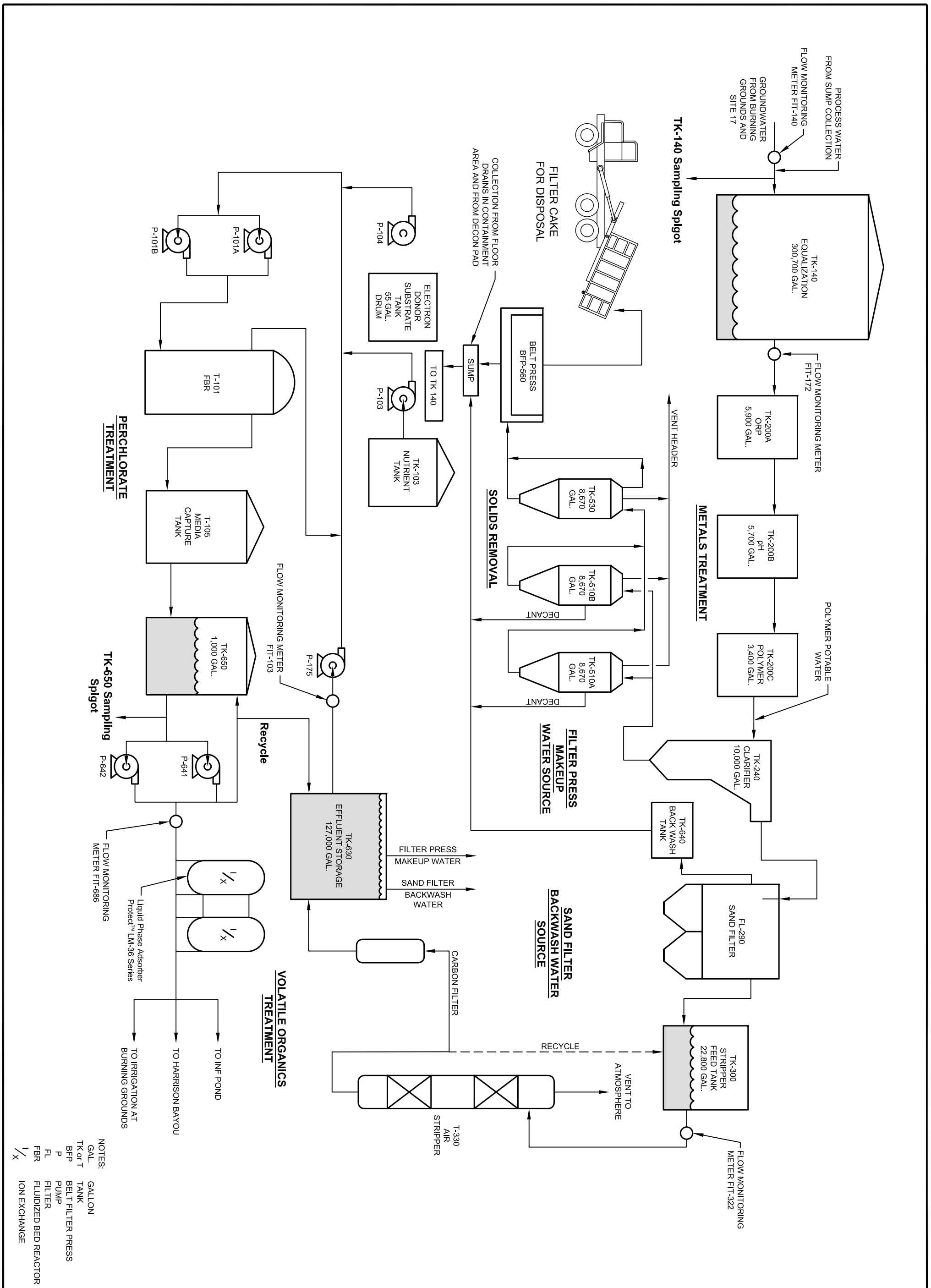
Quarterly Evaluation Report
Groundwater Treatment Plant
Longhorn Army Ammunition Plant, Karnack, Texas

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ICT Layout Map

Figure A-1

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Process Flow Diagram

Figure A-2

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

Well I.D.	Replaced Parts	Date	Contractor
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

Well I.D.	Replaced Parts	Date	Contractor
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

Well I.D.	Replaced Parts	Date	Contractor
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 & clened 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

Well I.D.	Replaced Parts	Date	Contractor
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

LHAAP-16

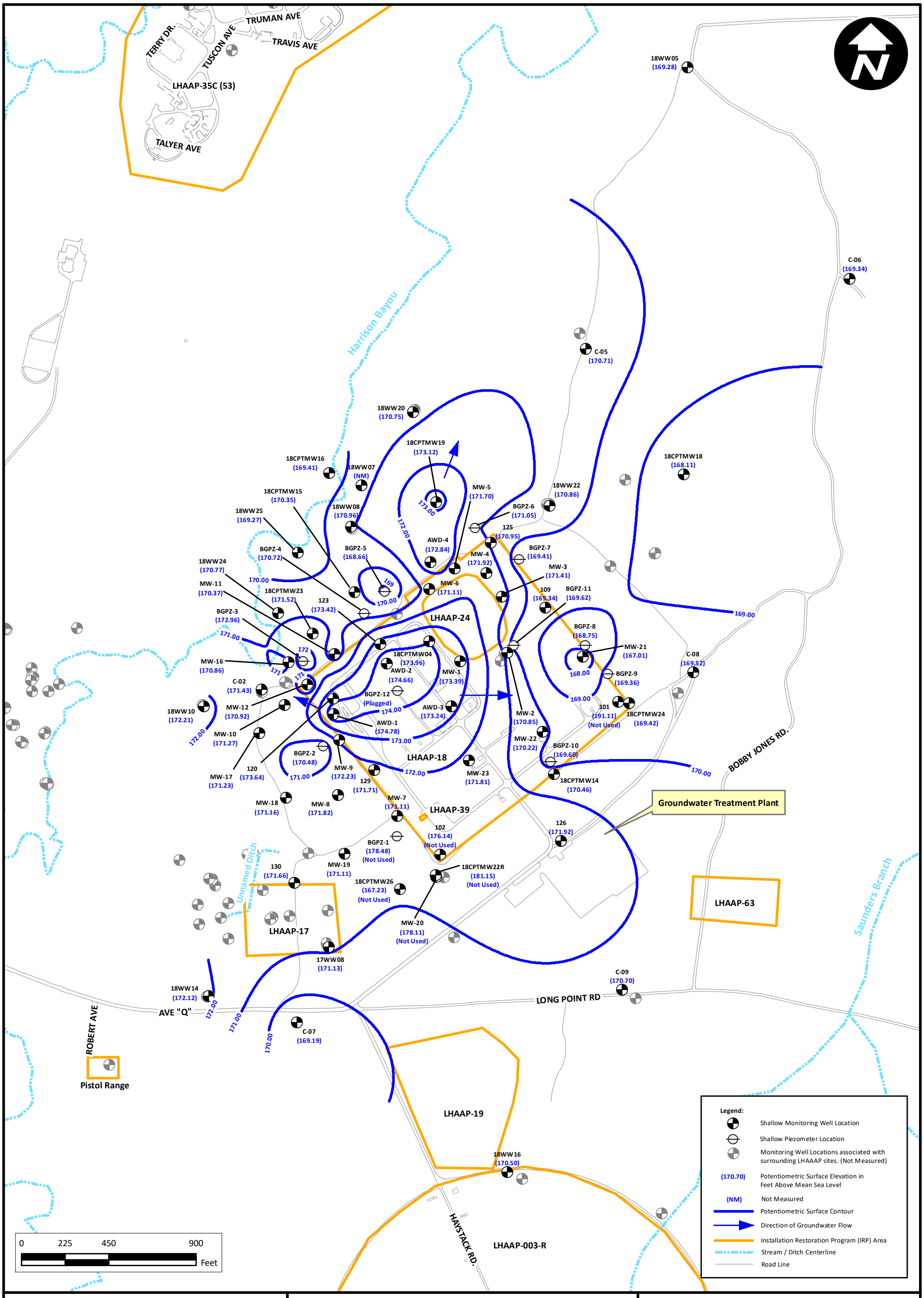
Well I.D.	Replaced Parts	Date	Contractor
EW08	New pump	2/28/2011	Shaw

Table A-2: Extraction Equipment Maintenance Since 2011

Well I.D.	Replaced Parts	Date	Contractor
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

APPENDIX B
GROUNDWATER ELEVATION CONTOUR MAPS

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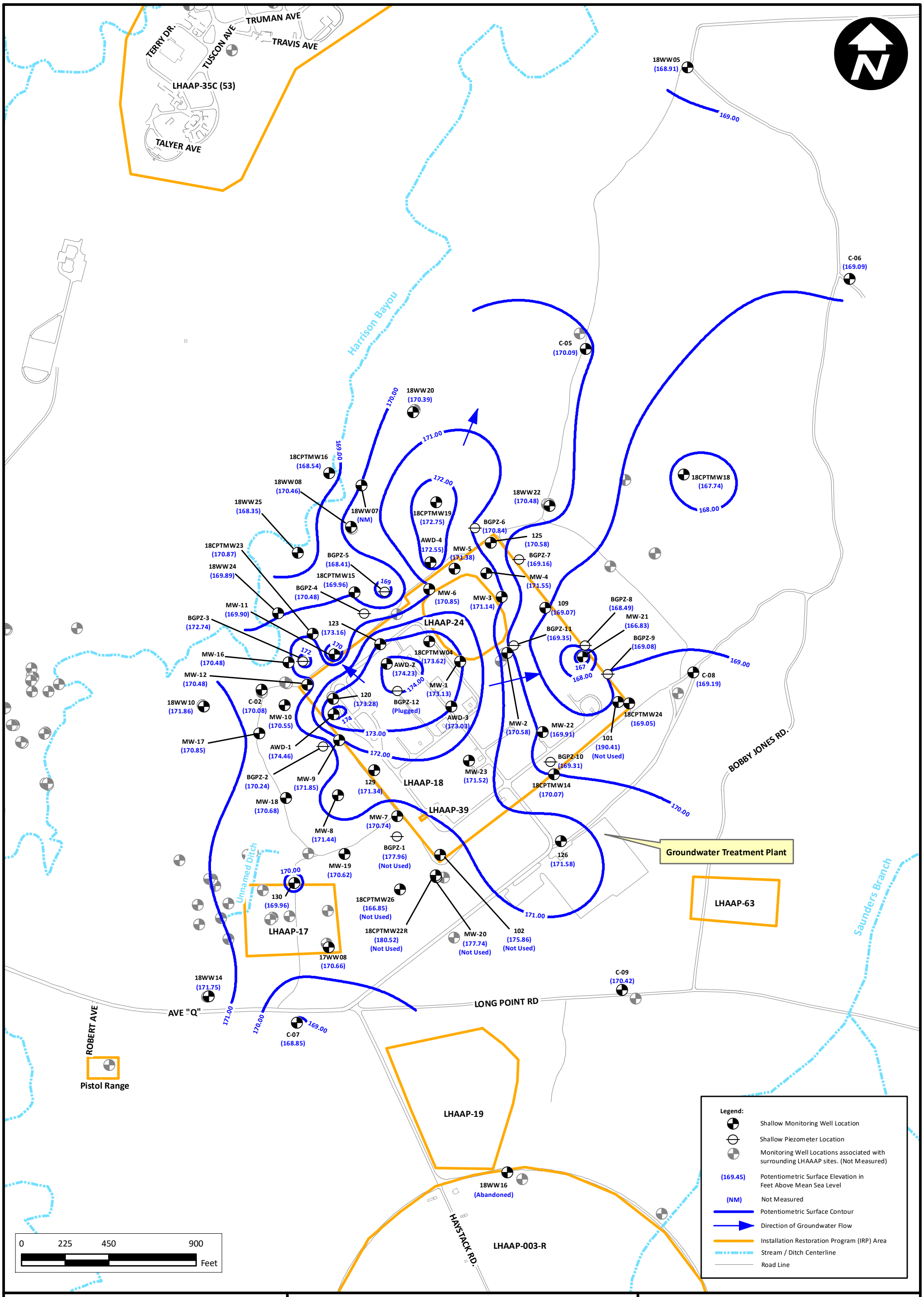
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Groundwater Treatment Plant
Longhorn Army Ammunition Plant, Karnack, Texas

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Groundwater Potentiometric Surface Map
Shallow Zone (July 29, 2020) LHAAP-18/24

Figure B-1

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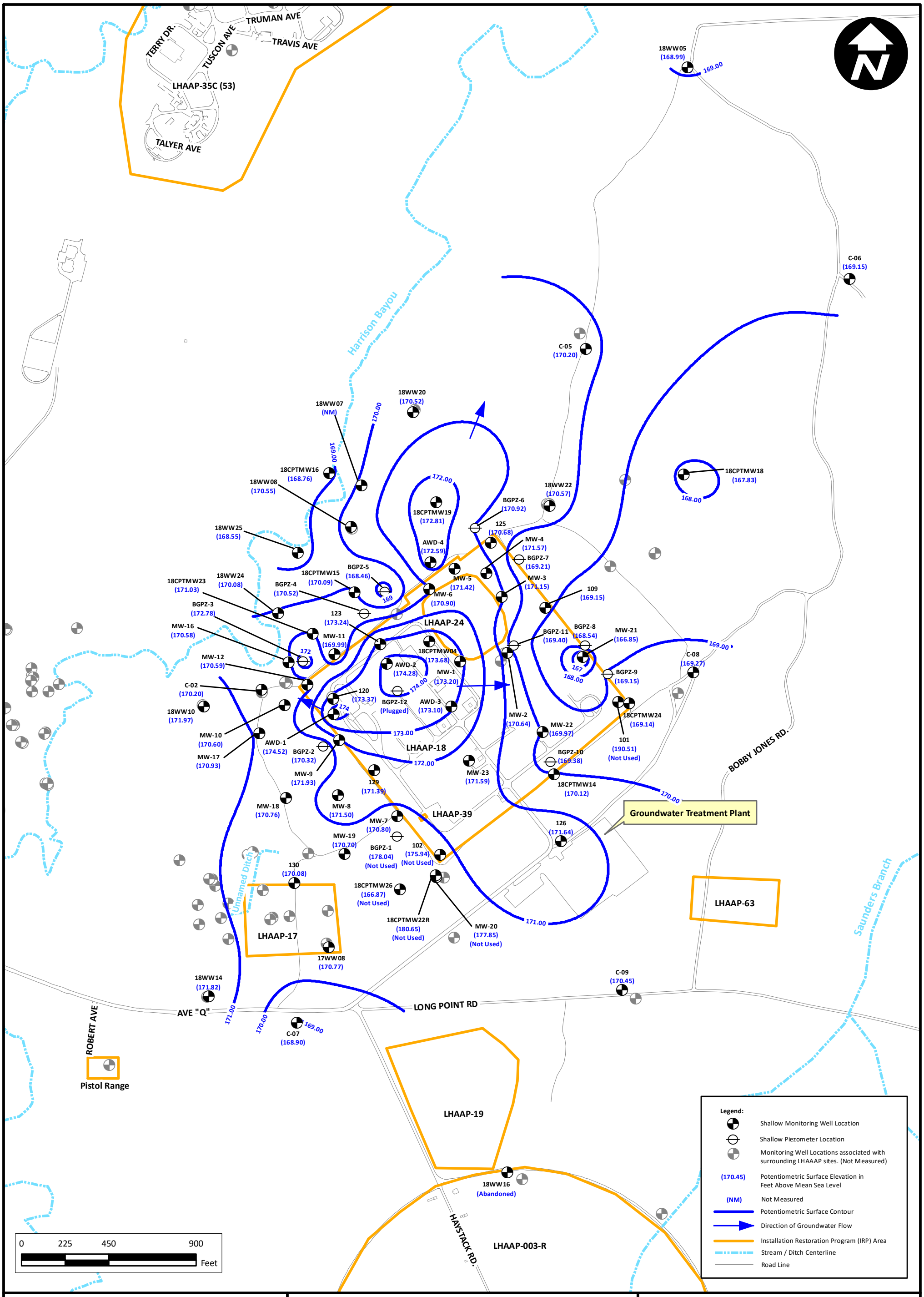
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Groundwater Potentiometric Surface Map
Shallow Zone (August 24, 2020) LHAAP-18/24

Figure B-2

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Groundwater Potentiometric Surface Map
Shallow Zone (September 28, 2020) LHAAP-18/24

Figure B-3

TALYER AVE
LHAAP-35C (53)
Harrison Bayou
18WW04
(168.95)
169.00
169.50
18WW19
(170.51)
18WW21
(169.91)
170.00
C-04A
(171.10)
C-04
(171.04)
18CPTMW19SW
(171.13)
18WW09
(170.98)
18CPTMW08DW
(170.90)
18CPTMW08SW
(171.26)
170.50
C-03
(170.90)
18WW18
(170.55)
18WW06
(170.59)
18CPTMW23SW
(170.83)
LHAAP-24
18CPTMW01SW
(172.01)
(Not Used)
18CPTMW04SW
(170.97)
18CPTMW07
(170.99)
171.50
172.00
172.50
173.00
173.50
174.00
18WW02
(170.83)
18CPTMW01DW
(170.60)
18WW11
(171.81)
MW-13
(171.10)
18WW03
(170.22)
MW-14
(174.54)
LHAAP-18
18CPTMW06
(170.91)
18CPTMW10DW
(170.53)
18CPTMW10SW
(170.95)
18CPTMW03SW
(171.15)
BOBBY JONES RD.
18CPTMW12SW
(171.09)
LHAAP-39
18CPTMW12DW
(170.97)
Groundwater Treatment Plant
Unnamed Ditch
18CPTMW26SW
(170.91)
18CPTMW22SW
(170.82)
LHAAP-63
Saunders Branch
LHAAP-17
18CPTMW22DW
(170.78)
C-01
(171.49)
18WW15
(172.06)
LONG POINT RD
AVE "Q"
172.00
C-10
(170.87)
ROBERT AVE
Pistol Range
LHAAP-19
171.50
171.00
18WW01
(170.90)
HAYSTACK RD.
LHAAP-003-R

0 225 450 900 Feet

Legend:
- Wilcox Zone Monitoring Well Location
- Monitoring Well Locations associated with surrounding LHAAAP sites. (Not Measured)
- (170.87) Potentiometric Surface Elevation in Feet Above Mean Sea Level
- Potentiometric Surface Contour
- Direction of Groundwater Flow
- Installation Restoration Program (IRP) Area
- Stream / Ditch Centerline
- Road Line

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Groundwater Potentiometric Surface Map
Wilcox Zone (July 29, 2020) LHAAP-18/24

Figure B-4

TALYER AVE
LHAAP-35C (53)
Harrison Bayou
18WW04 (168.69)
169.00
18WW19 (169.97)
C-04A (170.75)
169.50
18CPTMW19SW (170.74)
C-04 (170.70)
18WW21 (169.55)
170.00
18WW09 (170.51)
18CPTMW08SW (170.75)
18CPTMW08DW (170.54)
C-03 (170.59)
18WW18 (170.21)
18CPTMW04SW (170.56)
18CPTMW23SW (170.25)
171.00
LHAAP-24
18CPTMW01SW (171.63) (Not Used)
18WW06 (170.15)
171.50
18WW02 (170.41)
172.00
172.50
173.00
173.50
18CPTMW07 (170.51)
18CPTMW01DW (170.12)
18WW11 (171.44)
18WW03 (169.90)
MW-13 (170.15)
MW-14 (174.22)
LHAAP-18
18CPTMW06 (170.53)
170.00
18CPTMW10DW (170.18)
18CPTMW03SW (170.74)
18CPTMW10SW (170.49)
170.50
BOBBY JONES RD.
18CPTMW12SW (170.76)
LHAAP-39
Groundwater Treatment Plant
18CPTMW12DW (170.60)
Unnamed Ditch
18CPTMW26SW (170.55)
LHAAP-63
18CPTMW22DW (170.41)
18CPTMW22SW (170.42)
LHAAP-17
C-01 (171.14)
Saunders Branch
170.50
18WW15 (171.70)
171.50
LONG POINT RD
AVE "Q"
171.00
C-10 (170.58)
ROBERT AVE
Pistol Range
LHAAP-19
18WW01 (Abandoned)
HAYSTACK RD.
LHAAP-003-R

0 225 450 900 Feet

Legend:
- Wilcox Zone Monitoring Well Location
- Monitoring Well Locations associated with surrounding LHAAAP sites. (Not Measured)
- (170.42) Potentiometric Surface Elevation in Feet Above Mean Sea Level
- Potentiometric Surface Contour
- Direction of Groundwater Flow
- Installation Restoration Program (IRP) Area
- Stream / Ditch Centerline
- Road Line

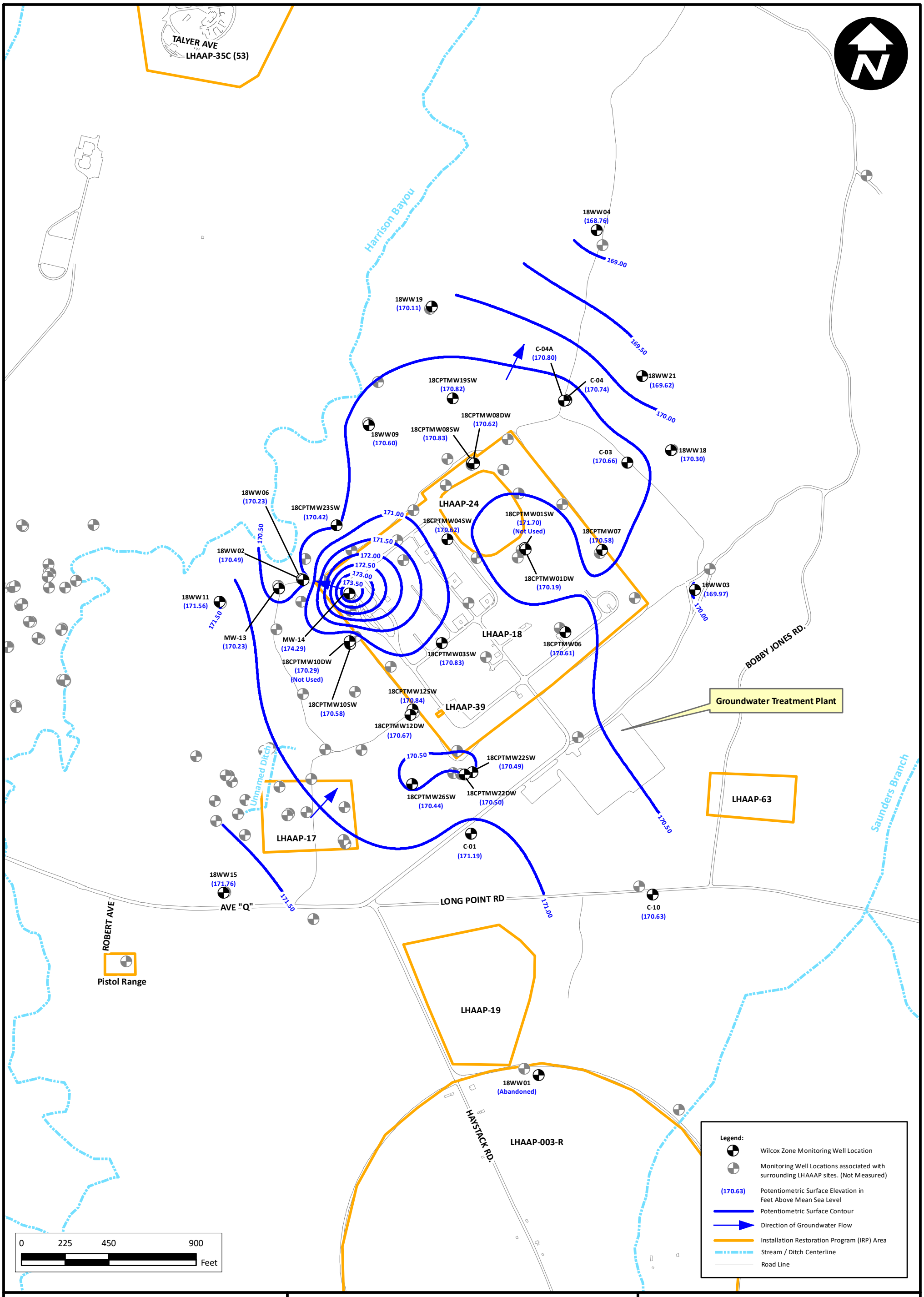
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Quarterly Evaluation Report 3rd Quarter (July – September) 2020
Groundwater Treatment Plant
Longhorn Army Ammunition Plant, Karnack, Texas

PROJECT NO:	SCALE:	DATE:	DRAWN BY:
NWO1312.0150	As Shown	11/3/2020	MRM

Groundwater Potentiometric Surface Map
Wilcox Zone (August 24, 2020) LHAAP-18/24

Figure B-5



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Quarterly Evaluation Report 3rd Quarter (July – September) 2020
Groundwater Treatment Plant
Longhorn Army Ammunition Plant, Karnack, Texas

PROJECT NO:	SCALE:	DATE:	DRAWN BY:
NWO1312.0150	As Shown	11/3/2020	MRM

Groundwater Potentiometric Surface Map
Wilcox Zone (September 28, 2020) LHAAP-18/24

Figure B-6

APPENDIX C
GWTP WATER SAMPLING LABORATORY ANALYTICAL RESULTS FOR THE 3RD QUARTER 2020 (PROVIDED ON CD ONLY)

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APPENDIX D
PROTOCOL FOR DISCHARGING GWTP EFFLUENT

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MEMORANDUM

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
Volatiles		
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
Anions		
Chloride	*	*
Sulfate	*	*
Perchlorate**	278	589
Metals		
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
Other		
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:

$$QE \leq \frac{QS\ (CC - CA)}{(CE - CC)}$$

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.

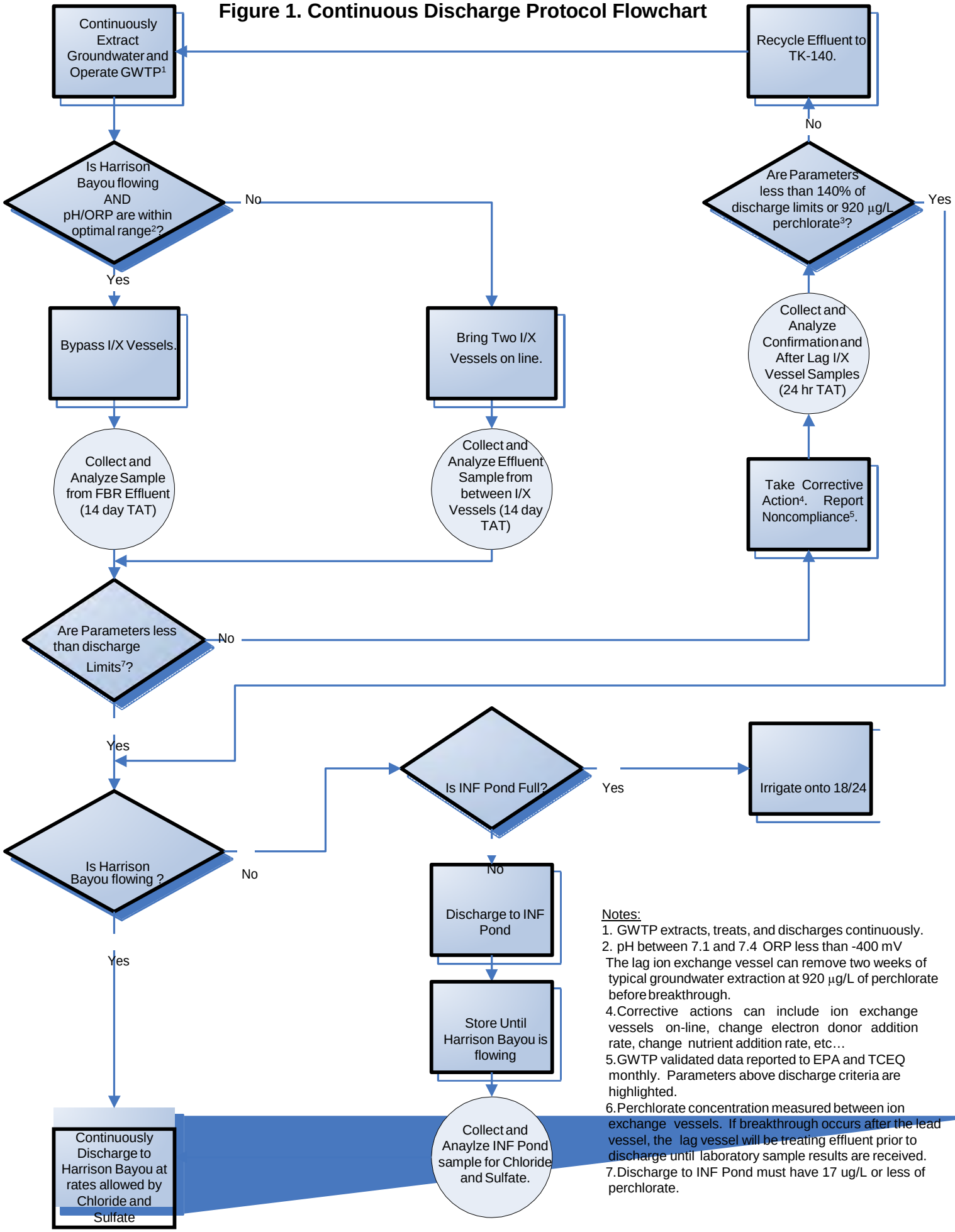
As soon as flow in Harrison Bayou returns, stored GWTP effluent from the INF Pond will be discharged. As with direct discharges from the GWTP to Harrison Bayou, the allowable flowrate of effluent from the INF Pond is calculated based upon the chloride and sulfate concentrations in the pond and the flow 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



Notes:

1. GWTP extracts, treats, and discharges continuously.
2. pH between 7.1 and 7.4 ORP less than -400 mV
The lag ion exchange vessel can remove two weeks of typical groundwater extraction at 920 µg/L of perchlorate before breakthrough.
4. Corrective actions can include ion exchange vessels on-line, change electron donor addition rate, change nutrient addition rate, etc…
5. GWTP validated data reported to EPA and TCEQ monthly. Parameters above discharge criteria are highlighted.
6. Perchlorate concentration measured between ion exchange vessels. If breakthrough occurs after the lead vessel, the lag vessel will be treating effluent prior to discharge until laboratory sample results are received.
7. Discharge to INF Pond must have 17 ug/L or less of perchlorate.

APPENDIX E
QUALITY CONTROL SUMMARY REPORT

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QUARTERLY QUALITY CONTROL SUMMARY REPORT
3rd QUARTER (July-Sept) 2020
GROUNDWATER TREATMENT PLANT
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

October 2020

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 13th Avenue South, Suite 300
Birmingham, Alabama 35205
1-800-806-4001 • www.bhate.com

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1 INTRODUCTION

Bhate reviewed 28 data packages from ALS Environmental, Houston, Texas. Groundwater samples were collected July 9, 2020 through September 29, 2020 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, January 2017), *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review* (USEPA, January 2017), 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/SM4500 NH3 – Nitrogen, Ammonia
- E365.3/SM4500 P – Orthophosphate
- SM5310 – Total Organic Carbon
- SW8260C- Volatiles
- SW8270D SIM- 1,4-Dioxane
- SW6020A/7470 – Metals
- SW9056A – Chloride (Cl) and Sulfate (SO_4)
- 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 time.

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 (CCV)

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 VOCs and SVOCs and 50% for closing CCVs; metals and general chemistry - 10%D; perchlorate - 15%D; and volatiles in air - 30%D.

The CCV for naphthalene associated with sample LH18/24-SP140_082520 exceeded control limits. The result was qualified estimated non-detected "UJ".

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

Sample LH18/24-SP650_082520 reported a detection of aluminum and sample LH18/24-SP650_091520 reported a detection of lead <5x the method blank concentrations and were flagged "UB".

1.4.2 Volatiles - SW8260

The trip blank associated with sample LH18/24-SP650_072120 reported a low level detection of toluene. The sample result was <5x the blank concentration and flagged "UB".

1.5 Surrogates

Surrogates were evaluated using limits defined by each method in the project-specific QAPP Worksheet 28.

Surrogates were within control limits.

1.6 Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD)

LCS/LCSD recoveries were evaluated using limits defined in the project-specific QAPP Worksheet 15.

LCS recoveries were within control limits.

1.7 Matrix Spike (MS)/Matrix Spike Duplicate Sample (MSD)

MS/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 Volatiles - SW8260

The MS and/or MSD recoveries for trichloroethene were above control limits for samples LH18/24-SP650_080520, LH18/24-SP650_081120, LH18/24-SP650_081820, and LH18/24-SP650_082520. Sample LH18/24-SP650_082520 reported the MS recovery above control limits for cis-1,2-dichloroethene. These compounds were qualified estimated "J".

1.7.2 Metals - SW6020

Sample LH18/24-SP650_091520 reported silver below MS/MSD recovery limits. This metal was qualified estimated non-detect "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 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

Air sample LH18/24-AIR_081720_Stripper and its duplicate exceeded control limits for methylene chloride, CFC 113, cis-1,2-dichlroroethene, 1,2-dichloroethane, tetrachloroethene, and trichloroethene. These compounds were qualified estimated "J" in both parent sample and duplicate.

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	SM5310C	SW8270D SIM	SW8260C	SW6020A	SW9056A	SW7196A	E410.4	1664A	TO-15
GWTP Samples													
LH18/24-SP650_070920/BIX	HS20070398	X	X	X	X								
LH18/24-SP650_070920	HS20070399						X		X				
LH18/24-SP650_071420/BIX	HS20070623	X				X	X	X		X			
LH18/24-SP140_071420	HS20070621	X						X		X			
LH18/24-SP650_071420/BIX	HS20070615	X	X	X	X								
LH18/24-SP650_072120	HS20070984						X		X				
LH18/24-SP650_072120/BIX	HS20070982	X	X	X	X								
LH18/24-SP650_072820/BIX	HS20071309	X	X	X	X								
LH18/24-SP650_080520	HS20080212						X		X				
LH18/24-SP650_080520/BIX	HS20080196	X	X	X	X								
LH18/24-SP140_081120	HS20080475	X						X		X			
LH18/24-SP650_081120/BIX	HS20080473	X				X	X	X		X			
LH18/24-SP650_081120/BIX	HS20080474	X	X	X	X								
LH 18/24-SP650_081820	HS20080801						X		X				
LH18/24-SP650_081820/AIX	HS20080794	X	X	X	X								
LH18/24-SP650_082520/AIX	HS20081151	X				X	X	X	X		X	X	
LH18/24-SP140_082520	HS20081150	X				X	X	X	X		X	X	
LH18/24-SP650_082520/AIX	HS20081133	X	X	X	X								
LH18/24-SP650_090120/AIX	HS20090080	X	X	X	X								
LH18/24-SP650_090920/AIX	HS20090475	X	X	X	X								
LH18/24-SP650_090920	HS20090534						X		X				
LH18/24-SP650_091520/AIX	HS20090748	X				X	X	X		X			
LH18/24-SP140_091520	HS20090744	X						X		X			
LH18/24-SP650_091520/BIX	HS20090747	X	X	X	X								
LH18/24-SP650_091520-AIX	HS20090747	X											
LH18/24-SP650_092220	HS20091030						X		X				
LH18/24-SP650_092220/AIX	HS20091027	X	X	X	X								
LH18/24-SP650_092920/BIX	HS20091394	X	X	X	X								
LH18/24-SP650_092920-between	HS20091394	X											
LH18/24-SP650_092920-AIX	HS20091394	X											
Air Samples													
LH18/24-Air_081720_Stripper	P2004706												X
LH18/24-Air_081720_Stripper_a	P2004706												X
LH18/24-Air_081720_GWTP	P2004706												X
LH18/24-Air_081720_Downwind_South	P2004706												X

GWTP – Groundwater Treatment Plant
ID – Identification
MW – Monitoring Well
SM – Standard Method
SW-846 - Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.
E – U.S. Environmental Protection Agency Method
HS – Houston

Table 2. Qualified Analytical Data

Client Sample ID Laboratory	Laboratory Package	Analyte Name	Data Validation Qualifier	Reason for Qualification
LH18/24-SP650_072120	HS20070984	Toluene	0.68 UB	TB
LH18/24-SP650_080520	HS20080212	Trichloroethene	4.6 J	MS >
LH18/24-SP650_081120	HS20080473	Trichloroethene	3.7 J	MS >
LH18/24-SP650_081820	HS20080801	Trichloroethene	3.4 J	MS >
LH18/24-AIR_081720_Stripper	P2004706	Methylene chloride CFC 113 Cis-1,2-Dichloroethene 1,2-Dichloroethane Tetrachloroethene Trichloroethene	3400 J 23000 J 14000 J 180 J 210 J 21000 J	FD RPD
LH18/24-AIR_081720_Stripper-a	P2004706	Methylene chloride CFC 113 Cis-1,2-Dichloroethene 1,2-Dichloroethane Tetrachloroethene Trichloroethene	2400 J 15000 J 9400 J 130 J 130 J 13000 J	FD RPD
LH18/24-SP650_082520	HS20081151	Trichloroethene Cis-1,2-Dichloroethene Aluminum	3.4 J 21 J 0.00864 UB	MS/MSD > MS > MB
LH18/24-SP140_082520	HS20081150	Naphthalene	5.0 UJ	CCV
LH18/24-SP650_091520	HS20090748	Lead Silver	0.000679 UB < 0.000500 UJ	MB MS/MSD <

GWTP – Groundwater Treatment Plant
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
FD RPD – Field Duplicate Relative Percent Difference outside control limits
HS – Houston
MB – Method Blank contamination TB – trip blank contamination
CCV – Continuing calibration verification percent recovery outside control limits
MS/MSD <>– Matrix spike/Matrix spike duplicate below/above control limits

Table 3. Completeness by Method

Method	No. of Rejected Results	% Completeness
SW6850	0	100
E350.1	0	100
E365.2	0	100
SM5310	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

APPENDIX F
AIR MONITORING DATA – 3RD QUARTER 2020

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ATTACHMENT 1: AIR MONITORING CALCULATIONS

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Table 1. Ambient Air Data - August 2020
Longhorn Army Ammunition Plant
Groundwater Treatment Plant

Pollutant	CAS #	Short Term ESL March 2012	AMCVs (ST Health)	GWTP Ambient Air Concentrations (1)		Status (3)	Downwind Ambient Air Concentrations (2)		Status (3)
		µg/m^3	µg/m^3	µg/m^3			µg/m^3		
1,1-Dichloroethane	75-34-3	4,000	4,047	0.71	U	PASS	0.69	U	PASS
1,1-Dichloroethene	75-35-4	210	714	0.70	U	PASS	0.68	U	PASS
1,2-Dichloroethane	107-06-2	160	162	0.70	U	PASS	0.68	U	PASS
Acetone	67-64-1	5,900	NA	**18**		PASS	**22**		PASS
Benzene	71-43-2	170	575	**1.2**		PASS	**1.4**		PASS
Carbon disulfide	75-15-0	30	NA	1.4	U	PASS	1.4	U	PASS
Chloroform	67-66-3	100	98	0.70	U	PASS	0.68	U	PASS
cis-1,2-Dichloroethene	156-59-2	7,900	NA	**6.1**		PASS	0.66	U	PASS
Methylene chloride	75-09-2	3,600	12,158	0.68	U	PASS	0.66	U	PASS
Tetrachloroethene	127-18-4	2,000	6,782	0.67	U	PASS	0.65	U	PASS
trans-1,2-Dichloroethene	156-60-5	7,900	NA	0.70	U	PASS	0.68	U	PASS
Trichloroethene	79-01-6	540	537	**9.0**		PASS	0.68	U	PASS
Vinyl chloride	75-01-4	20,000	66,460	0.70	U	PASS	0.68	U	PASS
n-Hexane	110-54-3	5,300	6,336	**25**		PASS	**29**		PASS
Styrene	100-42-5	110	21,725	0.68	U	PASS	0.66	U	PASS
Toluene	108-88-3	640	15,074	**5.6**		PASS	**7.1**		PASS
Ethylbenzene	100-41-4	740	86,844	**0.94**		PASS	**1.2**		PASS
m,p-Xylenes	179601-23-1	180	7,382	**3.2**		PASS	**4.3**		PASS
o-Xylene	95-47-6	1,600	7,382	**1.1**		PASS	**1.5**		PASS
1,3-Dichlorobenzene	541-73-1	720	NA	0.70	U	PASS	0.68	U	PASS
Propene (C3 H6)	115-07-1	Asphyxiant	Asphyxiant	0.68	U	NA	**0.85**		NA
Dichlorodifluoromethane (CFC 12)	75-71-8	50,000	49,452	**5.1**		PASS	**6.1**		PASS
Ethanol	64-17-5	18,800	NA	**41**		PASS	**53**		PASS
Trichlorofluoromethane (CFC 11)	75-69-4	28,000	56,184	**8.5**		PASS	**10**		PASS
Trichlorotrifluoroethane (CFC 113)	76-13-1	38,000	NA	**11**		PASS	**1.1**		PASS
alpha-Pinene	80-56-8	60	3,499	**2.5**		PASS	**1.7**		PASS
d-Limonene	5989-27-5	1,100	NA	0.70	U	PASS	**0.81**		PASS

Notes:

(1) Sample collected over an 8-hour period on August 17, 2020, between 8 AM and 4 PM

(2) Sample collected over a 24-hour period beginning on August 17, 2020, at 7:00 AM and ending on August 18, 2020 at 7:00 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 # = Chemcial Abstracts Service Number

GWTP = Groundwater Treatment Plant

U = non-detect

µg/m^3 = micrograms per cubic meter

Table 2. Emission Stack Air Data - August 2020
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 (L)	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^3		lb/hr		tpy		tpy		mg/m^3			feet		lb/hr	
1,1-Dichloroethane	75-34-3	140	U	1.15E-03	U	7.46E-04	U	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	**240**		3.93E-03		2.56E-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	**180**	J	2.95E-03		1.92E-03		5	PASS	40	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2,000	14	2.9	PASS
Acetone	67-64-1	1,400	U	1.15E-02	U	7.46E-03	U	5	PASS	590	106.262 List	30 TAC 106.533(f)(1)(A)(ii)	2,000	14	1.0	PASS
Benzene	71-43-2	140	U	1.15E-03	U	7.46E-04	U	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	280	U	2.30E-03	U	1.49E-03	U	5	PASS	31	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2,000	14	2.2	PASS
Chloroform	67-66-3	140.00	U	1.15E-03	U	7.46E-04	U	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	**14000**	J	2.30E-01		1.49E-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	**3400**	J	5.57E-02		3.62E-02		5	PASS	26	106.262 List	30 TAC 106.533(f)(1)(A)(ii)	2,000	14	1.9	PASS
Tetrachloroethene	127-18-4	**210**	J	3.44E-03		2.24E-03		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	140	U	1.15E-03	U	7.46E-04	U	5	PASS	793	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2,000	14	1.0	PASS
Trichloroethene	79-01-6	**21000**	J	3.44E-01		2.24E-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	**210**		3.44E-03		2.24E-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	**60**		9.84E-04		6.39E-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	140	U	1.15E-03	U	7.46E-04	U	5	PASS	21	106.262 List	30 TAC 106.533(f)(1)(A)(ii)	2,000	14	1.5	PASS
Toluene	108-88-3	140	U	1.15E-03	U	7.46E-04	U	5	PASS	188	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2,000	14	6.0	PASS
Ethylbenzene	100-41-4	140	U	1.15E-03	U	7.46E-04	U	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	280	U	2.30E-03	U	1.49E-03	U	5	PASS	434	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2,000	14	1.0	PASS
o-Xylene	95-47-6	140	U	1.15E-03	U	7.46E-04	U	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	140	U	1.15E-03	U	7.46E-04	U	5	PASS	(5)	--	30 TAC 106.533(f)(1)(A)(i)	2,000	14	1.0	PASS
Propene (C3 H6)	115-07-1	140	U	1.15E-03	U	7.46E-04	U	5	PASS	(5)	--	30 TAC 106.533(f)(1)(A)(i)	2,000	14	6.0	PASS
Dichlorodifluoromethane (CFC 12)	75-71-8	140	U	1.15E-03	U	7.46E-04	U	5	PASS	4,950	ACGIH List	30 TAC 106.533(f)(1)(A)(ii)	2,000	14	1.0	PASS
Ethanol	64-17-5	**11,000**		1.80E-01		1.17E-01		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	140	U	1.15E-03	U	7.46E-04	U	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	**23,000**	J	3.77E-01		2.45E-01		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	140	U	1.15E-03	U	7.46E-04	U	5	PASS	(5)	--	30 TAC 106.533(f)(1)(A)(i)	2,000	14	1.0	PASS
d-Limonene	5989-27-5	140	U	1.15E-03	U	7.46E-04	U	5	PASS	(5)	--	30 TAC 106.533(f)(1)(A)(i)	2,000	14	1.0	PASS
		TOTAL		1.234												

Notes:

(1) Sample collected on August 17, 2020. 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 operations is 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^3 is 1 lb/hr.

(8) Based on comparing the calculated air stripper stack sample emission rate in 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^3 = milligrams per cubic meter

µg/m^3 = micrograms per cubic meter

U = non-detect

ATTACHMENT 2: PID READINGS AND CALIBRATION LOGS

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Attachment 2; Table 1: PID Readings at the LHAAP Groundwater Treatment Plant

Date	Time	Location	Air Flow Rate at Blower	Instrument ID	Person Collecting	PID Reading	Weather Conditions
7/1/2020	9:00	Outside GWTP Office	3432 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 84°F
7/1/2020	9:00	Downwind	3432 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 84°F
7/1/2020	9:00	Stripper	3432 ACFM	MiniRAE 3000	Kennie Moore	Max. 23.3 ppm Steady State 5.9 ppm	Clear 84°F
7/9/2020	8:00	Outside GWTP Office	3890 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 82°F
7/9/2020	8:00	Downwind	3890 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 82°F
7/9/2020	8:00	Stripper	3890 ACFM	MiniRAE 3000	Kennie Moore	Max. 23.1 ppm Steady State 6.9 ppm	Clear 82°F
7/9/2020	12:00	Outside GWTP Office	3715 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 88°F
7/9/2020	12:00	Downwind	3715 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 88°F
7/9/2020	12:00	Stripper	3715 ACFM	MiniRAE 3000	Kennie Moore	Max. 22.7 ppm Steady State 5.6 ppm	Clear 88°F
7/13/2020	8:00	Outside GWTP Office	3865 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 80°F
7/13/2020	8:00	Downwind	3865 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 80°F
7/13/2020	8:00	Stripper	3865 ACFM	MiniRAE 3000	Kennie Moore	Max. 23.3 ppm Steady State 7.1 ppm	Clear 80°F
7/13/2020	14:00	Outside GWTP Office	3670 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 91°F
7/13/2020	14:00	Downwind	3670 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 91°F
7/13/2020	14:00	Stripper	3670 ACFM	MiniRAE 3000	Kennie Moore	Max. 22.5 ppm Steady State 6.3 ppm	Clear 91°F
7/16/2020	8:00	Outside GWTP Office	3795 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 81°F
7/16/2020	8:00	Downwind	3795 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 81°F
7/16/2020	8:00	Stripper	3795 ACFM	MiniRAE 3000	Kennie Moore	Max. 22.8 ppm Steady State 7.1 ppm	Clear 81°F
7/16/2020	12:00	Outside GWTP Office	3640 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 93°F
7/16/2020	12:00	Downwind	3640 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 93°F
7/16/2020	12:00	Stripper	3640 ACFM	MiniRAE 3000	Kennie Moore	Max. 21.7 ppm Steady State 6.3 ppm	Clear 93°F
7/20/2020	8:00	Outside GWTP Office	3870 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 83°F
7/20/2020	8:00	Downwind	3870 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 83°F
7/20/2020	8:00	Stripper	3870 ACFM	MiniRAE 3000	Kennie Moore	Max. 23.0 ppm Steady State 6.6 ppm	Clear 83°F
7/20/2020	14:00	Outside GWTP Office	3663 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 94°F
7/20/2020	14:00	Downwind	3663 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 94°F
7/20/2020	14:00	Stripper	3663 ACFM	MiniRAE 3000	Kennie Moore	Max. 21.8 ppm Steady State 5.0 ppm	Clear 94°F
7/23/2020	8:00	Outside GWTP Office	3820 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 76°F
7/23/2020	8:00	Downwind	3820 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 76°F
7/23/2020	8:00	Stripper	3820 ACFM	MiniRAE 3000	Kennie Moore	Max. 22.9 ppm Steady State 7.1 ppm	Clear 76°F
7/23/2020	12:00	Outside GWTP Office	3695 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 91°F
7/23/2020	12:00	Downwind	3695 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 91°F
7/23/2020	12:00	Stripper	3695 ACFM	MiniRAE 3000	Kennie Moore	Max. 21.4 ppm Steady State 6.3 ppm	Clear 91°F
7/27/2020	8:00	Outside GWTP Office	3845 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 74°F
7/27/2020	8:00	Downwind	3845 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 74°F
7/27/2020	8:00	Stripper	3845 ACFM	MiniRAE 3000	Kennie Moore	Max. 22.7 ppm Steady State 6.9 ppm	Clear 74°F
7/27/2020	14:00	Outside GWTP Office	3615 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 86°F
7/27/2020	14:00	Downwind	3615 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 86°F

Attachment 2; Table 1: PID Readings at the LHAAP Groundwater Treatment Plant

Date	Time	Location	Air Flow Rate at Blower	Instrument ID	Person Collecting	PID Reading	Weather Conditions
7/27/2020	14:00	Stripper	3615 ACFM	MiniRAE 3000	Kennie Moore	Max. 22.1 ppm Steady State 5.6 ppm	Clear 86°F
7/30/2020	8:00	Outside GWTP Office	3723 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 79°F
7/30/2020	8:00	Downwind	3723 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 79°F
7/30/2020	8:00	Stripper	3723 ACFM	MiniRAE 3000	Kennie Moore	Max. 24.5 ppm Steady State 8.1 ppm	Clear 79°F
7/30/2020	12:00	Outside GWTP Office	3574 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 84°F
7/30/2020	12:00	Downwind	3574 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 84°F
7/30/2020	12:00	Stripper	3574 ACFM	MiniRAE 3000	Kennie Moore	Max. 22.9 ppm Steady State 7.0 ppm	Clear 84°F
8/4/2020	8:00	Outside GWTP Office	3723 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 70°F
8/4/2020	8:00	Downwind	3723 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 70°F
8/4/2020	8:00	Stripper	3723 ACFM	MiniRAE 3000	Kennie Moore	Max. 24.3 ppm Steady State 6.5 ppm	Clear 70°F
8/4/2020	14:00	Outside GWTP Office	3533 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 90°F
8/4/2020	14:00	Downwind	3533 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 90°F
8/4/2020	14:00	Stripper	3533 ACFM	MiniRAE 3000	Kennie Moore	Max. 23.5 ppm Steady State 5.9 ppm	Clear 90°F
8/6/2020	8:00	Outside GWTP Office	3850 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 72°F
8/6/2020	8:00	Downwind	3850 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 72°F
8/6/2020	8:00	Stripper	3850 ACFM	MiniRAE 3000	Kennie Moore	Max. 22.6 ppm Steady State 6.3 ppm	Clear 72°F
8/6/2020	12:00	Outside GWTP Office	3640 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 80°F
8/6/2020	12:00	Downwind	3640 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 80°F
8/6/2020	12:00	Stripper	3640 ACFM	MiniRAE 3000	Kennie Moore	Max. 21.4 ppm Steady State 5.1 ppm	Clear 80°F
8/10/2020	8:00	Outside GWTP Office	3865 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 81°F
8/10/2020	8:00	Downwind	3865 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 81°F
8/10/2020	8:00	Stripper	3865 ACFM	MiniRAE 3000	Kennie Moore	Max. 23.3 ppm Steady State 6.9 ppm	Clear 81°F
8/10/2020	14:00	Outside GWTP Office	3640 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 94°F
8/10/2020	14:00	Downwind	3640 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 94°F
8/10/2020	14:00	Stripper	3640 ACFM	MiniRAE 3000	Kennie Moore	Max. 21.1 ppm Steady State 5.3 ppm	Clear 94°F
8/13/2020	8:00	Outside GWTP Office	3815 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 82°F
8/13/2020	8:00	Downwind	3815 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 82°F
8/13/2020	8:00	Stripper	3815 ACFM	MiniRAE 3000	Kennie Moore	Max. 22.6 ppm Steady State 6.7 ppm	Clear 82°F
8/13/2020	12:00	Outside GWTP Office	3602 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 93°F
8/13/2020	12:00	Downwind	3602 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 93°F
8/13/2020	12:00	Stripper	3602 ACFM	MiniRAE 3000	Kennie Moore	Max. 23.9 ppm Steady State 7.3 ppm	Clear 93°F
8/17/2020	8:00	Outside GWTP Office	3825 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 72°F
8/17/2020	8:00	Downwind	3825 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 72°F
8/17/2020	8:00	Stripper	3825 ACFM	MiniRAE 3000	Kennie Moore	Max. 22.7 ppm Steady State 6.3 ppm	Clear 72°F
8/17/2020	14:00	Outside GWTP Office	3505 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 92°F
8/17/2020	14:00	Downwind	3505 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 92°F
8/17/2020	14:00	Stripper	3505 ACFM	MiniRAE 3000	Kennie Moore	Max. 23.8 ppm Steady State 6.8 ppm	Clear 92°F

Attachment 2; Table 1: PID Readings at the LHAAP Groundwater Treatment Plant

Date	Time	Location	Air Flow Rate at Blower	Instrument ID	Person Collecting	PID Reading	Weather Conditions
8/20/2020	8:00	Outside GWTP Office	3621 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 65°F
8/20/2020	8:00	Downwind	3621 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 65°F
8/20/2020	8:00	Stripper	3621 ACFM	MiniRAE 3000	Kennie Moore	Max. 20.7 ppm Steady State 5.0 ppm	Clear 65°F
8/20/2020	12:00	Outside GWTP Office	3396 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 87°F
8/20/2020	12:00	Downwind	3396 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 87°F
8/20/2020	12:00	Stripper	3396 ACFM	MiniRAE 3000	Kennie Moore	Max. 21.9 ppm Steady State 5.5 ppm	Clear 87°F
8/24/2020	8:00	Outside GWTP Office	3606 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 66°F
8/24/2020	8:00	Downwind	3606 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 66°F
8/24/2020	8:00	Stripper	3606 ACFM	MiniRAE 3000	Kennie Moore	Max. 21.7 ppm Steady State 4.9 ppm	Clear 66°F
8/24/2020	14:00	Outside GWTP Office	3371 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 92°F
8/24/2020	14:00	Downwind	3371 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 92°F
8/24/2020	14:00	Stripper	3371 ACFM	MiniRAE 3000	Kennie Moore	Max. 23.1 ppm Steady State 5.4 ppm	Clear 92°F
8/26/2020	8:00	Outside GWTP Office	3655 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 82°F
8/26/2020	8:00	Downwind	3655 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 82°F
8/26/2020	8:00	Stripper	3655 ACFM	MiniRAE 3000	Kennie Moore	Max. 23.3 ppm Steady State 6.9 ppm	Clear 82°F
8/26/2020	12:00	Outside GWTP Office	3312 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Clear 88°F
8/26/2020	12:00	Downwind	3312 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Clear 88°F
8/26/2020	12:00	Stripper	3312 ACFM	MiniRAE 3000	Scott Beesinger	Max. 21.1 ppm Steady State 5.6 ppm	Clear 88°F
8/31/2020	8:00	Outside GWTP Office	3464 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 66°F
8/31/2020	8:00	Downwind	3464 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 66°F
8/31/2020	8:00	Stripper	3464 ACFM	MiniRAE 3000	Kennie Moore	Max. 24.7 ppm Steady State 7.4 ppm	Clear 66°F
8/31/2020	14:00	Outside GWTP Office	3265 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 94°F
8/31/2020	14:00	Downwind	3265 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 94°F
8/31/2020	14:00	Stripper	3265 ACFM	MiniRAE 3000	Kennie Moore	Max. 23.4 ppm Steady State 6.6 ppm	Clear 94°F
9/3/2020	8:00	Outside GWTP Office	3871 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Cloudy 73°F
9/3/2020	8:00	Downwind	3871 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Cloudy 73°F
9/3/2020	8:00	Stripper	3871 ACFM	MiniRAE 3000	Kennie Moore	Max. 23.9 ppm Steady State 7.4 ppm	Cloudy 73°F
9/3/2020	12:00	Outside GWTP Office	3655 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Cloudy 78°F
9/3/2020	12:00	Downwind	3655 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Cloudy 78°F
9/3/2020	12:00	Stripper	3655 ACFM	MiniRAE 3000	Scott Beesinger	Max. 23.1 ppm Steady State 6.3 ppm	Cloudy 78°F
9/8/2020	8:00	Outside GWTP Office	3477 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 72°F
9/8/2020	8:00	Downwind	3477 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 72°F
9/8/2020	8:00	Stripper	3477 ACFM	MiniRAE 3000	Kennie Moore	Max. 24.7 ppm Steady State 8.3 ppm	Clear 72°F
9/8/2020	14:00	Outside GWTP Office	3229 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 90°F
9/8/2020	14:00	Downwind	3229 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 90°F
9/8/2020	14:00	Stripper	3229 ACFM	MiniRAE 3000	Kennie Moore	Max. 22.6 ppm Steady State 6.5 ppm	Clear 90°F
9/10/2020	8:00	Outside GWTP Office	3458 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 75°F
9/10/2020	8:00	Downwind	3458 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 75°F

Attachment 2; Table 1: PID Readings at the LHAAP Groundwater Treatment Plant

Date	Time	Location	Air Flow Rate at Blower	Instrument ID	Person Collecting	PID Reading	Weather Conditions
9/10/2020	8:00	Stripper	3458 ACFM	MiniRAE 3000	Kennie Moore	Max. 22.2 ppm Steady State 5.4 ppm	Clear 75°F
9/10/2020	12:00	Outside GWTP Office	3255 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Clear 83°F
9/10/2020	12:00	Downwind	3255 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Clear 83°F
9/10/2020	12:00	Stripper	3255 ACFM	MiniRAE 3000	Scott Beesinger	Max. 24.9 ppm Steady State 7.7 ppm	Clear 83°F
9/14/2020	8:00	Outside GWTP Office	3425 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 73°F
9/14/2020	8:00	Downwind	3425 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 73°F
9/14/2020	8:00	Stripper	3425 ACFM	MiniRAE 3000	Kennie Moore	Max. 24.4 ppm Steady State 6.1 ppm	Clear 73°F
9/14/2020	14:00	Outside GWTP Office	3243 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 84°F
9/14/2020	14:00	Downwind	3243 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 84°F
9/14/2020	14:00	Stripper	3243 ACFM	MiniRAE 3000	Kennie Moore	Max. 22.3 ppm Steady State 5.7 ppm	Clear 84°F
9/17/2020	8:00	Outside GWTP Office	3412 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 73°F
9/17/2020	8:00	Downwind	3412 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 73°F
9/17/2020	8:00	Stripper	3412 ACFM	MiniRAE 3000	Kennie Moore	Max. 22.0 ppm Steady State 5.5 ppm	Clear 73°F
9/17/2020	12:00	Outside GWTP Office	3235 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Clear 83°F
9/17/2020	12:00	Downwind	3235 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Clear 83°F
9/17/2020	12:00	Stripper	3235 ACFM	MiniRAE 3000	Scott Beesinger	Max. 23.7 ppm Steady State 6.1 ppm	Clear 83°F
9/21/2020	8:00	Outside GWTP Office	3479 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Cloudy 70°F
9/21/2020	8:00	Downwind	3479 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Cloudy 70°F
9/21/2020	8:00	Stripper	3479 ACFM	MiniRAE 3000	Kennie Moore	Max. 24.9 ppm Steady State 7.3 ppm	Cloudy 70°F
9/21/2020	14:00	Outside GWTP Office	3206 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Rain 67°F
9/21/2020	14:00	Downwind	3206 ACFM	MiniRAE 3000	Scott Beesinger	0.0 ppm	Rain 67°F
9/21/2020	14:00	Stripper	3206 ACFM	MiniRAE 3000	Scott Beesinger	Max. 22.5 ppm Steady State 6.7 ppm	Rain 67°F
9/24/2020	8:00	Outside GWTP Office	3515 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Cloudy 62°F
9/24/2020	8:00	Downwind	3515 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Cloudy 62°F
9/24/2020	8:00	Stripper	3515 ACFM	MiniRAE 3000	Kennie Moore	Max. 23.3 ppm Steady State 7.1 ppm	Cloudy 62°F
9/24/2020	12:00	Outside GWTP Office	3256 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Cloudy 69°F
9/24/2020	12:00	Downwind	3256 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Cloudy 69°F
9/24/2020	12:00	Stripper	3256 ACFM	MiniRAE 3000	Kennie Moore	Max. 21.3 ppm Steady State 5.9 ppm	Cloudy 69°F
9/28/2020	8:00	Outside GWTP Office	3431 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 62°F
9/28/2020	8:00	Downwind	3431 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 62°F
9/28/2020	8:00	Stripper	3431 ACFM	MiniRAE 3000	Kennie Moore	Max. 24.9 ppm Steady State 7.7 ppm	Clear 62°F
9/28/2020	14:00	Outside GWTP Office	3239 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 77°F
9/28/2020	14:00	Downwind	3239 ACFM	MiniRAE 3000	Kennie Moore	0.0 ppm	Clear 77°F
9/28/2020	14:00	Stripper	3239 ACFM	MiniRAE 3000	Kennie Moore	Max. 22.2 ppm Steady State 6.6 ppm	Clear 77°F

00989005

EQUIPMENT CALIBRATION DAILY LOG

Date:	7/1/20	Project Name:	LHAAP - GWTP
Project Number:	NW01312.0150	Recorded By:	Scott Bassinger

PID

Model: Mini RAE 3000 Bulb: ~~10.6~~ 11.7 eV

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time: 0645	Time:	Time:
					Initials: SB	Initials:	Initials:
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Value: TO 24m SB	Value:	Value:
Second Point Calibration	Vapor conc. (ppm)	100 ppm (isobutylene)	10/5/24	JBH-248-100-19	Value: SB	Value:	Value:

COMB. GAS/O_2 METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration	O2 (%)				Value:	Value:	Value:
	% LEL Pentane				Value:	Value:	Value:

WATER QUALITY METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration (Auto)	pH	4.00			Value:	Value:	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:

00989006

EQUIPMENT CALIBRATION DAILY LOG

Date:	7/9/20	Project Name:	LHAAP-GWTP
Project Number:	NW01312.0150	Recorded By:	Scott Bassinger

					Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
PID	Model: Mini RAE 3000		Bulb: 11.7 ~~10.6~~ meV				
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot#	Time: 0630	Time:	Time:
					Initials: SB	Initials:	Initials:
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Value: TO ZERO SB	Value:	Value:
Second Point Calibration	Vapor conc. (ppm)	100 ppm (isobutylene)	10/5/21	JBH-248-100-19	Value: SB	Value:	Value:

					Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
COMB. GAS/O_2 METER	Model:						
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot#	Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration	O2 (%)				Value:	Value:	Value:
	% LEL Pentane				Value:	Value:	Value:

					Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
WATER QUALITY METER	Model:						
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot#	Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration (Auto)	pH	4.00			Value:	Value:	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:

00989007

EQUIPMENT CALIBRATION DAILY LOG

Date:	7/13/20	Project Name:	LHAAP-GWTP
Project Number:	NW01312.0150	Recorded By:	Scott Bassinger

					Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
PID	Model: Mini Rae 3000		Bulb: 10.6 eV				
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot#	Time: 0630	Time:	Time:
					Initials: SB	Initials:	Initials:
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Value: TO zero SB	Value:	Value:
Second Point Calibration	Vapor conc. (ppm)	100 ppm (isobutylene)	10/5/21	UBH-248-100-19	Value: SB	Value:	Value:

					Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
COMB. GAS/O_2 METER	Model:						
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot#	Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration	O2 (%)				Value:	Value:	Value:
	% LEL Pentane				Value:	Value:	Value:

					Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
WATER QUALITY METER	Model:						
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot#	Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration (Auto)	pH	4.00			Value:	Value:	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:

00989008

EQUIPMENT CALIBRATION DAILY LOG

Date:	7/16/20	Project Name:	LHAAP - GWTP
Project Number:	NWD1312.0150	Recorded By:	Scott Bassinger

PID

Model: Mini RAE 3000 Bulb: 10.7 ~~10.6~~ eV

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time: 0700	Time:	Time:
					Initials: SB	Initials:	Initials:
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Value: TO ZERO SB	Value:	Value:
Second Point Calibration	Vapor conc. (ppm)	100 ppm (isobutylene)	10/5/21	JBH-248-100-19	Value: SB	Value:	Value:

COMB. GAS/O_2 METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration	O2 (%)				Value:	Value:	Value:
	% LEL Pentane				Value:	Value:	Value:

WATER QUALITY METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration (Auto)	pH	4.00			Value:	Value:	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:

00989009

EQUIPMENT CALIBRATION DAILY LOG

Date:	7/20/20	Project Name:	LHAAP - GWTP
Project Number:	NW01312.0150	Recorded By:	Scott Bassinger

PID

Model: Mini RAE 3000 Bulb: 10.7 ~~10.6~~ eV

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time: 0650	Time:	Time:
					Initials: SB	Initials:	Initials:
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Value: TO ZERO SB	Value:	Value:
Second Point Calibration	Vapor conc. (ppm)	100 ppm (isobutylene)	10/5/21	JBH-248-100-19	Value: SB	Value:	Value:

COMB. GAS/O_2 METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration	O2 (%)				Value:	Value:	Value:
	% LEL Pentane				Value:	Value:	Value:

WATER QUALITY METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration (Auto)	pH	4.00			Value:	Value:	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:

00989010

EQUIPMENT CALIBRATION DAILY LOG

Date:	7/23/20	Project Name:	LHAAP-GWTP
Project Number:	NW01312.0150	Recorded By:	Scott Boesinger

PID					Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
Model: Mini RAE 3000			Bulb: 10.7 ~~10.6~~ eV				
Equipment ID #:							
	Parameter	Standard	Exp. Date	Lot#	Time: 0640	Time:	Time:
					Initials: SB	Initials:	Initials:
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Value: TOZERO SB	Value:	Value:
Second Point Calibration	Vapor conc. (ppm)	100 ppm (isobutylene)	10/5/21	JBH-248-100-19	Value: SB	Value:	Value:

COMB. GAS/O_2 METER					Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
Model:							
Equipment ID #:							
	Parameter	Standard	Exp. Date	Lot#	Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration	O2 (%)				Value:	Value:	Value:
	% LEL Pentane				Value:	Value:	Value:

WATER QUALITY METER					Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
Model:							
Equipment ID #:							
	Parameter	Standard	Exp. Date	Lot#	Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration (Auto)	pH	4.00			Value:	Value:	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:	07/27/20	Project Name:	LHAAP - GWTP
Project Number:	NWD1312.0150	Recorded By:	Scott Boasinger

PID

Model: mini RAE 3000 Bulb: 11.7 ~~10.6~~ meV

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time: 0635	Time:	Time:
					Initials: SB	Initials:	Initials:
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Value: TO ZERO SB	Value:	Value:
Second Point Calibration	Vapor conc. (ppm)	100 ppm (isobutylene)	10/5/21	JBH-248-100-19	Value: SB	Value:	Value:

COMB. GAS/O_2 METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration	O2 (%)				Value:	Value:	Value:
	% LEL Pentane				Value:	Value:	Value:

WATER QUALITY METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration (Auto)	pH	4.00			Value:	Value:	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 Pt. 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:

00989012

EQUIPMENT CALIBRATION DAILY LOG

Date:	7/30/20	Project Name:	LHAAP - GWTP
Project Number:	NW01312.0150	Recorded By:	Scott Boesinger

PID

Model: Mini Rae 3000 Bulb: 10.7 ~~10.6~~ eV

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time: 0645	Time:	Time:
					Initials: SB	Initials:	Initials:
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Value: TO ZERO SB	Value:	Value:
Second Point Calibration	Vapor conc. (ppm)	100 ppm (isobutylene)	10/5/21	JBH-248-100-19	Value: SB	Value:	Value:

COMB. GAS/O_2 METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration	O2 (%)				Value:	Value:	Value:
	% LEL Pentane				Value:	Value:	Value:

WATER QUALITY METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration (Auto)	pH	4.00			Value:	Value:	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:

00989013

EQUIPMENT CALIBRATION DAILY LOG

Date:	8/4/20	Project Name:	LHAAP-GWTP
Project Number:	NW01312.0150	Recorded By:	Scott Bassinger

PID

Model: Mini Rae 3000 Bulb: 10.7 ~~10.6~~ meV

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time: 0630	Time:	Time:
					Initials: SB	Initials:	Initials:
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Value: TO ZERO SB	Value:	Value:
Second Point Calibration	Vapor conc. (ppm)	100 ppm (Isobutylene)	10/5/21	JBH-248-100-19	Value: SB	Value:	Value:

COMB. GAS/O_2 METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration	O2 (%)				Value:	Value:	Value:
	% LEL Pentane				Value:	Value:	Value:

WATER QUALITY METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration (Auto)	pH	4.00			Value:	Value:	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:

00989014

EQUIPMENT CALIBRATION DAILY LOG

Date:	8/6/20	Project Name:	LHAAP-GWTP
Project Number:	NW01312.0150	Recorded By:	Scott Beasinger

PID

Model: mini RAE 3000 Bulb: 11.7 ~~10.6~~ eV

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time: 0620	Time:	Time:
					Initials: SB	Initials:	Initials:
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Value: TO ZERO SB	Value:	Value:
Second Point Calibration	Vapor conc. (ppm)	100 ppm (isobutylene)	10/5/21	JBH-248-100-19	Value: SB	Value:	Value:

COMB. GAS/O_2 METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration	O2 (%)				Value:	Value:	Value:
	% LEL Pentane				Value:	Value:	Value:

WATER QUALITY METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration (Auto)	pH	4.00			Value:	Value:	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:

00989015

EQUIPMENT CALIBRATION DAILY LOG

Date:	8/10/20	Project Name:	LHAAP-GWTP
Project Number:	NW01312.0150	Recorded By:	Scott Boesinger

PID

Model: Mini RAE 3000 Bulb: 10.7 ~~10.6~~ eV

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time: 0645	Time:	Time:
					Initials: SB	Initials:	Initials:
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Value: TO ZERO SB	Value:	Value:
Second Point Calibration	Vapor conc. (ppm)	100 ppm (isobutylene)	10/5/21	JBH-248-100-19	Value: SB	Value:	Value:

COMB. GAS/O_2 METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration	O2 (%)				Value:	Value:	Value:
	% LEL Pentane				Value:	Value:	Value:

WATER QUALITY METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration (Auto)	pH	4.00			Value:	Value:	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:

00989016

EQUIPMENT CALIBRATION DAILY LOG

Date: 8/13/20

Project Number: NW01312.0150

Project Name: LHAAP-GWTP

Recorded By: Scott Boesinger

PID

Model: mini RAE 3000 Bulb: 10.7 ~~10.6~~ meV

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time: 0635	Time:	Time:
					Initials: SB	Initials:	Initials:
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Value: TO ZERO SB	Value:	Value:
Second Point Calibration	Vapor conc. (ppm)	100 ppm (isobutylene)	10/5/21	JBH-248-100-19	Value: SB	Value:	Value:

COMB. GAS/O_2 METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration	O2 (%)				Value:	Value:	Value:
	% LEL Pentane				Value:	Value:	Value:

WATER QUALITY METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration (Auto)	pH	4.00			Value:	Value:	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:

00989017

EQUIPMENT CALIBRATION DAILY LOG

Date:	8/17/20	Project Name:	LHAAP-GWTP
Project Number:	NW01312.0150	Recorded By:	Scott Boesinger

PID

Model: MiniRAE 3000 Bulb: 10.7 ~~10.6~~ eV

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time: 0650	Time:	Time:
					Initials: SB	Initials:	Initials:
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Value: TO ZERO SB	Value:	Value:
Second Point Calibration	Vapor conc. (ppm)	100 ppm (isobutylene)	10/5/21	JBH-248-100-19	Value: SB	Value:	Value:

COMB. GAS/O_2 METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration	O2 (%)				Value:	Value:	Value:
	% LEL Pentane				Value:	Value:	Value:

WATER QUALITY METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration (Auto)	pH	4.00			Value:	Value:	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:

00989018

EQUIPMENT CALIBRATION DAILY LOG

Date:	8/20/20	Project Name:	LHAAP - GWTP
Project Number:	NW01312.0150	Recorded By:	Scott Bassinger

					Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
PID	Model: Mini Rae 3000		Bulb: 11.7 ~~10.6~~ meV				
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot#	Time: 0630	Time:	Time:
					Initials: SB	Initials:	Initials:
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Value: TO 0.0 SB	Value:	Value:
Second Point Calibration	Vapor conc. (ppm)	100 ppm (isobutylene)	10/5/21	JBH-248-100-19	Value: SB	Value:	Value:

					Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
COMB. GAS/O_2 METER	Model:						
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot#	Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration	O2 (%)				Value:	Value:	Value:
	% LEL Pentane				Value:	Value:	Value:

					Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
WATER QUALITY METER	Model:						
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot#	Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration (Auto)	pH	4.00			Value:	Value:	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:

00989019

EQUIPMENT CALIBRATION DAILY LOG

Date:	8/24/20	Project Name:	LHAAP-GWTP
Project Number:	NW013I2.0150	Recorded By:	Scott Boesinger

PID

Model: Mini Rae 3000 Bulb: 10.7 ~~10.6~~ eV

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time: 0650	Time:	Time:
					Initials: SB	Initials:	Initials:
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Value: TO 24.0 SB	Value:	Value:
Second Point Calibration	Vapor conc. (ppm)	100 ppm (Isobutylene)	10/5/21	JBH-248-100-19	Value: SB	Value:	Value:

COMB. GAS/O_2 METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration	O2 (%)				Value:	Value:	Value:
	% LEL Pentane				Value:	Value:	Value:

WATER QUALITY METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration (Auto)	pH	4.00			Value:	Value:	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:

00989020

EQUIPMENT CALIBRATION DAILY LOG

Date:	8/26/20	Project Name:	LHAAP-GWTP
Project Number:	NW01312.0150	Recorded By:	Scott Boesinger

PID

Model: Mini RAE 3000 Bulb: ~~10.6~~ 11.7 eV

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time: 0635	Time:	Time:
					Initials: SB	Initials:	Initials:
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Value: TOZERO SB	Value:	Value:
Second Point Calibration	Vapor conc. (ppm)	100 ppm (isobutylene)	10/5/21	JBH-248-100-19	Value: SB	Value:	Value:

COMB. GAS/O_2 METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration	O2 (%)				Value:	Value:	Value:
	% LEL Pentane				Value:	Value:	Value:

WATER QUALITY METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration (Auto)	pH	4.00			Value:	Value:	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:

00989021

EQUIPMENT CALIBRATION DAILY LOG

Date:	8/31/20	Project Name:	LHAAP-GWTP
Project Number:	NW01312.0150	Recorded By:	Scott Baysinger

PID

Model: Mini Rae 3000 Bulb: ~~10.6~~ 11.7 eV

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time: 0620	Time:	Time:
					Initials: SB	Initials:	Initials:
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Value: TOZERO SB	Value:	Value:
Second Point Calibration	Vapor conc. (ppm)	100 ppm (isobutylene)	10/5/21	JBH-248-100-19	Value: SB	Value:	Value:

COMB. GAS/O_2 METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration	O2 (%)				Value:	Value:	Value:
	% LEL Pentane				Value:	Value:	Value:

WATER QUALITY METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration (Auto)	pH	4.00			Value:	Value:	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:

00989022

EQUIPMENT CALIBRATION DAILY LOG

Date:	9/3/20	Project Name:	LHAAP-GWTP
Project Number:	NW01312.0150	Recorded By:	Scott Baysinger

						Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
PID	Model: Mini RAE 3000		Bulb: 11.7 ~~10.6~~ eV			Time: 0630	Time:	Time:
	Equipment ID #:					Initials: SB	Initials:	Initials:
	Parameter	Standard	Exp. Date	Lot#				
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA		Value: TO zero SB	Value:	Value:
Second Point Calibration	Vapor conc. (ppm)	100 ppm (isobutylene)	10/5/21	UBH-248-100-19		Value: SB	Value:	Value:

					Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
COMB. GAS/O_2 METER	Model:						
	Equipment ID #:				Time:	Time:	Time:
	Parameter	Standard	Exp. Date	Lot#	Initials:	Initials:	Initials:
First Point Calibration	O2 (%)				Value:	Value:	Value:
	% LEL Pentane				Value:	Value:	Value:

					Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
WATER QUALITY METER	Model:						
	Equipment ID #:				Time:	Time:	Time:
	Parameter	Standard	Exp. Date	Lot#	Initials:	Initials:	Initials:
First Point Calibration (Auto)	pH	4.00			Value:	Value:	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:

00989023

EQUIPMENT CALIBRATION DAILY LOG

Date:	9/8/20	Project Name:	LHAAP - GWTP
Project Number:	NW01312.0150	Recorded By:	Scott Boesinger

PID

Model: Mini RAE 3000 Bulb: 10.7 ~~10.6~~ meV

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time: 0625	Time:	Time:
					Initials: SB	Initials:	Initials:
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Value: TO ZERO SB	Value:	Value:
Second Point Calibration	Vapor conc. (ppm)	100 ppm (isobutylene)	10/5/21	JBH-248-100-19	Value: SB	Value:	Value:

COMB. GAS/O_2 METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration	O2 (%)				Value:	Value:	Value:
	% LEL Pentane				Value:	Value:	Value:

WATER QUALITY METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration (Auto)	pH	4.00			Value:	Value:	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 Pt. 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:

00989024

EQUIPMENT CALIBRATION DAILY LOG

Date:	9/10/20	Project Name:	LHAAP - GWTP
Project Number:	NW01312.0150	Recorded By:	Scott Boesinger

PID

Model: Mini RAE 3000 Bulb: 10.7 ~~10.6~~ eV

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time: 0640	Time:	Time:
					Initials: SB	Initials:	Initials:
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Value: TO ZERO SB	Value:	Value:
Second Point Calibration	Vapor conc. (ppm)	100 ppm (isobutylene)	10/5/21	JBH-248-100-19	Value: SB	Value:	Value:

COMB. GAS/O_2 METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration	O2 (%)				Value:	Value:	Value:
	% LEL Pentane				Value:	Value:	Value:

WATER QUALITY METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration (Auto)	pH	4.00			Value:	Value:	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:

00989025

EQUIPMENT CALIBRATION DAILY LOG

Date:	9/14/20	Project Name:	LHAAP-GWTP
Project Number:	NWD1312.0150	Recorded By:	Scott Bassinger

					Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
PID	Model: Mini Rae 3000		Bulb: 11.7 ~~10.6~~ eV				
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot#	Time: 0615	Time:	Time:
					Initials: SB	Initials:	Initials:
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Value: TO ZERO SB	Value:	Value:
Second Point Calibration	Vapor conc. (ppm)	100 ppm (isobutylene)	10/5/21	JBH-248-100-19	Value: SB	Value:	Value:

					Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
COMB. GAS/O_2 METER	Model:						
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot#	Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration	O2 (%)				Value:	Value:	Value:
	% LEL Pentane				Value:	Value:	Value:

					Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
WATER QUALITY METER	Model:						
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot#	Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration (Auto)	pH	4.00			Value:	Value:	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:

00989026

EQUIPMENT CALIBRATION DAILY LOG

Date:	9/17/20	Project Name:	LHAAP - GWTP
Project Number:	NW01312.0150	Recorded By:	Scott Boasinger

PID

Model: Mini Rae 3000 Bulb: 11.7 ~~10.6~~ meV

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time: 0645	Time:	Time:
					Initials: SB	Initials:	Initials:
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Value: TO ZERO SB	Value:	Value:
Second Point Calibration	Vapor conc. (ppm)	100 ppm (isobutylene)	10/5/21	JBH-248-100-19	Value: SB	Value:	Value:

COMB. GAS/O_2 METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration	O2 (%)				Value:	Value:	Value:
	% LEL Pentane				Value:	Value:	Value:

WATER QUALITY METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration (Auto)	pH	4.00			Value:	Value:	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:

00989027

EQUIPMENT CALIBRATION DAILY LOG

Date:	9/21/20	Project Name:	LHAAP - GWTP
Project Number:	NW013I2.0150	Recorded By:	Scott Boesinger

						Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
PID	Model: Mini RAE 3000		Bulb: ~~10.6~~ 11.7 eV					
	Equipment ID #:							
	Parameter	Standard	Exp. Date	Lot#		Time: 0650	Time:	Time:
						Initials: SB	Initials:	Initials:
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA		Value: TO ZERO SB	Value:	Value:
Second Point Calibration	Vapor conc. (ppm)	100 ppm (isobutylene)	10/5/21	JBH-248-100-19		Value: SB	Value:	Value:

					Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
COMB. GAS/O_2 METER	Model:						
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot#	Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration	O2 (%)				Value:	Value:	Value:
	% LEL Pentane				Value:	Value:	Value:

					Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
WATER QUALITY METER	Model:						
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot#	Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration (Auto)	pH	4.00			Value:	Value:	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:

00989028

EQUIPMENT CALIBRATION DAILY LOG

Date:	9/24/20	Project Name:	LHAAP - GWTP
Project Number:	NW01312.0150	Recorded By:	Scott Boesinger

PID

Model: Mini RAE 3000 Bulb: 10.6 eV

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time: 0645	Time:	Time:
					Initials: SB	Initials:	Initials:
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Value: TO ZERO SB	Value:	Value:
Second Point Calibration	Vapor conc. (ppm)	100 ppm (isobutylene)	10/5/21	JBH-248-100-19	Value: SB	Value:	Value:

COMB. GAS/O_2 METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration	O2 (%)				Value:	Value:	Value:
	% LEL Pentane				Value:	Value:	Value:

WATER QUALITY METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration (4.00)	pH	4.00			Value:	Value:	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:

00989029

EQUIPMENT CALIBRATION DAILY LOG

Date: 9/28/20

Project Number: NW01312.0150

Project Name: LHAAP-GWTP

Recorded By: Scott Baessinger

PID

Model: M.i. RAE 3000 Bulb: ~~10.6~~ 11.7 meV

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time: 0630	Time:	Time:
					Initials: SB	Initials:	Initials:
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Value: TOZERO SB	Value:	Value:
Second Point Calibration	Vapor conc. (ppm)	100 ppm (isobutylene)	10/5/21	JBH-248-100-19	Value: SB	Value:	Value:

COMB. GAS/O_2 METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration	Evening Check	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration	O2 (%)				Value:	Value:	Value:
	% LEL Pentane				Value:	Value:	Value:

WATER QUALITY METER

Model:

Equipment ID #:

	Parameter	Standard	Exp. Date	Lot#	Morning Calibration/Check	Evening Check (one point only)	Additional Calib./Check (if necessary)
					Time:	Time:	Time:
					Initials:	Initials:	Initials:
First Point Calibration (Auto)	pH	4.00			Value:	Value:	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:

ATTACHMENT 3: AIR ANALYTICAL LABORATORY REPORT

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2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
www.alsglobal.com

LABORATORY REPORT

September 10, 2020

Marcia Olive
Bhate Environmental Associates, Inc.
445 Union Blvd Suite 129
Lakewood, CO 80228

RE: LHAAP GWTP / NW01312.0150

Dear Marcia:

Enclosed are the results of the sample submitted to our laboratory on August 24, 2020. For your reference, these analyses have been assigned our service request number P2004706.

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. 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.

Respectfully submitted,

ALS | Environmental

By Sue Anderson at 6:03 pm, Sep 10, 2020

Sue Anderson
Project Manager

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
www.alsglobal.com

Client: Bhate Environmental Associates, Inc. Service Request No: P2004706
Project: LHAAP GWTP / NW01312.0150

CASE NARRATIVE

The samples were received intact under chain of custody on August 24, 2020 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 containers were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. For projects requiring DoD QSM 5.1 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.

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
www.alsglobal.com

ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
Alaska DEC	http://dec.alaska.gov/eh/lab.aspx	17-019
Arizona DHS	http://www.azdhs.gov/preparedness/state-laboratory/lab-licensure-certification/index.php#laboratory-licensure-home	AZ0694
Florida DOH (NELAP)	http://www.floridahealth.gov/licensing-and-regulation/environmental-laboratories/index.html	E871020
Louisiana DEQ (NELAP)	http://www.deq.louisiana.gov/page/la-lab-accreditation	05071
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/professionals/labCert.shtml	2018027
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	1776326
New Jersey DEP (NELAP)	http://www.nj.gov/dep/enforcement/oqa.html	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://www.oregon.gov/oha/ph/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-007
Pennsylvania DEP	http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx	68-03307 (Registration)
PJLA (DoD ELAP)	http://www.pjlabs.com/search-accredited-labs	65818 (Testing)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/agency/qa/env_lab_accreditation.html	T104704413-19-10
Utah DOH (NELAP)	http://health.utah.gov/lab/lab_cert_env	CA016272019-10
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

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 www.alsglobal.com, or at the accreditation body's website.

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.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: Bhate Environmental Associates, Inc. Service Request: P2004706
Project ID: LHAAP GWTP / NW01312.0150

Date Received: 8/24/2020
Time Received: 09:30

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pfl (psig)	TO-15 - VOC Cans
LH18/24-AIR_081720_Stripper	P2004706-001	Air	8/17/2020	14:00	AC02365	0.03	4.10	X
LH18/24-AIR_081720_Stripper_a	P2004706-002	Air	8/17/2020	14:00	AS01355	-10.84	4.20	X
LH18/24-AIR_081720_GWTP	P2004706-003	Air	8/17/2020	14:15	AS01094	-0.38	3.80	X
LH18/24-AIR_081820_Downwind_North	P2004706-004	Air	8/18/2020	07:00	AS00122	0.69	4.60	X

00989036

Air - Chain of Custody Record & Analytical Service Request

Page 1 of 1

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161

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. P2004706

Company Name & Address (Reporting Information)	BHATE ENVIRONMENTAL 445 UNION BLVD. STE. 129 LAKEWOOD, CO. 80228
Project Name	LHAAP-GWTP
Project Number	NW01312.0150
Project Manager	Kim Nemmers
P.O. # / Billing Information	
Phone	205-918-4000
Fax	
Email Address for Result Reporting	mdive@bhate.com
Sampler (Print & Sign)	Scott Beesinger Scott Beesinger
ALS Contact:	

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	Analysis Method		Comments e.g. Actual Preservative or specific instructions
									TO-15		
1 LH18/24-Air-081720-Stripper		8/17/20	1400	AC02365		-30	0	6L	X		
2 LH18/24-Air-081720-Stripper-dup		8/17/20	1400	AS01355		-29	0	6L	X		
3 LH18/24-Air-081720-GWTP		8/17/20	1415	AS01094	FCR00580	-29	0	6L	X		
4 LH18/24-Air-081820-Downwind-North		8/18/20	0700	AS00122	FCR00495	-29	0	6L	X		

5 of 40

Report Tier Levels - please select

Tier I - Results (Default if not specified) _____ Tier III (Results + QC & Calibration Summaries) _____
Tier II (Results + QC Summaries) _____ Tier IV (Data Validation Package) 10% Surcharge _____

EDD required Yes / No
Type: _____ Units: _____

Chain of Custody Seal (Circle)
INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature) Scott Beesinger	Date: 8/18/20	Time: 0730	Received by: (Signature)	Date:	Time:	
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date: 8-24-20	Time: 0930	Cooler / Blank Temperature ____°C

ALS Environmental
Sample Acceptance Check Form

Client: Bhate Environmental Associates, Inc. Work order: P2004706

Project: LHAAP GWTP / NW01312.0150

Sample(s) received on: 08/24/20 Date opened: 08/24/20 by: ADAVID

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Did **sample containers** arrive in good condition?	☒	☐	☐
3	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
4	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
5	Was **sample volume** received adequate for analysis?	☒	☐	☐
6	Are samples within specified holding times?	☒	☐	☐
7	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
8	Were **custody seals** on outside of cooler/Box/Container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
9	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
10	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
11	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P2004706-001.01	6.0 L Ambient Can					
P2004706-002.01	6.0 L Silonite Can					
P2004706-003.01	6.0 L Silonite Can					
P2004706-004.01	6.0 L Silonite Can					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **LH18/24-AIR_081720_Stripper** ALS Project ID: P2004706
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P2004706-001

Test Code: EPA TO-15 Date Collected: 8/17/20
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 8/24/20
Analyst: Wida Ang Date Analyzed: 8/31/20
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.0050 Liter(s)
Test Notes:
Container ID: AC02365

Initial Pressure (psig): 0.03 Final Pressure (psig): 4.10

Canister Dilution Factor: 1.28

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	ND	140	ND	79	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	140	ND	27	
74-87-3	Chloromethane	ND	140	ND	66	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	140	ND	19	
75-01-4	Vinyl Chloride	**210**	140	**83**	54	
106-99-0	1,3-Butadiene	ND	140	ND	61	
74-83-9	Bromomethane	ND	140	ND	36	
75-00-3	Chloroethane	ND	140	ND	52	
64-17-5	Ethanol	ND	1,300	ND	710	
75-05-8	Acetonitrile	ND	140	ND	81	
107-02-8	Acrolein	ND	260	ND	110	
67-64-1	Acetone	ND	1,400	ND	570	
75-69-4	Trichlorofluoromethane (CFC 11)	ND	140	ND	24	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	540	ND	220	
107-13-1	Acrylonitrile	ND	140	ND	63	
75-35-4	1,1-Dichloroethene	**240**	140	**62**	35	
75-09-2	Methylene Chloride	**3,400**	140	**980**	39	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	140	ND	44	
76-13-1	Trichlorotrifluoroethane (CFC 113)	**23,000**	140	**3,000**	18	
75-15-0	Carbon Disulfide	ND	280	ND	90	
156-60-5	trans-1,2-Dichloroethene	ND	140	ND	35	
75-34-3	1,1-Dichloroethane	ND	140	ND	35	
1634-04-4	Methyl tert-Butyl Ether	ND	140	ND	38	
108-05-4	Vinyl Acetate	ND	1,400	ND	390	
78-93-3	2-Butanone (MEK)	ND	280	ND	96	

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

Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **LH18/24-AIR_081720_Stripper** ALS Project ID: P2004706
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P2004706-001

Test Code: EPA TO-15 Date Collected: 8/17/20
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 8/24/20
Analyst: Wida Ang Date Analyzed: 8/31/20
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.0050 Liter(s)
Test Notes:
Container ID: AC02365

Initial Pressure (psig): 0.03 Final Pressure (psig): 4.10

Canister Dilution Factor: 1.28

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	**14,000**	140	**3,400**	34	
141-78-6	Ethyl Acetate	ND	280	ND	78	
110-54-3	n-Hexane	ND	140	ND	39	
67-66-3	Chloroform	ND	140	ND	28	
109-99-9	Tetrahydrofuran (THF)	ND	140	ND	48	
107-06-2	1,2-Dichloroethane	**180**	140	**44**	34	
71-55-6	1,1,1-Trichloroethane	ND	140	ND	25	
71-43-2	Benzene	ND	140	ND	42	
56-23-5	Carbon Tetrachloride	ND	140	ND	22	
110-82-7	Cyclohexane	ND	280	ND	82	
78-87-5	1,2-Dichloropropane	ND	140	ND	30	
75-27-4	Bromodichloromethane	ND	140	ND	21	
79-01-6	Trichloroethene	**21,000**	140	**3,900**	26	
123-91-1	1,4-Dioxane	ND	140	ND	38	
80-62-6	Methyl Methacrylate	ND	280	ND	69	
142-82-5	n-Heptane	ND	140	ND	34	
10061-01-5	cis-1,3-Dichloropropene	ND	130	ND	29	
108-10-1	4-Methyl-2-pentanone	ND	140	ND	33	
10061-02-6	trans-1,3-Dichloropropene	ND	140	ND	30	
79-00-5	1,1,2-Trichloroethane	ND	140	ND	25	
108-88-3	Toluene	ND	140	ND	37	
591-78-6	2-Hexanone	ND	140	ND	34	
124-48-1	Dibromochloromethane	ND	140	ND	16	
106-93-4	1,2-Dibromoethane	ND	140	ND	18	
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

Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **LH18/24-AIR_081720_Stripper** ALS Project ID: P2004706
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P2004706-001

Test Code: EPA TO-15 Date Collected: 8/17/20
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 8/24/20
Analyst: Wida Ang Date Analyzed: 8/31/20
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.0050 Liter(s)
Test Notes:
Container ID: AC02365

Initial Pressure (psig): 0.03 Final Pressure (psig): 4.10

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	140	ND	30	
127-18-4	Tetrachloroethene	**210**	130	**31**	20	
108-90-7	Chlorobenzene	ND	140	ND	30	
100-41-4	Ethylbenzene	ND	140	ND	32	
179601-23-1	m,p-Xylenes	ND	280	ND	65	
75-25-2	Bromoform	ND	140	ND	13	
100-42-5	Styrene	ND	140	ND	32	
95-47-6	o-Xylene	ND	140	ND	32	
111-84-2	n-Nonane	ND	140	ND	26	
79-34-5	1,1,2,2-Tetrachloroethane	ND	140	ND	20	
98-82-8	Cumene	ND	140	ND	28	
80-56-8	alpha-Pinene	ND	140	ND	25	
103-65-1	n-Propylbenzene	ND	140	ND	28	
622-96-8	4-Ethyltoluene	ND	140	ND	28	
108-67-8	1,3,5-Trimethylbenzene	ND	140	ND	28	
95-63-6	1,2,4-Trimethylbenzene	ND	140	ND	28	
100-44-7	Benzyl Chloride	ND	280	ND	54	
541-73-1	1,3-Dichlorobenzene	ND	140	ND	23	
106-46-7	1,4-Dichlorobenzene	ND	140	ND	23	
95-50-1	1,2-Dichlorobenzene	ND	140	ND	23	
5989-27-5	d-Limonene	ND	140	ND	25	
96-12-8	1,2-Dibromo-3-chloropropane	ND	140	ND	14	
120-82-1	1,2,4-Trichlorobenzene	ND	140	ND	19	
91-20-3	Naphthalene	ND	130	ND	25	
87-68-3	Hexachlorobutadiene	ND	140	ND	13	

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

Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **LH18/24-AIR_081720_Stripper_a** ALS Project ID: P2004706
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P2004706-002

Test Code: EPA TO-15 Date Collected: 8/17/20
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 8/24/20
Analyst: Wida Ang Date Analyzed: 8/31/20
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.050 Liter(s)
Test Notes: 0.0050 Liter(s)
Container ID: AS01355

Initial Pressure (psig): -10.84 Final Pressure (psig): 4.20

Canister Dilution Factor: 4.90

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	ND	52	ND	30	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	52	ND	11	
74-87-3	Chloromethane	ND	52	ND	25	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	52	ND	7.4	
75-01-4	Vinyl Chloride	**170**	53	**65**	21	
106-99-0	1,3-Butadiene	ND	52	ND	23	
74-83-9	Bromomethane	ND	53	ND	14	
75-00-3	Chloroethane	ND	53	ND	20	
64-17-5	Ethanol	**11,000**	510	**5,900**	270	
75-05-8	Acetonitrile	ND	52	ND	31	
107-02-8	Acrolein	ND	98	ND	43	
67-64-1	Acetone	ND	520	ND	220	
75-69-4	Trichlorofluoromethane (CFC 11)	ND	52	ND	9.2	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	210	ND	84	
107-13-1	Acrylonitrile	ND	52	ND	24	
75-35-4	1,1-Dichloroethene	**190**	53	**47**	13	
75-09-2	Methylene Chloride	**2,400**	52	**710**	15	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	53	ND	17	
76-13-1	Trichlorotrifluoroethane (CFC 113)	**15,000**	530	**2,000**	69	**D**
75-15-0	Carbon Disulfide	ND	110	ND	35	
156-60-5	trans-1,2-Dichloroethene	ND	53	ND	13	
75-34-3	1,1-Dichloroethane	ND	54	ND	13	
1634-04-4	Methyl tert-Butyl Ether	ND	53	ND	15	
108-05-4	Vinyl Acetate	ND	530	ND	150	
78-93-3	2-Butanone (MEK)	ND	110	ND	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.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **LH18/24-AIR_081720_Stripper_a** ALS Project ID: P2004706
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P2004706-002

Test Code: EPA TO-15 Date Collected: 8/17/20
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 8/24/20
Analyst: Wida Ang Date Analyzed: 8/31/20
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.050 Liter(s)
Test Notes: 0.0050 Liter(s)
Container ID: AS01355

Initial Pressure (psig): -10.84 Final Pressure (psig): 4.20

Canister Dilution Factor: 4.90

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	**9,400**	52	**2,400**	13	
141-78-6	Ethyl Acetate	ND	110	ND	30	
110-54-3	n-Hexane	**60**	53	**17**	15	
67-66-3	Chloroform	ND	53	ND	11	
109-99-9	Tetrahydrofuran (THF)	**60**	54	**20**	18	
107-06-2	1,2-Dichloroethane	**130**	53	**33**	13	
71-55-6	1,1,1-Trichloroethane	ND	53	ND	9.7	
71-43-2	Benzene	ND	52	ND	16	
56-23-5	Carbon Tetrachloride	ND	52	ND	8.3	
110-82-7	Cyclohexane	ND	110	ND	31	
78-87-5	1,2-Dichloropropane	ND	53	ND	11	
75-27-4	Bromodichloromethane	ND	53	ND	7.9	
79-01-6	Trichloroethene	**13,000**	530	**2,500**	99	**D**
123-91-1	1,4-Dioxane	ND	53	ND	15	
80-62-6	Methyl Methacrylate	ND	110	ND	26	
142-82-5	n-Heptane	ND	53	ND	13	
10061-01-5	cis-1,3-Dichloropropene	ND	51	ND	11	
108-10-1	4-Methyl-2-pentanone	ND	52	ND	13	
10061-02-6	trans-1,3-Dichloropropene	ND	52	ND	11	
79-00-5	1,1,2-Trichloroethane	ND	53	ND	9.7	
108-88-3	Toluene	ND	53	ND	14	
591-78-6	2-Hexanone	ND	53	ND	13	
124-48-1	Dibromochloromethane	ND	53	ND	6.2	
106-93-4	1,2-Dibromoethane	ND	53	ND	6.9	
123-86-4	n-Butyl Acetate	ND	54	ND	11	

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

Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **LH18/24-AIR_081720_Stripper_a** ALS Project ID: P2004706
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P2004706-002

Test Code: EPA TO-15 Date Collected: 8/17/20
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 8/24/20
Analyst: Wida Ang Date Analyzed: 8/31/20
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.050 Liter(s)
Test Notes: 0.0050 Liter(s)
Container ID: AS01355

Initial Pressure (psig): -10.84 Final Pressure (psig): 4.20

Canister Dilution Factor: 4.90

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	ND	53	ND	11	
127-18-4	Tetrachloroethene	**130**	51	**20**	7.5	
108-90-7	Chlorobenzene	ND	53	ND	11	
100-41-4	Ethylbenzene	ND	53	ND	12	
179601-23-1	m,p-Xylenes	ND	110	ND	25	
75-25-2	Bromoform	ND	53	ND	5.1	
100-42-5	Styrene	ND	52	ND	12	
95-47-6	o-Xylene	ND	53	ND	12	
111-84-2	n-Nonane	ND	53	ND	10	
79-34-5	1,1,2,2-Tetrachloroethane	ND	53	ND	7.7	
98-82-8	Cumene	ND	53	ND	11	
80-56-8	alpha-Pinene	ND	53	ND	9.5	
103-65-1	n-Propylbenzene	ND	53	ND	11	
622-96-8	4-Ethyltoluene	ND	53	ND	11	
108-67-8	1,3,5-Trimethylbenzene	ND	52	ND	11	
95-63-6	1,2,4-Trimethylbenzene	ND	53	ND	11	
100-44-7	Benzyl Chloride	ND	110	ND	21	
541-73-1	1,3-Dichlorobenzene	ND	53	ND	8.8	
106-46-7	1,4-Dichlorobenzene	ND	53	ND	8.8	
95-50-1	1,2-Dichlorobenzene	ND	53	ND	8.8	
5989-27-5	d-Limonene	ND	53	ND	9.5	
96-12-8	1,2-Dibromo-3-chloropropane	ND	52	ND	5.4	
120-82-1	1,2,4-Trichlorobenzene	ND	53	ND	7.1	
91-20-3	Naphthalene	ND	51	ND	9.7	
87-68-3	Hexachlorobutadiene	ND	52	ND	4.9	

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

Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **LH18/24-AIR_081720_GWTP** ALS Project ID: P2004706
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P2004706-003

Test Code: EPA TO-15 Date Collected: 8/17/20
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 8/24/20
Analyst: Wida Ang Date Analyzed: 8/31/20
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS01094

Initial Pressure (psig): -0.38 Final Pressure (psig): 3.80

Canister Dilution Factor: 1.29

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	ND	0.68	ND	0.40	
75-71-8	Dichlorodifluoromethane (CFC 12)	**5.1**	0.68	**1.0**	0.14	
74-87-3	Chloromethane	ND	0.68	ND	0.33	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	0.68	ND	0.098	
75-01-4	Vinyl Chloride	ND	0.70	ND	0.27	
106-99-0	1,3-Butadiene	ND	0.68	ND	0.31	
74-83-9	Bromomethane	ND	0.70	ND	0.18	
75-00-3	Chloroethane	ND	0.70	ND	0.26	
64-17-5	Ethanol	**41**	6.7	**22**	3.6	
75-05-8	Acetonitrile	ND	0.68	ND	0.41	
107-02-8	Acrolein	ND	1.3	ND	0.56	
67-64-1	Acetone	**18**	6.8	**7.6**	2.9	
75-69-4	Trichlorofluoromethane (CFC 11)	**8.5**	0.68	**1.5**	0.12	
67-63-0	2-Propanol (Isopropyl Alcohol)	**3.1**	2.7	**1.3**	1.1	
107-13-1	Acrylonitrile	ND	0.68	ND	0.32	
75-35-4	1,1-Dichloroethene	ND	0.70	ND	0.18	
75-09-2	Methylene Chloride	ND	0.68	ND	0.20	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	0.70	ND	0.22	
76-13-1	Trichlorotrifluoroethane (CFC 113)	**11**	0.70	**1.4**	0.091	
75-15-0	Carbon Disulfide	ND	1.4	ND	0.46	
156-60-5	trans-1,2-Dichloroethene	ND	0.70	ND	0.18	
75-34-3	1,1-Dichloroethane	ND	0.71	ND	0.18	
1634-04-4	Methyl tert-Butyl Ether	ND	0.70	ND	0.19	
108-05-4	Vinyl Acetate	ND	7.0	ND	2.0	
78-93-3	2-Butanone (MEK)	**6.3**	1.4	**2.1**	0.48	

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

Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **LH18/24-AIR_081720_GWTP** ALS Project ID: P2004706
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P2004706-003

Test Code: EPA TO-15 Date Collected: 8/17/20
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 8/24/20
Analyst: Wida Ang Date Analyzed: 8/31/20
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS01094

Initial Pressure (psig): -0.38 Final Pressure (psig): 3.80

Canister Dilution Factor: 1.29

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	**6.1**	0.68	**1.5**	0.17	
141-78-6	Ethyl Acetate	ND	1.4	ND	0.39	
110-54-3	n-Hexane	**25**	0.70	**7.1**	0.20	
67-66-3	Chloroform	ND	0.70	ND	0.14	
109-99-9	Tetrahydrofuran (THF)	**23**	0.71	**7.9**	0.24	
107-06-2	1,2-Dichloroethane	ND	0.70	ND	0.17	
71-55-6	1,1,1-Trichloroethane	ND	0.70	ND	0.13	
71-43-2	Benzene	**1.2**	0.68	**0.36**	0.21	
56-23-5	Carbon Tetrachloride	ND	0.68	ND	0.11	
110-82-7	Cyclohexane	ND	1.4	ND	0.41	
78-87-5	1,2-Dichloropropane	ND	0.70	ND	0.15	
75-27-4	Bromodichloromethane	ND	0.70	ND	0.10	
79-01-6	Trichloroethene	**9.0**	0.70	**1.7**	0.13	
123-91-1	1,4-Dioxane	ND	0.70	ND	0.19	
80-62-6	Methyl Methacrylate	ND	1.4	ND	0.35	
142-82-5	n-Heptane	**1.2**	0.70	**0.29**	0.17	
10061-01-5	cis-1,3-Dichloropropene	ND	0.67	ND	0.15	
108-10-1	4-Methyl-2-pentanone	ND	0.68	ND	0.17	
10061-02-6	trans-1,3-Dichloropropene	ND	0.68	ND	0.15	
79-00-5	1,1,2-Trichloroethane	ND	0.70	ND	0.13	
108-88-3	Toluene	**5.6**	0.70	**1.5**	0.18	
591-78-6	2-Hexanone	ND	0.70	ND	0.17	
124-48-1	Dibromochloromethane	ND	0.70	ND	0.082	
106-93-4	1,2-Dibromoethane	ND	0.70	ND	0.091	
123-86-4	n-Butyl Acetate	ND	0.71	ND	0.15	

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

Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **LH18/24-AIR_081720_GWTP** ALS Project ID: P2004706
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P2004706-003

Test Code: EPA TO-15 Date Collected: 8/17/20
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 8/24/20
Analyst: Wida Ang Date Analyzed: 8/31/20
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS01094

Initial Pressure (psig): -0.38 Final Pressure (psig): 3.80

Canister Dilution Factor: 1.29

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	ND	0.70	ND	0.15	
127-18-4	Tetrachloroethene	ND	0.67	ND	0.099	
108-90-7	Chlorobenzene	ND	0.70	ND	0.15	
100-41-4	Ethylbenzene	**0.94**	0.70	**0.22**	0.16	
179601-23-1	m,p-Xylenes	**3.2**	1.4	**0.73**	0.33	
75-25-2	Bromoform	ND	0.70	ND	0.067	
100-42-5	Styrene	ND	0.68	ND	0.16	
95-47-6	o-Xylene	**1.1**	0.70	**0.26**	0.16	
111-84-2	n-Nonane	ND	0.70	ND	0.13	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.70	ND	0.10	
98-82-8	Cumene	ND	0.70	ND	0.14	
80-56-8	alpha-Pinene	**2.5**	0.70	**0.45**	0.13	
103-65-1	n-Propylbenzene	ND	0.70	ND	0.14	
622-96-8	4-Ethyltoluene	ND	0.70	ND	0.14	
108-67-8	1,3,5-Trimethylbenzene	ND	0.68	ND	0.14	
95-63-6	1,2,4-Trimethylbenzene	**0.98**	0.70	**0.20**	0.14	
100-44-7	Benzyl Chloride	ND	1.4	ND	0.27	
541-73-1	1,3-Dichlorobenzene	ND	0.70	ND	0.12	
106-46-7	1,4-Dichlorobenzene	ND	0.70	ND	0.12	
95-50-1	1,2-Dichlorobenzene	ND	0.70	ND	0.12	
5989-27-5	d-Limonene	ND	0.70	ND	0.13	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.68	ND	0.071	
120-82-1	1,2,4-Trichlorobenzene	ND	0.70	ND	0.094	
91-20-3	Naphthalene	ND	0.67	ND	0.13	
87-68-3	Hexachlorobutadiene	ND	0.68	ND	0.064	

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

Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **LH18/24-AIR_081820_Downwind_North** ALS Project ID: P2004706
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P2004706-004

Test Code: EPA TO-15 Date Collected: 8/18/20
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 8/24/20
Analyst: Wida Ang Date Analyzed: 8/31/20
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS00122

Initial Pressure (psig): 0.69 Final Pressure (psig): 4.60

Canister Dilution Factor: 1.25

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	**0.85**	0.66	**0.50**	0.39	
75-71-8	Dichlorodifluoromethane (CFC 12)	**6.1**	0.66	**1.2**	0.13	
74-87-3	Chloromethane	ND	0.66	ND	0.32	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	0.66	ND	0.095	
75-01-4	Vinyl Chloride	ND	0.68	ND	0.26	
106-99-0	1,3-Butadiene	ND	0.66	ND	0.30	
74-83-9	Bromomethane	ND	0.68	ND	0.17	
75-00-3	Chloroethane	ND	0.68	ND	0.26	
64-17-5	Ethanol	**53**	6.5	**28**	3.5	
75-05-8	Acetonitrile	ND	0.66	ND	0.39	
107-02-8	Acrolein	ND	1.3	ND	0.55	
67-64-1	Acetone	**22**	6.6	**9.4**	2.8	
75-69-4	Trichlorofluoromethane (CFC 11)	**10**	0.66	**1.8**	0.12	
67-63-0	2-Propanol (Isopropyl Alcohol)	**3.9**	2.6	**1.6**	1.1	
107-13-1	Acrylonitrile	ND	0.66	ND	0.31	
75-35-4	1,1-Dichloroethene	ND	0.68	ND	0.17	
75-09-2	Methylene Chloride	ND	0.66	ND	0.19	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	0.68	ND	0.22	
76-13-1	Trichlorotrifluoroethane (CFC 113)	**1.1**	0.68	**0.15**	0.088	
75-15-0	Carbon Disulfide	ND	1.4	ND	0.44	
156-60-5	trans-1,2-Dichloroethene	ND	0.68	ND	0.17	
75-34-3	1,1-Dichloroethane	ND	0.69	ND	0.17	
1634-04-4	Methyl tert-Butyl Ether	ND	0.68	ND	0.19	
108-05-4	Vinyl Acetate	ND	6.8	ND	1.9	
78-93-3	2-Butanone (MEK)	**7.8**	1.4	**2.7**	0.47	

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

Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **LH18/24-AIR_081820_Downwind_North** ALS Project ID: P2004706
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P2004706-004

Test Code: EPA TO-15 Date Collected: 8/18/20
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 8/24/20
Analyst: Wida Ang Date Analyzed: 8/31/20
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS00122

Initial Pressure (psig): 0.69 Final Pressure (psig): 4.60

Canister Dilution Factor: 1.25

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	ND	0.66	ND	0.17	
141-78-6	Ethyl Acetate	**1.8**	1.4	**0.51**	0.38	
110-54-3	n-Hexane	**29**	0.68	**8.3**	0.19	
67-66-3	Chloroform	ND	0.68	ND	0.14	
109-99-9	Tetrahydrofuran (THF)	**29**	0.69	**9.7**	0.23	
107-06-2	1,2-Dichloroethane	ND	0.68	ND	0.17	
71-55-6	1,1,1-Trichloroethane	ND	0.68	ND	0.12	
71-43-2	Benzene	**1.4**	0.66	**0.45**	0.21	
56-23-5	Carbon Tetrachloride	ND	0.66	ND	0.11	
110-82-7	Cyclohexane	ND	1.4	ND	0.40	
78-87-5	1,2-Dichloropropane	ND	0.68	ND	0.15	
75-27-4	Bromodichloromethane	ND	0.68	ND	0.10	
79-01-6	Trichloroethene	ND	0.68	ND	0.13	
123-91-1	1,4-Dioxane	ND	0.68	ND	0.19	
80-62-6	Methyl Methacrylate	ND	1.4	ND	0.34	
142-82-5	n-Heptane	**1.5**	0.68	**0.36**	0.16	
10061-01-5	cis-1,3-Dichloropropene	ND	0.65	ND	0.14	
108-10-1	4-Methyl-2-pentanone	ND	0.66	ND	0.16	
10061-02-6	trans-1,3-Dichloropropene	ND	0.66	ND	0.15	
79-00-5	1,1,2-Trichloroethane	ND	0.68	ND	0.12	
108-88-3	Toluene	**7.1**	0.68	**1.9**	0.18	
591-78-6	2-Hexanone	ND	0.68	ND	0.16	
124-48-1	Dibromochloromethane	ND	0.68	ND	0.079	
106-93-4	1,2-Dibromoethane	ND	0.68	ND	0.088	
123-86-4	n-Butyl Acetate	ND	0.69	ND	0.14	

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

Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **LH18/24-AIR_081820_Downwind_North** ALS Project ID: P2004706
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P2004706-004

Test Code: EPA TO-15 Date Collected: 8/18/20
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 8/24/20
Analyst: Wida Ang Date Analyzed: 8/31/20
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS00122

Initial Pressure (psig): 0.69 Final Pressure (psig): 4.60

Canister Dilution Factor: 1.25

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	**0.68**	0.68	**0.15**	0.14	
127-18-4	Tetrachloroethene	ND	0.65	ND	0.096	
108-90-7	Chlorobenzene	ND	0.68	ND	0.15	
100-41-4	Ethylbenzene	**1.2**	0.68	**0.28**	0.16	
179601-23-1	m,p-Xylenes	**4.3**	1.4	**0.99**	0.32	
75-25-2	Bromoform	ND	0.68	ND	0.065	
100-42-5	Styrene	ND	0.66	ND	0.16	
95-47-6	o-Xylene	**1.5**	0.68	**0.35**	0.16	
111-84-2	n-Nonane	**1.0**	0.68	**0.20**	0.13	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.68	ND	0.098	
98-82-8	Cumene	ND	0.68	ND	0.14	
80-56-8	alpha-Pinene	**1.7**	0.68	**0.30**	0.12	
103-65-1	n-Propylbenzene	ND	0.68	ND	0.14	
622-96-8	4-Ethyltoluene	ND	0.68	ND	0.14	
108-67-8	1,3,5-Trimethylbenzene	ND	0.66	ND	0.13	
95-63-6	1,2,4-Trimethylbenzene	**1.5**	0.68	**0.30**	0.14	
100-44-7	Benzyl Chloride	ND	1.4	ND	0.27	
541-73-1	1,3-Dichlorobenzene	ND	0.68	ND	0.11	
106-46-7	1,4-Dichlorobenzene	ND	0.68	ND	0.11	
95-50-1	1,2-Dichlorobenzene	ND	0.68	ND	0.11	
5989-27-5	d-Limonene	**0.81**	0.68	**0.14**	0.12	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.66	ND	0.069	
120-82-1	1,2,4-Trichlorobenzene	ND	0.68	ND	0.091	
91-20-3	Naphthalene	ND	0.65	ND	0.12	
87-68-3	Hexachlorobutadiene	ND	0.66	ND	0.062	

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

Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **Method Blank** ALS Project ID: P2004706
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P200831-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA
Analyst: Wida Ang Date Analyzed: 8/31/20
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	ND	0.53	ND	0.31	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	0.53	ND	0.11	
74-87-3	Chloromethane	ND	0.53	ND	0.26	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	0.53	ND	0.076	
75-01-4	Vinyl Chloride	ND	0.54	ND	0.21	
106-99-0	1,3-Butadiene	ND	0.53	ND	0.24	
74-83-9	Bromomethane	ND	0.54	ND	0.14	
75-00-3	Chloroethane	ND	0.54	ND	0.20	
64-17-5	Ethanol	ND	5.2	ND	2.8	
75-05-8	Acetonitrile	ND	0.53	ND	0.32	
107-02-8	Acrolein	ND	1.0	ND	0.44	
67-64-1	Acetone	ND	5.3	ND	2.2	
75-69-4	Trichlorofluoromethane (CFC 11)	ND	0.53	ND	0.094	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	2.1	ND	0.85	
107-13-1	Acrylonitrile	ND	0.53	ND	0.24	
75-35-4	1,1-Dichloroethene	ND	0.54	ND	0.14	
75-09-2	Methylene Chloride	ND	0.53	ND	0.15	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	0.54	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	0.54	ND	0.14	
75-34-3	1,1-Dichloroethane	ND	0.55	ND	0.14	
1634-04-4	Methyl tert-Butyl Ether	ND	0.54	ND	0.15	
108-05-4	Vinyl Acetate	ND	5.4	ND	1.5	
78-93-3	2-Butanone (MEK)	ND	1.1	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.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **Method Blank** ALS Project ID: P2004706
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P200831-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA
Analyst: Wida Ang Date Analyzed: 8/31/20
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	ND	0.53	ND	0.13	
141-78-6	Ethyl Acetate	ND	1.1	ND	0.31	
110-54-3	n-Hexane	ND	0.54	ND	0.15	
67-66-3	Chloroform	ND	0.54	ND	0.11	
109-99-9	Tetrahydrofuran (THF)	ND	0.55	ND	0.19	
107-06-2	1,2-Dichloroethane	ND	0.54	ND	0.13	
71-55-6	1,1,1-Trichloroethane	ND	0.54	ND	0.099	
71-43-2	Benzene	ND	0.53	ND	0.17	
56-23-5	Carbon Tetrachloride	ND	0.53	ND	0.084	
110-82-7	Cyclohexane	ND	1.1	ND	0.32	
78-87-5	1,2-Dichloropropane	ND	0.54	ND	0.12	
75-27-4	Bromodichloromethane	ND	0.54	ND	0.081	
79-01-6	Trichloroethene	ND	0.54	ND	0.10	
123-91-1	1,4-Dioxane	ND	0.54	ND	0.15	
80-62-6	Methyl Methacrylate	ND	1.1	ND	0.27	
142-82-5	n-Heptane	ND	0.54	ND	0.13	
10061-01-5	cis-1,3-Dichloropropene	ND	0.52	ND	0.11	
108-10-1	4-Methyl-2-pentanone	ND	0.53	ND	0.13	
10061-02-6	trans-1,3-Dichloropropene	ND	0.53	ND	0.12	
79-00-5	1,1,2-Trichloroethane	ND	0.54	ND	0.099	
108-88-3	Toluene	ND	0.54	ND	0.14	
591-78-6	2-Hexanone	ND	0.54	ND	0.13	
124-48-1	Dibromochloromethane	ND	0.54	ND	0.063	
106-93-4	1,2-Dibromoethane	ND	0.54	ND	0.070	
123-86-4	n-Butyl Acetate	ND	0.55	ND	0.12	

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

Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **Method Blank** ALS Project ID: P2004706
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P200831-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA
Analyst: Wida Ang Date Analyzed: 8/31/20
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	ND	0.54	ND	0.12	
127-18-4	Tetrachloroethene	ND	0.52	ND	0.077	
108-90-7	Chlorobenzene	ND	0.54	ND	0.12	
100-41-4	Ethylbenzene	ND	0.54	ND	0.12	
179601-23-1	m,p-Xylenes	ND	1.1	ND	0.25	
75-25-2	Bromoform	ND	0.54	ND	0.052	
100-42-5	Styrene	ND	0.53	ND	0.12	
95-47-6	o-Xylene	ND	0.54	ND	0.12	
111-84-2	n-Nonane	ND	0.54	ND	0.10	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.54	ND	0.079	
98-82-8	Cumene	ND	0.54	ND	0.11	
80-56-8	alpha-Pinene	ND	0.54	ND	0.097	
103-65-1	n-Propylbenzene	ND	0.54	ND	0.11	
622-96-8	4-Ethyltoluene	ND	0.54	ND	0.11	
108-67-8	1,3,5-Trimethylbenzene	ND	0.53	ND	0.11	
95-63-6	1,2,4-Trimethylbenzene	ND	0.54	ND	0.11	
100-44-7	Benzyl Chloride	ND	1.1	ND	0.21	
541-73-1	1,3-Dichlorobenzene	ND	0.54	ND	0.090	
106-46-7	1,4-Dichlorobenzene	ND	0.54	ND	0.090	
95-50-1	1,2-Dichlorobenzene	ND	0.54	ND	0.090	
5989-27-5	d-Limonene	ND	0.54	ND	0.097	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.53	ND	0.055	
120-82-1	1,2,4-Trichlorobenzene	ND	0.54	ND	0.073	
91-20-3	Naphthalene	ND	0.52	ND	0.099	
87-68-3	Hexachlorobutadiene	ND	0.53	ND	0.050	

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

Client: **Bhate Environmental Associates, Inc.**
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Project ID: P2004706

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date(s) Collected: 8/17 - 8/18/20
Analyst: Wida Ang Date(s) Received: 8/24/20
Sample Type: 6.0 L Summa Canister(s) / 6.0 L Silonite Canister(s) Date(s) Analyzed: 8/31/20
Test Notes:

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4 Percent Recovered	Toluene-d8 Percent Recovered	Bromofluorobenzene Percent Recovered	Acceptance Limits	Data Qualifier
Method Blank	P200831-MB	**98**	**98**	**102**	70-130	
Lab Control Sample	P200831-LCS	**101**	**99**	**105**	70-130	
LH18/24-AIR_081720_Stripper	P2004706-001	**96**	**99**	**110**	70-130	
LH18/24-AIR_081720_Stripper_a	P2004706-002	**101**	**99**	**106**	70-130	
LH18/24-AIR_081720_GWTP	P2004706-003	**101**	**98**	**98**	70-130	
LH18/24-AIR_081820_Downwind_North	P2004706-004	**99**	**101**	**103**	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 SUMMARY

Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **Lab Control Sample** ALS Project ID: P2004706
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P200831-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA
Analyst: Wida Ang Date Analyzed: 8/31/20
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
115-07-1	Propene	210	**221**	**105**	51-133	
75-71-8	Dichlorodifluoromethane (CFC 12)	210	**216**	**103**	64-115	
74-87-3	Chloromethane	212	**242**	**114**	49-127	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	206	**205**	**100**	65-114	
75-01-4	Vinyl Chloride	212	**222**	**105**	61-129	
106-99-0	1,3-Butadiene	212	**247**	**117**	54-140	
74-83-9	Bromomethane	212	**216**	**102**	68-120	
75-00-3	Chloroethane	214	**225**	**105**	63-123	
64-17-5	Ethanol	1,060	**1090**	**103**	49-134	
75-05-8	Acetonitrile	214	**238**	**111**	50-137	
107-02-8	Acrolein	206	**226**	**110**	62-128	
67-64-1	Acetone	1,070	**1010**	**94**	56-125	
75-69-4	Trichlorofluoromethane (CFC 11)	212	**199**	**94**	64-115	
67-63-0	2-Propanol (Isopropyl Alcohol)	422	**441**	**105**	57-133	
107-13-1	Acrylonitrile	212	**229**	**108**	64-136	
75-35-4	1,1-Dichloroethene	214	**209**	**98**	67-115	
75-09-2	Methylene Chloride	210	**206**	**98**	68-114	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	214	**208**	**97**	55-139	
76-13-1	Trichlorotrifluoroethane (CFC 113)	216	**205**	**95**	65-115	
75-15-0	Carbon Disulfide	212	**187**	**88**	68-113	
156-60-5	trans-1,2-Dichloroethene	214	**223**	**104**	65-122	
75-34-3	1,1-Dichloroethane	212	**206**	**97**	63-118	
1634-04-4	Methyl tert-Butyl Ether	214	**210**	**98**	57-131	
108-05-4	Vinyl Acetate	1,070	**1150**	**107**	71-128	
78-93-3	2-Butanone (MEK)	212	**219**	**103**	67-123	

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 SUMMARY

Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **Lab Control Sample** ALS Project ID: P2004706
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P200831-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA
Analyst: Wida Ang Date Analyzed: 8/31/20
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	212	**209**	**99**	64-120	
141-78-6	Ethyl Acetate	432	**477**	**110**	64-131	
110-54-3	n-Hexane	216	**199**	**92**	58-125	
67-66-3	Chloroform	214	**209**	**98**	65-114	
109-99-9	Tetrahydrofuran (THF)	220	**207**	**94**	65-115	
107-06-2	1,2-Dichloroethane	214	**213**	**100**	59-119	
71-55-6	1,1,1-Trichloroethane	214	**213**	**100**	66-115	
71-43-2	Benzene	210	**206**	**98**	66-109	
56-23-5	Carbon Tetrachloride	208	**208**	**100**	66-119	
110-82-7	Cyclohexane	422	**407**	**96**	67-117	
78-87-5	1,2-Dichloropropane	214	**209**	**98**	66-119	
75-27-4	Bromodichloromethane	218	**216**	**99**	71-119	
79-01-6	Trichloroethene	216	**213**	**99**	70-114	
123-91-1	1,4-Dioxane	216	**237**	**110**	71-117	
80-62-6	Methyl Methacrylate	430	**471**	**110**	76-121	
142-82-5	n-Heptane	214	**205**	**96**	66-119	
10061-01-5	cis-1,3-Dichloropropene	214	**236**	**110**	72-125	
108-10-1	4-Methyl-2-pentanone	212	**223**	**105**	68-130	
10061-02-6	trans-1,3-Dichloropropene	212	**224**	**106**	71-132	
79-00-5	1,1,2-Trichloroethane	214	**213**	**100**	70-117	
108-88-3	Toluene	212	**195**	**92**	67-113	
591-78-6	2-Hexanone	216	**229**	**106**	62-135	
124-48-1	Dibromochloromethane	214	**214**	**100**	73-126	
106-93-4	1,2-Dibromoethane	214	**216**	**101**	71-122	
123-86-4	n-Butyl Acetate	218	**247**	**113**	65-134	

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 SUMMARY

Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **Lab Control Sample** ALS Project ID: P2004706
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P200831-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA
Analyst: Wida Ang Date Analyzed: 8/31/20
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
111-65-9	n-Octane	216	**196**	**91**	63-120	
127-18-4	Tetrachloroethene	208	**193**	**93**	64-120	
108-90-7	Chlorobenzene	214	**200**	**93**	65-116	
100-41-4	Ethylbenzene	212	**198**	**93**	65-117	
179601-23-1	m,p-Xylenes	426	**394**	**92**	64-121	
75-25-2	Bromoform	214	**229**	**107**	72-130	
100-42-5	Styrene	212	**215**	**101**	72-126	
95-47-6	o-Xylene	214	**196**	**92**	64-120	
111-84-2	n-Nonane	214	**194**	**91**	56-132	
79-34-5	1,1,2,2-Tetrachloroethane	214	**206**	**96**	66-122	
98-82-8	Cumene	214	**197**	**92**	64-121	
80-56-8	alpha-Pinene	212	**202**	**95**	62-136	
103-65-1	n-Propylbenzene	214	**197**	**92**	65-123	
622-96-8	4-Ethyltoluene	210	**189**	**90**	71-126	
108-67-8	1,3,5-Trimethylbenzene	212	**197**	**93**	65-120	
95-63-6	1,2,4-Trimethylbenzene	212	**204**	**96**	63-129	
100-44-7	Benzyl Chloride	214	**240**	**112**	66-138	
541-73-1	1,3-Dichlorobenzene	214	**208**	**97**	65-127	
106-46-7	1,4-Dichlorobenzene	214	**202**	**94**	65-125	
95-50-1	1,2-Dichlorobenzene	214	**204**	**95**	67-128	
5989-27-5	d-Limonene	212	**208**	**98**	65-136	
96-12-8	1,2-Dibromo-3-chloropropane	214	**220**	**103**	73-133	
120-82-1	1,2,4-Trichlorobenzene	216	**225**	**104**	62-140	
91-20-3	Naphthalene	212	**221**	**104**	57-149	
87-68-3	Hexachlorobutadiene	214	**203**	**95**	57-129	

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

Client: **Bhate Environmental Associates, Inc.** ALS Project ID: P2004706
Client Project ID: **LHAAP GWTP / NW01312.0150**

Internal Standard Area and RT Summary

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Lab File ID: 08312002.D
Analyst: Wida Ang Date Analyzed: 8/31/20
Sample Type: 6.0 L Summa Canister(s) Time Analyzed: 07:10
Test Notes:

		IS1 (BCM)		IS2 (DFB)		IS3 (CBZ)	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
	24 Hour Standard	152067	11.21	645236	13.32	294668	17.63
	Upper Limit	212894	11.54	903330	13.65	412535	17.96
	Lower Limit	91240	10.88	387142	12.99	176801	17.30
	Client Sample ID						
01	Method Blank	151192	11.18	635775	13.31	289779	17.63
02	Lab Control Sample	155319	11.21	661336	13.32	302759	17.63
03	LH18/24-AIR_081720_Stripper	150707	11.19	639778	13.31	285236	17.63
04	LH18/24-AIR_081720_Stripper_a (Dilution)	158143	11.18	657651	13.31	292458	17.63
05	LH18/24-AIR_081720_Stripper_a	163835	11.19	706488	13.31	313754	17.63
06	LH18/24-AIR_081720_GWTP	153718	11.19	660404	13.31	300384	17.63
07	LH18/24-AIR_081820_Downwind_North	143305	11.19	619493	13.31	270992	17.63
08							
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:\MS13\DATA\2020_08\31\08312010.D Vial: 4
Acq On : 31 Aug 2020 11:52 Operator: WA
Sample : P2004706-001 (5.0mL) Inst : MS13
Misc : S34-06182001

Quant Time: Sep 01 20:42:54 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020 9/1/20
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.19	130	150707	12.500	ng	-0.03
37) 1,4-Difluorobenzene (IS2)	13.31	114	639778	12.500	ng	-0.02
56) Chlorobenzene-d5 (IS3)	17.63	82	285236	12.500	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.04	65	185239	12.052	ng	-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.40%			
57) Toluene-d8 (SS2)	15.76	98	708869	12.376	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.04%			
73) Bromofluorobenzene (SS3)	19.02	174	262815	13.751	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 110.00%			
Target Compounds						Qvalue
2) Propene	4.21	42	412	N.D.		
3) Dichlorodifluoromethan...	4.24	85	1716	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	5.05	62	15052	0.831	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	6.44	45	2852	N.D.		
11) Acetonitrile	0.00	41	0	N.D.		
12) Acrolein	0.00	56	0	N.D.		
13) Acetone	7.14	58	3413	N.D.		
14) Trichlorofluoromethane	7.09	101	1310	N.D.		
15) 2-Propanol (Isopropanol)	7.68	45	2342	N.D.		
16) Acrylonitrile	8.05	53	387	N.D.		
17) 1,1-Dichloroethene	8.26	96	12066	0.955	ng	99
18) 2-Methyl-2-Propanol (t...	8.27	59	383	N.D.		
19) Methylene Chloride	8.46	84	173117	13.261	ng	97
20) 3-Chloro-1-propene (Al...	8.46	41	4299	N.D.		
21) Trichlorotrifluoroethane	8.90	151	1099623	89.205	ng	97
22) Carbon Disulfide	8.75	76	4162	N.D.		
23) trans-1,2-Dichloroethene	9.76	61	2619	N.D.		
24) 1,1-Dichloroethane	10.00	63	3063	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)	10.60	72	1036	N.D.		
28) cis-1,2-Dichloroethene	11.01	61	852966	52.832	ng	98
29) Diisopropyl Ether	11.35	87	278	N.D.		
30) Ethyl Acetate	11.34	61	115	N.D.		
31) n-Hexane	11.30	57	175	N.D.		
32) Chloroform	11.36	83	4249	N.D.		
34) Tetrahydrofuran (THF)	11.87	72	466	N.D.		
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.		
36) 1,2-Dichloroethane	12.17	62	9734	0.698	ng	98
38) 1,1,1-Trichloroethane	12.44	97	321	N.D.		
39) Isopropyl Acetate	0.00	61	0	N.D.		
40) 1-Butanol	13.05	56	343	N.D.		
41) Benzene	12.94	78	3257	N.D.		
42) Carbon Tetrachloride	13.08	117	1364	N.D.		
43) Cyclohexane	13.21	84	1217	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	14.02	130	1171514	82.444	ng	98
48) 1,4-Dioxane	0.00	88	0	N.D.		
49) 2,2,4-Trimethylpentane...	14.09	57	1262	N.D.		
50) Methyl Methacrylate	0.00	100	0	N.D.	d	

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_08\31\08312010.D Vial: 4
Acq On : 31 Aug 2020 11:52 Operator: WA
Sample : P2004706-001 (5.0mL) Inst : MS13
Misc : S34-06182001

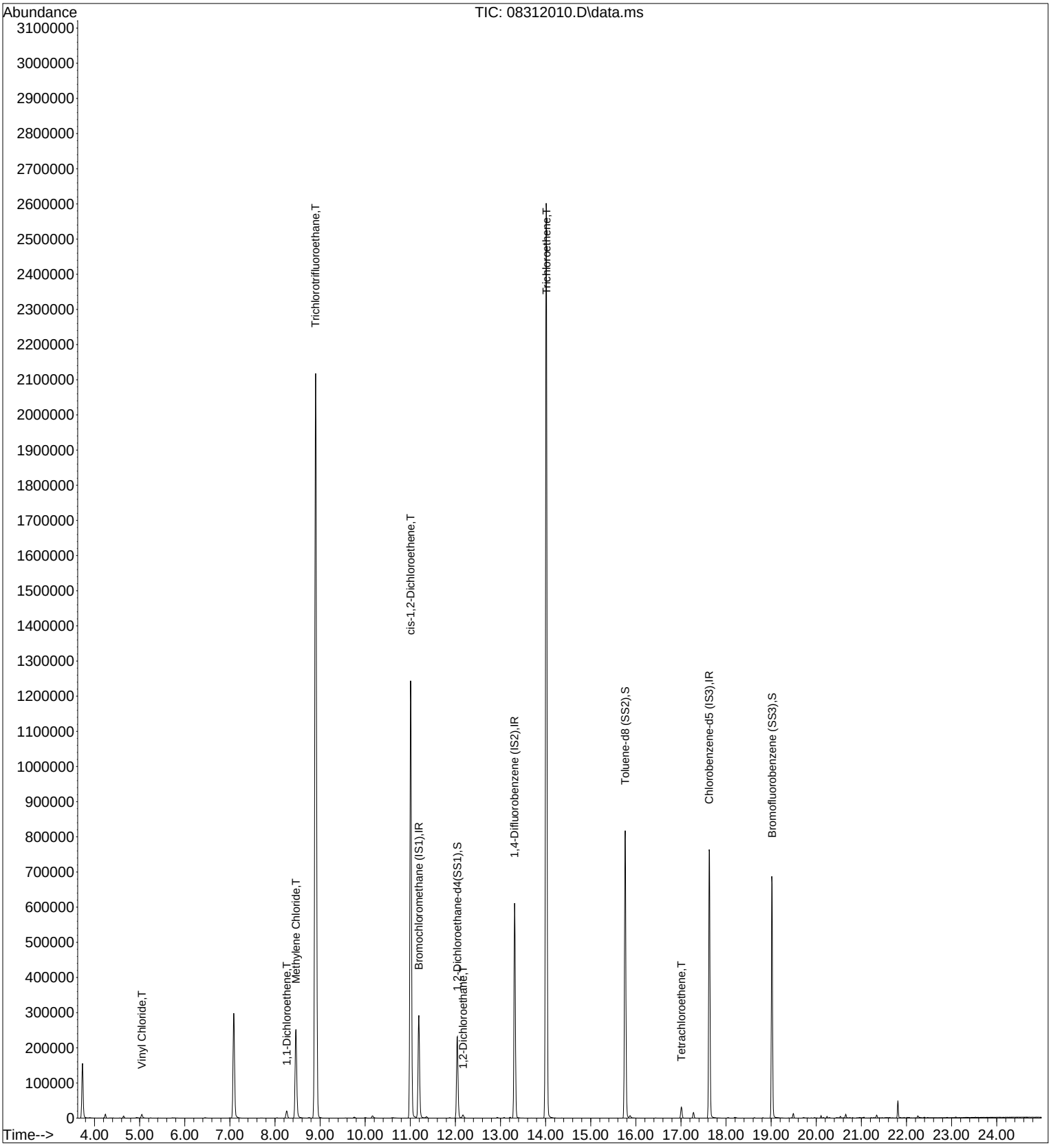
Quant Time: Sep 01 20:42:54 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M

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	15.59	97	187	N.D.	
58) Toluene	15.87	91	8000	N.D.	
59) 2-Hexanone	15.88	43	115	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	354	N.D.	
63) n-Octane	0.00	57	0	N.D.	
64) Tetrachloroethene	17.01	166	13915	0.823 ng	98
65) Chlorobenzene	0.00	112	0	N.D.	
66) Ethylbenzene	18.04	91	2963	N.D.	
67) m- & p-Xylenes	18.20	91	4044	N.D.	
68) Bromoform	0.00	173	0	N.D.	
69) Styrene	18.56	104	332	N.D.	
70) o-Xylene	18.63	91	1723	N.D.	
71) n-Nonane	18.82	43	759	N.D.	
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.	
74) Cumene	19.15	105	512	N.D.	
75) alpha-Pinene	19.49	93	5494	N.D.	
76) n-Propylbenzene	19.61	91	370	N.D.	
77) 3-Ethyltoluene	19.70	105	1570	N.D.	
78) 4-Ethyltoluene	19.70	105	1570	N.D.	
79) 1,3,5-Trimethylbenzene	19.79	105	558	N.D.	
80) alpha-Methylstyrene	0.00	118	0	N.D.	
81) 2-Ethyltoluene	19.96	105	404	N.D.	
82) 1,2,4-Trimethylbenzene	20.16	105	1419	N.D.	
83) n-Decane	20.24	57	2191	N.D.	
84) Benzyl Chloride	20.47	91	124	N.D.	
85) 1,3-Dichlorobenzene	0.00	146	0	N.D.	
86) 1,4-Dichlorobenzene	0.00	146	0	N.D.	
87) sec-Butylbenzene	20.53	105	510	N.D.	
88) 4-Isopropyltoluene (p-...	20.53	119	2261	N.D.	
89) 1,2,3-Trimethylbenzene	20.53	105	510	N.D.	
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.	
91) d-Limonene	20.65	68	2869	N.D.	
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.	
93) n-Undecane	21.34	57	2882	N.D.	
94) 1,2,4-Trichlorobenzene	0.00	180	0	N.D.	
95) Naphthalene	22.29	128	4040	N.D.	
96) n-Dodecane	22.25	57	2296	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	0.00	91	0	N.D.	

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Data File : I:\MS13\DATA\2020_08\31\08312010.D Vial: 4
Acq On : 31 Aug 2020 11:52 Operator: WA
Sample : P2004706-001 (5.0mL) Inst : MS13
Misc : S34-06182001

Quant Time: Sep 01 20:42:54 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_08\31\08312010.D Vial: 4
Acq On : 31 Aug 2020 11:52 Operator: WA
Sample : P2004706-001 (5.0mL) Inst : MS13
Misc : S34-06182001

Quant Time: Sep 01 20:42:54 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M

WA 9/1/20

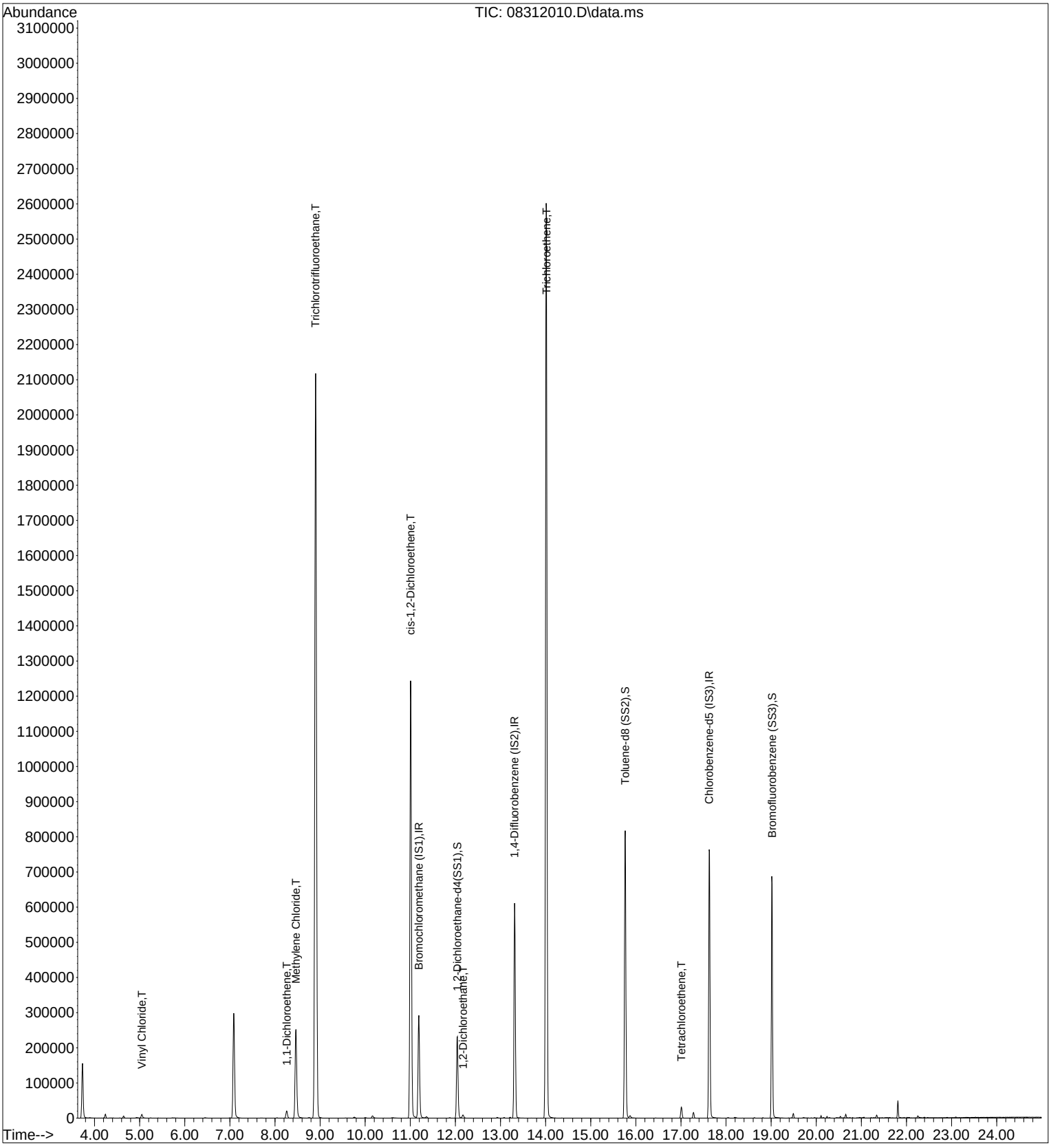
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.19	130	150707	12.500	ng	-0.03
37) 1,4-Difluorobenzene (IS2)	13.31	114	639778	12.500	ng	-0.02
56) Chlorobenzene-d5 (IS3)	17.63	82	285236	12.500	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.04	65	185239	12.052	ng	-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.40%			
57) Toluene-d8 (SS2)	15.76	98	708869	12.376	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.04%			
73) Bromofluorobenzene (SS3)	19.02	174	262815	13.751	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 110.00%			
Target Compounds						Qvalue
6) Vinyl Chloride	5.05	62	15052	0.831	ng	99
17) 1,1-Dichloroethene	8.26	96	12066	0.955	ng	99
19) Methylene Chloride	8.46	84	173117	13.261	ng	97
21) Trichlorotrifluoroethane	8.90	151	1099623	89.205	ng	97
28) cis-1,2-Dichloroethene	11.01	61	852966	52.832	ng	98
36) 1,2-Dichloroethane	12.17	62	9734	0.698	ng	98
47) Trichloroethene	14.02	130	1171514	82.444	ng	98
64) Tetrachloroethene	17.01	166	13915	0.823	ng	98

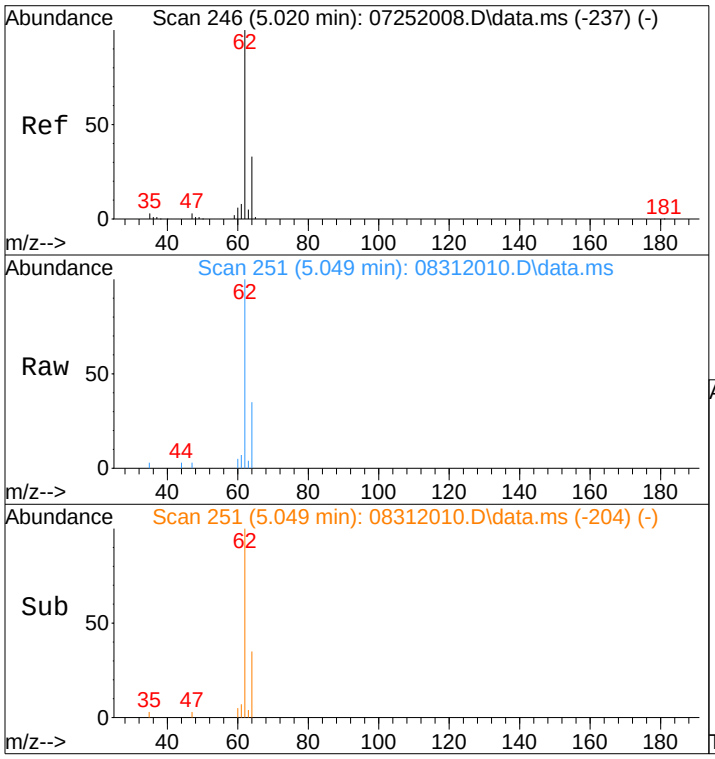
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_08\31\08312010.D Vial: 4
Acq On : 31 Aug 2020 11:52 Operator: WA
Sample : P2004706-001 (5.0mL) Inst : MS13
Misc : S34-06182001

Quant Time: Sep 01 20:42:54 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M

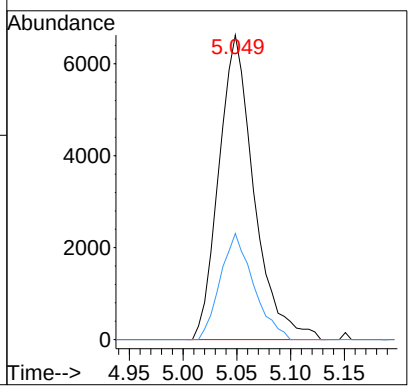


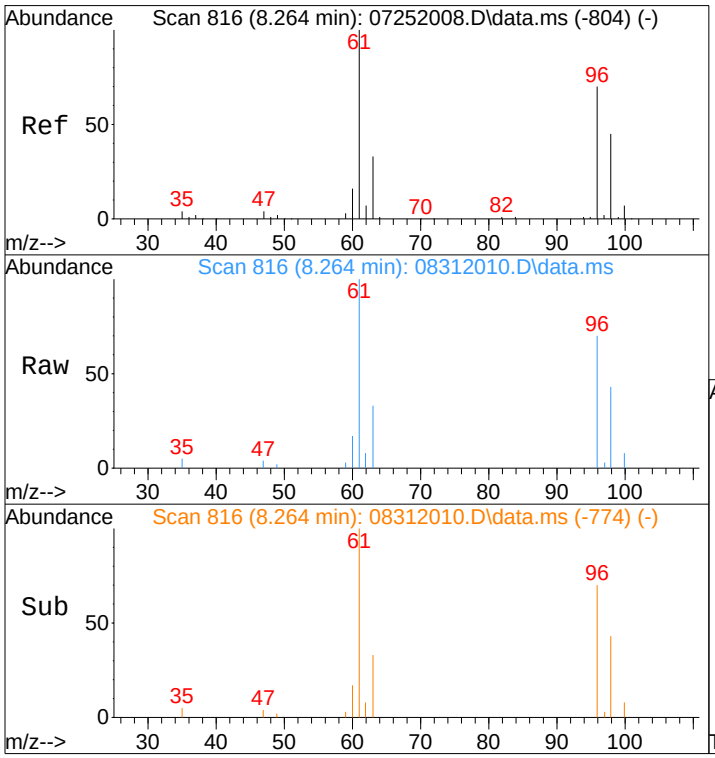


#6
Vinyl Chloride
Concen: 0.83 ng
RT: 5.05 min Scan# 251
Delta R.T. 0.017 min
Lab File: 08312010.D
Acq: 31 Aug 2020 11:52

Tgt Ion: 62 Resp: 15052

Ion	Ratio	Lower	Upper
62	100		
64	32.9	12.4	52.4

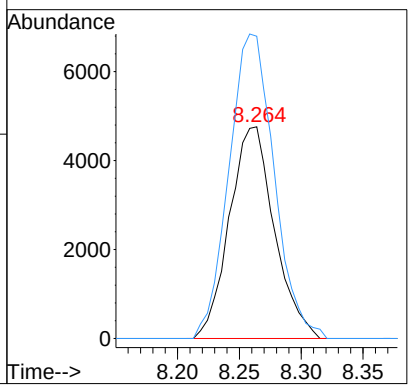


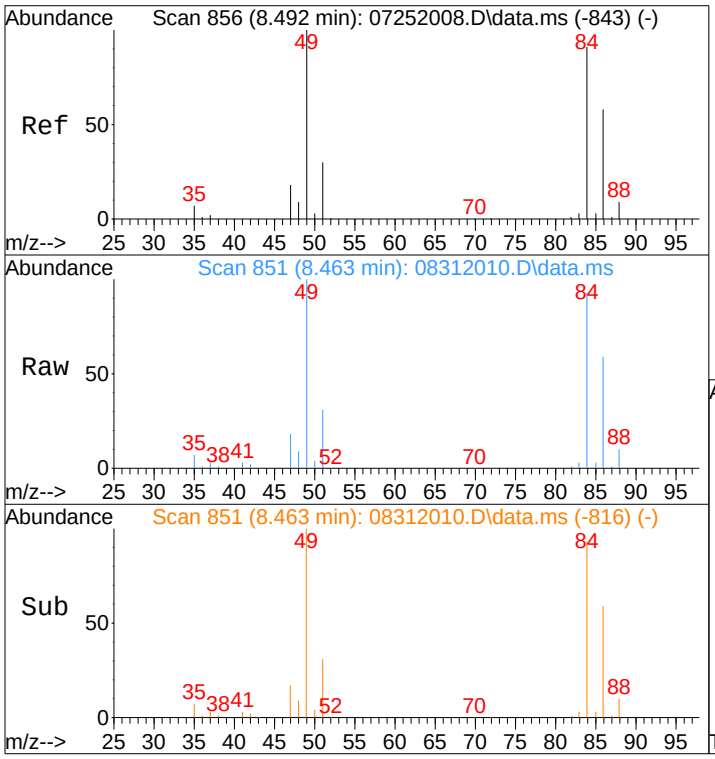


#17
1,1-Dichloroethene
Concen: 0.96 ng
RT: 8.26 min Scan# 816
Delta R.T. -0.011 min
Lab File: 08312010.D
Acq: 31 Aug 2020 11:52

Tgt Ion: 96 Resp: 12066

Ion	Ratio	Lower	Upper
96	100		
61	144.7	125.8	165.8

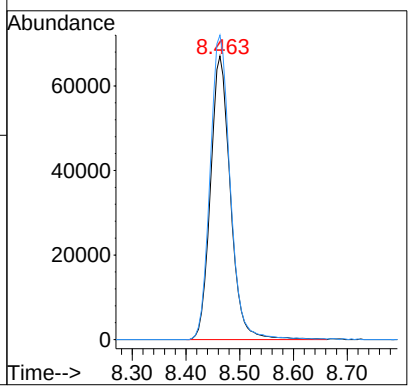


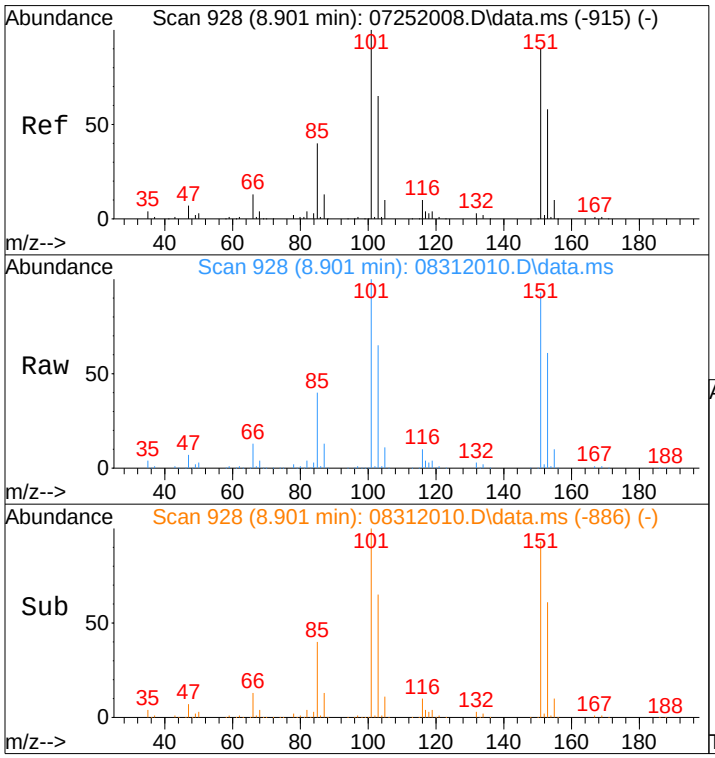


#19
Methylene Chloride
Concen: 13.26 ng
RT: 8.46 min Scan# 851
Delta R.T. -0.051 min
Lab File: 08312010.D
Acq: 31 Aug 2020 11:52

Tgt Ion: 84 Resp: 173117

Ion	Ratio	Lower	Upper
84	100		
49	108.9	87.2	137.2

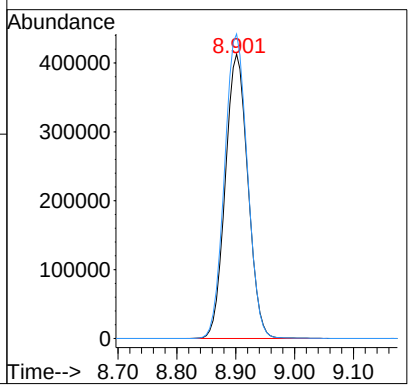


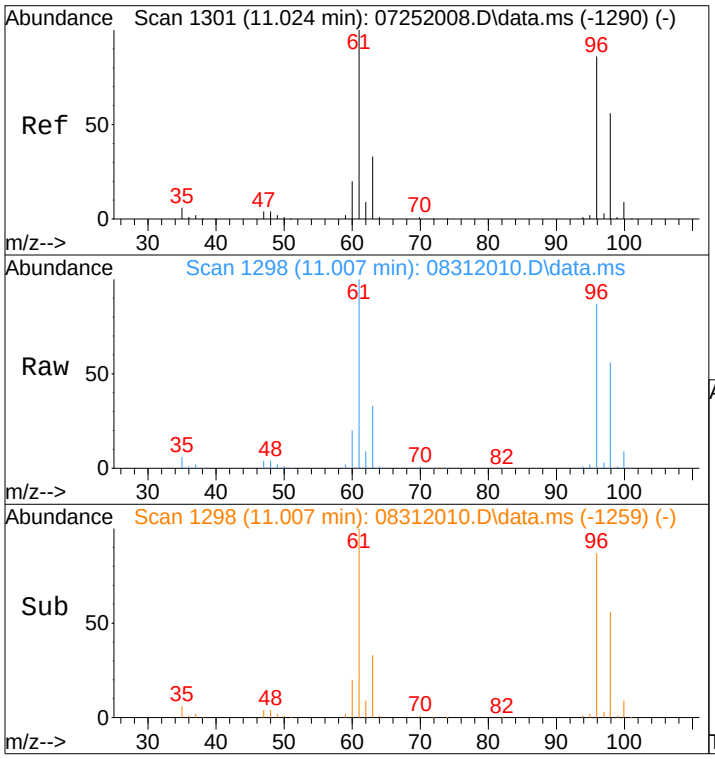


#21
Trichlorotrifluoroethane
Concen: 89.21 ng
RT: 8.90 min Scan# 928
Delta R.T. -0.012 min
Lab File: 08312010.D
Acq: 31 Aug 2020 11:52

Tgt Ion:151 Resp: 1099623

Ion	Ratio	Lower	Upper
151	100		
101	108.5	92.1	132.1

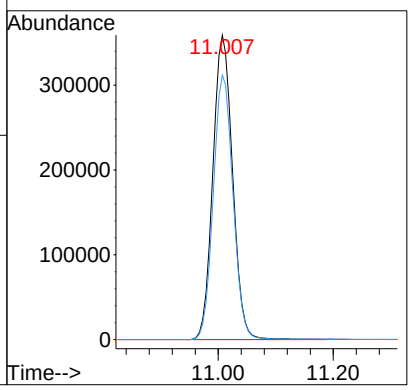


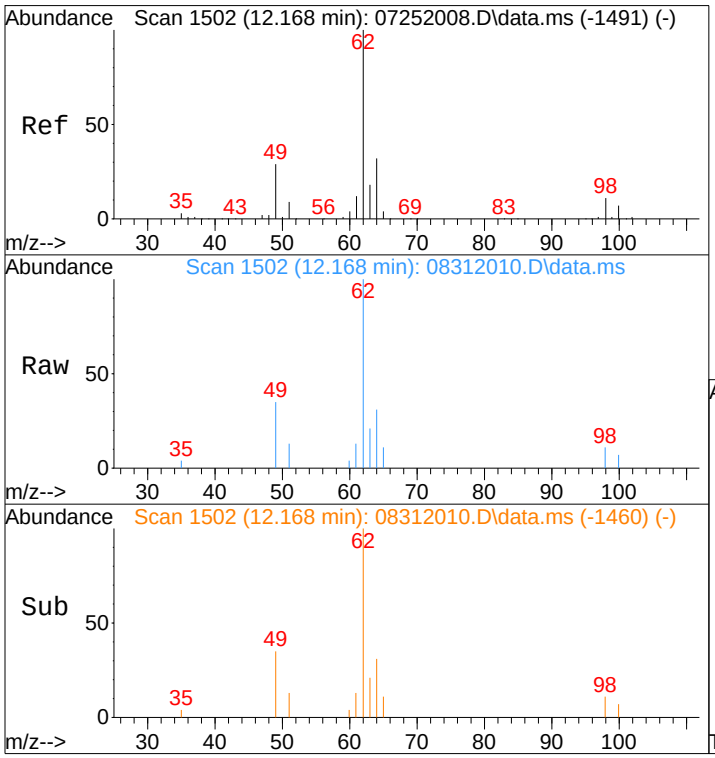


#28
cis-1,2-Dichloroethene
Concen: 52.83 ng
RT: 11.01 min Scan# 1298
Delta R.T. -0.029 min
Lab File: 08312010.D
Acq: 31 Aug 2020 11:52

Tgt Ion: 61 Resp: 852966

Ion	Ratio	Lower	Upper
61	100		
96	87.2	65.1	105.1

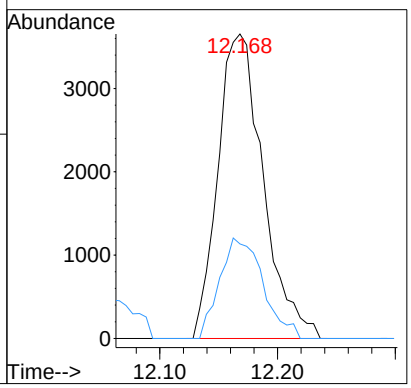


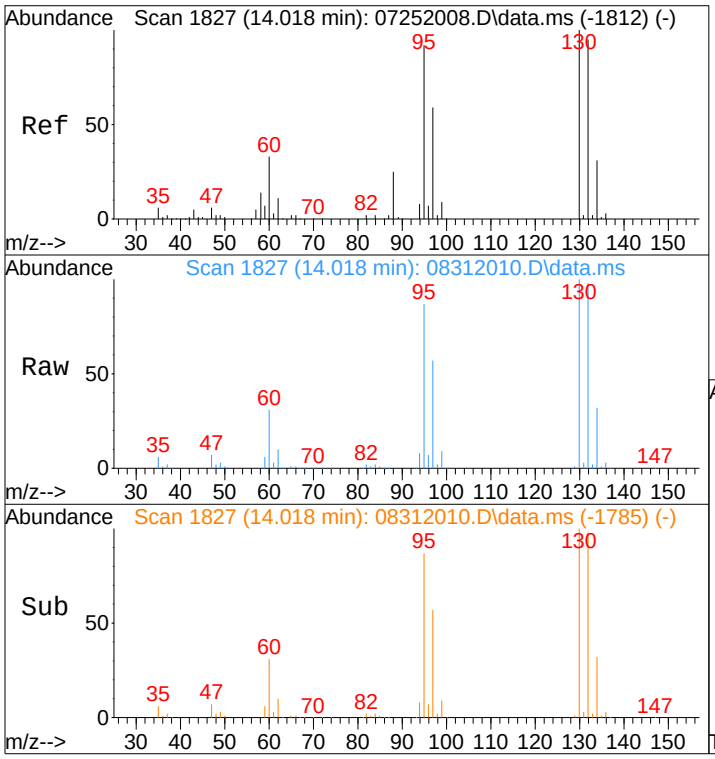


#36
1,2-Dichloroethane
Concen: 0.70 ng
RT: 12.17 min Scan# 1502
Delta R.T. -0.011 min
Lab File: 08312010.D
Acq: 31 Aug 2020 11:52

Tgt Ion: 62 Resp: 9734

Ion	Ratio	Lower	Upper
62	100		
64	31.5	12.7	52.7

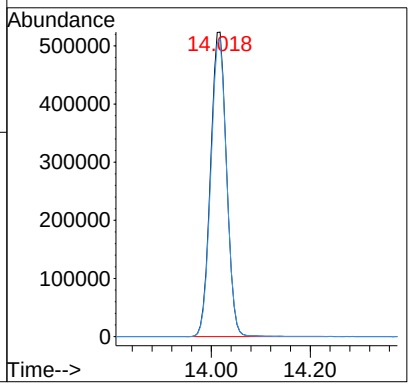


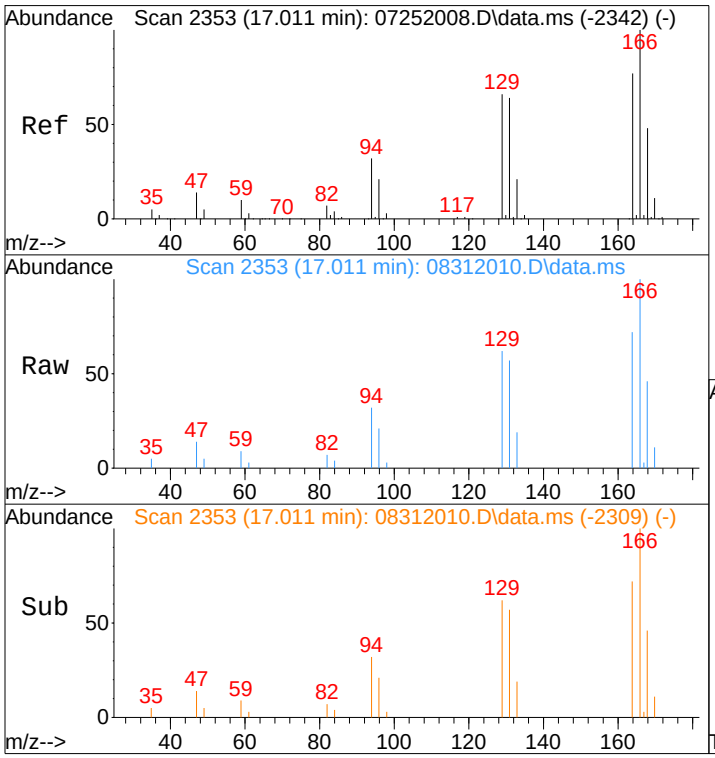


#47
Trichloroethene
Concen: 82.44 ng
RT: 14.02 min Scan# 1827
Delta R.T. -0.011 min
Lab File: 08312010.D
Acq: 31 Aug 2020 11:52

Tgt Ion:130 Resp: 1171514

Ion	Ratio	Lower	Upper
130	100		
132	96.9	75.4	115.4

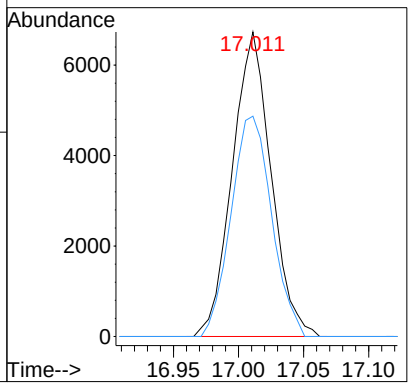




#64
Tetrachloroethene
Concen: 0.82 ng
RT: 17.01 min Scan# 2353
Delta R.T. 0.000 min
Lab File: 08312010.D
Acq: 31 Aug 2020 11:52

Tgt Ion:166 Resp: 13915

Ion	Ratio	Lower	Upper
166	100		
164	75.9	58.0	98.0



Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_08\31\08312012.D Vial: 6
Acq On : 31 Aug 2020 13:11 Operator: WA
Sample : P2004706-002 (50mL) Inst : MS13
Misc : S34-06182001

Quant Time: Sep 01 20:47:28 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020 9/1/20
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.19	130	163835	12.500	ng	-0.03
37) 1,4-Difluorobenzene (IS2)	13.31	114	706488	12.500	ng	-0.02
56) Chlorobenzene-d5 (IS3)	17.63	82	313754	12.500	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.04	65	210720	12.611	ng	-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.88%			
57) Toluene-d8 (SS2)	15.76	98	780582	12.389	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.12%			
73) Bromofluorobenzene (SS3)	19.02	174	278290	13.237	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 105.92%			
Target Compounds						Qvalue
2) Propene	4.20	42	890	N.D.		
3) Dichlorodifluoromethan...	4.34	85	2784	N.D.		
4) Chloromethane	4.62	50	369	N.D.		
5) 1,2-Dichloro-1,1,2,2-t...	0.00	135	0	N.D.		
6) Vinyl Chloride	5.04	62	33526	1.703	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	6.43	45	1107326	112.626	ng	100
11) Acetonitrile	6.70	41	300	N.D.		
12) Acrolein	6.90	56	4230	0.498	ng	95
13) Acetone	0.00	58	0	N.D.	d	
14) Trichlorofluoromethane	7.31	101	4314	N.D.		
15) 2-Propanol (Isopropanol)	7.65	45	10746	N.D.		
16) Acrylonitrile	8.05	53	1463	N.D.		
17) 1,1-Dichloroethene	8.26	96	25942	1.889	ng	99
18) 2-Methyl-2-Propanol (t...	8.26	59	1076	N.D.		
19) Methylene Chloride	8.47	84	354563	24.983	ng	100
20) 3-Chloro-1-propene (Al...	0.00	41	0	N.D.	d	
21) Trichlorotrifluoroethane	8.91	151	2154884	160.804	ng	96
22) Carbon Disulfide	8.75	76	4976	N.D.		
23) trans-1,2-Dichloroethene	9.76	61	5875	N.D.		
24) 1,1-Dichloroethane	10.01	63	6499	N.D.		
25) Methyl tert-Butyl Ether	0.00	73	0	N.D.		
26) Vinyl Acetate	10.26	86	844	N.D.		
27) 2-Butanone (MEK)	10.47	72	106	N.D.		
28) cis-1,2-Dichloroethene	11.01	61	1683782	95.935	ng	99
29) Diisopropyl Ether	11.36	87	963	N.D.		
30) Ethyl Acetate	11.36	61	3488m	0.839	ng	
31) n-Hexane	11.31	57	13254	0.612	ng	99
32) Chloroform	11.37	83	9070	N.D.		
34) Tetrahydrofuran (THF)	11.82	72	5764	0.616	ng #	67
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.		
36) 1,2-Dichloroethane	12.16	62	20446	1.348	ng	100
38) 1,1,1-Trichloroethane	12.44	97	1048	N.D.		
39) Isopropyl Acetate	0.00	61	0	N.D.		
40) 1-Butanol	12.96	56	2040	N.D.		
41) Benzene	12.93	78	6419	N.D.		
42) Carbon Tetrachloride	13.08	117	3068	N.D.		
43) Cyclohexane	13.21	84	3207	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	14.02	130	2142901	136.564	ng	98
48) 1,4-Dioxane	14.07	88	376	N.D.		
49) 2,2,4-Trimethylpentane...	14.09	57	5001	N.D.		
50) Methyl Methacrylate	14.35	100	123	N.D.		

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_08\31\08312012.D Vial: 6
Acq On : 31 Aug 2020 13:11 Operator: WA
Sample : P2004706-002 (50mL) Inst : MS13
Misc : S34-06182001

Quant Time: Sep 01 20:47:28 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M

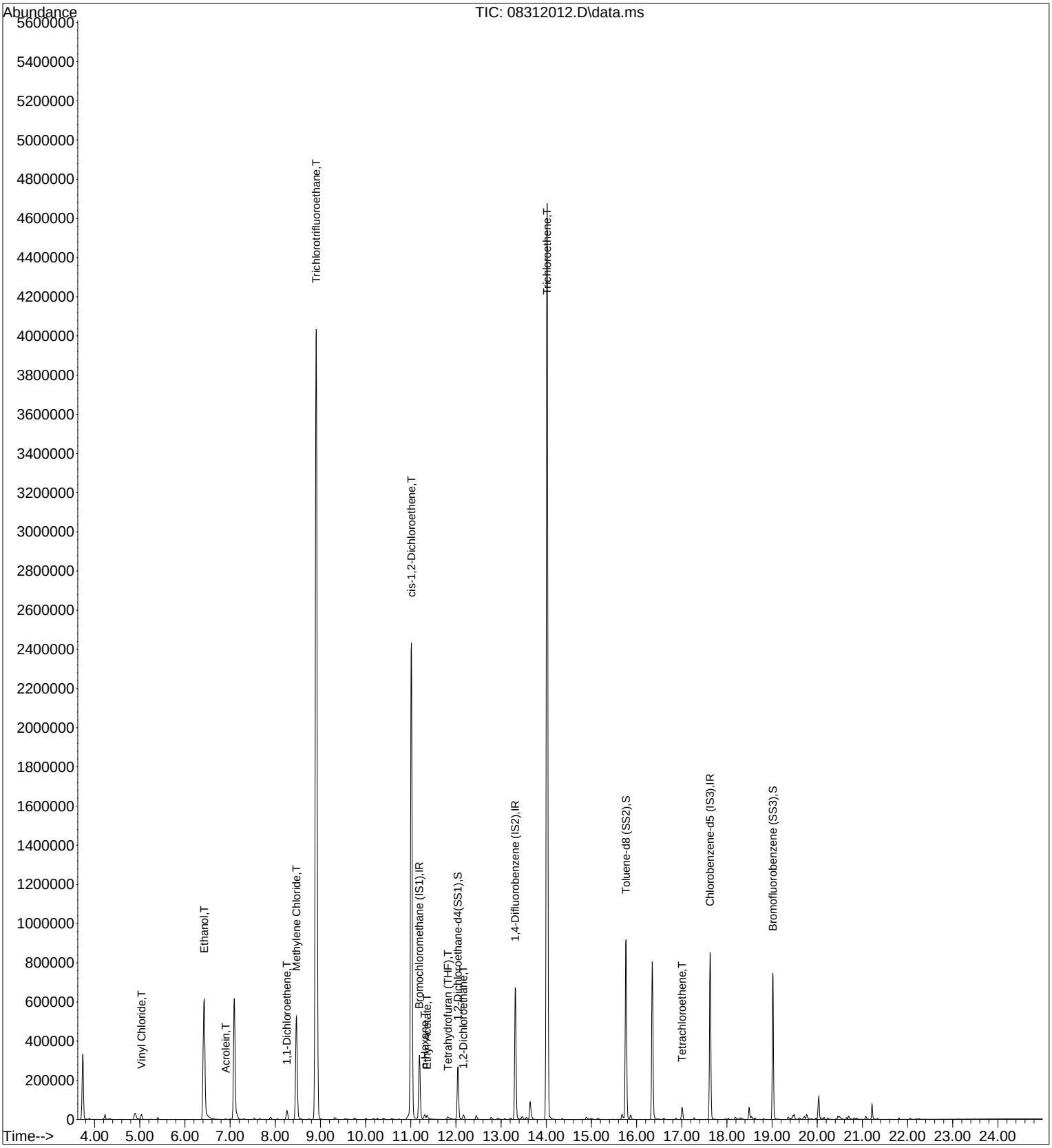
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
51) n-Heptane	14.35	71	1277	N.D.	
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.	
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
55) 1,1,2-Trichloroethane	15.58	97	715	N.D.	
58) Toluene	15.87	91	19893	N.D.	
59) 2-Hexanone	16.08	43	535	N.D.	
60) Dibromochloromethane	0.00	129	0	N.D.	
61) 1,2-Dibromoethane	0.00	107	0	N.D.	
62) n-Butyl Acetate	16.79	43	299	N.D.	
63) n-Octane	16.87	57	1216	N.D.	
64) Tetrachloroethene	17.01	166	25387	1.366 ng	99
65) Chlorobenzene	0.00	112	0	N.D.	
66) Ethylbenzene	18.03	91	6604	N.D.	
67) m- & p-Xylenes	18.19	91	10935	N.D.	
68) Bromoform	0.00	173	0	N.D.	
69) Styrene	18.53	104	1557	N.D.	
70) o-Xylene	18.62	91	4280	N.D.	
71) n-Nonane	18.82	43	2063	N.D.	
72) 1,1,2,2-Tetrachloroethane	18.55	83	1201	N.D.	
74) Cumene	19.15	105	978	N.D.	
75) alpha-Pinene	19.49	93	9412	N.D.	
76) n-Propylbenzene	19.60	91	2029	N.D.	
77) 3-Ethyltoluene	19.69	105	2834	N.D.	
78) 4-Ethyltoluene	19.69	105	2834	N.D.	
79) 1,3,5-Trimethylbenzene	19.78	105	1307	N.D.	
80) alpha-Methylstyrene	0.00	118	0	N.D.	
81) 2-Ethyltoluene	19.95	105	1156	N.D.	
82) 1,2,4-Trimethylbenzene	20.15	105	3770	N.D.	
83) n-Decane	20.24	57	2525	N.D.	
84) Benzyl Chloride	20.27	91	935	N.D.	
85) 1,3-Dichlorobenzene	20.35	146	199	N.D.	
86) 1,4-Dichlorobenzene	20.35	146	199	N.D.	
87) sec-Butylbenzene	20.53	105	1219	N.D.	
88) 4-Isopropyltoluene (p-...	20.52	119	2307	N.D.	
89) 1,2,3-Trimethylbenzene	20.53	105	1219	N.D.	
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.	
91) d-Limonene	20.65	68	2420	N.D.	
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.	
93) n-Undecane	21.34	57	1791	N.D.	
94) 1,2,4-Trichlorobenzene	0.00	180	0	N.D.	
95) Naphthalene	22.28	128	2315	N.D.	
96) n-Dodecane	22.25	57	1569	N.D.	
97) Hexachlorobutadiene	0.00	225	0	N.D.	
98) Cyclohexanone	18.34	55	664	N.D.	
99) tert-Butylbenzene	20.15	119	403	N.D.	
100) n-Butylbenzene	20.86	91	1753	N.D.	

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_08\31\08312012.D Vial: 6
Acq On : 31 Aug 2020 13:11 Operator: WA
Sample : P2004706-002 (50mL) Inst : MS13
Misc : S34-06182001

Quant Time: Sep 01 20:47:28 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_08\31\08312012.D Vial: 6
Acq On : 31 Aug 2020 13:11 Operator: WA
Sample : P2004706-002 (50mL) Inst : MS13
Misc : S34-06182001

Quant Time: Sep 01 20:47:28 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M

WA 9/1/20

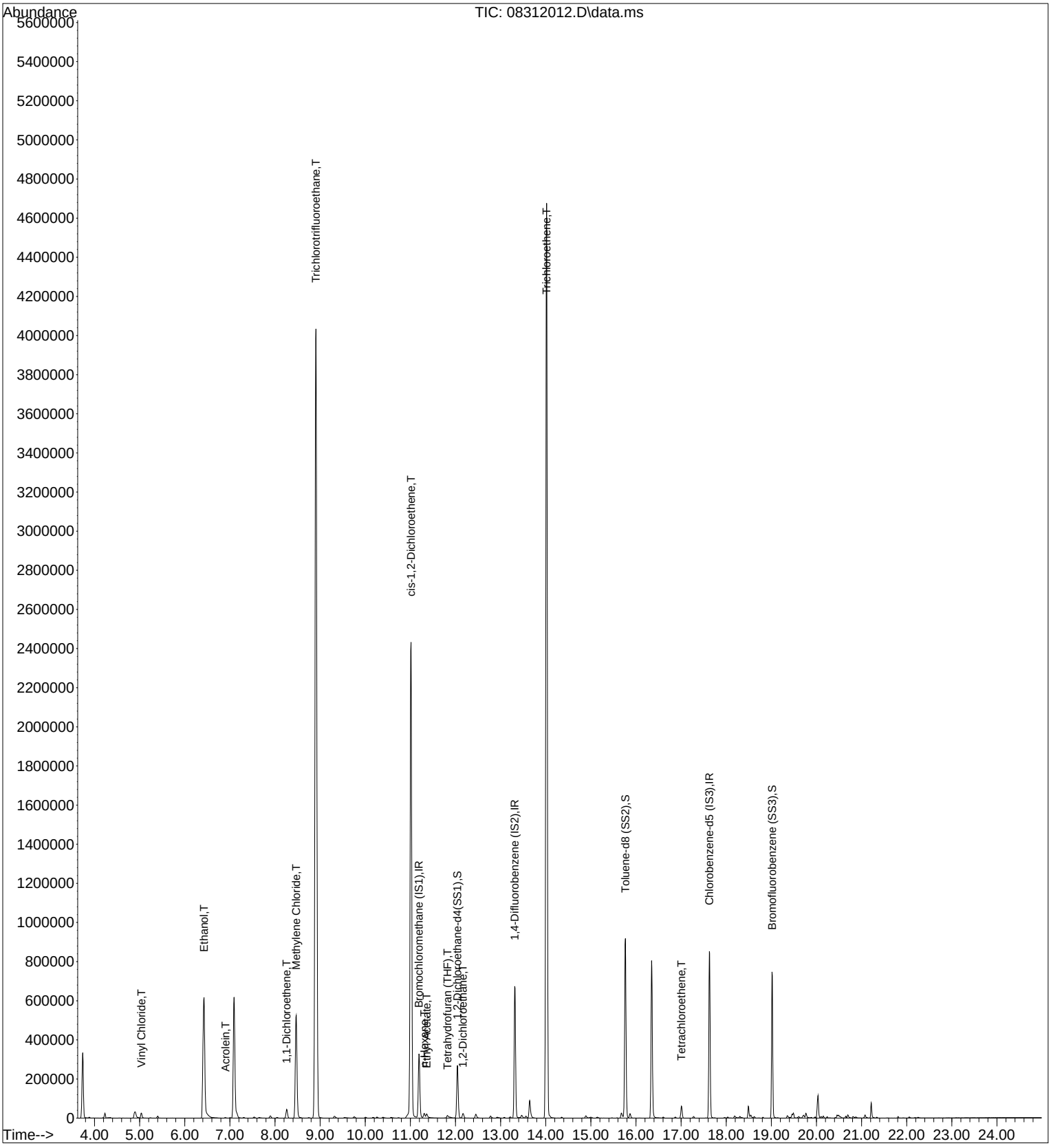
Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.19	130	163835	12.500	ng		-0.03
37) 1,4-Difluorobenzene (IS2)	13.31	114	706488	12.500	ng		-0.02
56) Chlorobenzene-d5 (IS3)	17.63	82	313754	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.04	65	210720	12.611	ng		-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.88%				
57) Toluene-d8 (SS2)	15.76	98	780582	12.389	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.12%				
73) Bromofluorobenzene (SS3)	19.02	174	278290	13.237	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 105.92%				
Target Compounds							Qvalue
6) Vinyl Chloride	5.04	62	33526	1.703	ng		99
10) Ethanol	6.43	45	1107326	112.626	ng		100
12) Acrolein	6.90	56	4230	0.498	ng		95
17) 1,1-Dichloroethene	8.26	96	25942	1.889	ng		99
19) Methylene Chloride	8.47	84	354563	24.983	ng		100
21) Trichlorotrifluoroethane	8.91	151	2154884	160.804	ng		96
28) cis-1,2-Dichloroethene	11.01	61	1683782	95.935	ng		99
30) Ethyl Acetate	11.36	61	3488m	0.839	ng		
31) n-Hexane	11.31	57	13254	0.612	ng		99
34) Tetrahydrofuran (THF)	11.82	72	5764	0.616	ng	#	67
36) 1,2-Dichloroethane	12.16	62	20446	1.348	ng		100
47) Trichloroethene	14.02	130	2142901	136.564	ng		98
64) Tetrachloroethene	17.01	166	25387	1.366	ng		99

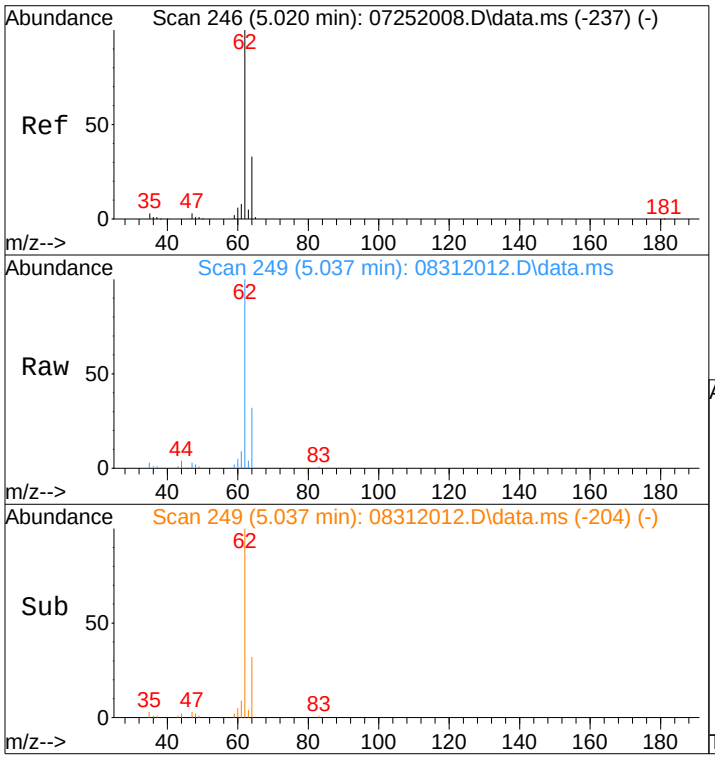
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_08\31\08312012.D Vial: 6
Acq On : 31 Aug 2020 13:11 Operator: WA
Sample : P2004706-002 (50mL) Inst : MS13
Misc : S34-06182001

Quant Time: Sep 01 20:47:28 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M

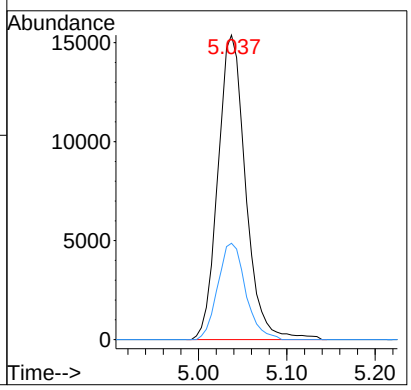


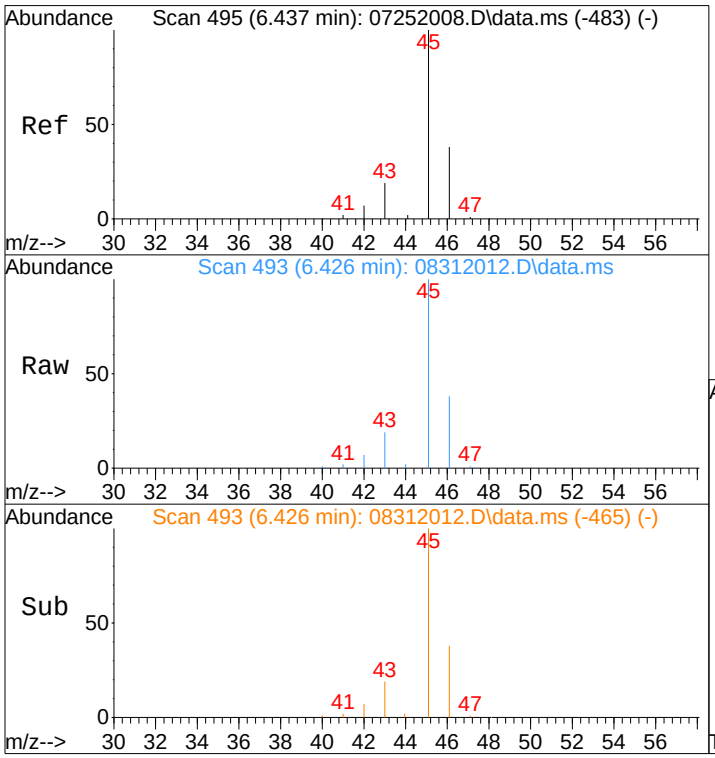


#6
Vinyl Chloride
Concen: 1.70 ng
RT: 5.04 min Scan# 249
Delta R.T. 0.006 min
Lab File: 08312012.D
Acq: 31 Aug 2020 13:11

Tgt Ion: 62 Resp: 33526

Ion	Ratio	Lower	Upper
62	100		
64	31.8	12.4	52.4

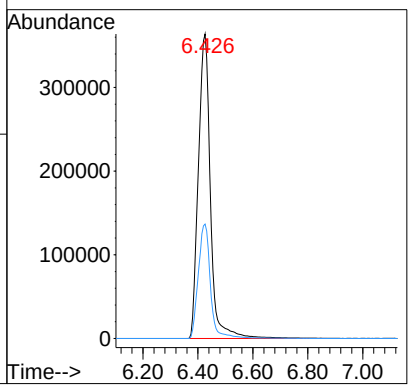


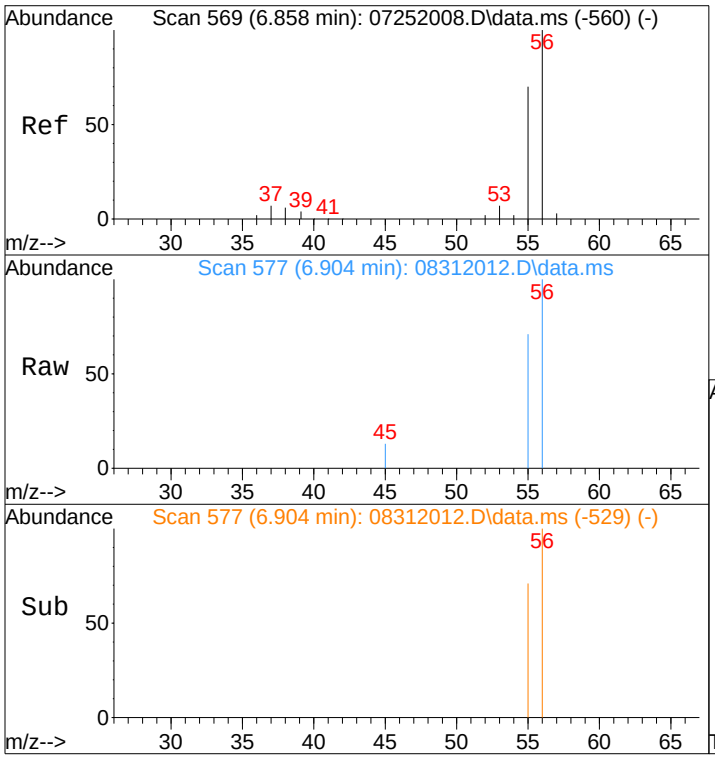


#10
Ethanol
Concen: 112.63 ng
RT: 6.43 min Scan# 493
Delta R.T. -0.091 min
Lab File: 08312012.D
Acq: 31 Aug 2020 13:11

Tgt Ion: 45 Resp: 1107326

Ion	Ratio	Lower	Upper
45	100		
46	38.1	18.0	58.0

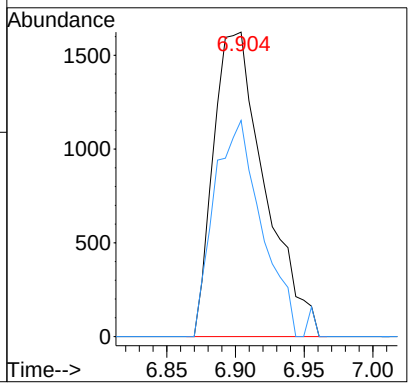


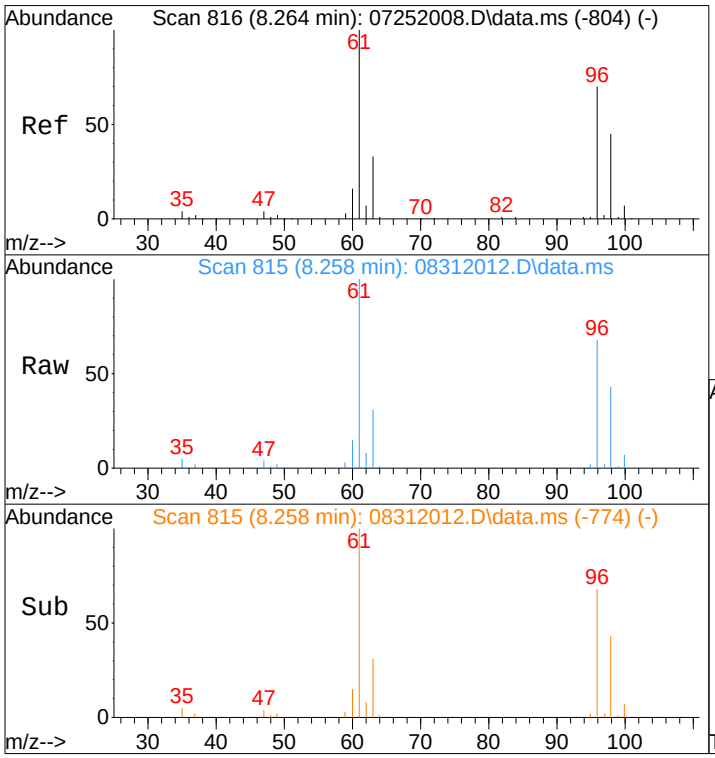


#12
Acrolein
Concen: 0.50 ng
RT: 6.90 min Scan# 577
Delta R.T. 0.023 min
Lab File: 08312012.D
Acq: 31 Aug 2020 13:11

Tgt Ion: 56 Resp: 4230

Ion	Ratio	Lower	Upper
56	100		
55	65.0	49.5	89.5

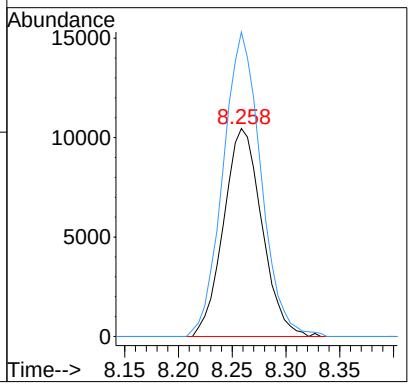


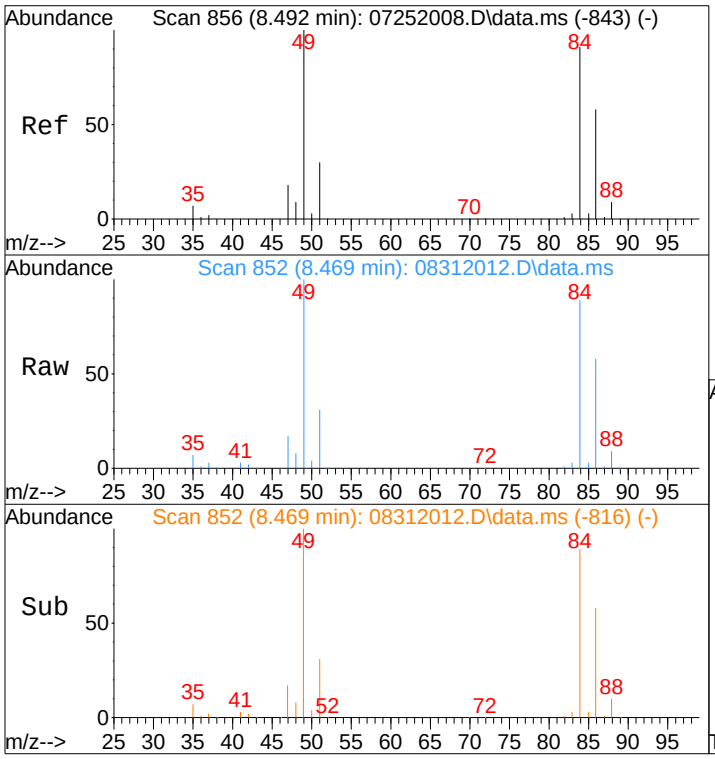


#17
1,1-Dichloroethene
Concen: 1.89 ng
RT: 8.26 min Scan# 815
Delta R.T. -0.017 min
Lab File: 08312012.D
Acq: 31 Aug 2020 13:11

Tgt Ion: 96 Resp: 25942

Ion	Ratio	Lower	Upper
96	100		
61	144.9	125.8	165.8

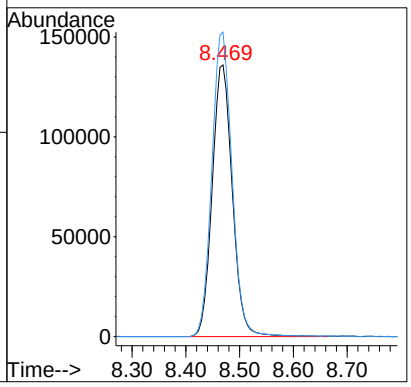


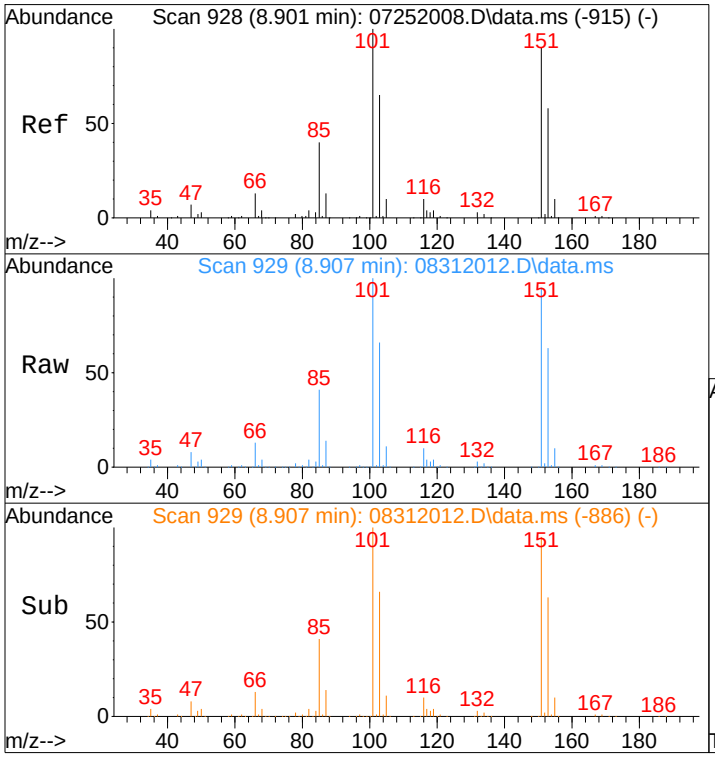


#19
Methylene Chloride
Concen: 24.98 ng
RT: 8.47 min Scan# 852
Delta R.T. -0.045 min
Lab File: 08312012.D
Acq: 31 Aug 2020 13:11

Tgt Ion: 84 Resp: 354563

Ion	Ratio	Lower	Upper
84	100		
49	112.4	87.2	137.2

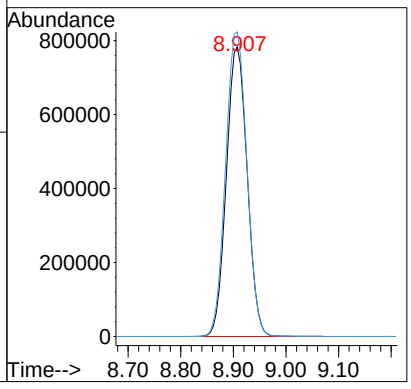


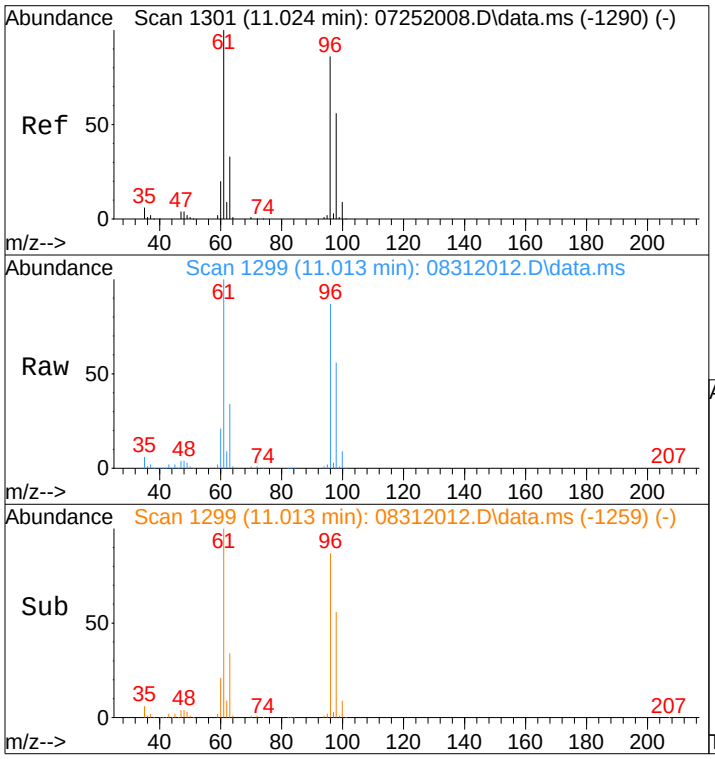


#21
Trichlorotrifluoroethane
Concen: 160.80 ng
RT: 8.91 min Scan# 929
Delta R.T. -0.006 min
Lab File: 08312012.D
Acq: 31 Aug 2020 13:11

Tgt Ion:151 Resp: 2154884

Ion	Ratio	Lower	Upper
151	100		
101	107.8	92.1	132.1

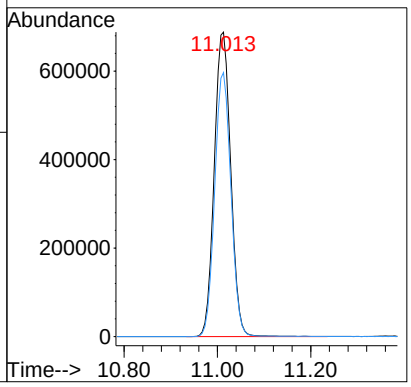


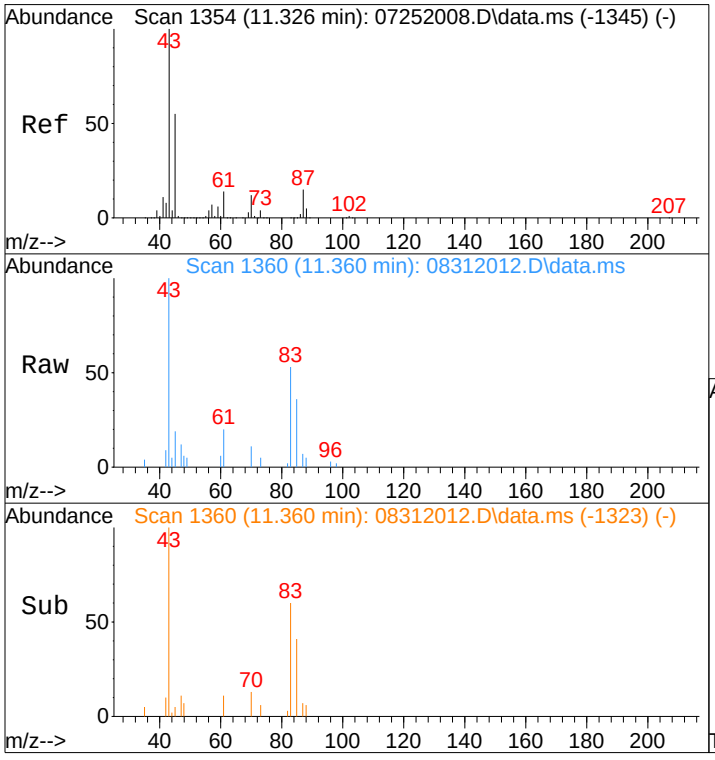


#28
cis-1,2-Dichloroethene
Concen: 95.94 ng
RT: 11.01 min Scan# 1299
Delta R.T. -0.023 min
Lab File: 08312012.D
Acq: 31 Aug 2020 13:11

Tgt Ion: 61 Resp: 1683782

Ion	Ratio	Lower	Upper
61	100		
96	85.7	65.1	105.1

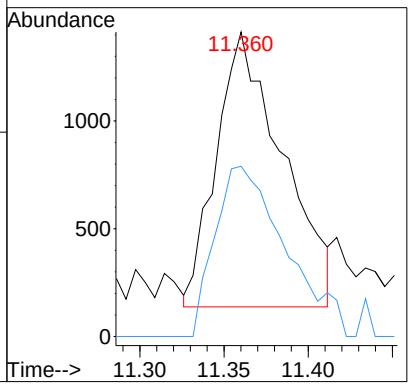


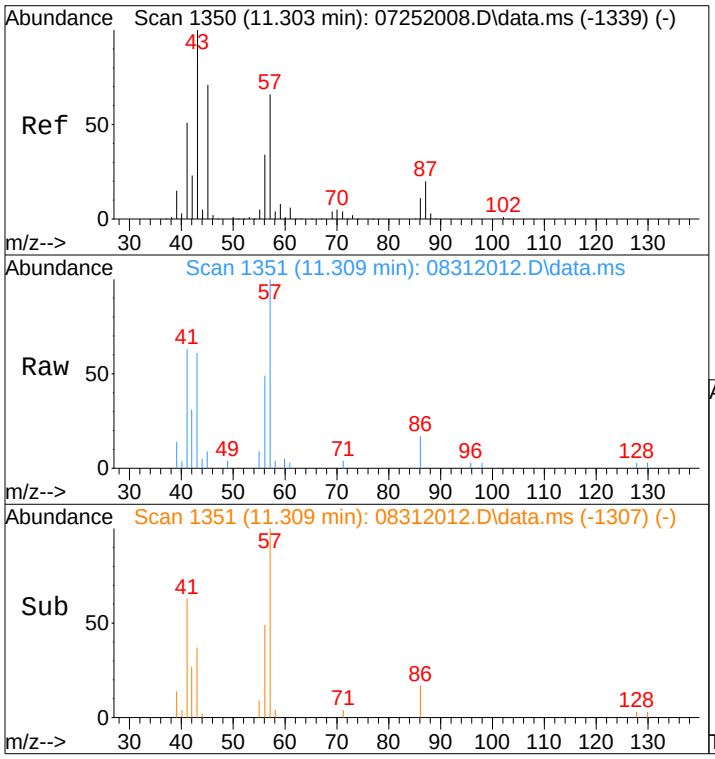


#30
Ethyl Acetate
Concen: 0.84 ng m
RT: 11.36 min Scan# 1360
Delta R.T. 0.011 min
Lab File: 08312012.D
Acq: 31 Aug 2020 13:11

Tgt Ion: 61 Resp: 3488

Ion	Ratio	Lower	Upper
61	100		
70	66.1	64.9	104.9

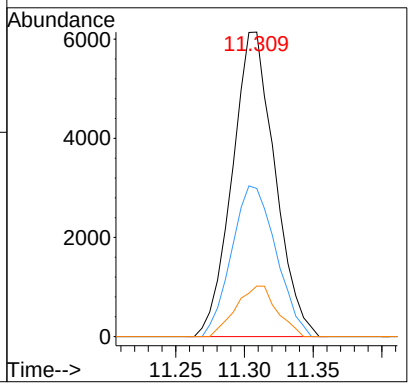


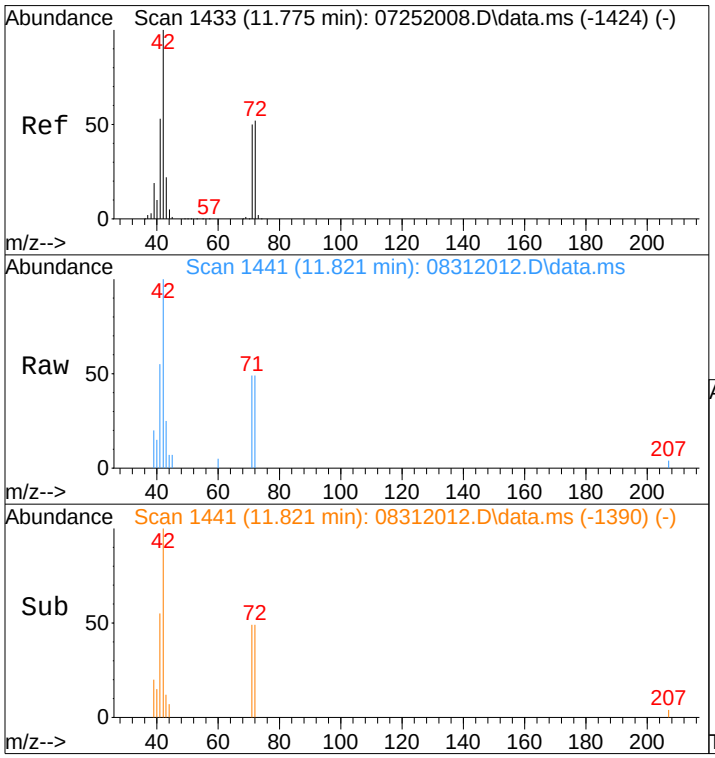


#31
n-Hexane
Concen: 0.61 ng
RT: 11.31 min Scan# 1351
Delta R.T. 0.000 min
Lab File: 08312012.D
Acq: 31 Aug 2020 13:11

Tgt Ion: 57 Resp: 13254

Ion	Ratio	Lower	Upper
57	100		
56	51.6	41.0	61.4
86	16.0	13.8	20.8

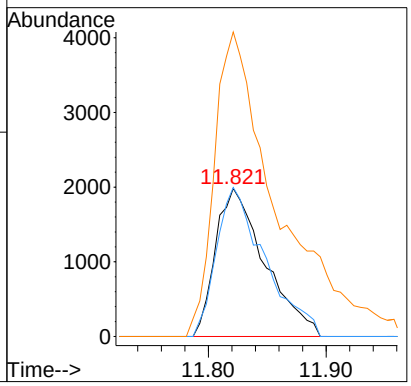


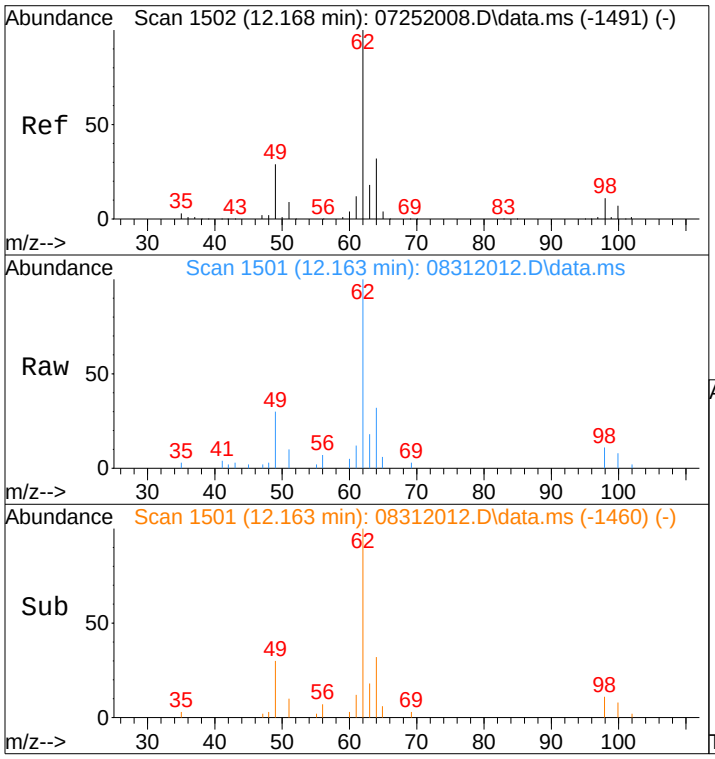


#34
Tetrahydrofuran (THF)
Concen: 0.62 ng
RT: 11.82 min Scan# 1441
Delta R.T. 0.040 min
Lab File: 08312012.D
Acq: 31 Aug 2020 13:11

Tgt Ion: 72 Resp: 5764

Ion	Ratio	Lower	Upper
72	100		
71	99.2	76.0	116.0
42	266.5	174.5	214.5#

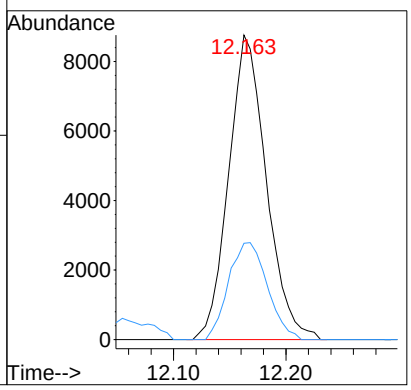


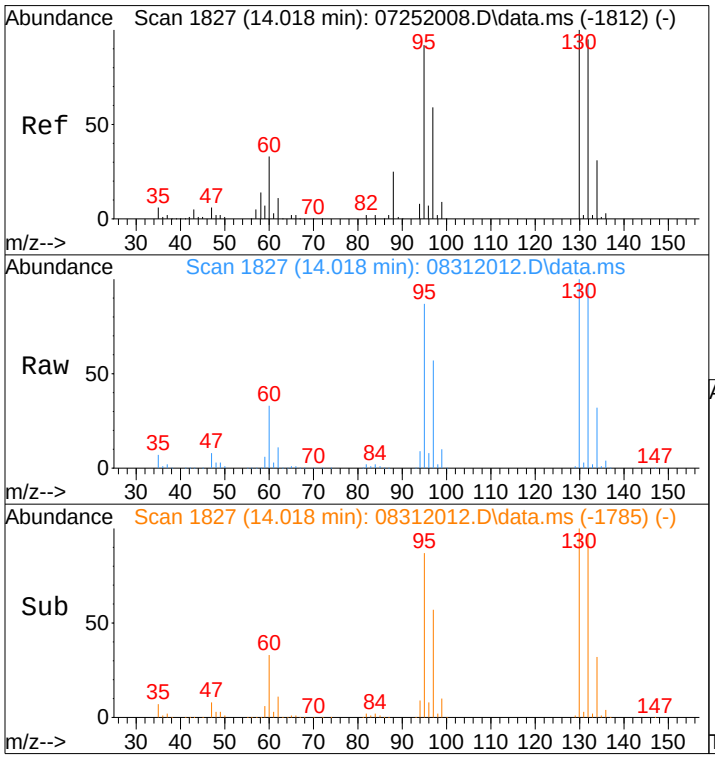


#36
1,2-Dichloroethane
Concen: 1.35 ng
RT: 12.16 min Scan# 1501
Delta R.T. -0.016 min
Lab File: 08312012.D
Acq: 31 Aug 2020 13:11

Tgt Ion: 62 Resp: 20446

Ion	Ratio	Lower	Upper
62	100		
64	32.8	12.7	52.7

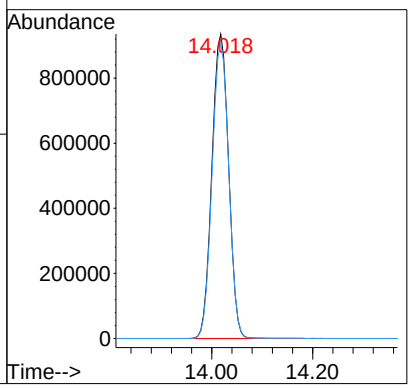


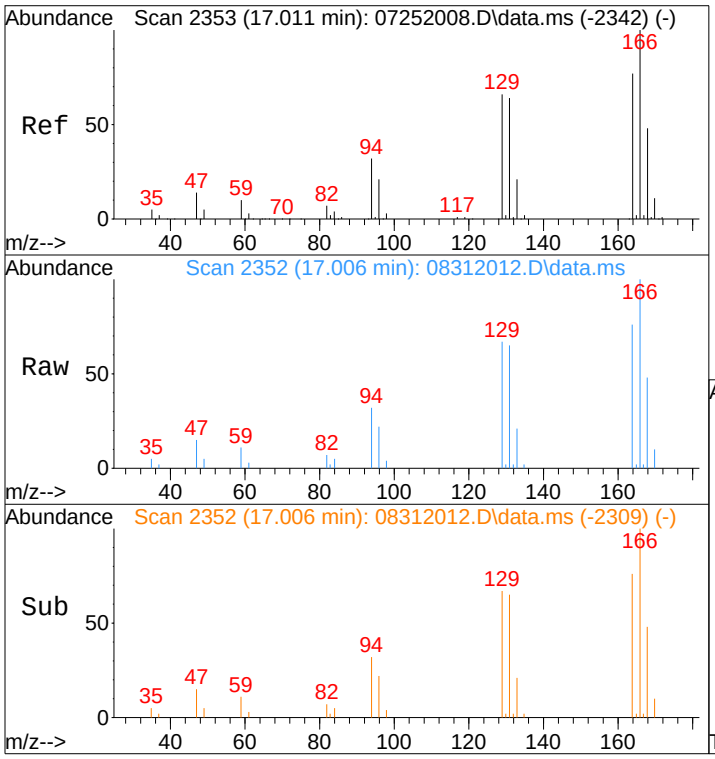


#47
Trichloroethene
Concen: 136.56 ng
RT: 14.02 min Scan# 1827
Delta R.T. -0.011 min
Lab File: 08312012.D
Acq: 31 Aug 2020 13:11

Tgt Ion:130 Resp: 2142901

Ion	Ratio	Lower	Upper
130	100		
132	96.9	75.4	115.4

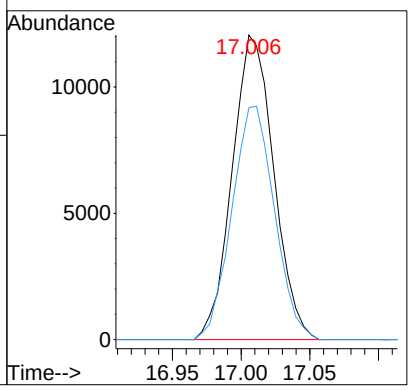




#64
Tetrachloroethene
Concen: 1.37 ng
RT: 17.01 min Scan# 2352
Delta R.T. -0.005 min
Lab File: 08312012.D
Acq: 31 Aug 2020 13:11

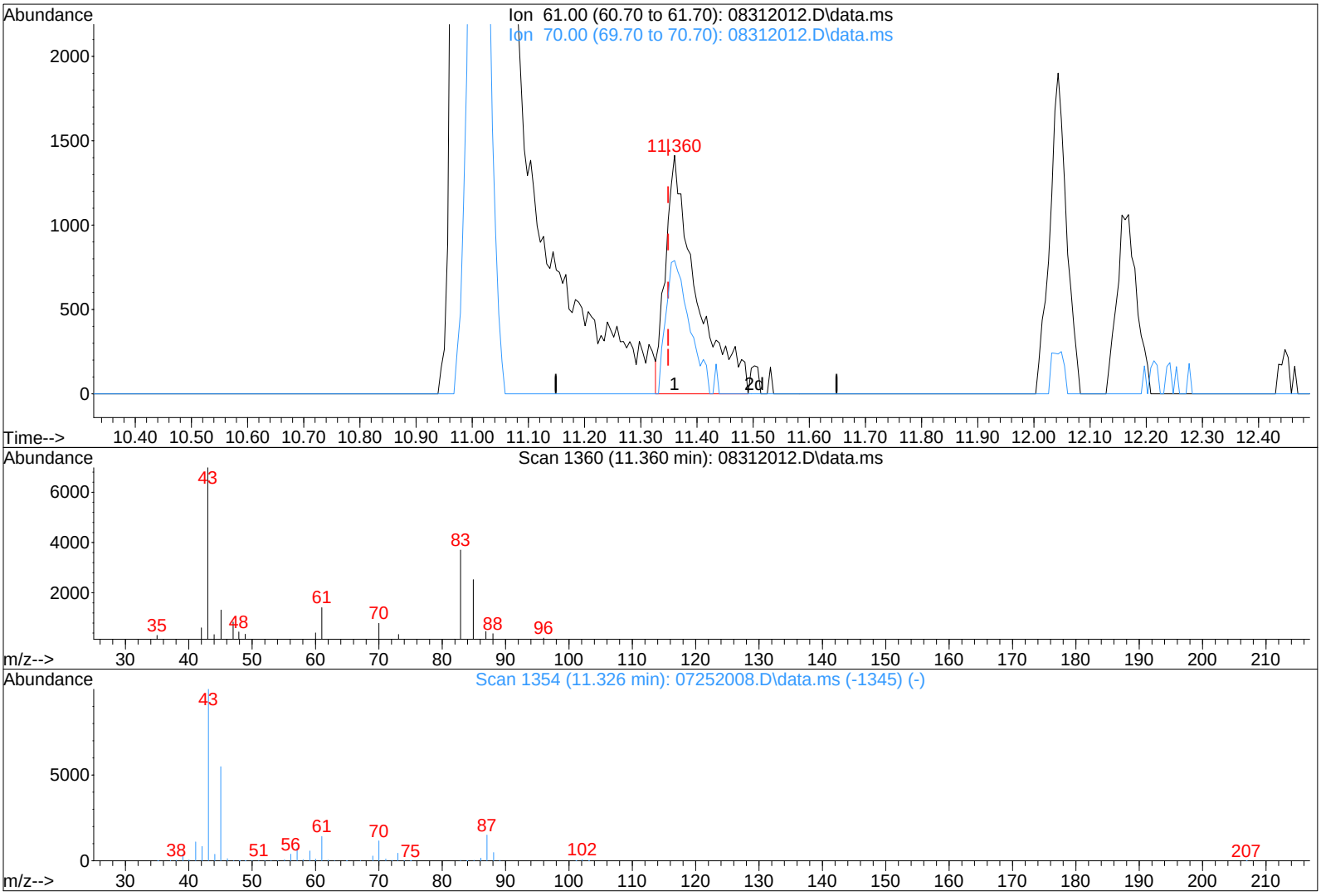
Tgt Ion:166 Resp: 25387

Ion	Ratio	Lower	Upper
166	100		
164	78.6	58.0	98.0



Data File : I:\MS13\DATA\2020_08\31\08312012.D Vial: 6
Acq On : 31 Aug 2020 13:11 Operator: WA
Sample : P2004706-002 (50mL) Inst : MS13
Misc : S34-06182001

Quant Time: Aug 31 13:35:53 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 08312012.D\data.ms

(30) Ethyl Acetate (T)

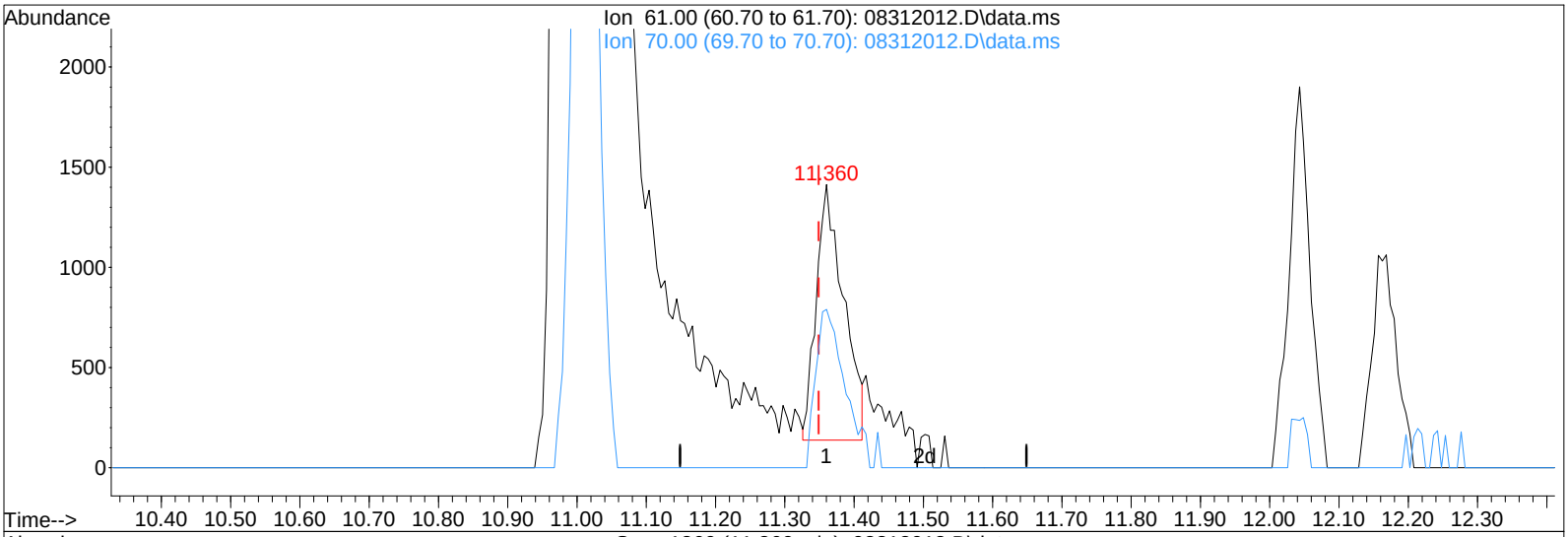
11.360min (+0.011) 1.30ng

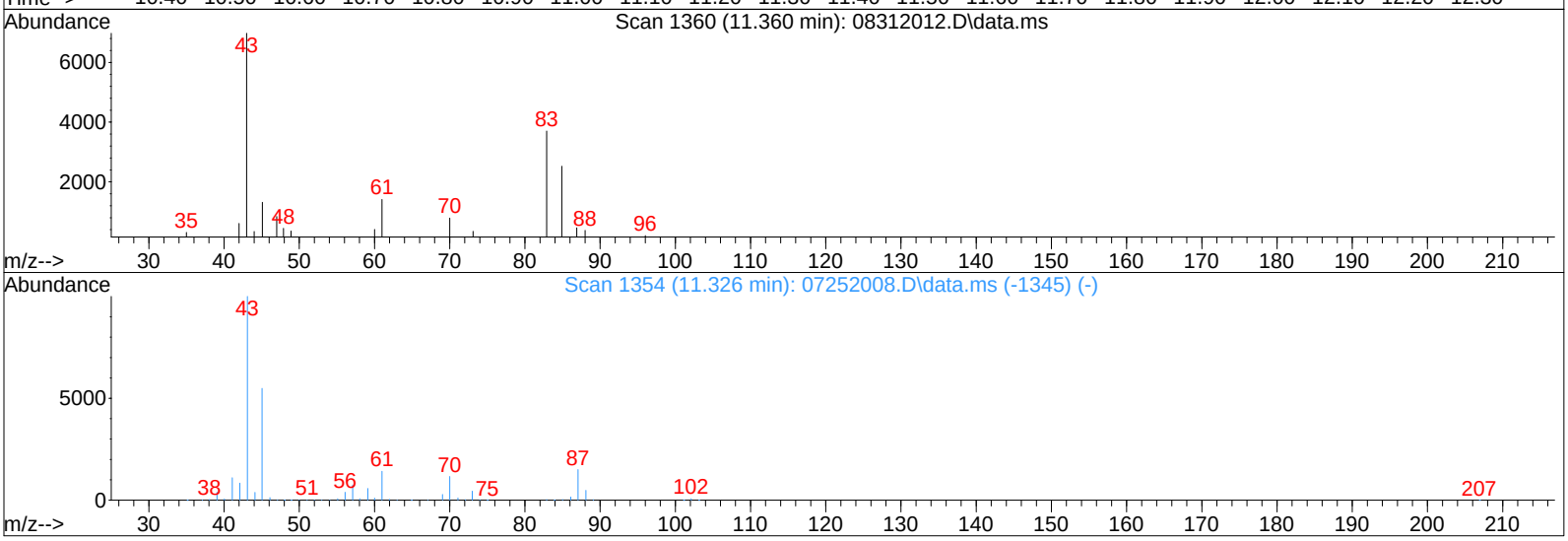
response 5383

Ion	Exp%	Act%
61.00	100	100
70.00	84.90	42.86#
0.00	0.00	0.00
0.00	0.00	0.00

Data File : I:\MS13\DATA\2020_08\31\08312012.D Vial: 6
Acq On : 31 Aug 2020 13:11 Operator: WA
Sample : P2004706-002 (50mL) Inst : MS13
Misc : S34-06182001

Quant Time: Aug 31 13:35:53 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 08312012.D\data.ms

(30) Ethyl Acetate (T)

11.360min (+0.011) 0.84ng m

response 3488

Ion	Exp%	Act%
61.00	100	100
70.00	84.90	66.14
0.00	0.00	0.00
0.00	0.00	0.00

BLC

9/1/20

9/2/20

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_08\31\08312011.D Vial: 4
Acq On : 31 Aug 2020 12:26 Operator: WA
Sample : P2004706-002dil (5.0mL) Inst : MS13
Misc : S34-06182001

Quant Time: Sep 01 20:39:53 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020 9/1/20
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.18	130	158143	12.500	ng	-0.03
37) 1,4-Difluorobenzene (IS2)	13.31	114	657651	12.500	ng	-0.02
56) Chlorobenzene-d5 (IS3)	17.63	82	292458	12.500	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.04	65	201105	12.469	ng	-0.03
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.76%			
57) Toluene-d8 (SS2)	15.76	98	725674	12.356	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.88%			
73) Bromofluorobenzene (SS3)	19.02	174	260191	13.277	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 106.24%			
Target Compounds						Qvalue
2) Propene	4.22	42	637	N.D.		
3) Dichlorodifluoromethan...	4.25	85	197	N.D.		
4) Chloromethane	4.64	50	115	N.D.		
5) 1,2-Dichloro-1,1,2,2-t...	0.00	135	0	N.D.		
6) Vinyl Chloride	5.05	62	2417	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	6.39	45	193975	20.439	ng	100
11) Acetonitrile	0.00	41	0	N.D.		
12) Acrolein	0.00	56	0	N.D.		
13) Acetone	0.00	58	0	N.D. d		
14) Trichlorofluoromethane	0.00	101	0	N.D.		
15) 2-Propanol (Isopropanol)	7.68	45	3565	N.D.		
16) Acrylonitrile	0.00	53	0	N.D.		
17) 1,1-Dichloroethene	8.26	96	2140	N.D.		
18) 2-Methyl-2-Propanol (t...	0.00	59	0	N.D.		
19) Methylene Chloride	8.46	84	32210	2.351	ng	96
20) 3-Chloro-1-propene (Al...	8.47	41	915	N.D.		
21) Trichlorotrifluoroethane	8.90	151	200872	15.529	ng	97
22) Carbon Disulfide	8.75	76	4442	N.D.		
23) trans-1,2-Dichloroethene	0.00	61	0	N.D.		
24) 1,1-Dichloroethane	9.99	63	450	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)	10.60	72	310	N.D.		
28) cis-1,2-Dichloroethene	11.00	61	163267	9.637	ng	99
29) Diisopropyl Ether	0.00	87	0	N.D.		
30) Ethyl Acetate	11.38	61	1020	N.D.		
31) n-Hexane	11.30	57	1136	N.D.		
32) Chloroform	11.36	83	626	N.D.		
34) Tetrahydrofuran (THF)	11.86	72	752	N.D.		
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.		
36) 1,2-Dichloroethane	12.19	62	1326	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	12.93	78	1386	N.D.		
42) Carbon Tetrachloride	0.00	117	0	N.D.		
43) Cyclohexane	13.20	84	253	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	14.01	83	1922	N.D.		
47) Trichloroethene	14.01	130	198223	13.571	ng	98
48) 1,4-Dioxane	0.00	88	0	N.D.		
49) 2,2,4-Trimethylpentane...	14.08	57	1006	N.D.		
50) Methyl Methacrylate	14.01	100	310	N.D.		

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_08\31\08312011.D Vial: 4
Acq On : 31 Aug 2020 12:26 Operator: WA
Sample : P2004706-002dil (5.0mL) Inst : MS13
Misc : S34-06182001

Quant Time: Sep 01 20:39:53 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M

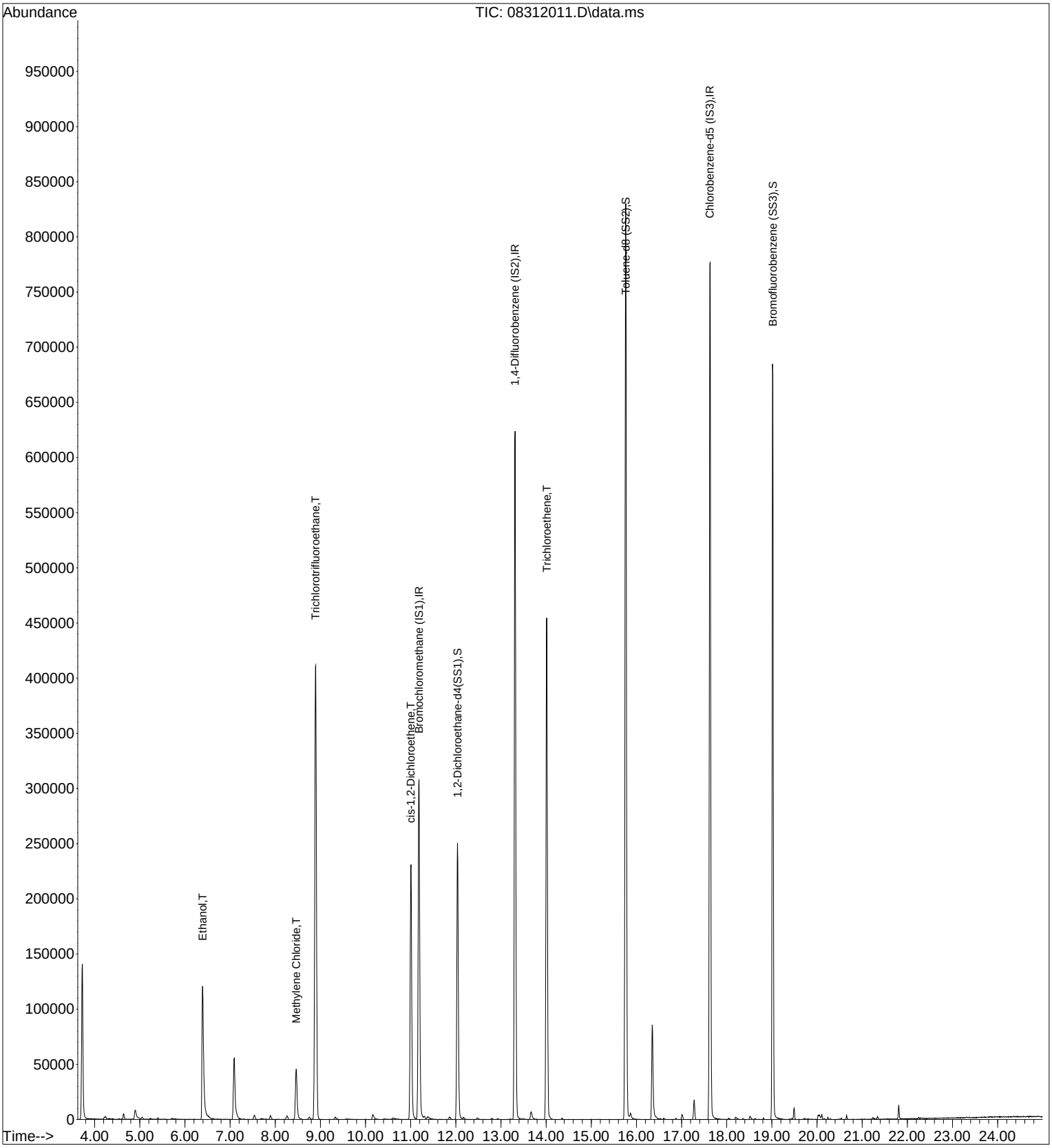
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.35	71	350	N.D.		
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.		
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.		
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.		
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.		
58) Toluene	15.87	91	5820	N.D.		
59) 2-Hexanone	0.00	43	0	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	796	N.D.		
63) n-Octane	16.87	57	203	N.D.		
64) Tetrachloroethene	17.01	166	2059	N.D.		
65) Chlorobenzene	0.00	112	0	N.D.		
66) Ethylbenzene	18.05	91	1950	N.D.		
67) m- & p-Xylenes	18.19	91	3144	N.D.		
68) Bromoform	0.00	173	0	N.D.		
69) Styrene	0.00	104	0	N.D.		
70) o-Xylene	18.63	91	1004	N.D.		
71) n-Nonane	18.81	43	713	N.D.		
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.		
74) Cumene	19.16	105	228	N.D.		
75) alpha-Pinene	19.49	93	4879	N.D.		
76) n-Propylbenzene	19.61	91	190	N.D.		
77) 3-Ethyltoluene	19.69	105	750	N.D.		
78) 4-Ethyltoluene	19.69	105	750	N.D.		
79) 1,3,5-Trimethylbenzene	19.79	105	332	N.D.		
80) alpha-Methylstyrene	0.00	118	0	N.D.		
81) 2-Ethyltoluene	19.79	105	332	N.D.		
82) 1,2,4-Trimethylbenzene	20.16	105	729	N.D.		
83) n-Decane	20.24	57	989	N.D.		
84) Benzyl Chloride	0.00	91	0	N.D.		
85) 1,3-Dichlorobenzene	0.00	146	0	N.D.		
86) 1,4-Dichlorobenzene	0.00	146	0	N.D.		
87) sec-Butylbenzene	20.16	105	660	N.D.		
88) 4-Isopropyltoluene (p-...	20.53	119	988	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	20.65	68	1201	N.D.		
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.		
93) n-Undecane	21.34	57	1038	N.D.		
94) 1,2,4-Trichlorobenzene	0.00	180	0	N.D.		
95) Naphthalene	22.30	128	1555	N.D.		
96) n-Dodecane	22.25	57	581	N.D.		
97) Hexachlorobutadiene	0.00	225	0	N.D.		
98) Cyclohexanone	18.52	55	774	N.D.		
99) tert-Butylbenzene	0.00	119	0	N.D.		
100) n-Butylbenzene	0.00	91	0	N.D.		

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

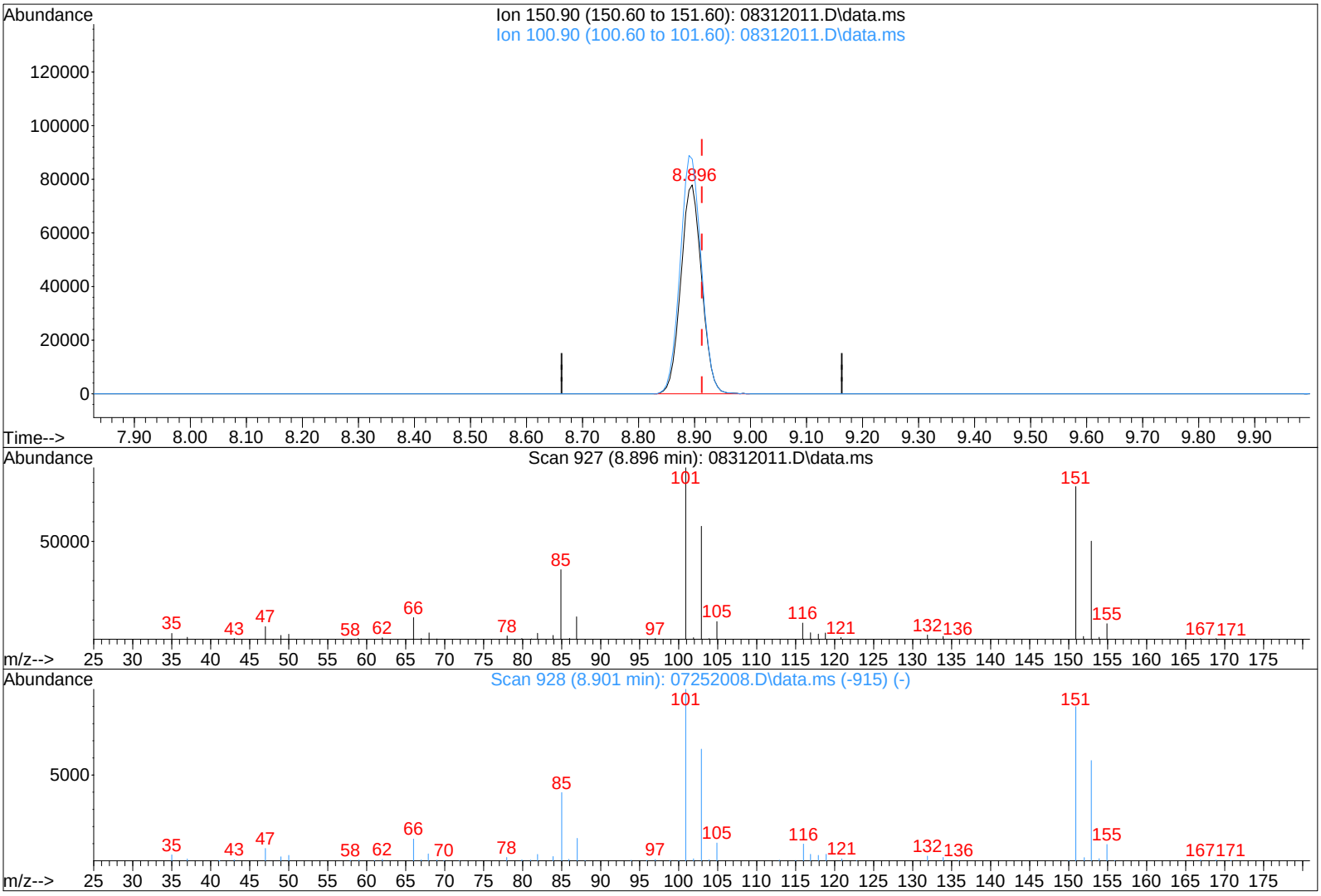
Data File : I:\MS13\DATA\2020_08\31\08312011.D Vial: 4
Acq On : 31 Aug 2020 12:26 Operator: WA
Sample : P2004706-002dil (5.0mL) Inst : MS13
Misc : S34-06182001

Quant Time: Sep 01 20:39:53 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M



Data File : I:\MS13\DATA\2020_08\31\08312011.D Vial: 4
Acq On : 31 Aug 2020 12:26 Operator: WA
Sample : P2004706-002dil (5.0mL) Inst : MS13
Misc : S34-06182001

Quant Time: Sep 01 20:39:53 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 08312011.D\data.ms

(21) Trichlorotrifluoroethane (T)

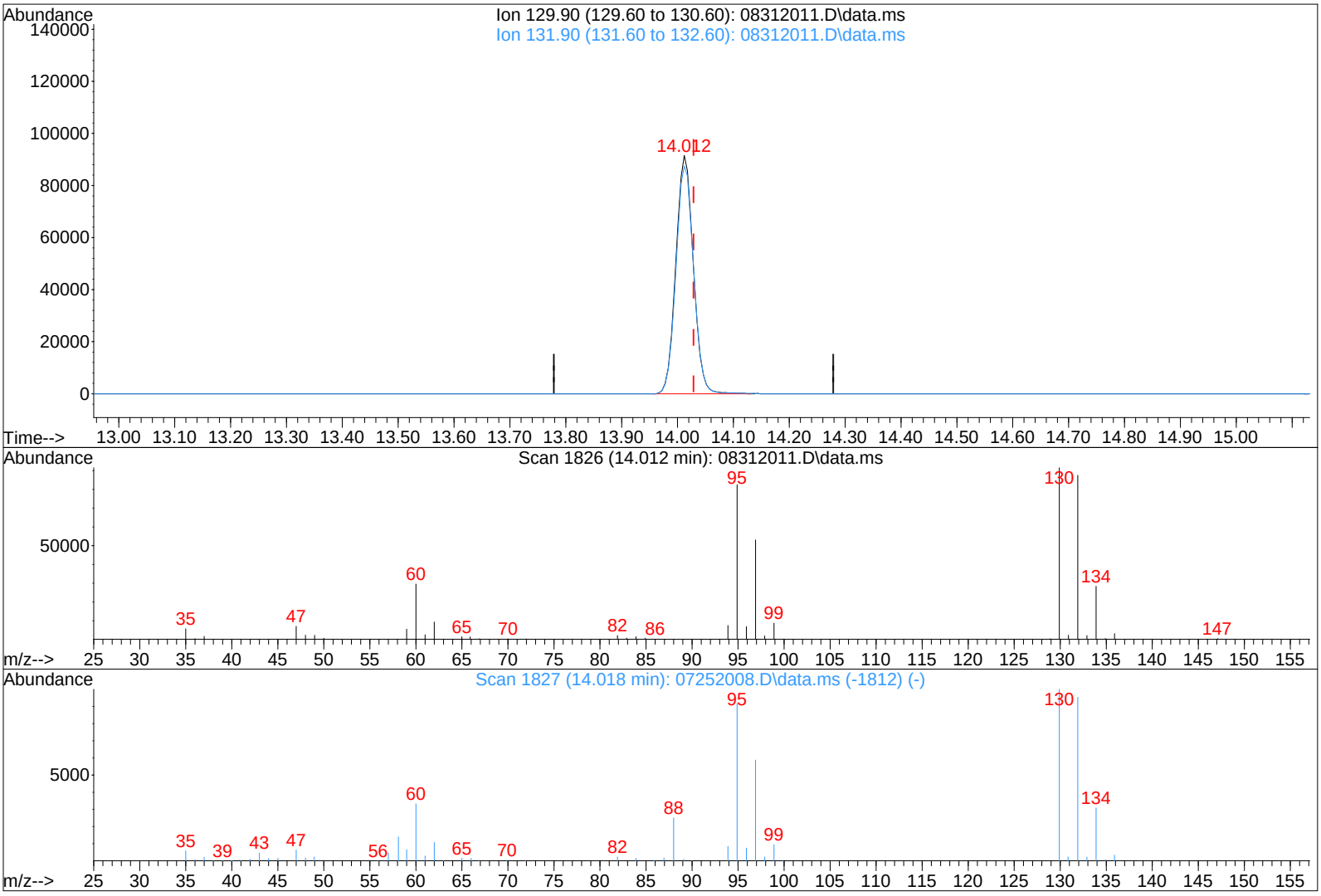
8.896min (-0.017) 15.53ng

response 200872

Ion	Exp%	Act%
150.90	100	100
100.90	112.10	115.28
0.00	0.00	0.00
0.00	0.00	0.00

Data File : I:\MS13\DATA\2020_08\31\08312011.D Vial: 4
Acq On : 31 Aug 2020 12:26 Operator: WA
Sample : P2004706-002dil (5.0mL) Inst : MS13
Misc : S34-06182001

Quant Time: Sep 01 20:39:53 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 08312011.D\data.ms

(47) Trichloroethene (T)

14.012min (-0.017) 13.57ng

response 198223

Ion	Exp%	Act%
129.90	100	100
131.90	95.40	97.00
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_08\31\08312016.D Vial: 7
Acq On : 31 Aug 2020 15:39 Operator: WA
Sample : P2004706-003 (1000mL) Inst : MS13
Misc : S34-06182001

Quant Time: Sep 01 20:52:08 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020 9/1/20
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.19	130	153718	12.500	ng		-0.03
37) 1,4-Difluorobenzene (IS2)	13.31	114	660404	12.500	ng		-0.02
56) Chlorobenzene-d5 (IS3)	17.63	82	300384	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.04	65	198172	12.641	ng		-0.03
Spiked Amount 12.500	Range 70 - 130		Recovery = 101.12%				
57) Toluene-d8 (SS2)	15.76	98	736903	12.216	ng		-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 97.76%				
73) Bromofluorobenzene (SS3)	19.02	174	245623	12.203	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 97.60%				
Target Compounds							Qvalue
2) Propene	4.16	42	7376	0.506	ng		96
3) Dichlorodifluoromethan...	4.32	85	100508	3.945	ng		99
4) Chloromethane	4.60	50	4082	N.D.			
5) 1,2-Dichloro-1,1,2,2-t...	4.86	135	1133	N.D.			
6) Vinyl Chloride	5.03	62	931	N.D.			
7) 1,3-Butadiene	5.38	54	430	N.D.			
8) Bromomethane	5.71	94	292	N.D.			
9) Chloroethane	0.00	64	0	N.D.			
10) Ethanol	6.40	45	292573	31.716	ng		100
11) Acetonitrile	6.66	41	4980	N.D.			
12) Acrolein	6.86	56	5527	0.694	ng		95
13) Acetone	7.05	58	130093	13.994	ng	#	50
14) Trichlorofluoromethane	7.30	101	145556	6.567	ng		100
15) 2-Propanol (Isopropanol)	7.58	45	68031	2.432	ng		95
16) Acrylonitrile	7.89	53	2261	N.D.			
17) 1,1-Dichloroethene	8.25	96	964	N.D.			
18) 2-Methyl-2-Propanol (t...	8.55	59	1254	N.D.			
19) Methylene Chloride	8.47	84	3290	N.D.			
20) 3-Chloro-1-propene (Al...	8.56	41	4326	N.D.			
21) Trichlorotrifluoroethane	8.90	151	106001	8.431	ng		95
22) Carbon Disulfide	8.74	76	13055	N.D.			
23) trans-1,2-Dichloroethene	0.00	61	0	N.D.			
24) 1,1-Dichloroethane	10.01	63	105	N.D.			
25) Methyl tert-Butyl Ether	0.00	73	0	N.D.			
26) Vinyl Acetate	0.00	86	0	N.D.	d		
27) 2-Butanone (MEK)	10.51	72	40876	4.877	ng	#	89
28) cis-1,2-Dichloroethene	11.01	61	78211	4.749	ng		96
29) Diisopropyl Ether	11.30	87	4164	N.D.			
30) Ethyl Acetate	11.30	61	224	N.D.			
31) n-Hexane	11.30	57	392107	19.304	ng		99
32) Chloroform	11.36	83	2376	N.D.			
34) Tetrahydrofuran (THF)	11.76	72	158849	18.093	ng		95
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.			
36) 1,2-Dichloroethane	12.17	62	2403	N.D.			
38) 1,1,1-Trichloroethane	0.00	97	0	N.D.			
39) Isopropyl Acetate	12.91	61	126	N.D.			
40) 1-Butanol	0.00	56	0	N.D.	d		
41) Benzene	12.92	78	45640	0.900	ng		99
42) Carbon Tetrachloride	13.07	117	6594	N.D.			
43) Cyclohexane	13.21	84	14861	0.731	ng		89
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.			
45) 1,2-Dichloropropane	0.00	63	0	N.D.			
46) Bromodichloromethane	14.01	83	2179	N.D.			
47) Trichloroethene	14.01	130	102218	6.969	ng		99
48) 1,4-Dioxane	0.00	88	0	N.D.			
49) 2,2,4-Trimethylpentane...	0.00	57	0	N.D.	d		
50) Methyl Methacrylate	0.00	100	0	N.D.	d		

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_08\31\08312016.D Vial: 7
Acq On : 31 Aug 2020 15:39 Operator: WA
Sample : P2004706-003 (1000mL) Inst : MS13
Misc : S34-06182001

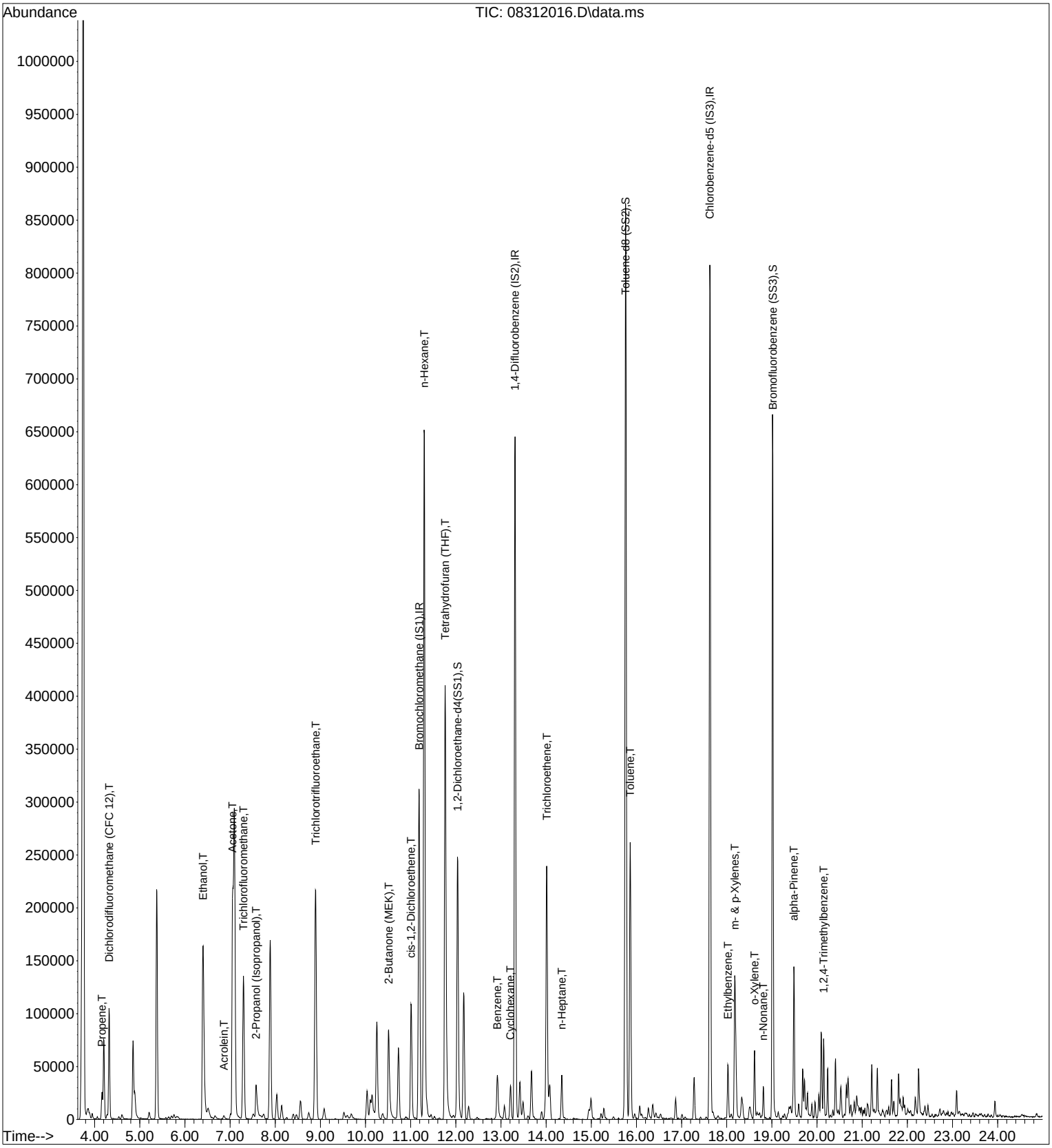
Quant Time: Sep 01 20:52:08 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
51) n-Heptane	14.35	71	11981	0.918 ng	96
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
53) 4-Methyl-2-pentanone	14.95	58	3007	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	15.86	91	238169	4.304 ng	99
59) 2-Hexanone	16.07	43	5216	N.D.	
60) Dibromochloromethane	0.00	129	0	N.D.	
61) 1,2-Dibromoethane	0.00	107	0	N.D.	
62) n-Butyl Acetate	16.77	43	1722	N.D.	
63) n-Octane	16.87	57	4071	N.D.	
64) Tetrachloroethene	17.01	166	2144	N.D.	
65) Chlorobenzene	17.69	112	374	N.D.	
66) Ethylbenzene	18.02	91	44120	0.726 ng	99
67) m- & p-Xylenes	18.18	91	116934	2.461 ng	98
68) Bromoform	0.00	173	0	N.D.	
69) Styrene	18.52	104	5517	N.D.	
70) o-Xylene	18.62	91	41975	0.877 ng	98
71) n-Nonane	18.81	43	11150	0.507 ng	83
72) 1,1,2,2-Tetrachloroethane	18.66	83	1041	N.D.	
74) Cumene	19.15	105	3370	N.D.	
75) alpha-Pinene	19.49	93	60559	1.963 ng	79
76) n-Propylbenzene	19.59	91	11896	N.D.	
77) 3-Ethyltoluene	0.00	105	0	N.D. d	
78) 4-Ethyltoluene	19.72	105	13881	N.D.	
79) 1,3,5-Trimethylbenzene	19.79	105	9033	N.D.	
80) alpha-Methylstyrene	19.93	118	541	N.D.	
81) 2-Ethyltoluene	19.95	105	10698	N.D.	
82) 1,2,4-Trimethylbenzene	20.15	105	37616	0.763 ng	88
83) n-Decane	0.00	57	0	N.D. d	
84) Benzyl Chloride	20.36	91	1134	N.D.	
85) 1,3-Dichlorobenzene	20.35	146	2068	N.D.	
86) 1,4-Dichlorobenzene	20.35	146	2068	N.D.	
87) sec-Butylbenzene	20.39	105	1635	N.D.	
88) 4-Isopropyltoluene (p-...	20.53	119	6115	N.D.	
89) 1,2,3-Trimethylbenzene	20.52	105	9872	N.D.	
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.	
91) d-Limonene	20.65	68	7270	N.D.	
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.	
93) n-Undecane	0.00	57	0	N.D. d	
94) 1,2,4-Trichlorobenzene	0.00	180	0	N.D.	
95) Naphthalene	22.26	128	9140	N.D.	
96) n-Dodecane	0.00	57	0	N.D. d	
97) Hexachlorobutadiene	0.00	225	0	N.D.	
98) Cyclohexanone	0.00	55	0	N.D. d	
99) tert-Butylbenzene	20.15	119	4830	N.D.	
100) n-Butylbenzene	20.89	91	5830	N.D.	

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Data File : I:\MS13\DATA\2020_08\31\08312016.D Vial: 7
Acq On : 31 Aug 2020 15:39 Operator: WA
Sample : P2004706-003 (1000mL) Inst : MS13
Misc : S34-06182001

Quant Time: Sep 01 20:52:08 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_08\31\08312016.D Vial: 7
Acq On : 31 Aug 2020 15:39 Operator: WA
Sample : P2004706-003 (1000mL) Inst : MS13
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Quant Time: Sep 01 20:52:08 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020 WA 9/1/20
Response via : Initial Calibration
DataAcq Meth:TO15.M

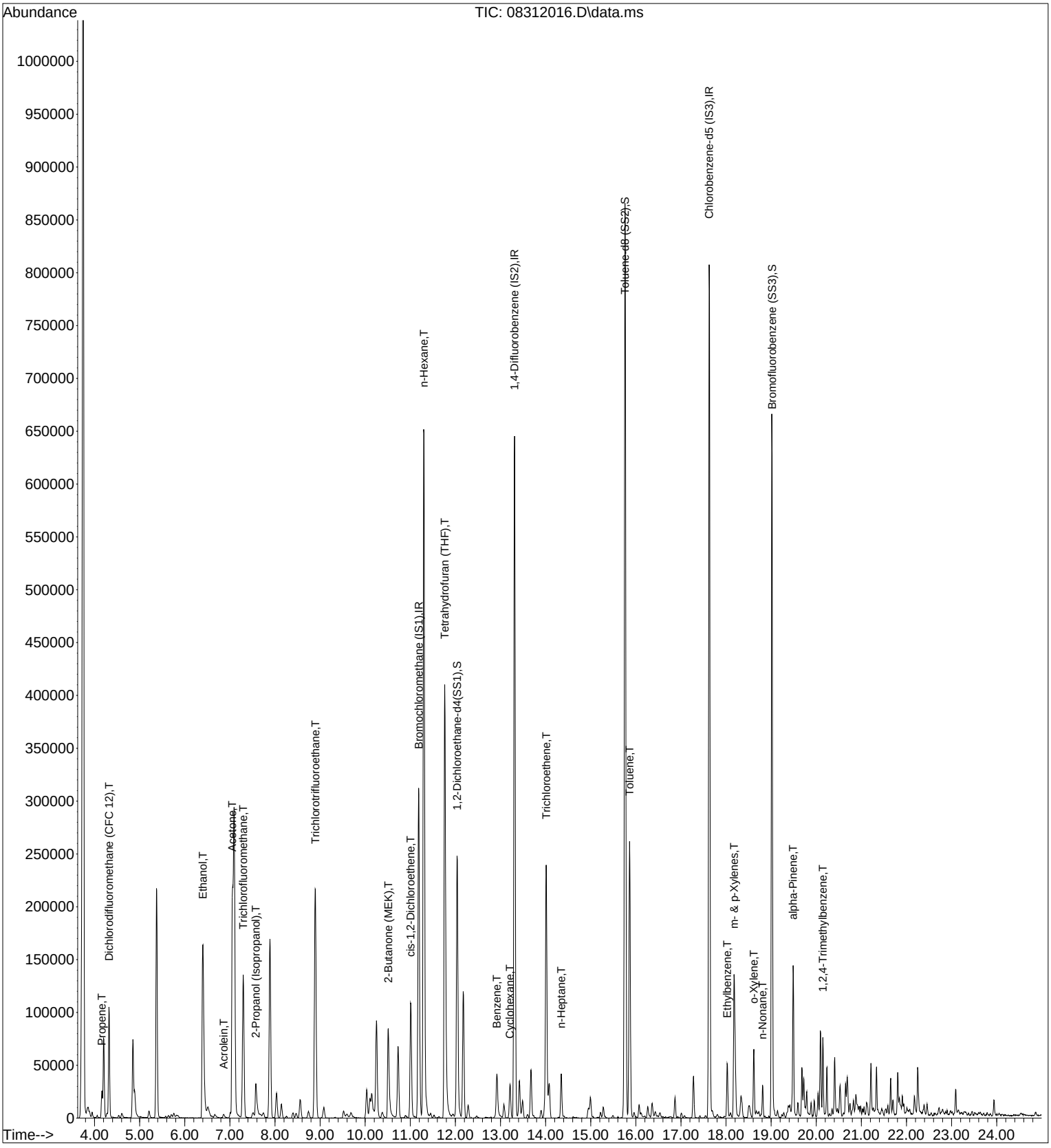
Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.19	130	153718	12.500	ng		-0.03
37) 1,4-Difluorobenzene (IS2)	13.31	114	660404	12.500	ng		-0.02
56) Chlorobenzene-d5 (IS3)	17.63	82	300384	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.04	65	198172	12.641	ng		-0.03
Spiked Amount 12.500	Range 70 - 130		Recovery = 101.12%				
57) Toluene-d8 (SS2)	15.76	98	736903	12.216	ng		-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 97.76%				
73) Bromofluorobenzene (SS3)	19.02	174	245623	12.203	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 97.60%				
Target Compounds							Qvalue
2) Propene	4.16	42	7376	0.506	ng		96
3) Dichlorodifluoromethan...	4.32	85	100508	3.945	ng		99
10) Ethanol	6.40	45	292573	31.716	ng		100
12) Acrolein	6.86	56	5527	0.694	ng		95
13) Acetone	7.05	58	130093	13.994	ng	#	50
14) Trichlorofluoromethane	7.30	101	145556	6.567	ng		100
15) 2-Propanol (Isopropanol)	7.58	45	68031	2.432	ng		95
21) Trichlorotrifluoroethane	8.90	151	106001	8.431	ng		95
27) 2-Butanone (MEK)	10.51	72	40876	4.877	ng	#	89
28) cis-1,2-Dichloroethene	11.01	61	78211	4.749	ng		96
31) n-Hexane	11.30	57	392107	19.304	ng		99
34) Tetrahydrofuran (THF)	11.76	72	158849	18.093	ng		95
41) Benzene	12.92	78	45640	0.900	ng		99
43) Cyclohexane	13.21	84	14861	0.731	ng		89
47) Trichloroethene	14.01	130	102218	6.969	ng		99
51) n-Heptane	14.35	71	11981	0.918	ng		96
58) Toluene	15.86	91	238169	4.304	ng		99
66) Ethylbenzene	18.02	91	44120	0.726	ng		99
67) m- & p-Xylenes	18.18	91	116934	2.461	ng		98
70) o-Xylene	18.62	91	41975	0.877	ng		98
71) n-Nonane	18.81	43	11150	0.507	ng		83
75) alpha-Pinene	19.49	93	60559	1.963	ng		79
82) 1,2,4-Trimethylbenzene	20.15	105	37616	0.763	ng		88

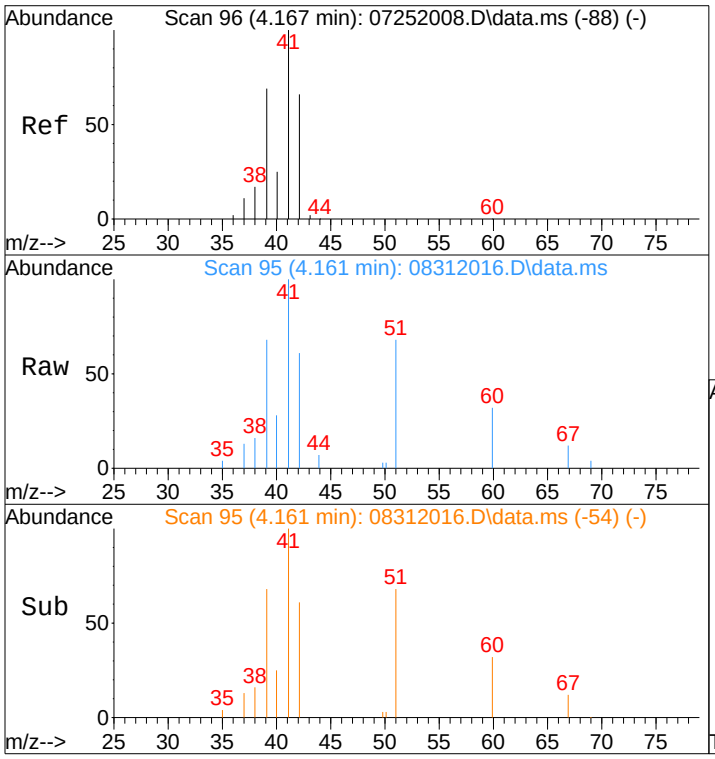
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_08\31\08312016.D Vial: 7
Acq On : 31 Aug 2020 15:39 Operator: WA
Sample : P2004706-003 (1000mL) Inst : MS13
Misc : S34-06182001

Quant Time: Sep 01 20:52:08 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M

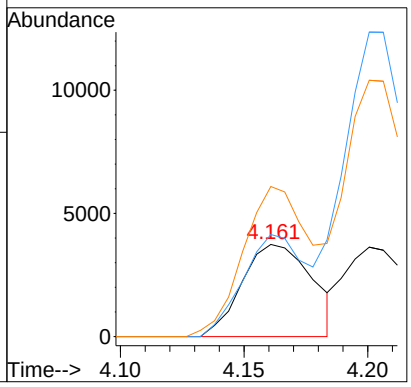


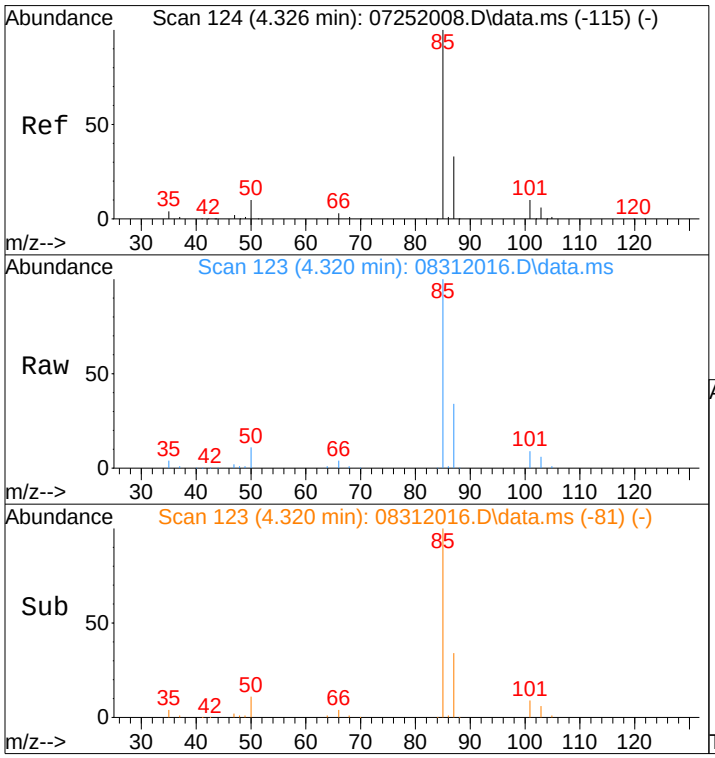


#2
Propene
Concen: 0.51 ng
RT: 4.16 min Scan# 95
Delta R.T. -0.017 min
Lab File: 08312016.D
Acq: 31 Aug 2020 15:39

Tgt Ion: 42 Resp: 7376

Ion	Ratio	Lower	Upper
42	100		
39	99.7	83.4	123.4
41	145.0	130.6	170.6

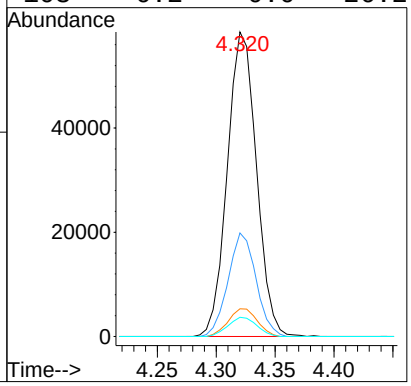


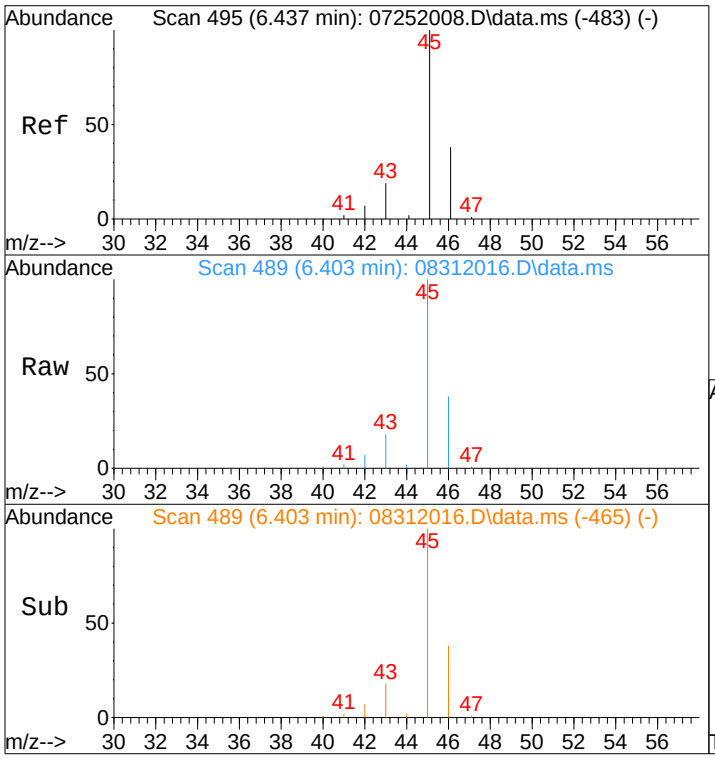


#3
Dichlorodifluoromethane (CFC 12)
Concen: 3.95 ng
RT: 4.32 min Scan# 123
Delta R.T. -0.011 min
Lab File: 08312016.D
Acq: 31 Aug 2020 15:39

Tgt Ion: 85 Resp: 100508

Ion	Ratio	Lower	Upper
85	100		
87	32.6	12.8	52.8
101	9.1	0.0	29.5
103	6.2	0.0	26.2

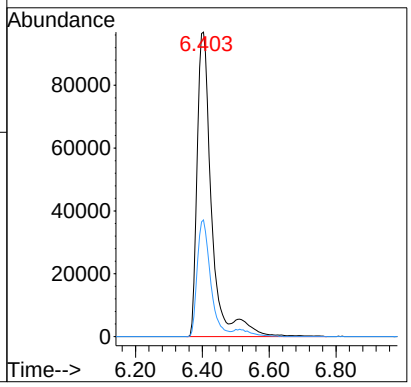


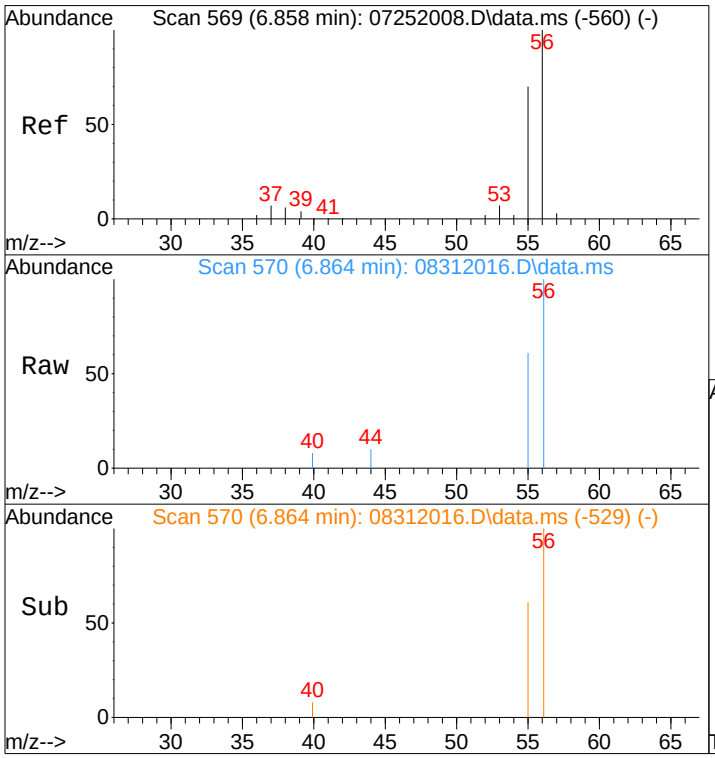


#10
Ethanol
Concen: 31.72 ng
RT: 6.40 min Scan# 489
Delta R.T. -0.114 min
Lab File: 08312016.D
Acq: 31 Aug 2020 15:39

Tgt Ion: 45 Resp: 292573

Ion	Ratio	Lower	Upper
45	100		
46	38.1	18.0	58.0

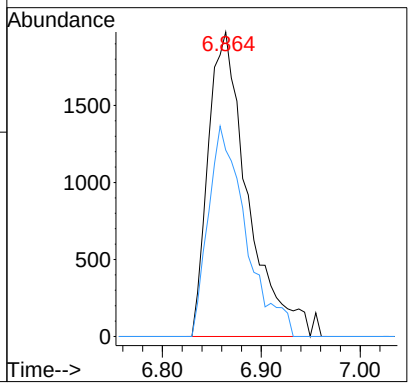


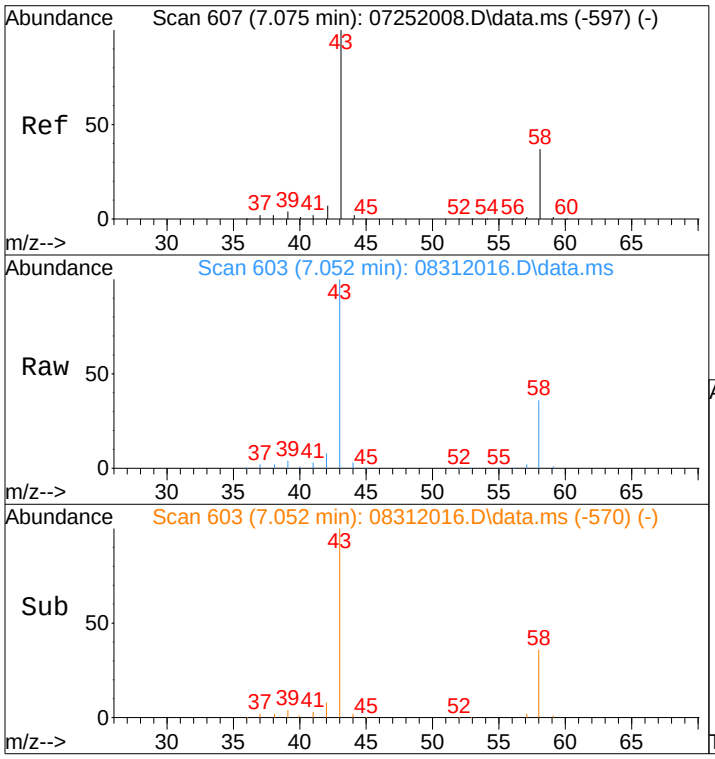


#12
Acrolein
Concen: 0.69 ng
RT: 6.86 min Scan# 570
Delta R.T. -0.017 min
Lab File: 08312016.D
Acq: 31 Aug 2020 15:39

Tgt Ion: 56 Resp: 5527

Ion	Ratio	Lower	Upper
56	100		
55	65.2	49.5	89.5

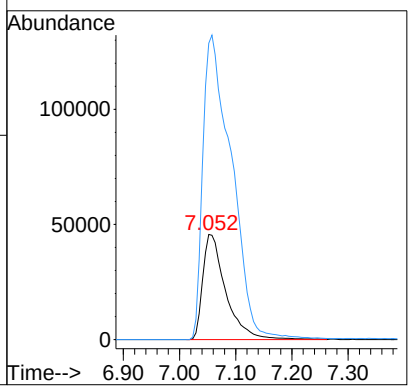


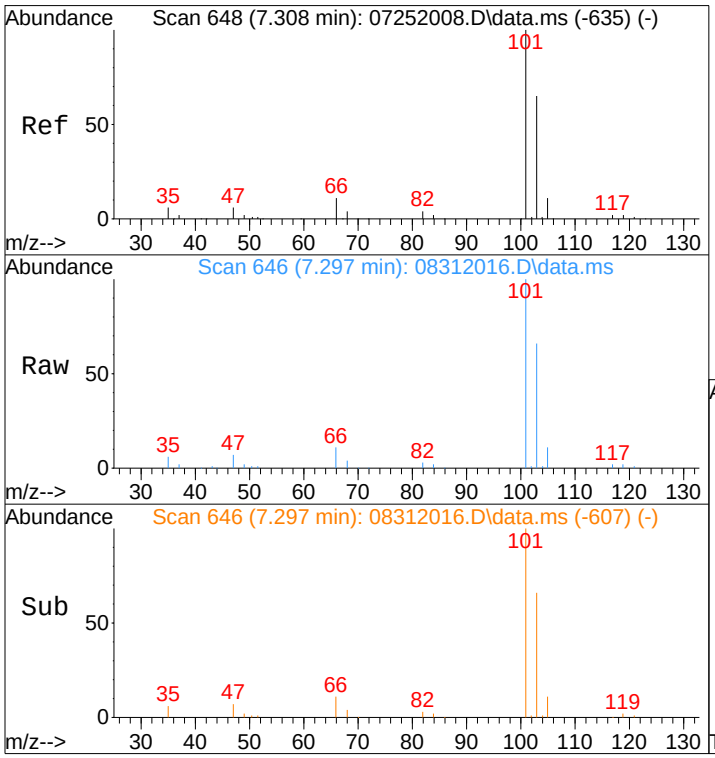


#13
Acetone
Concen: 13.99 ng
RT: 7.05 min Scan# 603
Delta R.T. -0.062 min
Lab File: 08312016.D
Acq: 31 Aug 2020 15:39

Tgt Ion: 58 Resp: 130093

Ion	Ratio	Lower	Upper
58	100		
43	362.3	240.7	300.7#

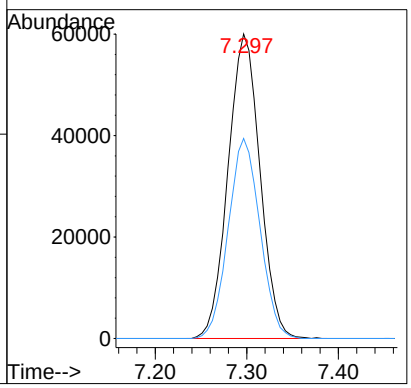


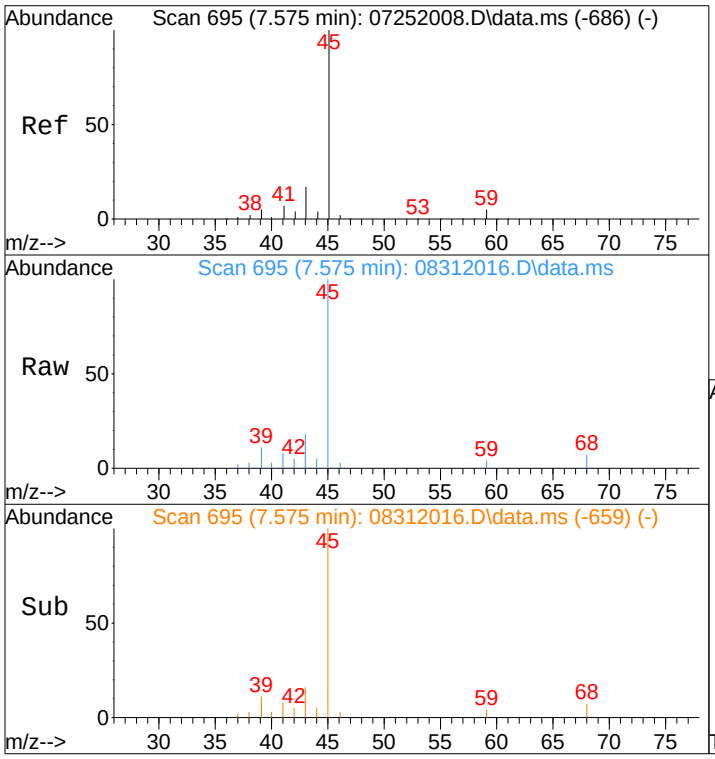


#14
Trichlorofluoromethane
Concen: 6.57 ng
RT: 7.30 min Scan# 646
Delta R.T. -0.028 min
Lab File: 08312016.D
Acq: 31 Aug 2020 15:39

Tgt Ion:101 Resp: 145556

Ion	Ratio	Lower	Upper
101	100		
103	65.3	45.1	85.1

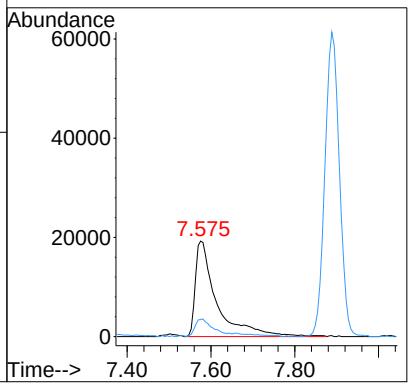


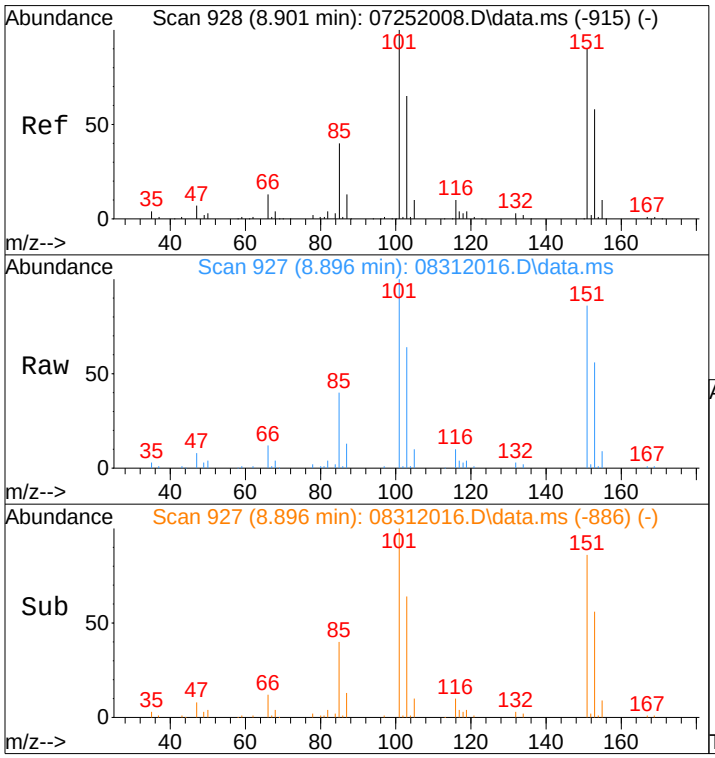


#15
2-Propanol (Isopropanol)
Concen: 2.43 ng
RT: 7.58 min Scan# 695
Delta R.T. -0.046 min
Lab File: 08312016.D
Acq: 31 Aug 2020 15:39

Tgt Ion: 45 Resp: 68031

Ion	Ratio	Lower	Upper
45	100		
43	19.6	0.0	37.4

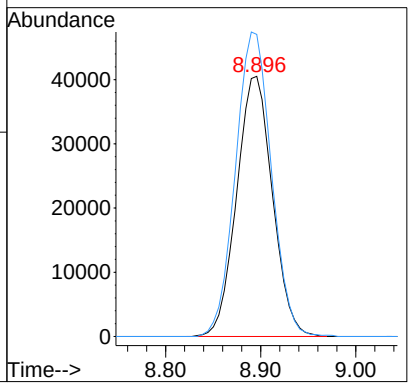


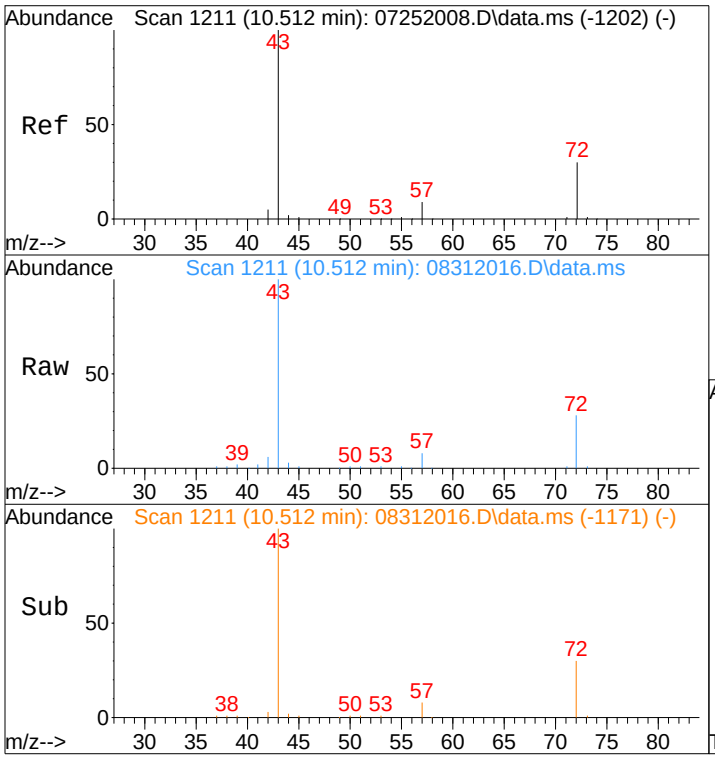


#21
Trichlorotrifluoroethane
Concen: 8.43 ng
RT: 8.90 min Scan# 927
Delta R.T. -0.017 min
Lab File: 08312016.D
Acq: 31 Aug 2020 15:39

Tgt Ion:151 Resp: 106001

Ion	Ratio	Lower	Upper
151	100		
101	117.7	92.1	132.1

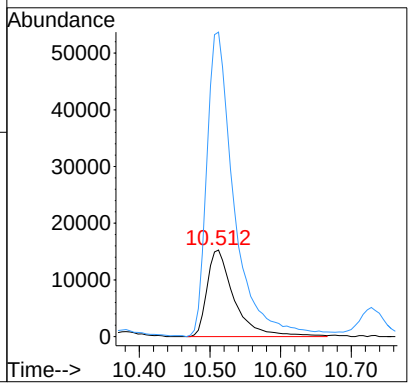


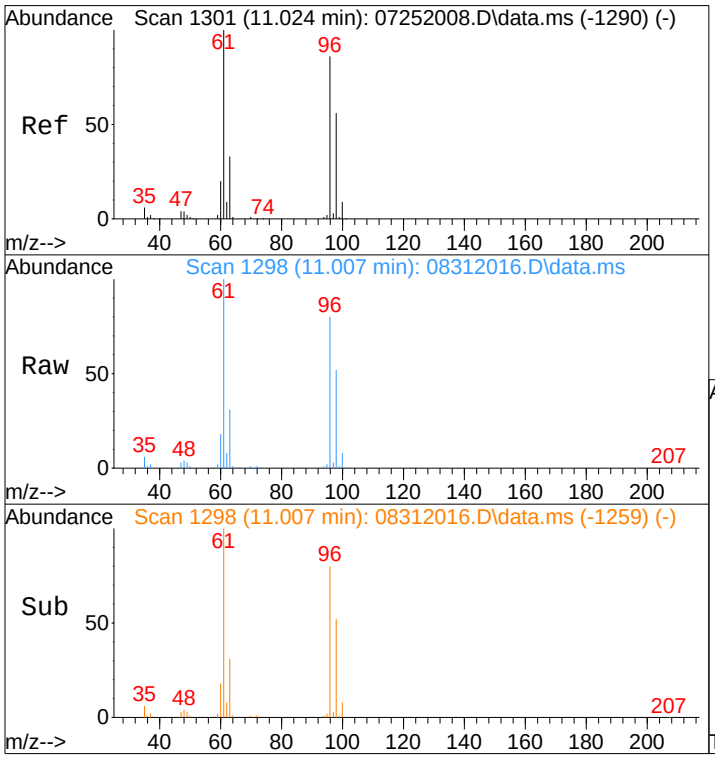


#27
2-Butanone (MEK)
Concen: 4.88 ng
RT: 10.51 min Scan# 1211
Delta R.T. -0.023 min
Lab File: 08312016.D
Acq: 31 Aug 2020 15:39

Tgt Ion: 72 Resp: 40876

Ion	Ratio	Lower	Upper
72	100		
43	357.3	314.3	354.3#

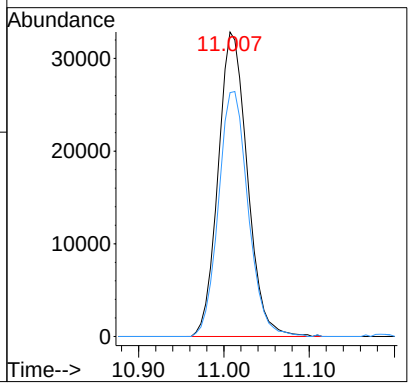


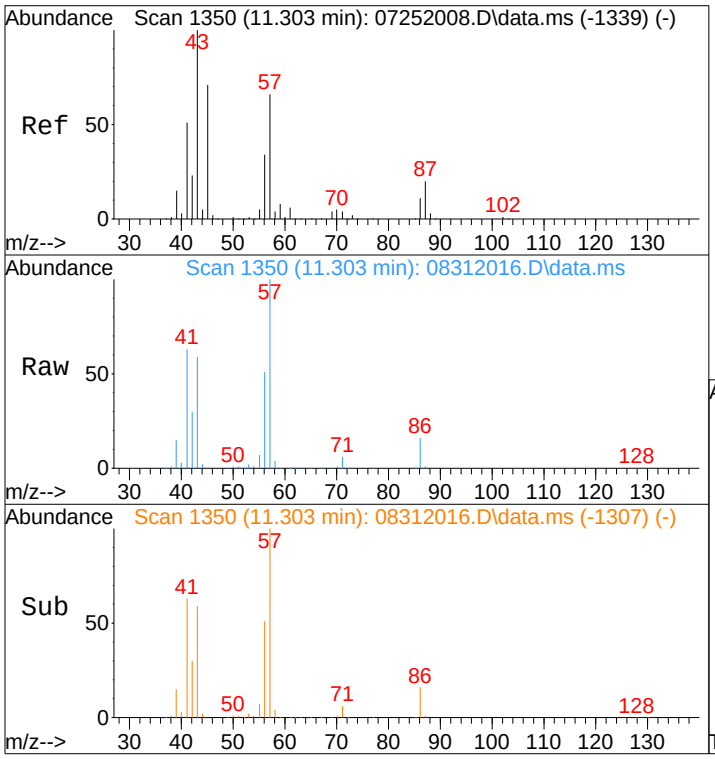


#28
cis-1,2-Dichloroethene
Concen: 4.75 ng
RT: 11.01 min Scan# 1298
Delta R.T. -0.029 min
Lab File: 08312016.D
Acq: 31 Aug 2020 15:39

Tgt Ion: 61 Resp: 78211

Ion	Ratio	Lower	Upper
61	100		
96	81.8	65.1	105.1

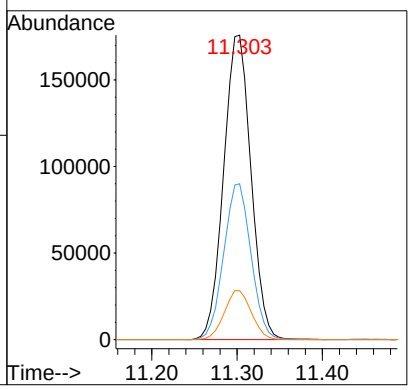


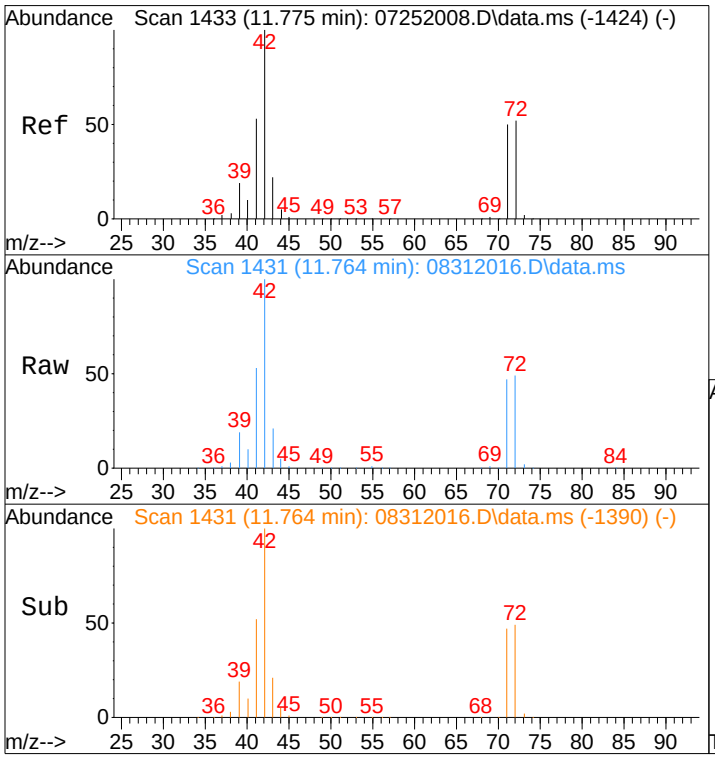


#31
n-Hexane
Concen: 19.30 ng
RT: 11.30 min Scan# 1350
Delta R.T. -0.006 min
Lab File: 08312016.D
Acq: 31 Aug 2020 15:39

Tgt Ion: 57 Resp: 392107

Ion	Ratio	Lower	Upper
57	100		
56	51.0	41.0	61.4
86	15.9	13.8	20.8

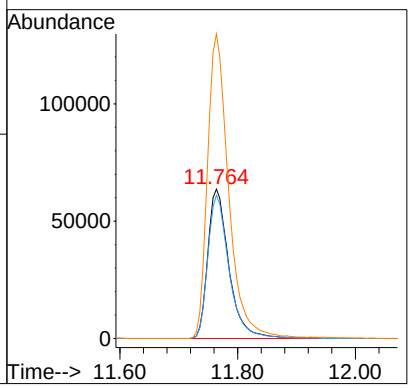


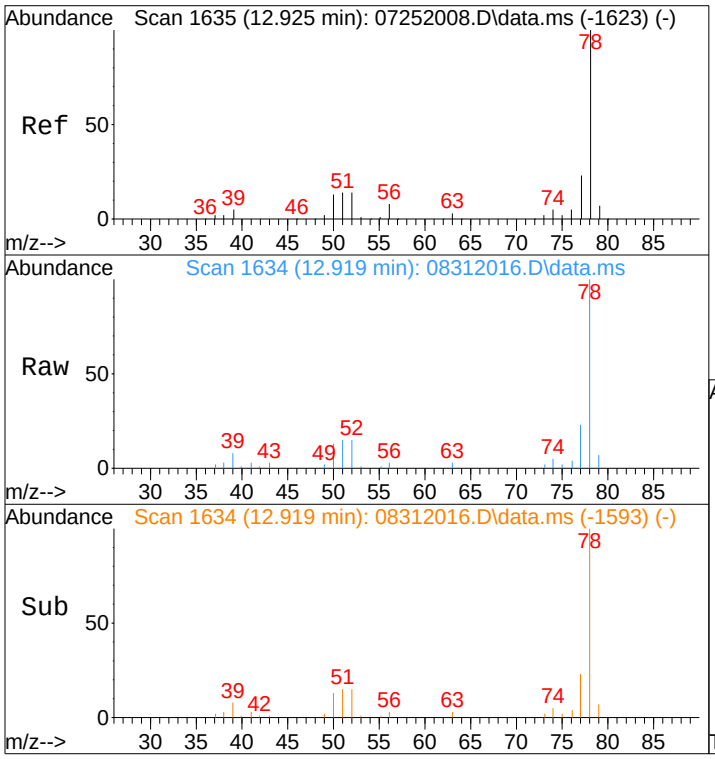


#34
Tetrahydrofuran (THF)
Concen: 18.09 ng
RT: 11.76 min Scan# 1431
Delta R.T. -0.017 min
Lab File: 08312016.D
Acq: 31 Aug 2020 15:39

Tgt Ion: 72 Resp: 158849

Ion	Ratio	Lower	Upper
72	100		
71	95.9	76.0	116.0
42	205.0	174.5	214.5

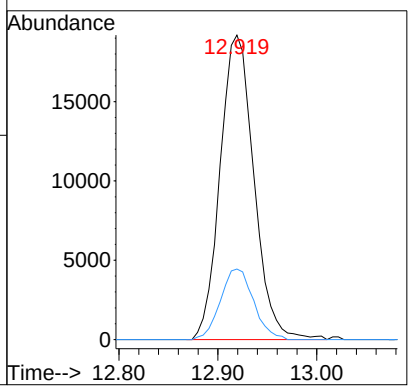


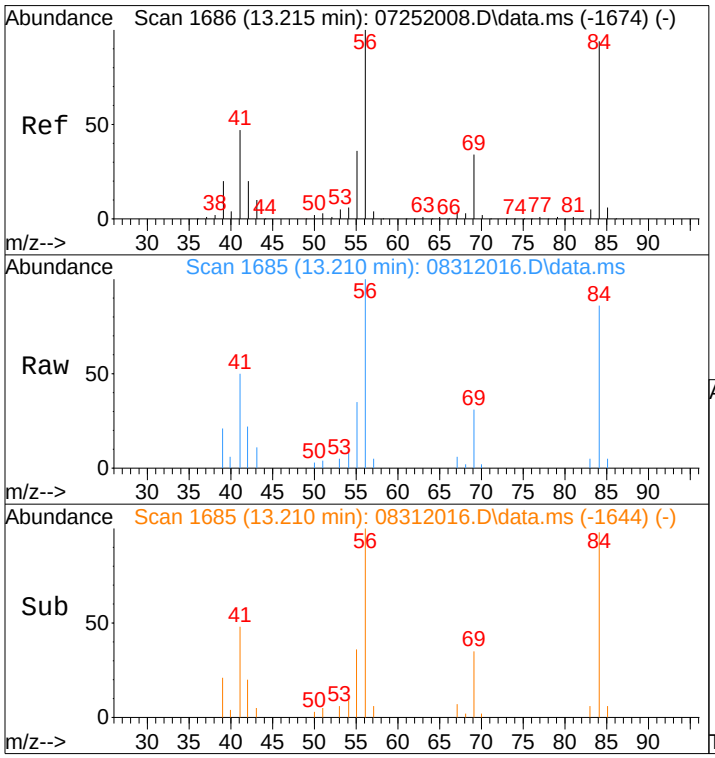


#41
Benzene
Concen: 0.90 ng
RT: 12.92 min Scan# 1634
Delta R.T. -0.017 min
Lab File: 08312016.D
Acq: 31 Aug 2020 15:39

Tgt Ion: 78 Resp: 45640

Ion	Ratio	Lower	Upper
78	100		
77	22.7	3.2	43.2

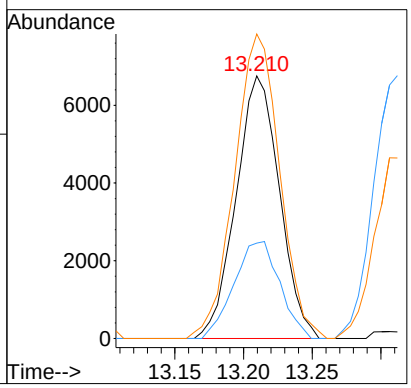


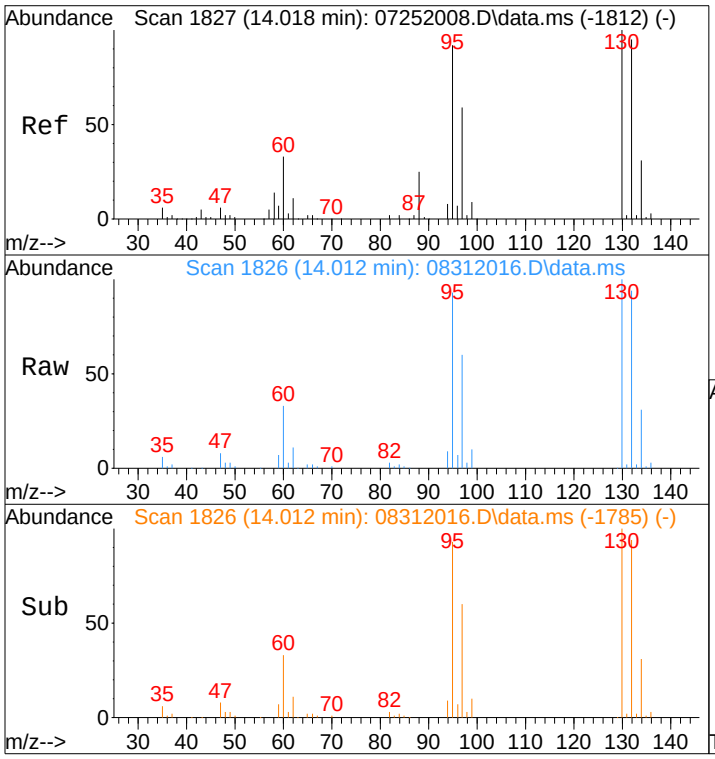


#43
Cyclohexane
Concen: 0.73 ng
RT: 13.21 min Scan# 1685
Delta R.T. -0.017 min
Lab File: 08312016.D
Acq: 31 Aug 2020 15:39

Tgt Ion: 84 Resp: 14861

Ion	Ratio	Lower	Upper
84	100		
69	38.9	15.9	55.9
56	120.2	87.1	127.1

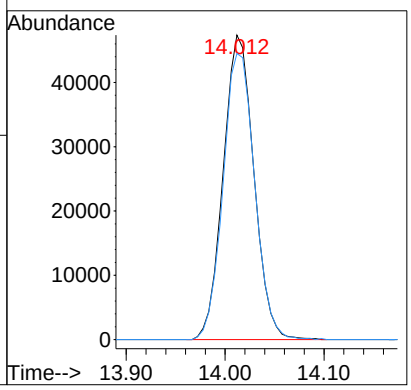


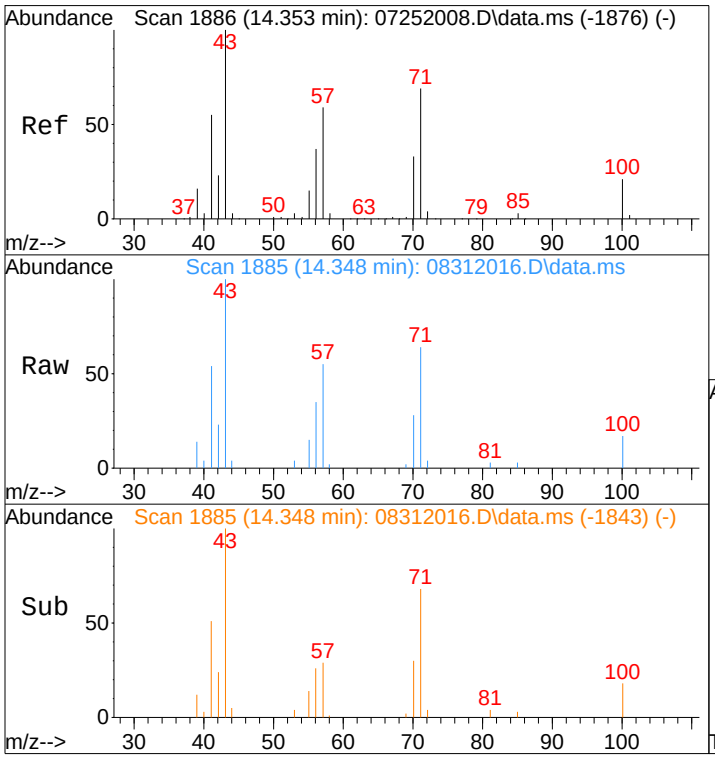


#47
Trichloroethene
Concen: 6.97 ng
RT: 14.01 min Scan# 1826
Delta R.T. -0.017 min
Lab File: 08312016.D
Acq: 31 Aug 2020 15:39

Tgt Ion:130 Resp: 102218

Ion	Ratio	Lower	Upper
130	100		
132	96.7	75.4	115.4

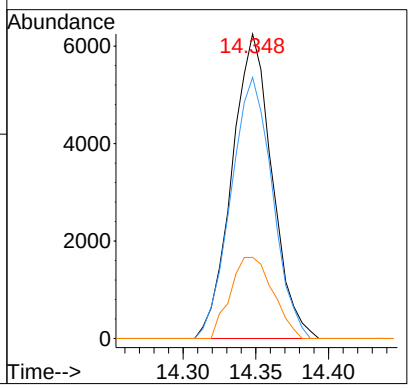


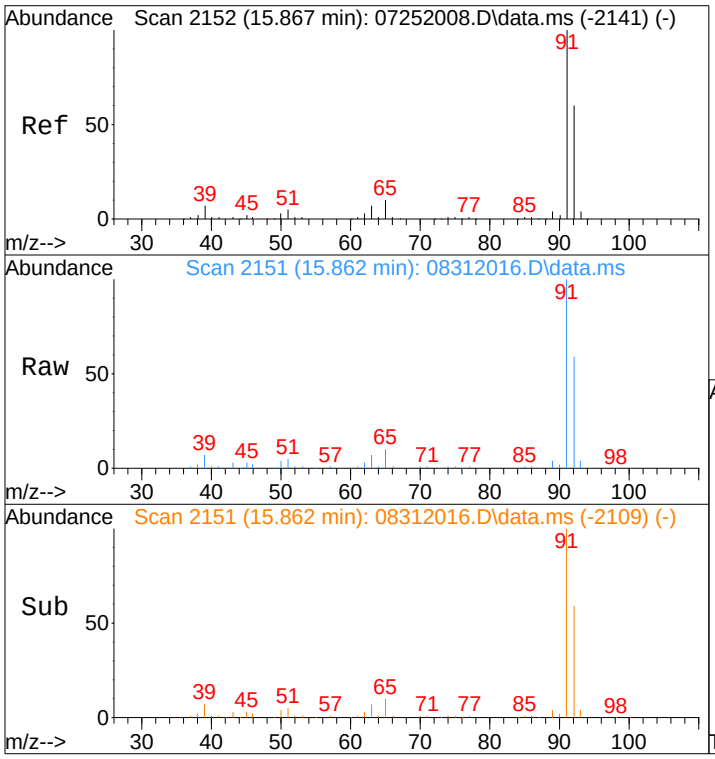


#51
n-Heptane
Concen: 0.92 ng
RT: 14.35 min Scan# 1885
Delta R.T. -0.011 min
Lab File: 08312016.D
Acq: 31 Aug 2020 15:39

Tgt Ion: 71 Resp: 11981

Ion	Ratio	Lower	Upper
71	100		
57	88.7	65.0	105.0
100	28.2	10.1	50.1

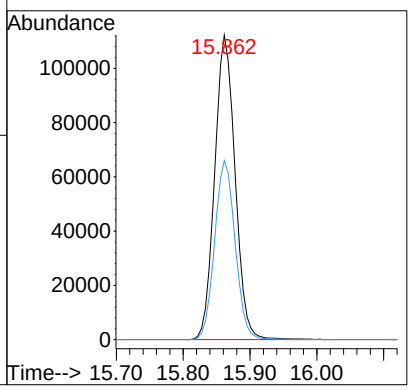


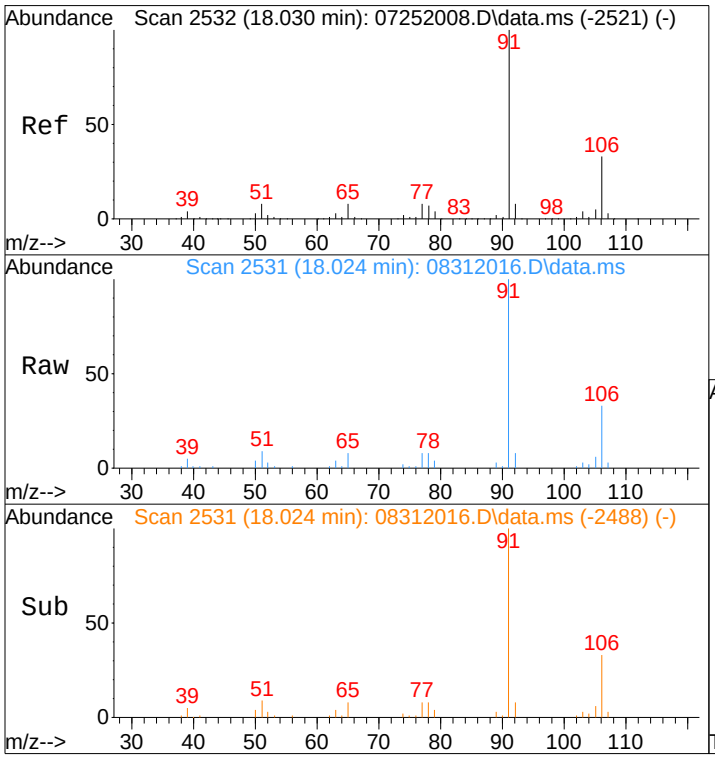


#58
Toluene
Concen: 4.30 ng
RT: 15.86 min Scan# 2151
Delta R.T. -0.011 min
Lab File: 08312016.D
Acq: 31 Aug 2020 15:39

Tgt Ion: 91 Resp: 238169

Ion	Ratio	Lower	Upper
91	100		
92	59.0	39.8	79.8

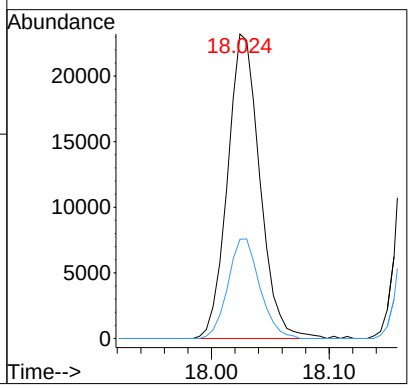


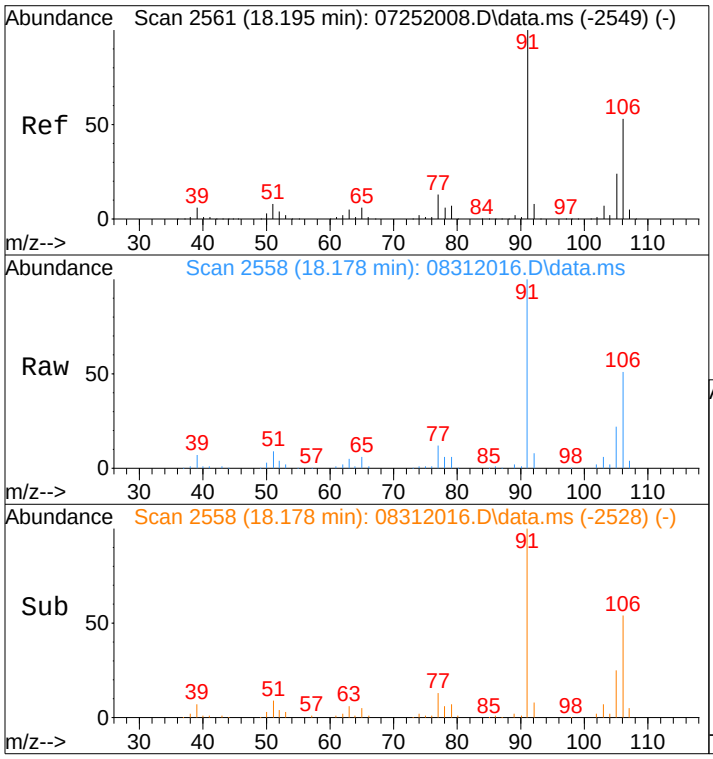


#66
Ethylbenzene
Concen: 0.73 ng
RT: 18.02 min Scan# 2531
Delta R.T. -0.006 min
Lab File: 08312016.D
Acq: 31 Aug 2020 15:39

Tgt Ion: 91 Resp: 44120

Ion	Ratio	Lower	Upper
91	100		
106	32.3	12.9	52.9

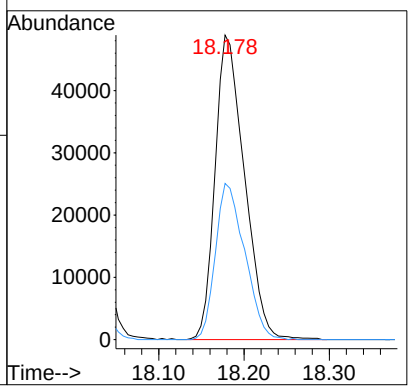


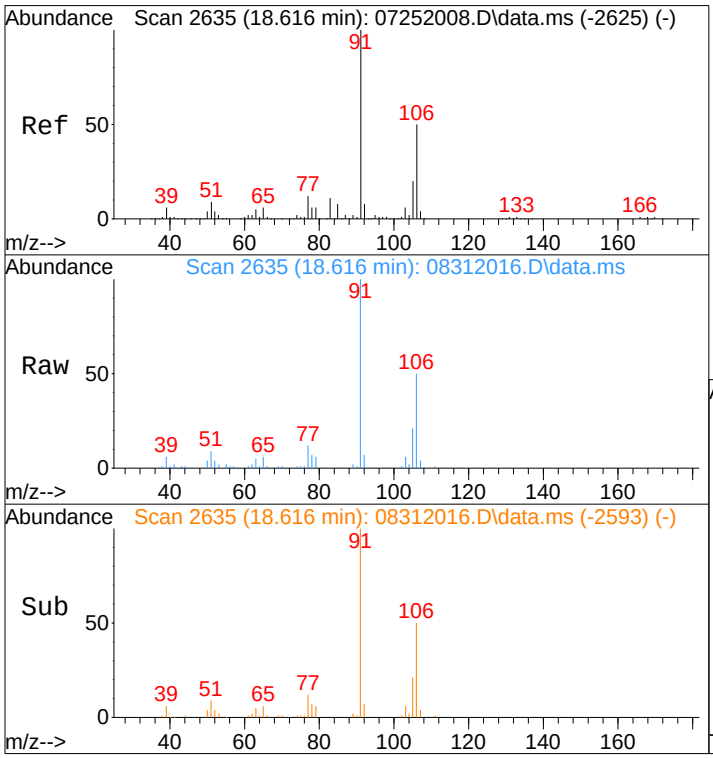


#67
m- & p-Xylenes
Concen: 2.46 ng
RT: 18.18 min Scan# 2558
Delta R.T. -0.028 min
Lab File: 08312016.D
Acq: 31 Aug 2020 15:39

Tgt Ion: 91 Resp: 116934

Ion	Ratio	Lower	Upper
91	100		
106	51.2	32.5	72.5

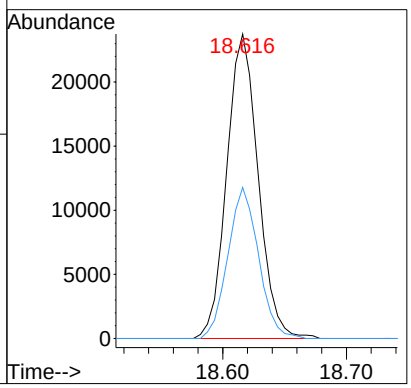


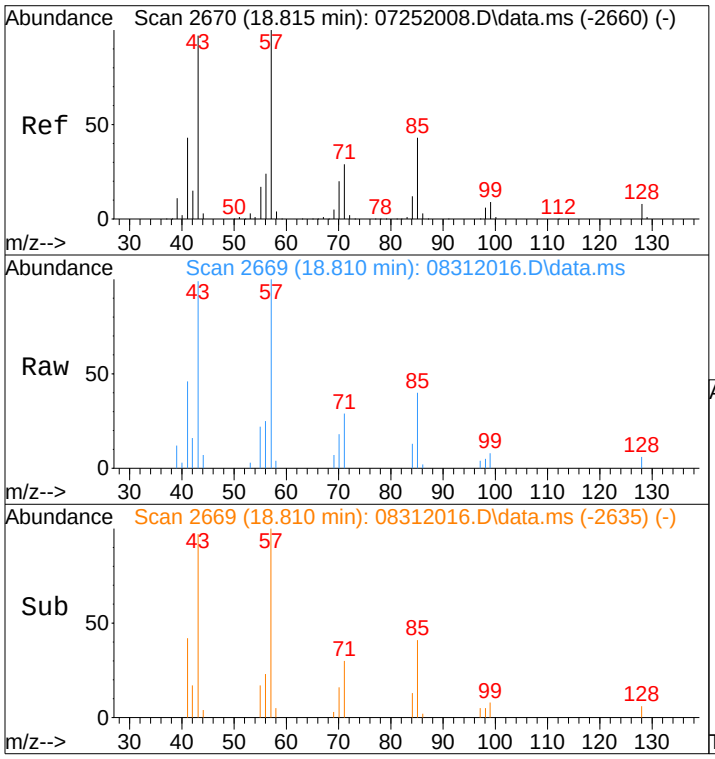


#70
o-Xylene
Concen: 0.88 ng
RT: 18.62 min Scan# 2635
Delta R.T. -0.011 min
Lab File: 08312016.D
Acq: 31 Aug 2020 15:39

Tgt Ion: 91 Resp: 41975

Ion	Ratio	Lower	Upper
91	100		
106	48.4	30.1	70.1

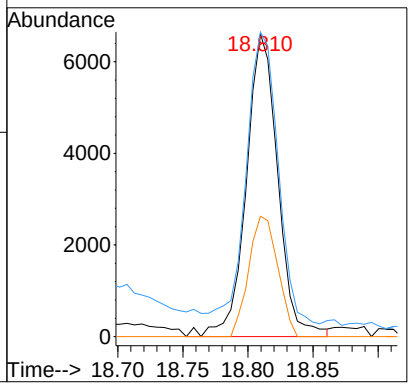


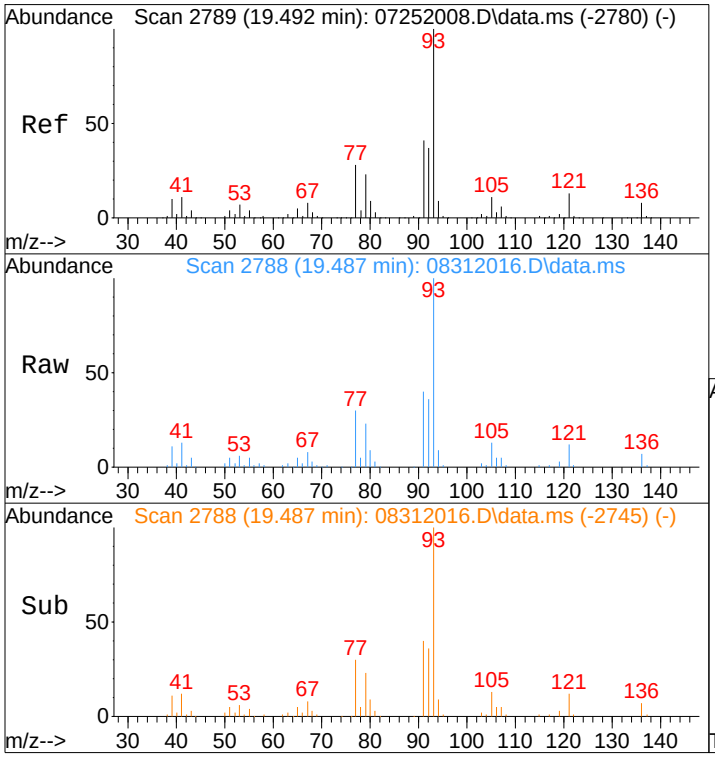


#71
n-Nonane
Concen: 0.51 ng
RT: 18.81 min Scan# 2669
Delta R.T. -0.006 min
Lab File: 08312016.D
Acq: 31 Aug 2020 15:39

Tgt Ion: 43 Resp: 11150

Ion	Ratio	Lower	Upper
43	100		
57	121.8	82.0	122.0
85	36.4	23.1	63.1

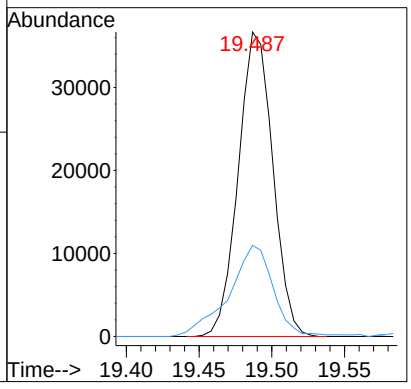


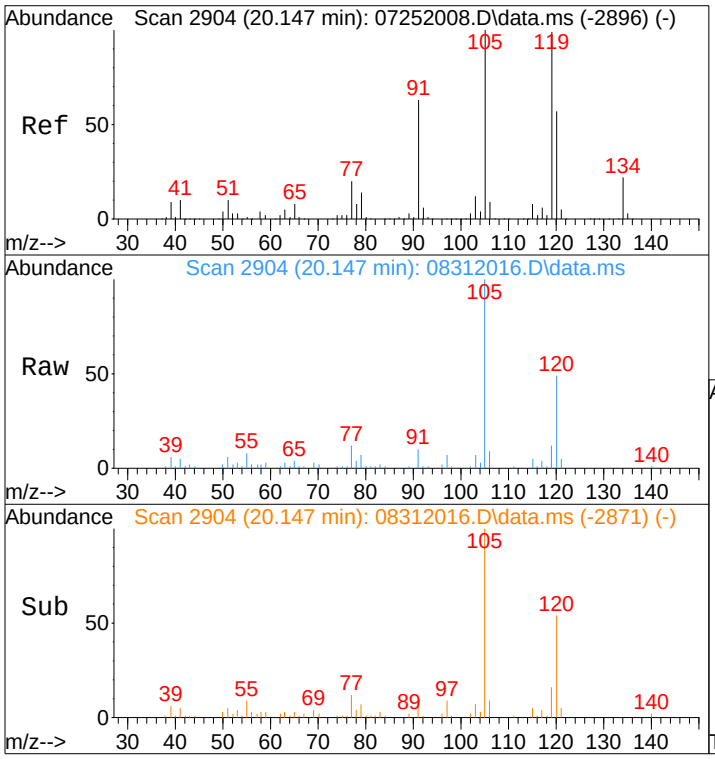


#75
alpha-Pinene
Concen: 1.96 ng
RT: 19.49 min Scan# 2788
Delta R.T. -0.005 min
Lab File: 08312016.D
Acq: 31 Aug 2020 15:39

Tgt Ion: 93 Resp: 60559

Ion	Ratio	Lower	Upper
93	100		
77	38.8	7.7	47.7

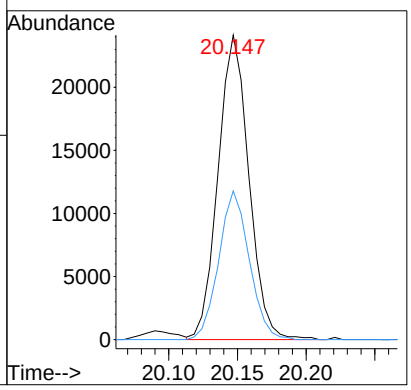




#82
1,2,4-Trimethylbenzene
Concen: 0.76 ng
RT: 20.15 min Scan# 2904
Delta R.T. -0.011 min
Lab File: 08312016.D
Acq: 31 Aug 2020 15:39

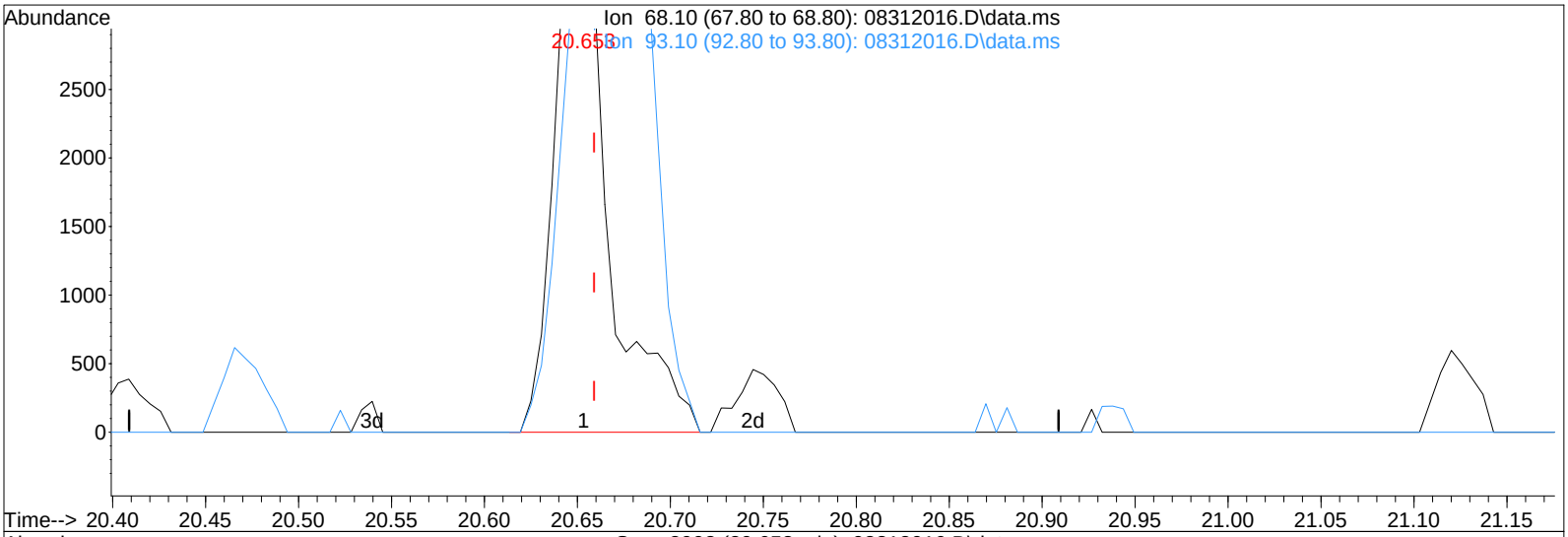
Tgt Ion:105 Resp: 37616

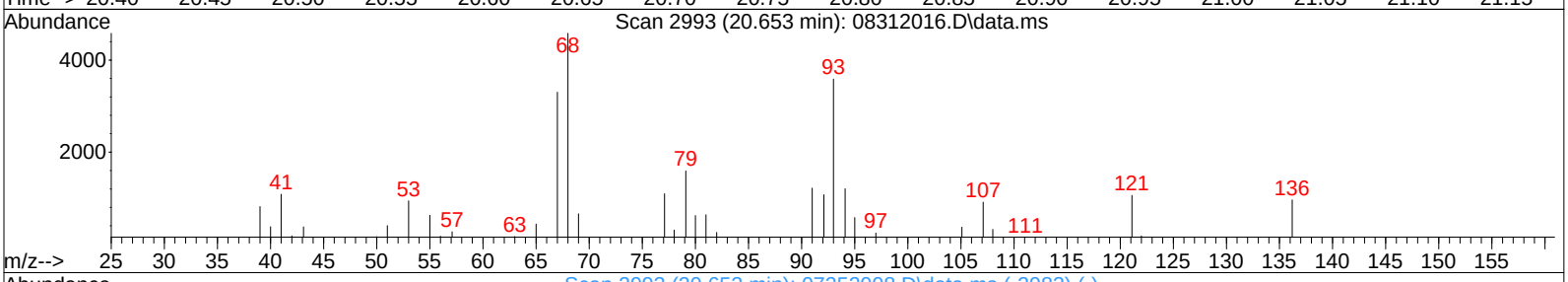
Ion	Ratio	Lower	Upper
105	100		
120	48.3	37.2	77.2

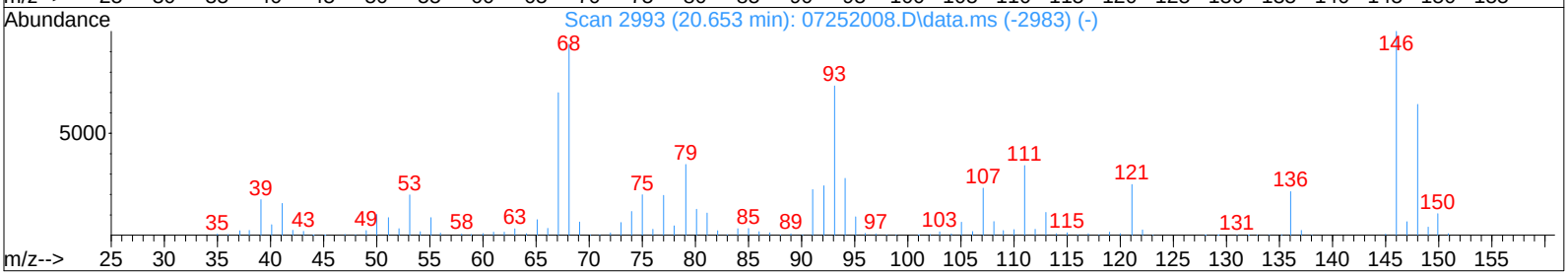


Data File : I:\MS13\DATA\2020_08\31\08312016.D Vial: 7
Acq On : 31 Aug 2020 15:39 Operator: WA
Sample : P2004706-003 (1000mL) Inst : MS13
Misc : S34-06182001

Quant Time: Aug 31 16:46:18 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 08312016.D\data.ms

(91) d-Limonene (T)

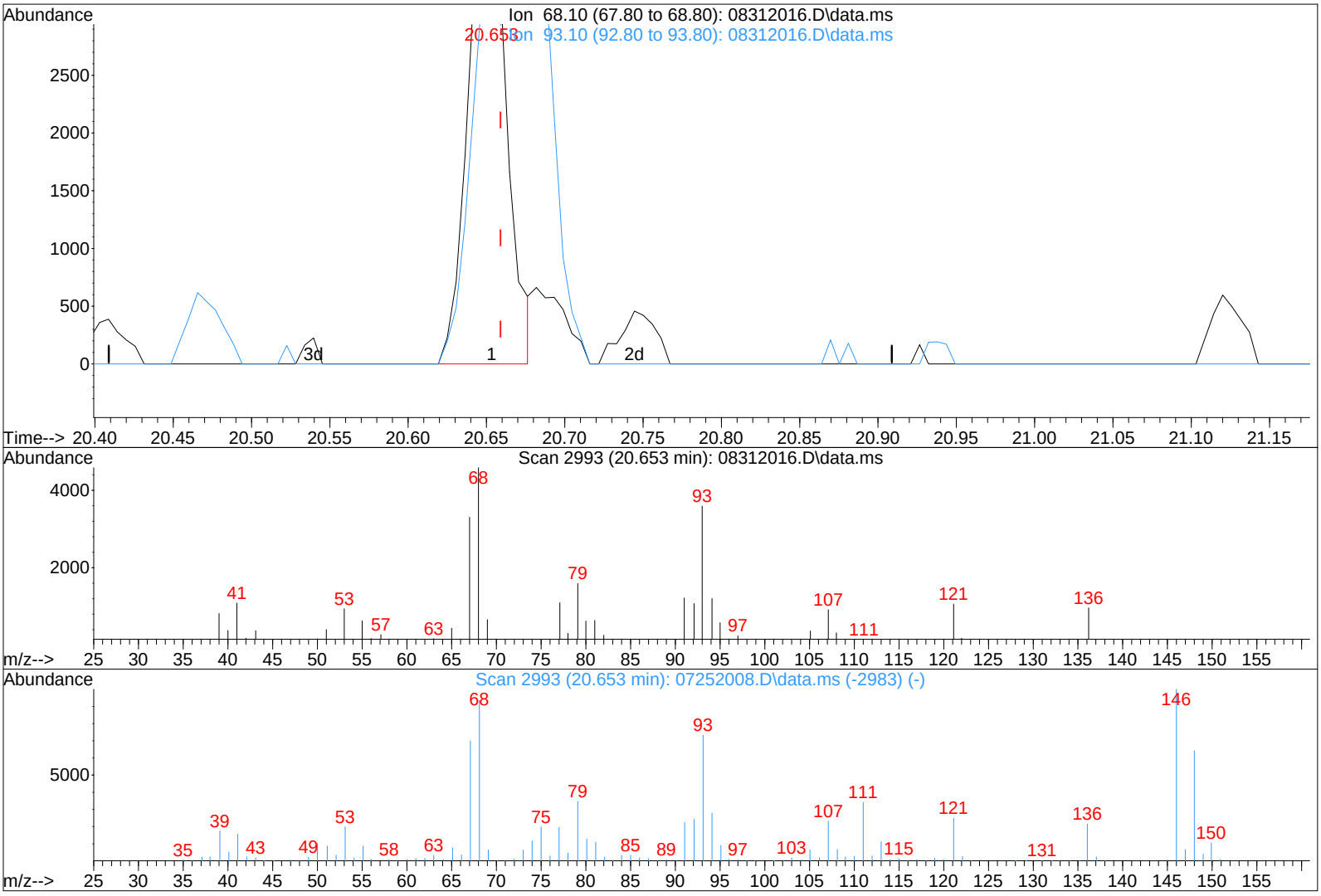
20.653min (-0.006) 0.50ng

response 8207

Ion	Exp%	Act%
68.10	100	100
93.10	76.50	58.26
0.00	0.00	0.00
0.00	0.00	0.00

Data File : I:\MS13\DATA\2020_08\31\08312016.D Vial: 7
Acq On : 31 Aug 2020 15:39 Operator: WA
Sample : P2004706-003 (1000mL) Inst : MS13
Misc : S34-06182001

Quant Time: Aug 31 16:46:18 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 08312016.D\data.ms

(91) d-Limonene (T)

20.653min (-0.006) 0.44ng m

response 7270

Ion	Exp%	Act%
68.10	100	100
93.10	76.50	65.76
0.00	0.00	0.00
0.00	0.00	0.00

IPC

9/1/20

9/2/20

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_08\31\08312017.D Vial: 8
Acq On : 31 Aug 2020 16:13 Operator: WA
Sample : P2004706-004 (1000mL) Inst : MS13
Misc : S34-06182001

Quant Time: Sep 01 20:55:34 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M

9/1/20

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.19	130	143305	12.500	ng		-0.03
37) 1,4-Difluorobenzene (IS2)	13.31	114	619493	12.500	ng		-0.02
56) Chlorobenzene-d5 (IS3)	17.63	82	270992	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.04	65	180135	12.325	ng		-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.64%				
57) Toluene-d8 (SS2)	15.76	98	684891	12.586	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.72%				
73) Bromofluorobenzene (SS3)	19.01	174	234190	12.897	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 103.20%				
Target Compounds							Qvalue
2) Propene	4.17	42	9272	0.683	ng	#	50
3) Dichlorodifluoromethan...	4.33	85	115611	4.868	ng		100
4) Chloromethane	4.60	50	4313	N.D.			
5) 1,2-Dichloro-1,1,2,2-t...	4.87	135	1149	N.D.			
6) Vinyl Chloride	0.00	62	0	N.D.			
7) 1,3-Butadiene	5.38	54	589	N.D.			
8) Bromomethane	5.72	94	182	N.D.			
9) Chloroethane	0.00	64	0	N.D.			
10) Ethanol	6.40	45	366242	42.587	ng		100
11) Acetonitrile	6.67	41	8109	N.D.			
12) Acrolein	6.86	56	3792	0.510	ng		97
13) Acetone	7.05	58	154823	17.864	ng	#	54
14) Trichlorofluoromethane	7.30	101	166983	8.081	ng		100
15) 2-Propanol (Isopropanol)	7.57	45	80528	3.088	ng		95
16) Acrylonitrile	7.89	53	2539	N.D.			
17) 1,1-Dichloroethene	0.00	96	0	N.D.			
18) 2-Methyl-2-Propanol (t...	8.55	59	1081	N.D.			
19) Methylene Chloride	8.49	84	2644	N.D.			
20) 3-Chloro-1-propene (Al...	8.56	41	5742	N.D.			
21) Trichlorotrifluoroethane	8.90	151	10722	0.915	ng		97
22) Carbon Disulfide	8.75	76	11734	N.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. d			
27) 2-Butanone (MEK)	10.51	72	48864	6.254	ng		94
28) cis-1,2-Dichloroethene	11.02	61	1438	N.D.			
29) Diisopropyl Ether	0.00	87	0	N.D. d			
30) Ethyl Acetate	11.34	61	5333	1.467	ng		96
31) n-Hexane	11.30	57	445236	23.513	ng		99
32) Chloroform	11.36	83	1885	N.D.			
34) Tetrahydrofuran (THF)	11.76	72	187210	22.872	ng		99
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.			
36) 1,2-Dichloroethane	12.17	62	1692	N.D.			
38) 1,1,1-Trichloroethane	0.00	97	0	N.D.			
39) Isopropyl Acetate	12.92	61	115	N.D.			
40) 1-Butanol	0.00	56	0	N.D. d			
41) Benzene	12.92	78	54523	1.147	ng		99
42) Carbon Tetrachloride	13.08	117	6398	N.D.			
43) Cyclohexane	13.21	84	19192	1.007	ng		98
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.			
45) 1,2-Dichloropropane	0.00	63	0	N.D.			
46) Bromodichloromethane	13.98	83	1228	N.D.			
47) Trichloroethene	14.02	130	2703	N.D.			
48) 1,4-Dioxane	0.00	88	0	N.D.			
49) 2,2,4-Trimethylpentane...	0.00	57	0	N.D. d			
50) Methyl Methacrylate	0.00	100	0	N.D. d			

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_08\31\08312017.D Vial: 8
Acq On : 31 Aug 2020 16:13 Operator: WA
Sample : P2004706-004 (1000mL) Inst : MS13
Misc : S34-06182001

Quant Time: Sep 01 20:55:34 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M

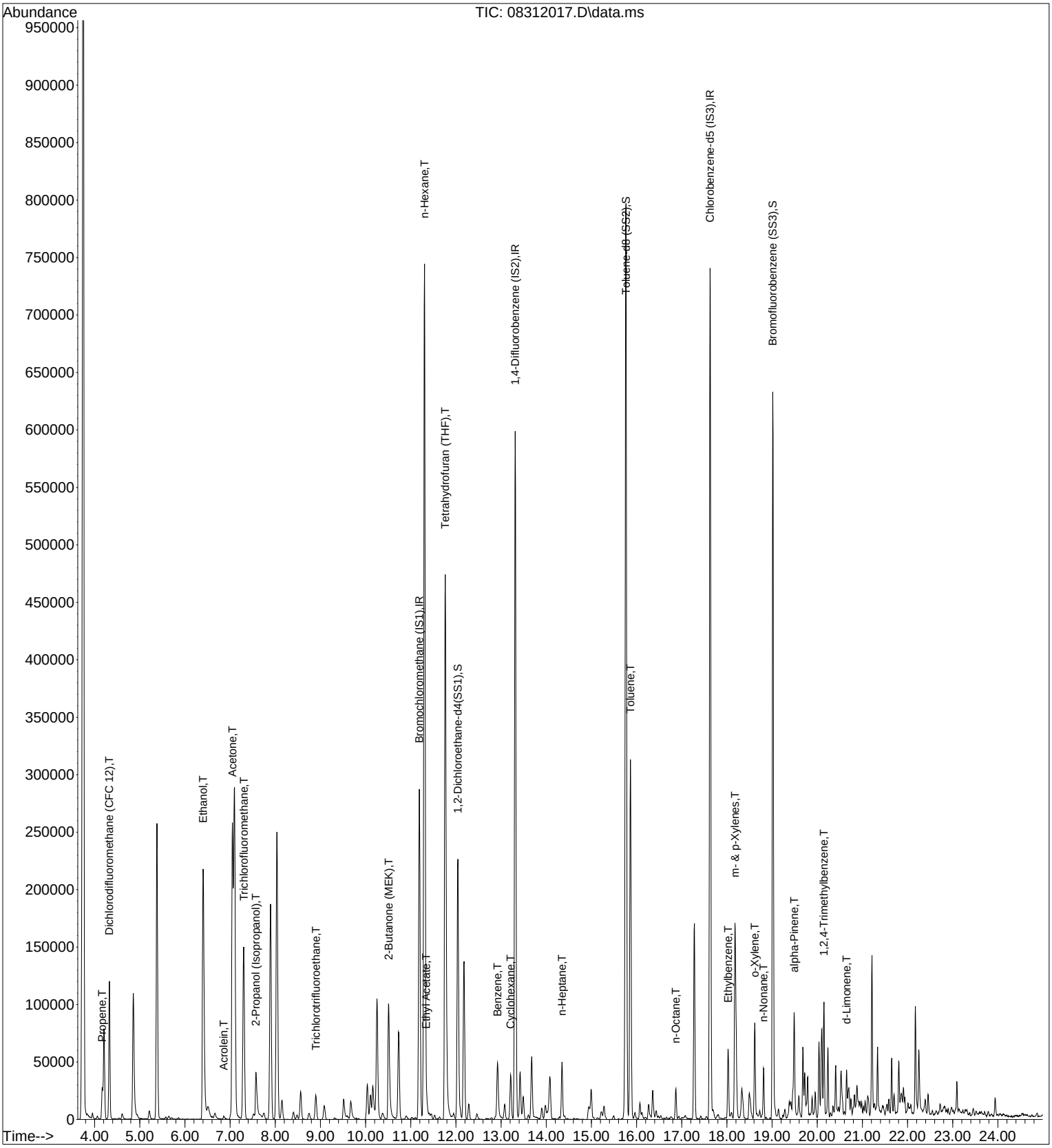
Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
51) n-Heptane	14.35	71	14547	1.189	ng		98
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.			
53) 4-Methyl-2-pentanone	14.94	58	3604	N.D.			
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.			
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.			
58) Toluene	15.86	91	283781	5.685	ng		99
59) 2-Hexanone	16.11	43	2782	N.D.			
60) Dibromochloromethane	0.00	129	0	N.D.			
61) 1,2-Dibromoethane	0.00	107	0	N.D.			
62) n-Butyl Acetate	16.77	43	2306	N.D.			
63) n-Octane	16.87	57	5350	0.547	ng		97
64) Tetrachloroethene	0.00	166	0	N.D.			
65) Chlorobenzene	17.70	112	491	N.D.			
66) Ethylbenzene	18.02	91	53950	0.983	ng		98
67) m- & p-Xylenes	18.18	91	147051	3.430	ng		98
68) Bromoform	0.00	173	0	N.D.			
69) Styrene	18.52	104	6923	N.D.			
70) o-Xylene	18.62	91	53162	1.231	ng		97
71) n-Nonane	18.81	43	16486	0.831	ng		95
72) 1,1,2,2-Tetrachloroethane	18.66	83	1630	N.D.			
74) Cumene	19.14	105	4363	N.D.			
75) alpha-Pinene	19.49	93	37423	1.344	ng		84
76) n-Propylbenzene	19.60	91	16260	N.D.			
77) 3-Ethyltoluene	0.00	105	0	N.D.	d		
78) 4-Ethyltoluene	19.72	105	17625	N.D.			
79) 1,3,5-Trimethylbenzene	19.78	105	12922	N.D.			
80) alpha-Methylstyrene	19.93	118	1663	N.D.			
81) 2-Ethyltoluene	19.95	105	14256	N.D.			
82) 1,2,4-Trimethylbenzene	20.15	105	51926	1.168	ng		87
83) n-Decane	0.00	57	0	N.D.	d		
84) Benzyl Chloride	20.35	91	1682	N.D.			
85) 1,3-Dichlorobenzene	20.35	146	2567	N.D.			
86) 1,4-Dichlorobenzene	20.35	146	2567	N.D.			
87) sec-Butylbenzene	20.39	105	2143	N.D.			
88) 4-Isopropyltoluene (p-...	20.52	119	7797	N.D.			
89) 1,2,3-Trimethylbenzene	20.52	105	14542	N.D.			
90) 1,2-Dichlorobenzene	20.64	146	638	N.D.			
91) d-Limonene	20.65	68	9639	0.645	ng	#	35
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.			
93) n-Undecane	0.00	57	0	N.D.	d		
94) 1,2,4-Trichlorobenzene	0.00	180	0	N.D.			
95) Naphthalene	22.26	128	11180	N.D.			
96) n-Dodecane	0.00	57	0	N.D.	d		
97) Hexachlorobutadiene	0.00	225	0	N.D.			
98) Cyclohexanone	0.00	55	0	N.D.	d		
99) tert-Butylbenzene	20.15	119	6886	N.D.			
100) n-Butylbenzene	20.89	91	7487	N.D.			

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_08\31\08312017.D Vial: 8
Acq On : 31 Aug 2020 16:13 Operator: WA
Sample : P2004706-004 (1000mL) Inst : MS13
Misc : S34-06182001

Quant Time: Sep 01 20:55:34 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_08\31\08312017.D Vial: 8
Acq On : 31 Aug 2020 16:13 Operator: WA
Sample : P2004706-004 (1000mL) Inst : MS13
Misc : S34-06182001

Quant Time: Sep 01 20:55:34 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M

WA 9/1/20

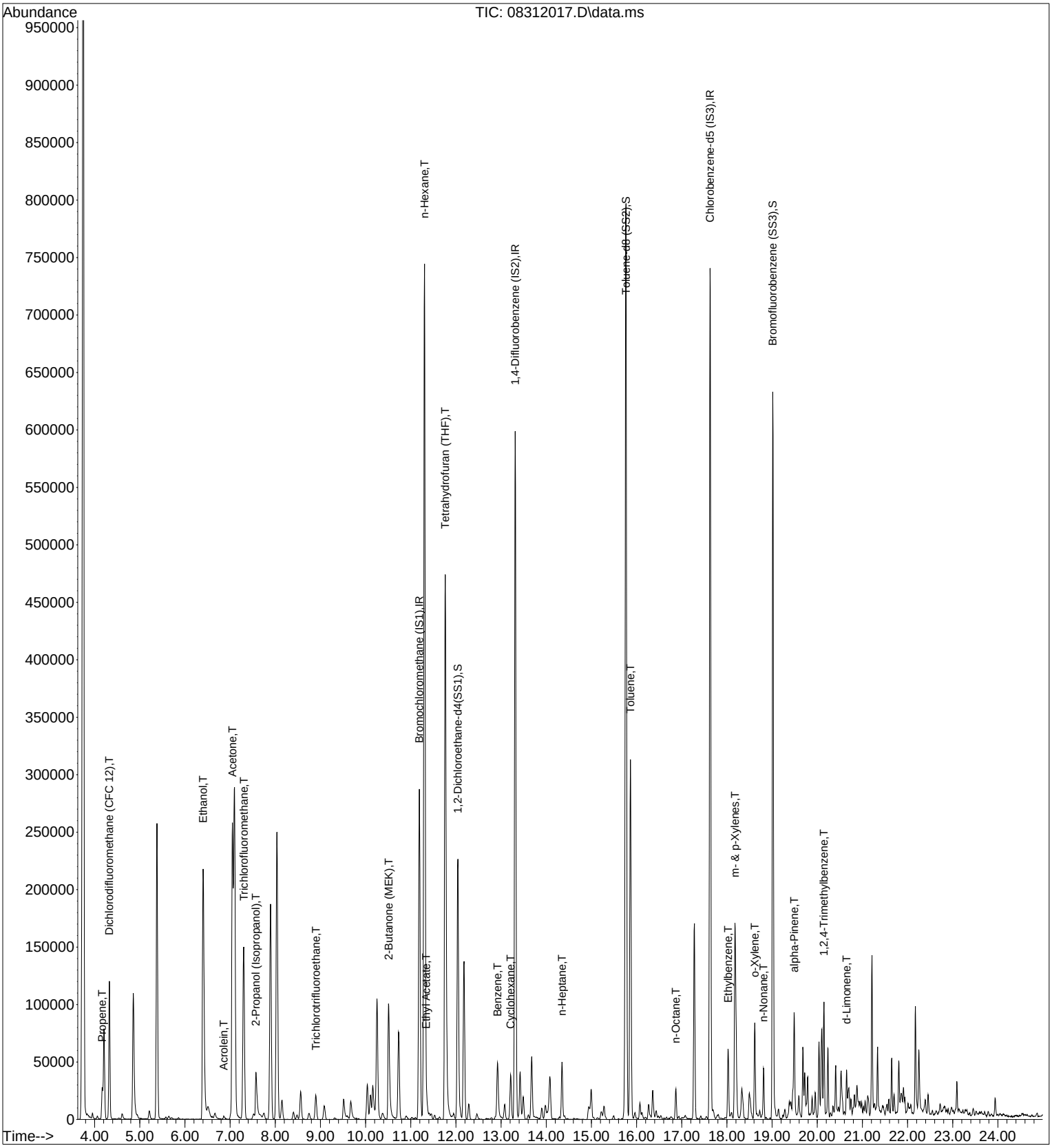
Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.19	130	143305	12.500	ng		-0.03
37) 1,4-Difluorobenzene (IS2)	13.31	114	619493	12.500	ng		-0.02
56) Chlorobenzene-d5 (IS3)	17.63	82	270992	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.04	65	180135	12.325	ng		-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.64%				
57) Toluene-d8 (SS2)	15.76	98	684891	12.586	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.72%				
73) Bromofluorobenzene (SS3)	19.01	174	234190	12.897	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 103.20%				
Target Compounds							Qvalue
2) Propene	4.17	42	9272	0.683	ng	#	50
3) Dichlorodifluoromethan...	4.33	85	115611	4.868	ng		100
10) Ethanol	6.40	45	366242	42.587	ng		100
12) Acrolein	6.86	56	3792	0.510	ng		97
13) Acetone	7.05	58	154823	17.864	ng	#	54
14) Trichlorofluoromethane	7.30	101	166983	8.081	ng		100
15) 2-Propanol (Isopropanol)	7.57	45	80528	3.088	ng		95
21) Trichlorotrifluoroethane	8.90	151	10722	0.915	ng		97
27) 2-Butanone (MEK)	10.51	72	48864	6.254	ng		94
30) Ethyl Acetate	11.34	61	5333	1.467	ng		96
31) n-Hexane	11.30	57	445236	23.513	ng		99
34) Tetrahydrofuran (THF)	11.76	72	187210	22.872	ng		99
41) Benzene	12.92	78	54523	1.147	ng		99
43) Cyclohexane	13.21	84	19192	1.007	ng		98
51) n-Heptane	14.35	71	14547	1.189	ng		98
58) Toluene	15.86	91	283781	5.685	ng		99
63) n-Octane	16.87	57	5350	0.547	ng		97
66) Ethylbenzene	18.02	91	53950	0.983	ng		98
67) m- & p-Xylenes	18.18	91	147051	3.430	ng		98
70) o-Xylene	18.62	91	53162	1.231	ng		97
71) n-Nonane	18.81	43	16486	0.831	ng		95
75) alpha-Pinene	19.49	93	37423	1.344	ng		84
82) 1,2,4-Trimethylbenzene	20.15	105	51926	1.168	ng		87
91) d-Limonene	20.65	68	9639	0.645	ng	#	35

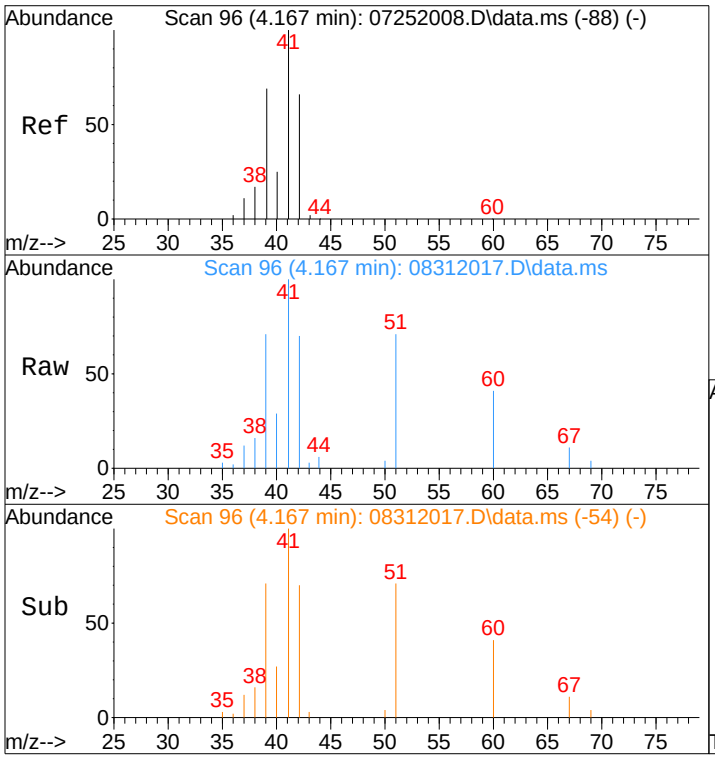
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_08\31\08312017.D Vial: 8
Acq On : 31 Aug 2020 16:13 Operator: WA
Sample : P2004706-004 (1000mL) Inst : MS13
Misc : S34-06182001

Quant Time: Sep 01 20:55:34 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M

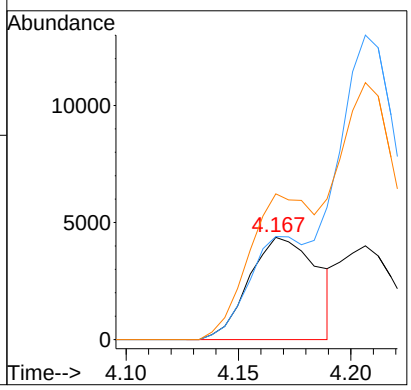


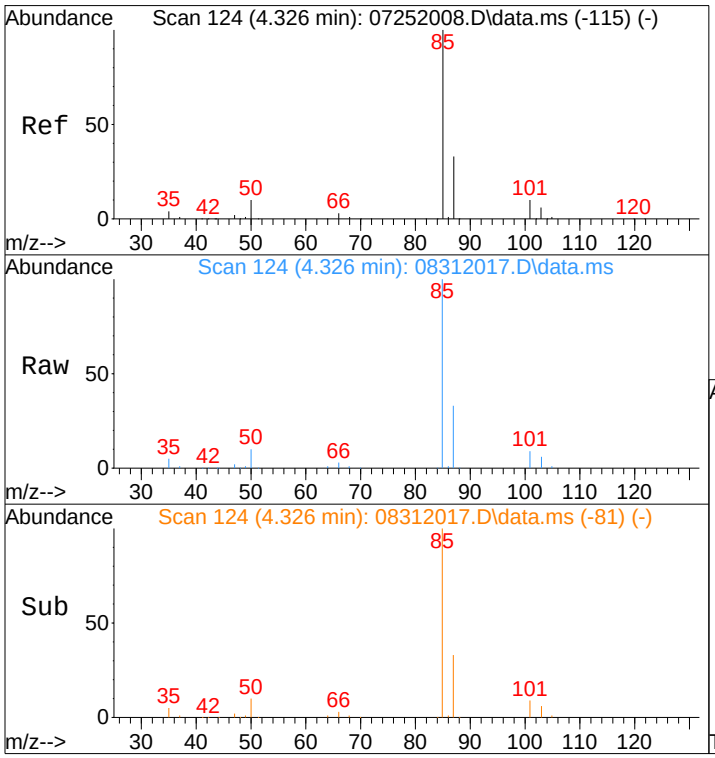


#2
Propene
Concen: 0.68 ng
RT: 4.17 min Scan# 96
Delta R.T. -0.011 min
Lab File: 08312017.D
Acq: 31 Aug 2020 16:13

Tgt Ion: 42 Resp: 9272

Ion	Ratio	Lower	Upper
42	100		
39	0.0	83.4	123.4#
41	132.7	130.6	170.6

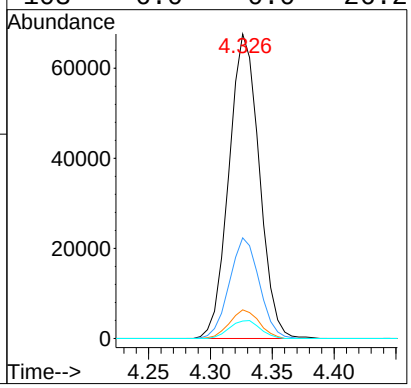


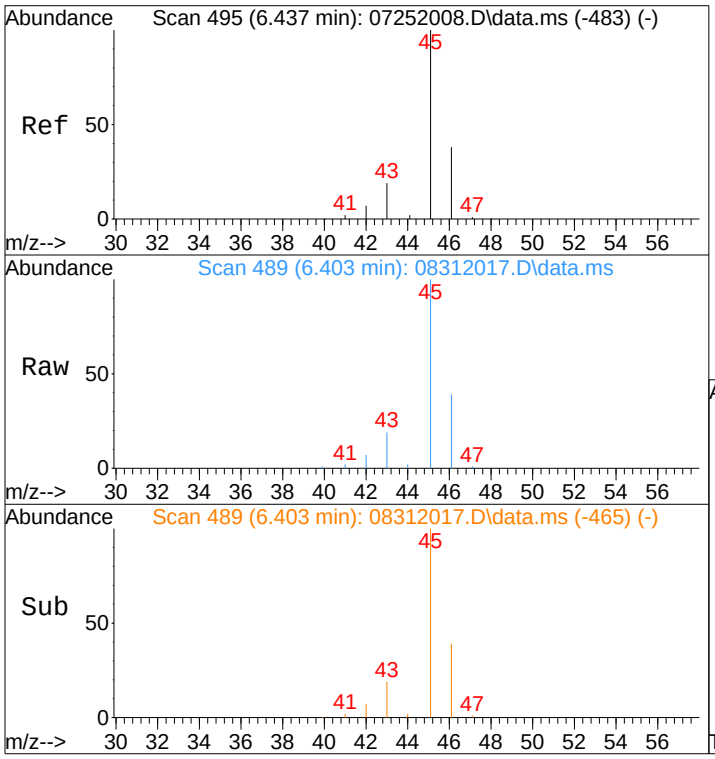


#3
Dichlorodifluoromethane (CFC 12)
Concen: 4.87 ng
RT: 4.33 min Scan# 124
Delta R.T. -0.006 min
Lab File: 08312017.D
Acq: 31 Aug 2020 16:13

Tgt Ion: 85 Resp: 115611

Ion	Ratio	Lower	Upper
85	100		
87	32.7	12.8	52.8
101	9.2	0.0	29.5
103	6.0	0.0	26.2

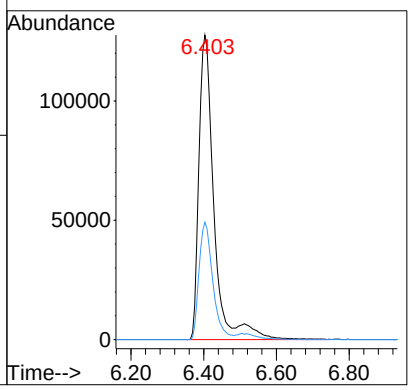


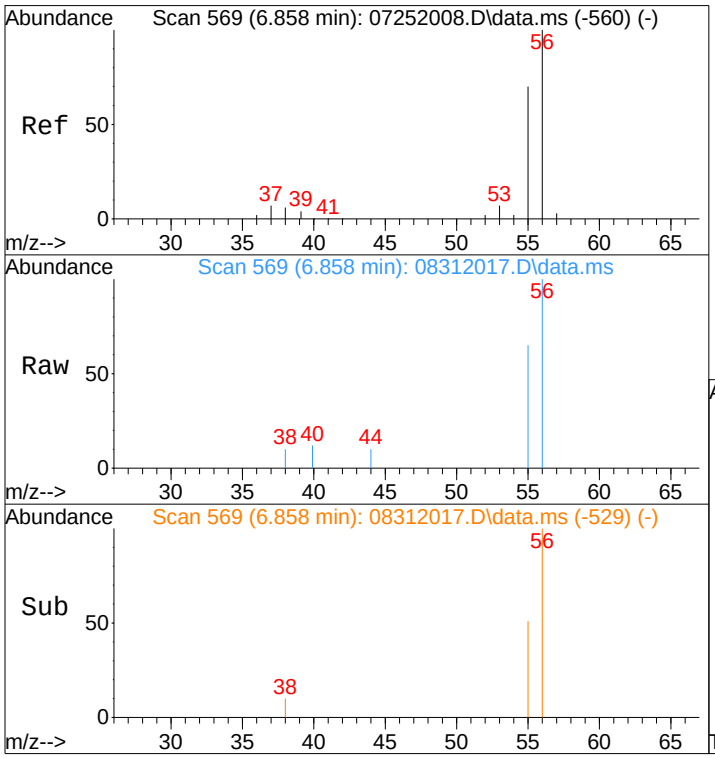


#10
Ethanol
Concen: 42.59 ng
RT: 6.40 min Scan# 489
Delta R.T. -0.114 min
Lab File: 08312017.D
Acq: 31 Aug 2020 16:13

Tgt Ion: 45 Resp: 366242

Ion	Ratio	Lower	Upper
45	100		
46	37.9	18.0	58.0

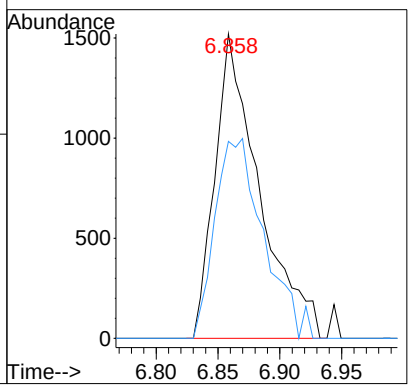


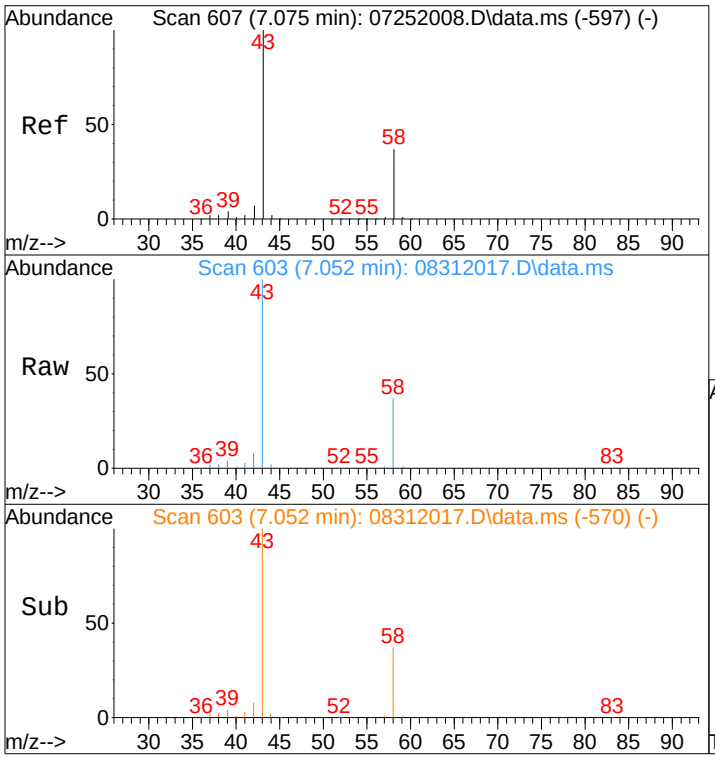


#12
Acrolein
Concen: 0.51 ng
RT: 6.86 min Scan# 569
Delta R.T. -0.023 min
Lab File: 08312017.D
Acq: 31 Aug 2020 16:13

Tgt Ion: 56 Resp: 3792

Ion	Ratio	Lower	Upper
56	100		
55	72.0	49.5	89.5

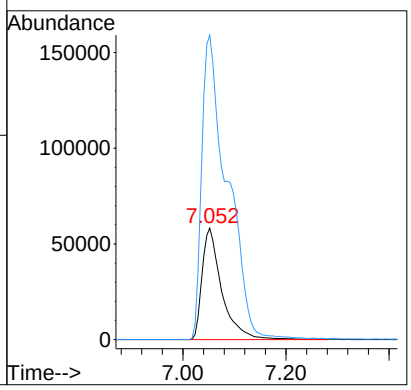


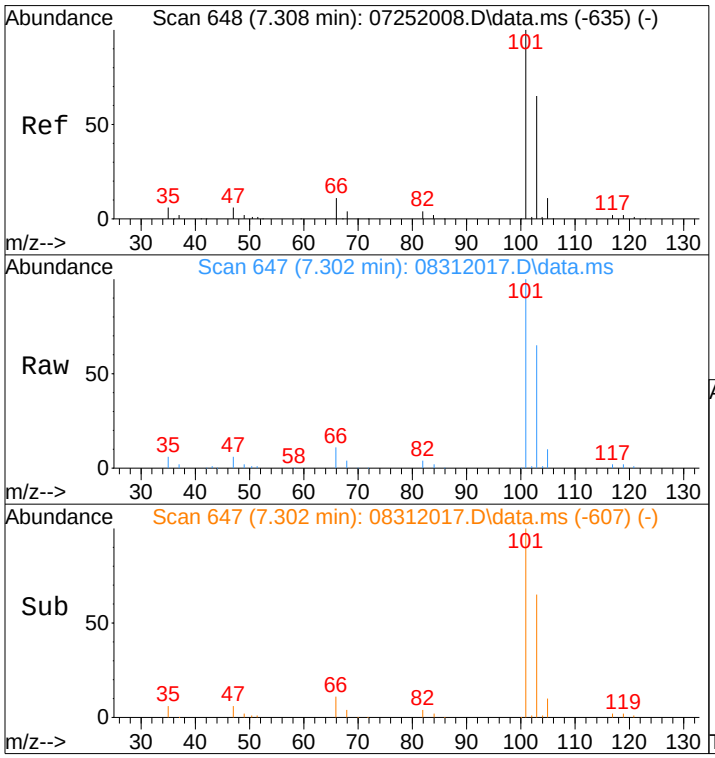


#13
Acetone
Concen: 17.86 ng
RT: 7.05 min Scan# 603
Delta R.T. -0.062 min
Lab File: 08312017.D
Acq: 31 Aug 2020 16:13

Tgt Ion: 58 Resp: 154823

Ion	Ratio	Lower	Upper
58	100		
43	354.4	240.7	300.7#

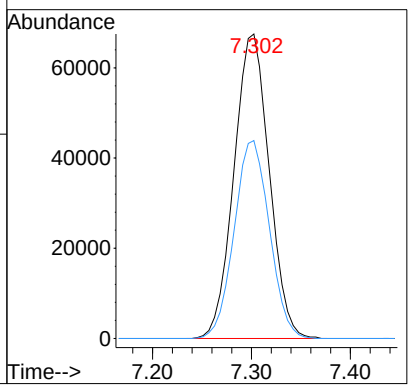


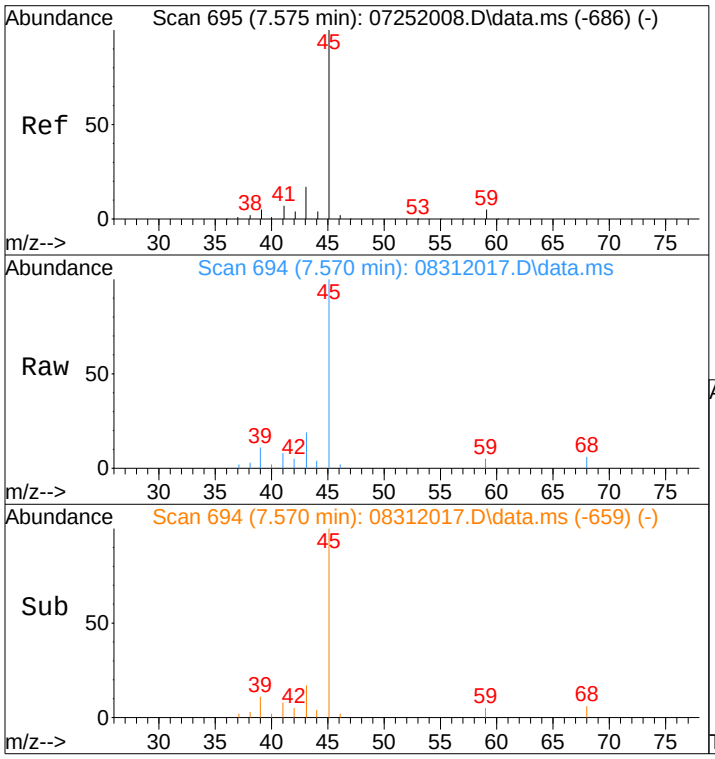


#14
Trichlorofluoromethane
Concen: 8.08 ng
RT: 7.30 min Scan# 647
Delta R.T. -0.023 min
Lab File: 08312017.D
Acq: 31 Aug 2020 16:13

Tgt Ion:101 Resp: 166983

Ion	Ratio	Lower	Upper
101	100		
103	65.0	45.1	85.1

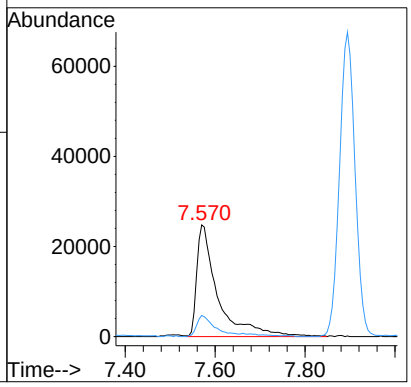


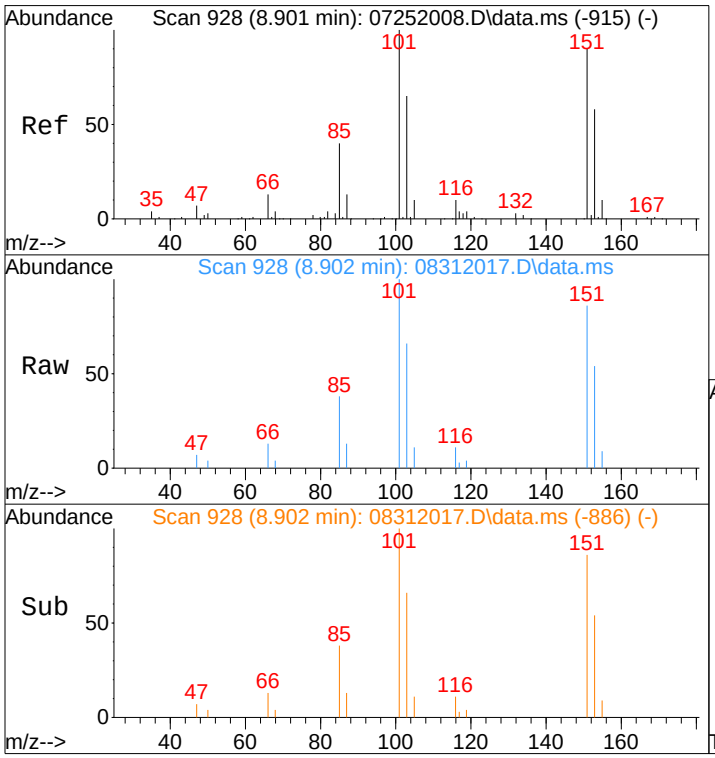


#15
2-Propanol (Isopropanol)
Concen: 3.09 ng
RT: 7.57 min Scan# 694
Delta R.T. -0.051 min
Lab File: 08312017.D
Acq: 31 Aug 2020 16:13

Tgt Ion: 45 Resp: 80528

Ion	Ratio	Lower	Upper
45	100		
43	19.5	0.0	37.4

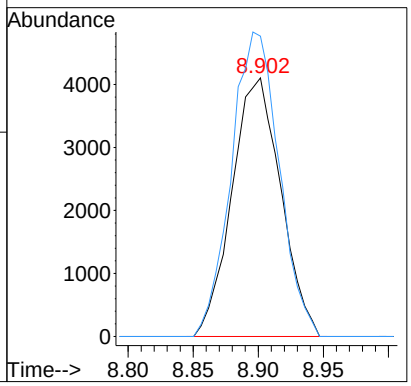


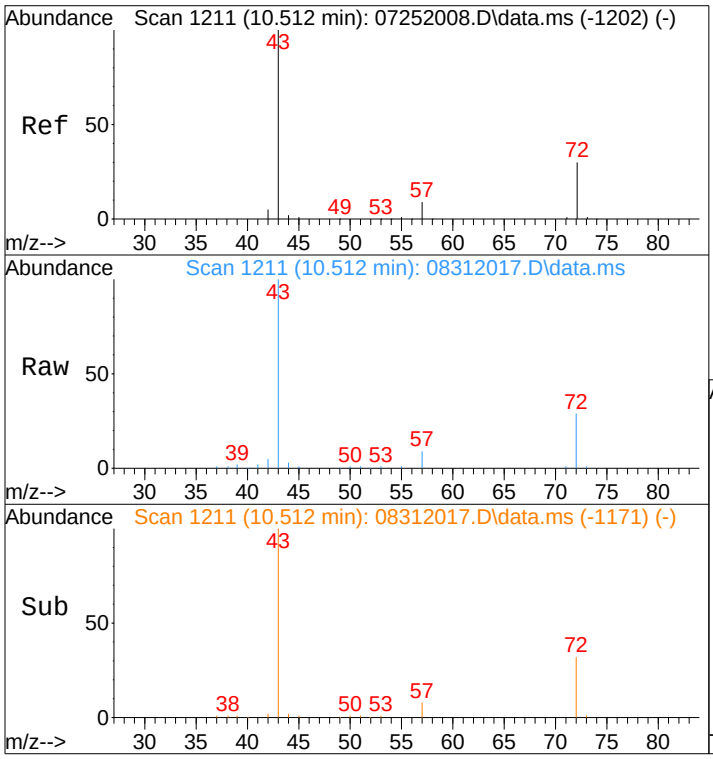


#21
Trichlorotrifluoroethane
Concen: 0.91 ng
RT: 8.90 min Scan# 928
Delta R.T. -0.011 min
Lab File: 08312017.D
Acq: 31 Aug 2020 16:13

Tgt Ion:151 Resp: 10722

Ion	Ratio	Lower	Upper
151	100		
101	115.1	92.1	132.1

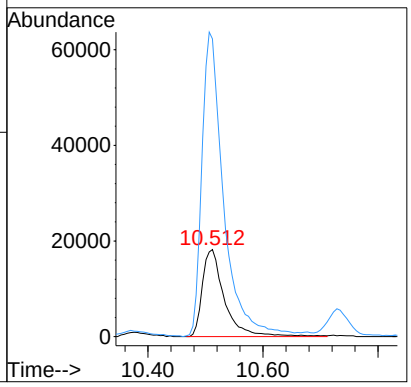


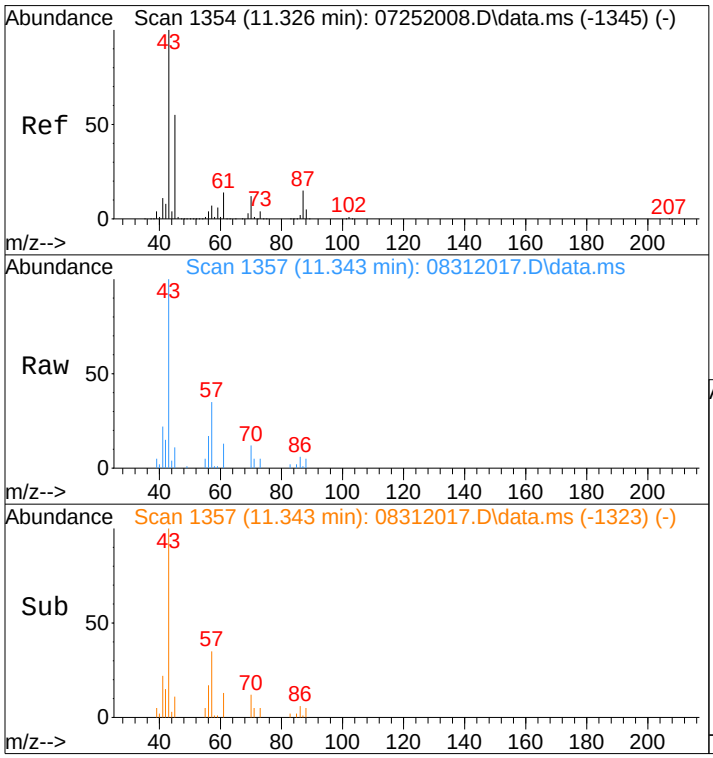


#27
2-Butanone (MEK)
Concen: 6.25 ng
RT: 10.51 min Scan# 1211
Delta R.T. -0.023 min
Lab File: 08312017.D
Acq: 31 Aug 2020 16:13

Tgt Ion: 72 Resp: 48864

Ion	Ratio	Lower	Upper
72	100		
43	346.8	314.3	354.3

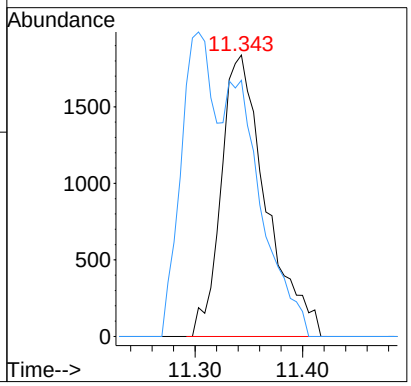


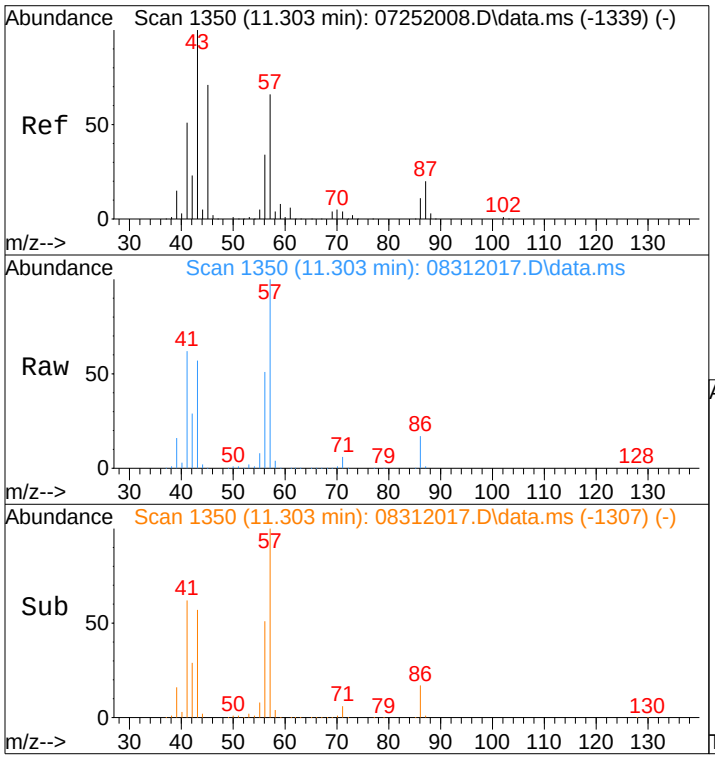


#30
Ethyl Acetate
Concen: 1.47 ng
RT: 11.34 min Scan# 1357
Delta R.T. -0.006 min
Lab File: 08312017.D
Acq: 31 Aug 2020 16:13

Tgt Ion: 61 Resp: 5333

Ion	Ratio	Lower	Upper
61	100		
70	88.8	64.9	104.9

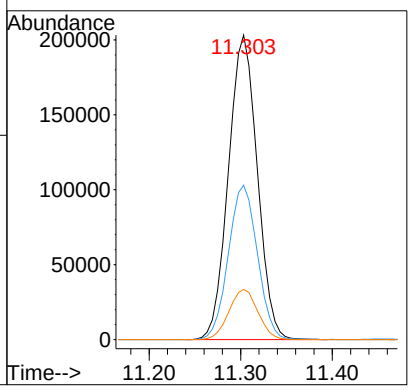


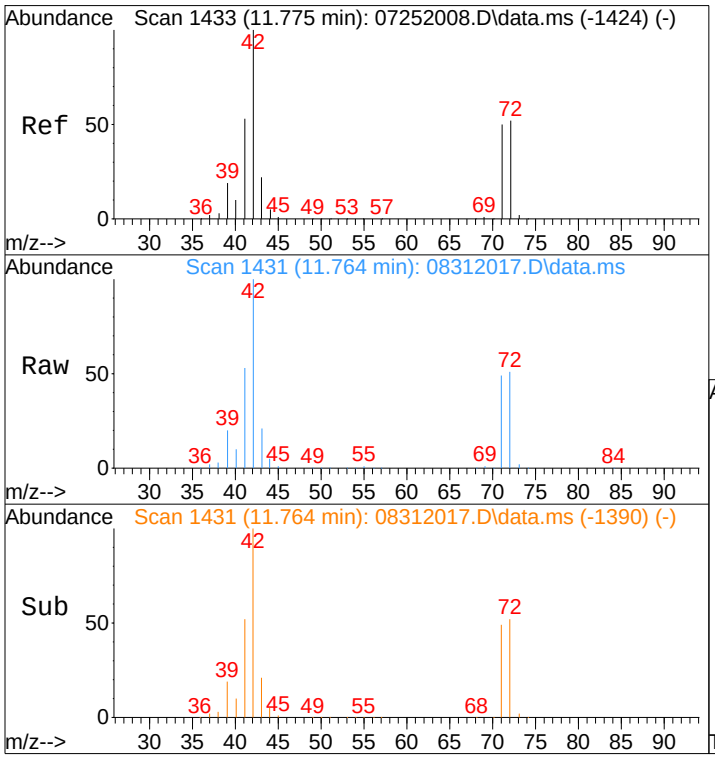


#31
n-Hexane
Concen: 23.51 ng
RT: 11.30 min Scan# 1350
Delta R.T. -0.006 min
Lab File: 08312017.D
Acq: 31 Aug 2020 16:13

Tgt Ion: 57 Resp: 445236

Ion	Ratio	Lower	Upper
57	100		
56	51.0	41.0	61.4
86	16.5	13.8	20.8

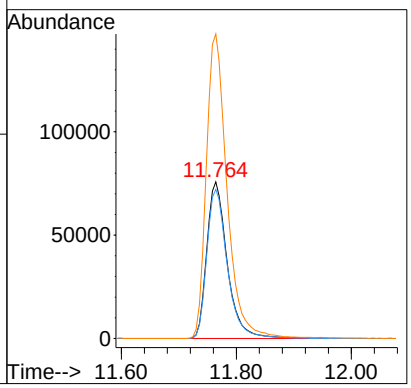


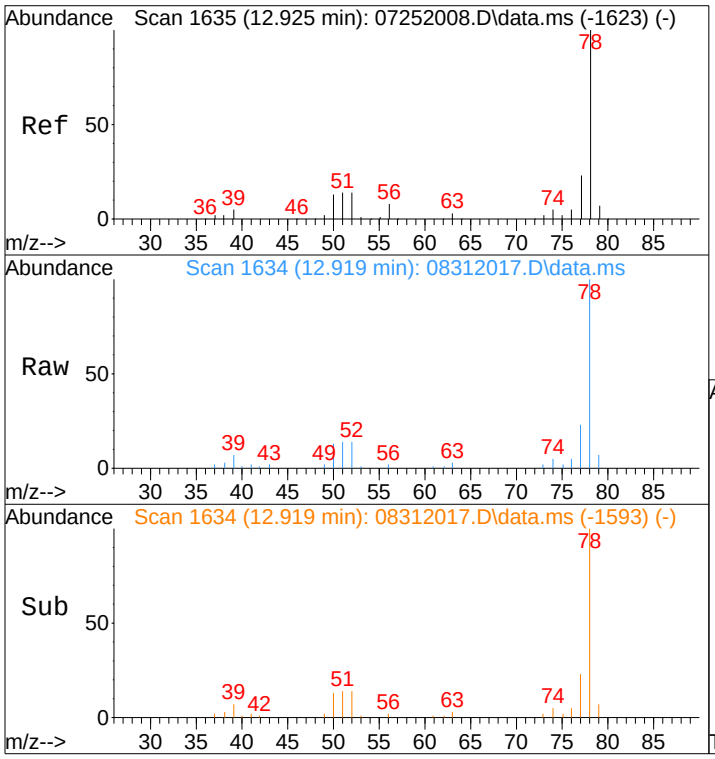


#34
Tetrahydrofuran (THF)
Concen: 22.87 ng
RT: 11.76 min Scan# 1431
Delta R.T. -0.017 min
Lab File: 08312017.D
Acq: 31 Aug 2020 16:13

Tgt Ion: 72 Resp: 187210

Ion	Ratio	Lower	Upper
72	100		
71	95.5	76.0	116.0
42	197.3	174.5	214.5

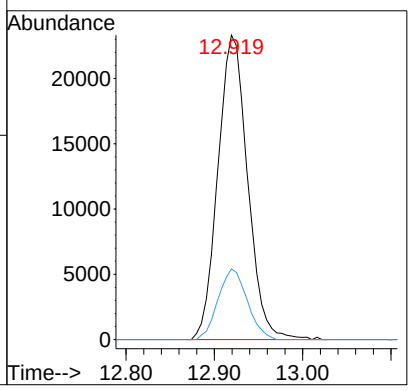


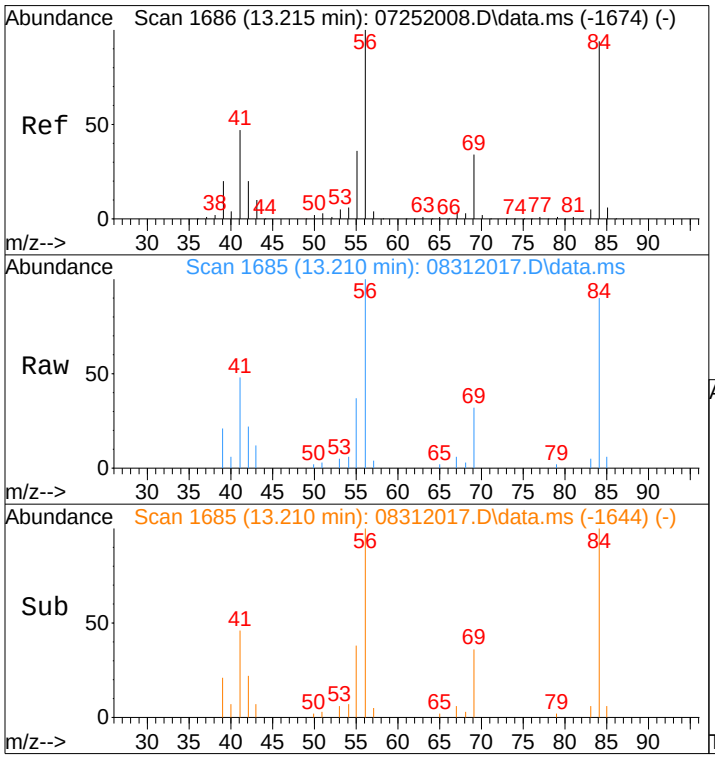


#41
Benzene
Concen: 1.15 ng
RT: 12.92 min Scan# 1634
Delta R.T. -0.017 min
Lab File: 08312017.D
Acq: 31 Aug 2020 16:13

Tgt Ion: 78 Resp: 54523

Ion	Ratio	Lower	Upper
78	100		
77	22.7	3.2	43.2

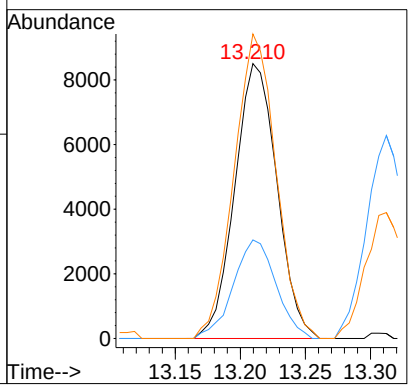


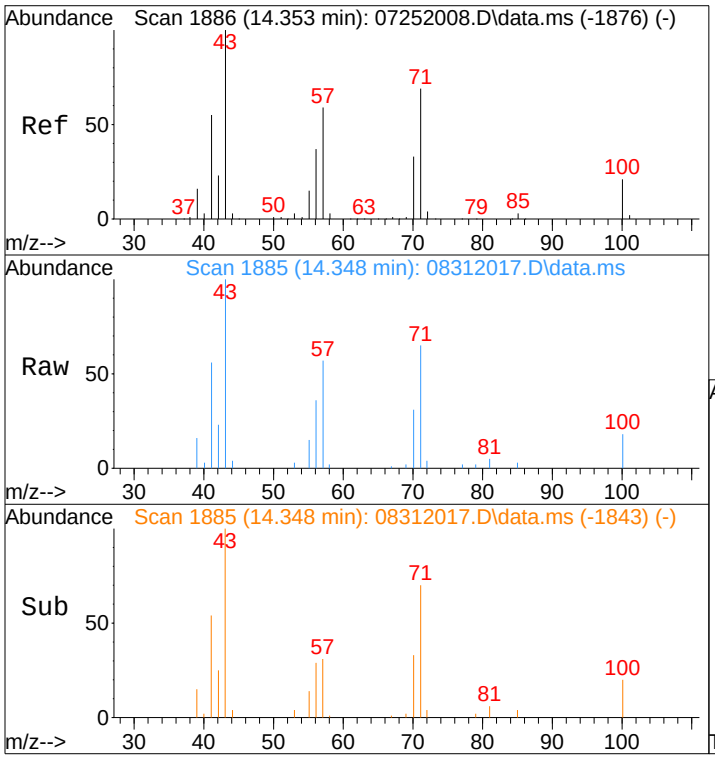


#43
Cyclohexane
Concen: 1.01 ng
RT: 13.21 min Scan# 1685
Delta R.T. -0.017 min
Lab File: 08312017.D
Acq: 31 Aug 2020 16:13

Tgt Ion: 84 Resp: 19192

Ion	Ratio	Lower	Upper
84	100		
69	36.3	15.9	55.9
56	110.1	87.1	127.1

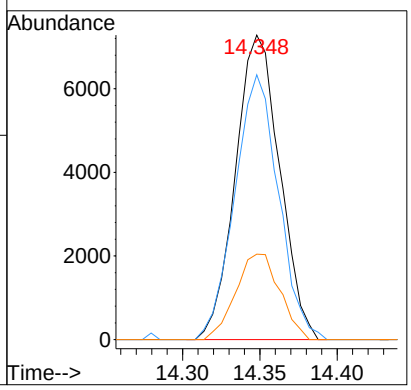


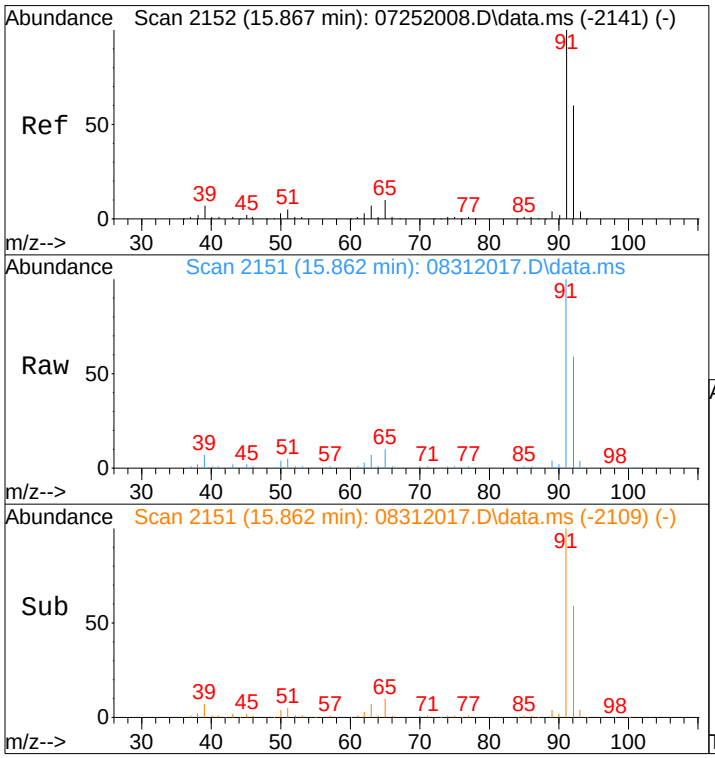


#51
n-Heptane
Concen: 1.19 ng
RT: 14.35 min Scan# 1885
Delta R.T. -0.011 min
Lab File: 08312017.D
Acq: 31 Aug 2020 16:13

Tgt Ion: 71 Resp: 14547

Ion	Ratio	Lower	Upper
71	100		
57	85.9	65.0	105.0
100	27.9	10.1	50.1

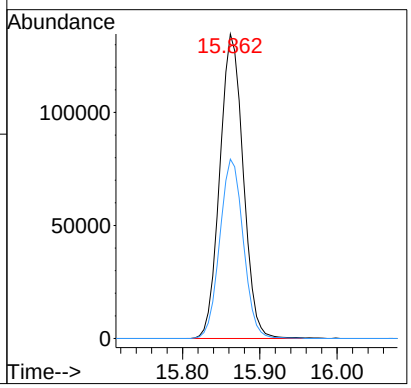


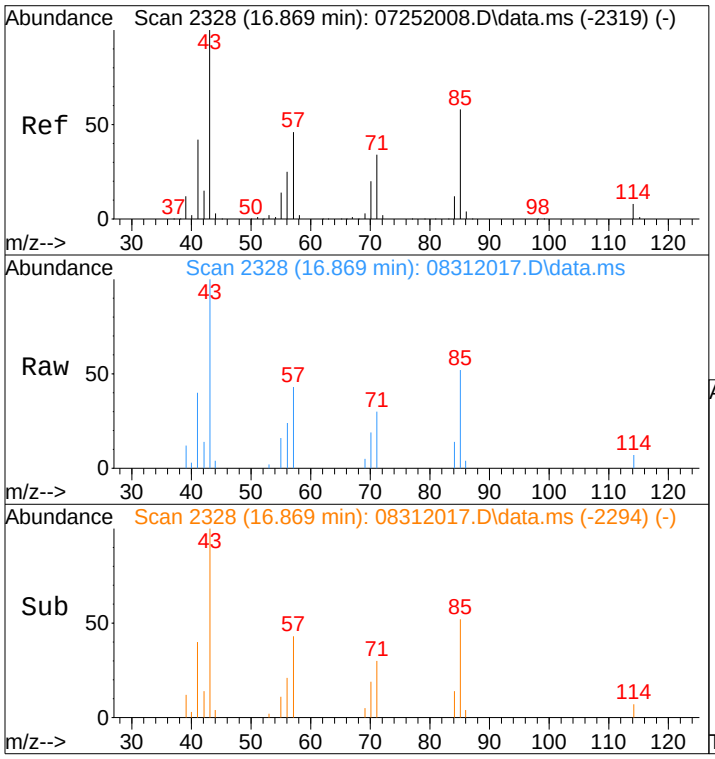


#58
Toluene
Concen: 5.69 ng
RT: 15.86 min Scan# 2151
Delta R.T. -0.011 min
Lab File: 08312017.D
Acq: 31 Aug 2020 16:13

Tgt Ion: 91 Resp: 283781

Ion	Ratio	Lower	Upper
91	100		
92	59.2	39.8	79.8

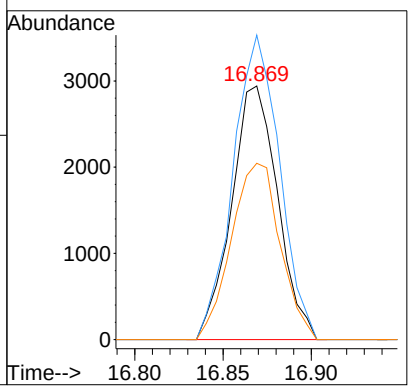


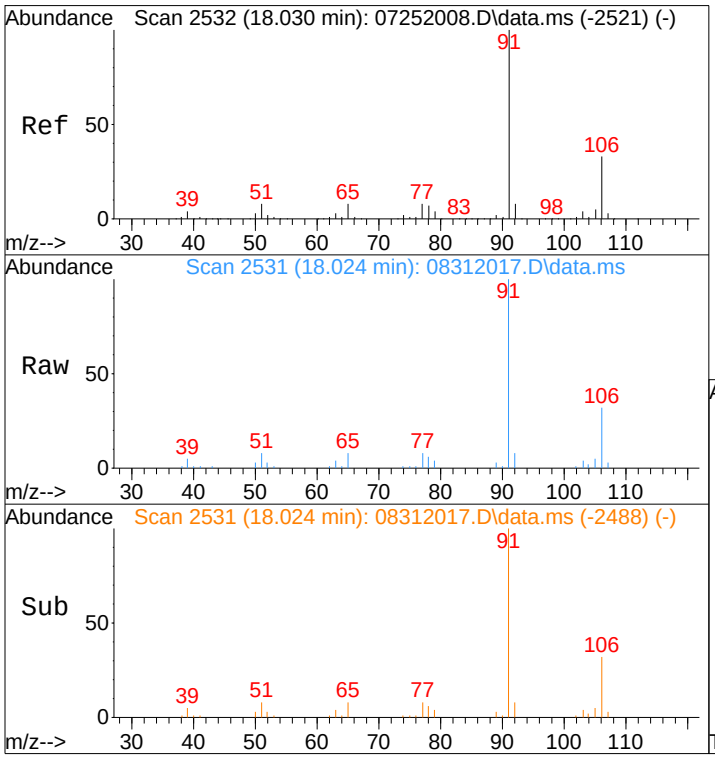


#63
n-Octane
Concen: 0.55 ng
RT: 16.87 min Scan# 2328
Delta R.T. -0.006 min
Lab File: 08312017.D
Acq: 31 Aug 2020 16:13

Tgt Ion: 57 Resp: 5350

Ion	Ratio	Lower	Upper
57	100		
85	120.5	101.2	151.8
71	73.7	59.1	88.7

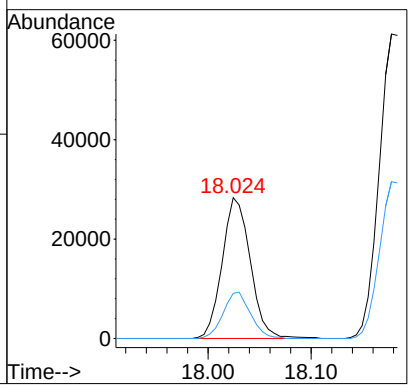


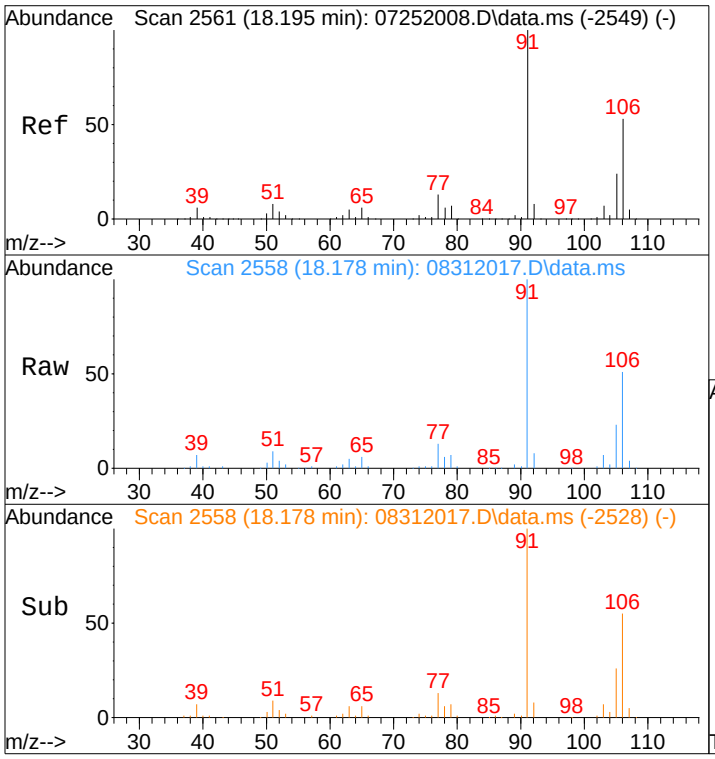


#66
Ethylbenzene
Concen: 0.98 ng
RT: 18.02 min Scan# 2531
Delta R.T. -0.006 min
Lab File: 08312017.D
Acq: 31 Aug 2020 16:13

Tgt Ion: 91 Resp: 53950

Ion	Ratio	Lower	Upper
91	100		
106	31.8	12.9	52.9

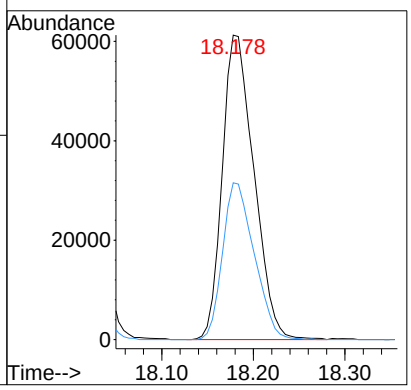


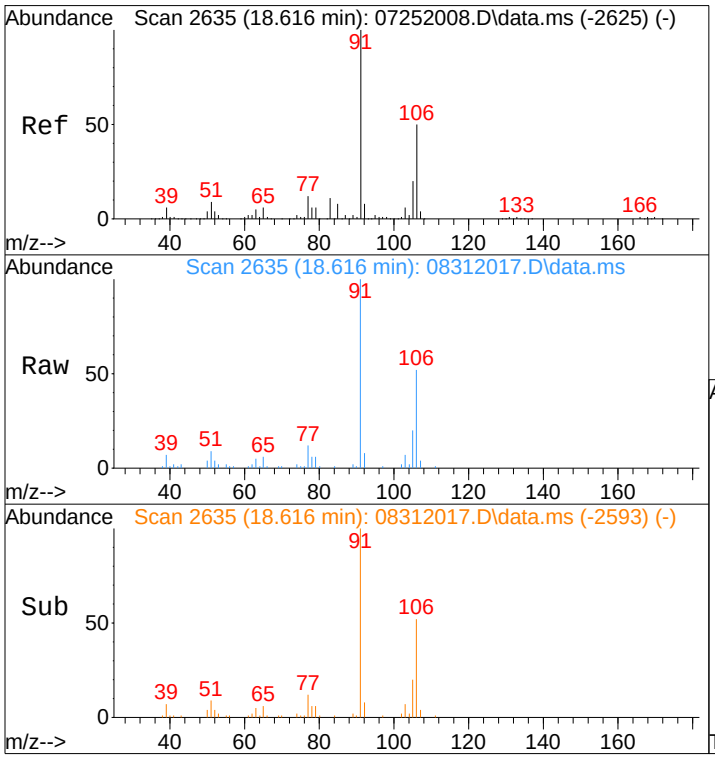


#67
m- & p-Xylenes
Concen: 3.43 ng
RT: 18.18 min Scan# 2558
Delta R.T. -0.028 min
Lab File: 08312017.D
Acq: 31 Aug 2020 16:13

Tgt Ion: 91 Resp: 147051

Ion	Ratio	Lower	Upper
91	100		
106	51.4	32.5	72.5

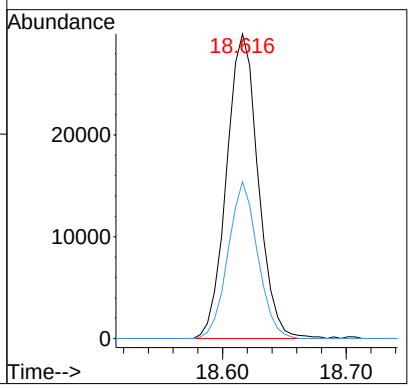


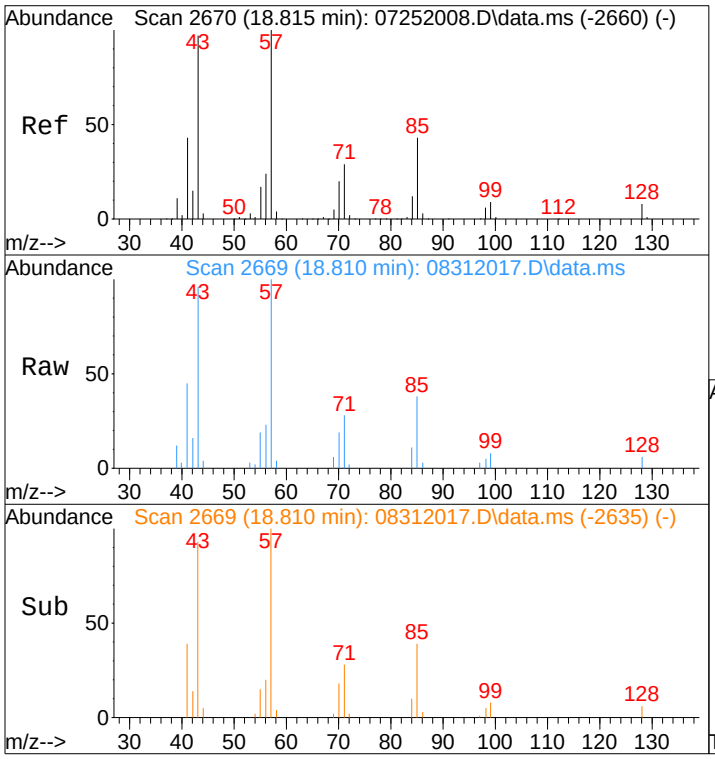


#70
o-Xylene
Concen: 1.23 ng
RT: 18.62 min Scan# 2635
Delta R.T. -0.011 min
Lab File: 08312017.D
Acq: 31 Aug 2020 16:13

Tgt Ion: 91 Resp: 53162

Ion	Ratio	Lower	Upper
91	100		
106	48.3	30.1	70.1

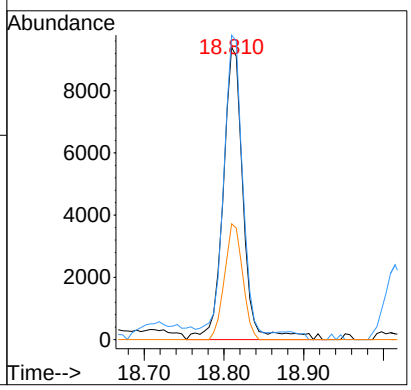


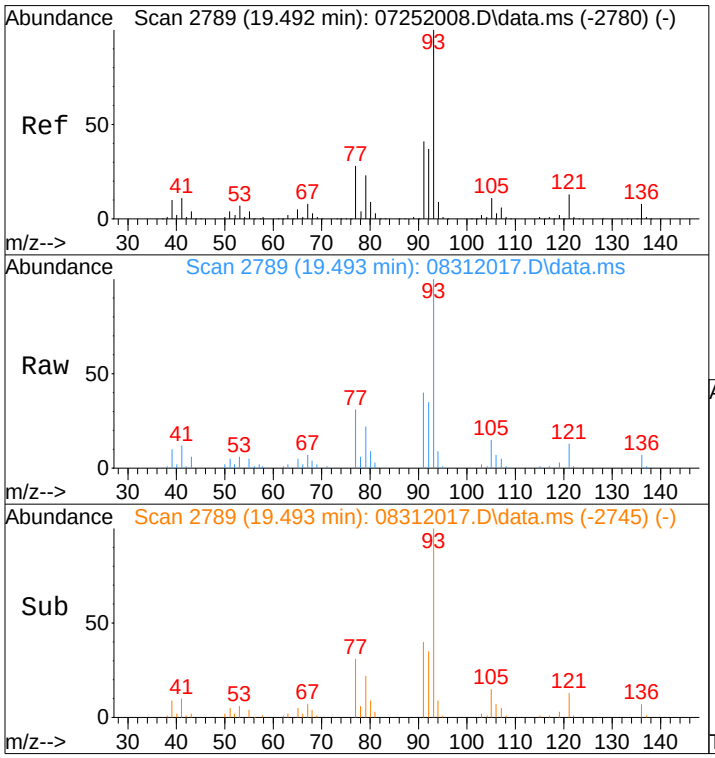


#71
n-Nonane
Concen: 0.83 ng
RT: 18.81 min Scan# 2669
Delta R.T. -0.005 min
Lab File: 08312017.D
Acq: 31 Aug 2020 16:13

Tgt Ion: 43 Resp: 16486

Ion	Ratio	Lower	Upper
43	100		
57	103.7	82.0	122.0
85	35.6	23.1	63.1

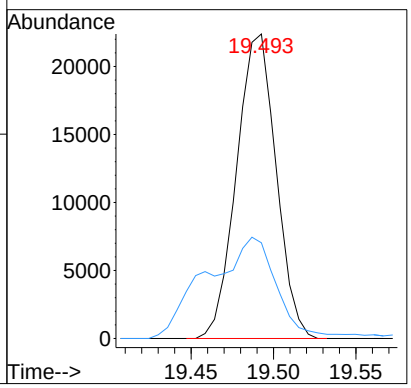


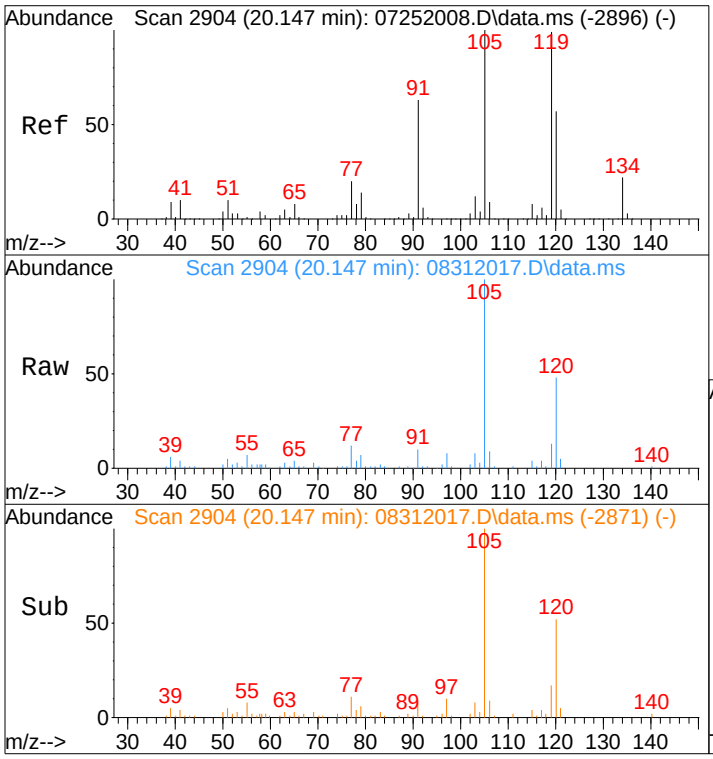


#75
alpha-Pinene
Concen: 1.34 ng
RT: 19.49 min Scan# 2789
Delta R.T. 0.001 min
Lab File: 08312017.D
Acq: 31 Aug 2020 16:13

Tgt Ion: 93 Resp: 37423

Ion	Ratio	Lower	Upper
93	100		
77	36.2	7.7	47.7

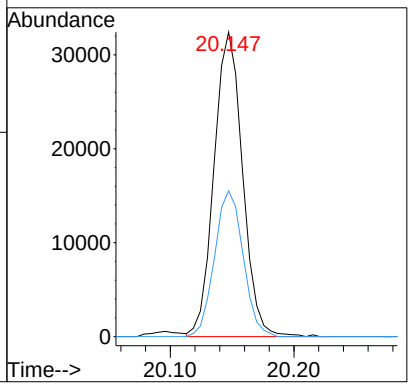


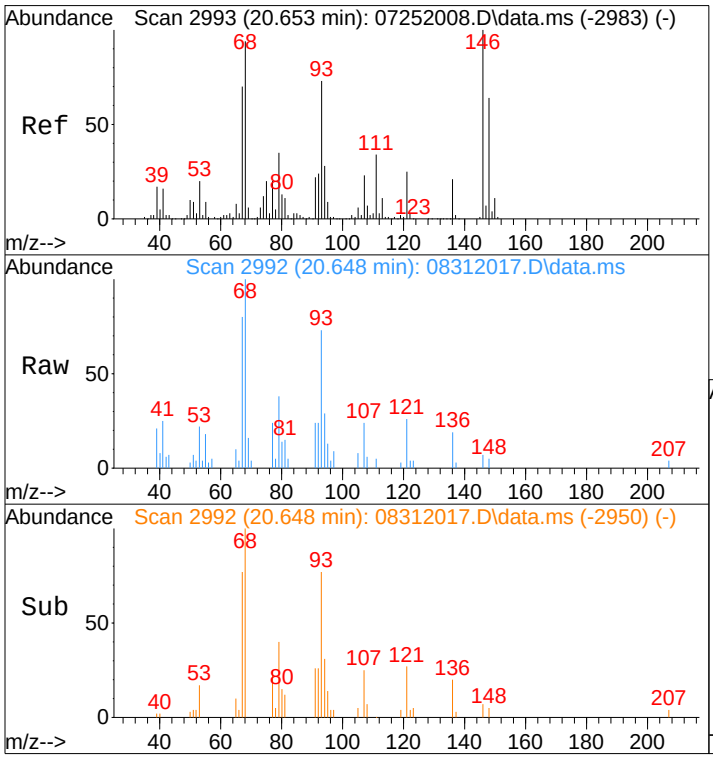


#82
1,2,4-Trimethylbenzene
Concen: 1.17 ng
RT: 20.15 min Scan# 2904
Delta R.T. -0.011 min
Lab File: 08312017.D
Acq: 31 Aug 2020 16:13

Tgt Ion:105 Resp: 51926

Ion	Ratio	Lower	Upper
105	100		
120	47.9	37.2	77.2

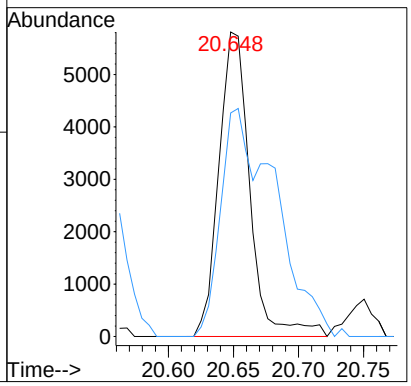




#91
d-Limonene
Concen: 0.65 ng
RT: 20.65 min Scan# 2992
Delta R.T. -0.011 min
Lab File: 08312017.D
Acq: 31 Aug 2020 16:13

Tgt Ion: 68 Resp: 9639

Ion	Ratio	Lower	Upper
68	100		
93	132.5	56.5	96.5#



Data File : I:\MS13\DATA\2020_08\31\08312004.D Vial: 1
Acq On : 31 Aug 2020 8:19 Operator: WA
Sample : MB R13083120_1000mL Inst : MS13
Misc : S34-06182001

Quant Time: Aug 31 09:10:24 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020 8/31/20
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.18	130	151192	12.500	ng		-0.03
37) 1,4-Difluorobenzene (IS2)	13.31	114	635775	12.500	ng		-0.02
56) Chlorobenzene-d5 (IS3)	17.63	82	289779	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.04	65	189256	12.274	ng		-0.03
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.16%				
57) Toluene-d8 (SS2)	15.76	98	714175	12.273	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.16%				
73) Bromofluorobenzene (SS3)	19.02	174	248624	12.804	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 102.40%				
Target Compounds							Qvalue
2) Propene	4.22	42	531	N.D.			
3) Dichlorodifluoromethan...	4.25	85	105	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	0.00	45	0	N.D. d			
11) Acetonitrile	0.00	41	0	N.D.			
12) Acrolein	0.00	56	0	N.D.			
13) Acetone	7.17	58	1837	0.201	ng	#	83
14) Trichlorofluoromethane	0.00	101	0	N.D.			
15) 2-Propanol (Isopropanol)	7.73	45	53	N.D.			
16) Acrylonitrile	0.00	53	0	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	8.76	76	5361	0.102	ng		81
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	12.93	78	364	N.D.			
42) Carbon Tetrachloride	0.00	117	0	N.D.			
43) Cyclohexane	13.31	84	200	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.			

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_08\31\08312004.D Vial: 1
Acq On : 31 Aug 2020 8:19 Operator: WA
Sample : MB R13083120_1000mL Inst : MS13
Misc : S34-06182001

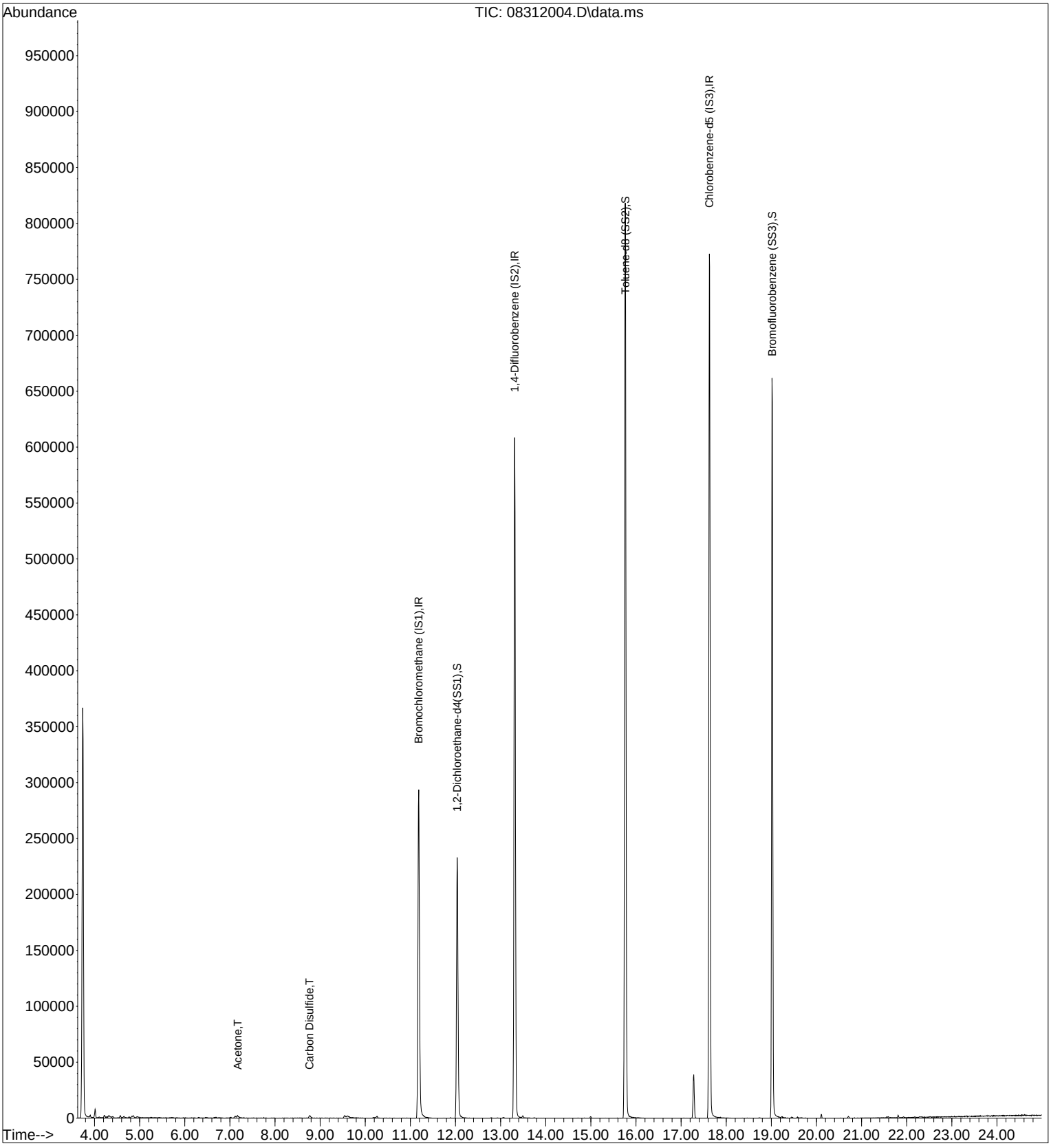
Quant Time: Aug 31 09:10:24 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M

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	15.87	91	281	N.D.		
59) 2-Hexanone	0.00	43	0	N.D.		
60) Dibromochloromethane	0.00	129	0	N.D.		
61) 1,2-Dibromoethane	0.00	107	0	N.D.		
62) n-Butyl Acetate	0.00	43	0	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	17.86	91	251	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	19.02	105	251	N.D.		
75) alpha-Pinene	0.00	93	0	N.D.		
76) n-Propylbenzene	19.58	91	1525	N.D.		
77) 3-Ethyltoluene	19.74	105	118	N.D.		
78) 4-Ethyltoluene	19.74	105	118	N.D.		
79) 1,3,5-Trimethylbenzene	19.74	105	118	N.D.		
80) alpha-Methylstyrene	0.00	118	0	N.D.		
81) 2-Ethyltoluene	19.74	105	118	N.D.		
82) 1,2,4-Trimethylbenzene	0.00	105	0	N.D.		
83) n-Decane	0.00	57	0	N.D.		
84) Benzyl Chloride	0.00	91	0	N.D.		
85) 1,3-Dichlorobenzene	0.00	146	0	N.D.		
86) 1,4-Dichlorobenzene	0.00	146	0	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	22.18	180	333	N.D.		
95) Naphthalene	22.29	128	2004	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	0.00	91	0	N.D.		

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Data File : I:\MS13\DATA\2020_08\31\08312004.D Vial: 1
Acq On : 31 Aug 2020 8:19 Operator: WA
Sample : MB R13083120_1000mL Inst : MS13
Misc : S34-06182001

Quant Time: Aug 31 09:10:24 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_08\31\08312005.D Vial: 1
Acq On : 31 Aug 2020 9:00 Operator: WA
Sample : LCS R13083120_25ng Inst : MS13
Misc : S34-06182001/S34-08212011 (9/19)

Quant Time: Aug 31 09:24:37 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M

WA 8/31/20

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.21	130	155319	12.500	ng		-0.01
37) 1,4-Difluorobenzene (IS2)	13.32	114	661336	12.500	ng		-0.01
56) Chlorobenzene-d5 (IS3)	17.63	82	302759	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.05	65	199013	12.563	ng		-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.48%				
57) Toluene-d8 (SS2)	15.76	98	751015	12.353	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.80%				
73) Bromofluorobenzene (SS3)	19.02	174	266298	13.127	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 105.04%				
Target Compounds							Qvalue
2) Propene	4.16	42	406706	27.623	ng		99
3) Dichlorodifluoromethan...	4.32	85	695469	27.019	ng		100
4) Chloromethane	4.60	50	537673	30.275	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.87	135	363905	25.567	ng		100
6) Vinyl Chloride	5.02	62	518465	27.776	ng		100
7) 1,3-Butadiene	5.29	54	446731	30.917	ng		98
8) Bromomethane	5.72	94	338114	27.032	ng		99
9) Chloroethane	6.05	64	276125	28.181	ng		100
10) Ethanol	6.44	45	1268913	136.137	ng		100
11) Acetonitrile	6.68	41	665641	29.721	ng		100
12) Acrolein	6.86	56	227889	28.303	ng		100
13) Acetone	7.07	58	1186124	126.273	ng		98
14) Trichlorofluoromethane	7.31	101	555726	24.814	ng		100
15) 2-Propanol (Isopropanol)	7.58	45	1557472	55.110	ng		100
16) Acrylonitrile	7.83	53	454871	28.588	ng		100
17) 1,1-Dichloroethene	8.26	96	340674	26.163	ng		100
18) 2-Methyl-2-Propanol (t...	8.44	59	1626518	57.824	ng		100
19) Methylene Chloride	8.49	84	345891	25.709	ng		99
20) 3-Chloro-1-propene (Al...	8.65	41	461318	25.954	ng		100
21) Trichlorotrifluoroethane	8.90	151	325681	25.636	ng		100
22) Carbon Disulfide	8.75	76	1255692	23.349	ng		100
23) trans-1,2-Dichloroethene	9.76	61	466865	27.931	ng		99
24) 1,1-Dichloroethane	10.01	63	558866	25.798	ng		100
25) Methyl tert-Butyl Ether	10.10	73	1010033	26.287	ng		100
26) Vinyl Acetate	10.27	86	411496	143.757	ng	#	95
27) 2-Butanone (MEK)	10.51	72	231951	27.392	ng		98
28) cis-1,2-Dichloroethene	11.02	61	434739	26.128	ng		100
29) Diisopropyl Ether	11.31	87	279665	24.070	ng	#	89
30) Ethyl Acetate	11.33	61	234778	59.590	ng		99
31) n-Hexane	11.30	57	511218	24.909	ng		100
32) Chloroform	11.37	83	553014	26.128	ng		99
34) Tetrahydrofuran (THF)	11.78	72	229173	25.834	ng		99
35) Ethyl tert-Butyl Ether	11.91	87	406773	26.752	ng		100
36) 1,2-Dichloroethane	12.17	62	383463	26.670	ng		100
38) 1,1,1-Trichloroethane	12.45	97	496413	26.596	ng		99
39) Isopropyl Acetate	12.87	61	397758	52.757	ng		98
40) 1-Butanol	12.90	56	617831	57.247	ng		98
41) Benzene	12.93	78	1304088	25.689	ng		100
42) Carbon Tetrachloride	13.08	117	460141	25.946	ng		100
43) Cyclohexane	13.22	84	1034674	50.829	ng		100
44) tert-Amyl Methyl Ether	13.56	73	933260	26.413	ng		100
45) 1,2-Dichloropropane	13.77	63	325708	26.072	ng		100
46) Bromodichloromethane	13.97	83	437250	27.057	ng		100
47) Trichloroethene	14.02	130	390708	26.599	ng		99
48) 1,4-Dioxane	13.99	88	289536	29.649	ng		99
49) 2,2,4-Trimethylpentane...	14.09	57	1320773	25.163	ng		100
50) Methyl Methacrylate	14.23	100	293082	58.907	ng		99

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_08\31\08312005.D Vial: 1
Acq On : 31 Aug 2020 9:00 Operator: WA
Sample : LCS R13083120_25ng Inst : MS13
Misc : S34-06182001/S34-08212011 (9/19)

Quant Time: Aug 31 09:24:37 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M

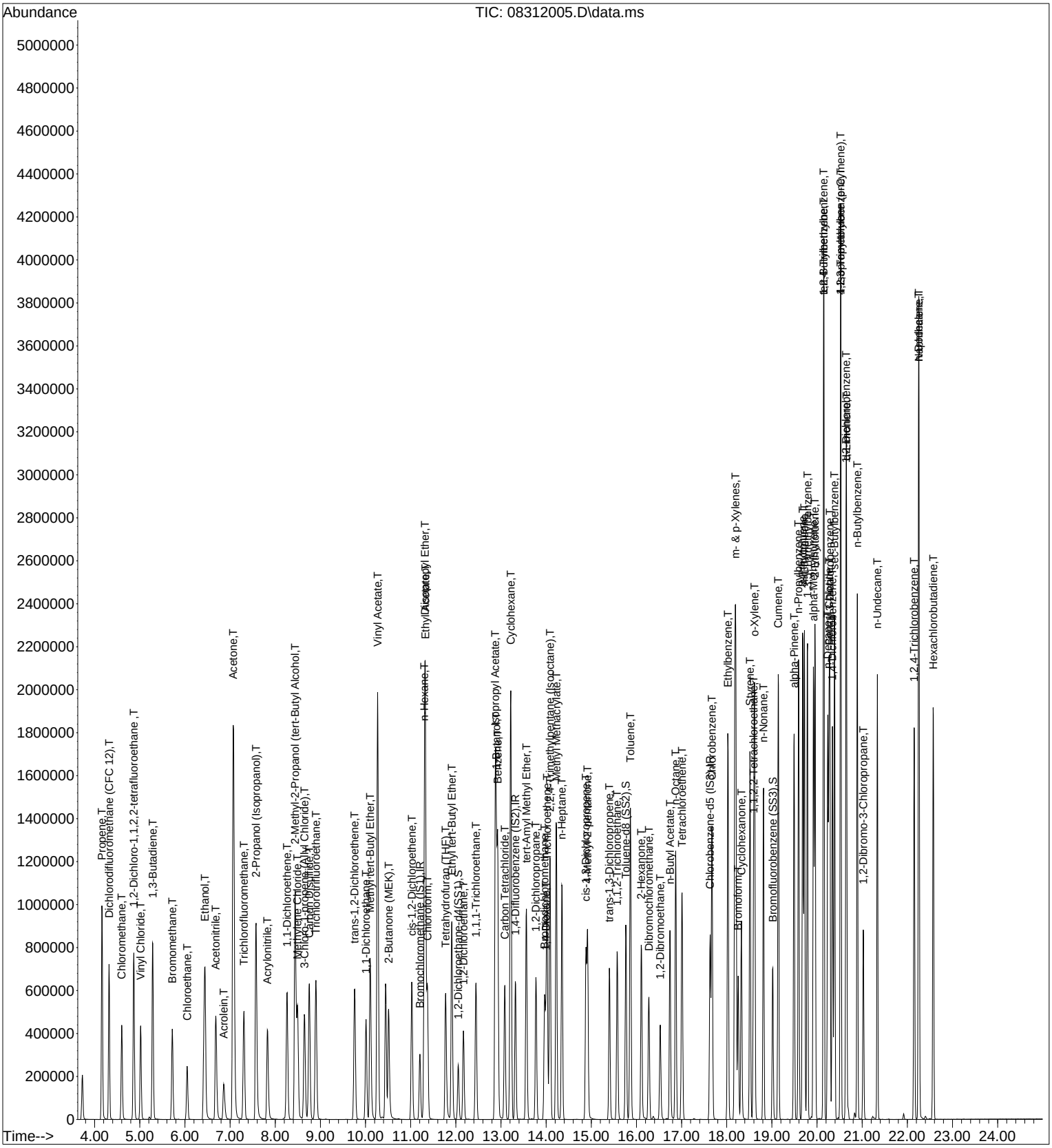
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.35	71	335201	25.657	ng	100
52) cis-1,3-Dichloropropene	14.88	75	579409	29.555	ng	100
53) 4-Methyl-2-pentanone	14.92	58	294441	27.934	ng	99
54) trans-1,3-Dichloropropene	15.40	75	500864	28.038	ng	99
55) 1,1,2-Trichloroethane	15.57	97	331993	26.655	ng	99
58) Toluene	15.87	91	1359499	24.377	ng	100
59) 2-Hexanone	16.11	43	634815	28.605	ng	100
60) Dibromochloromethane	16.28	129	411023	26.729	ng	100
61) 1,2-Dibromoethane	16.53	107	384563	27.042	ng	100
62) n-Butyl Acetate	16.74	43	734279	30.852	ng	99
63) n-Octane	16.87	57	267738	24.485	ng	100
64) Tetrachloroethene	17.01	166	432736	24.122	ng	100
65) Chlorobenzene	17.67	112	955328	24.946	ng	100
66) Ethylbenzene	18.02	91	1515841	24.731	ng	100
67) m- & p-Xylenes	18.19	91	2361571	49.303	ng	100
68) Bromoform	18.25	173	385218	28.651	ng	100
69) Styrene	18.51	104	997934	26.864	ng	100
70) o-Xylene	18.62	91	1181489	24.492	ng	100
71) n-Nonane	18.82	43	538228	24.288	ng	99
72) 1,1,2,2-Tetrachloroethane	18.59	83	568454	25.787	ng	100
74) Cumene	19.14	105	1542948	24.573	ng	100
75) alpha-Pinene	19.49	93	785703	25.266	ng	99
76) n-Propylbenzene	19.59	91	1793916	24.574	ng	100
77) 3-Ethyltoluene	19.68	105	1649763	26.721	ng	100
78) 4-Ethyltoluene	19.72	105	1409732	23.623	ng	100
79) 1,3,5-Trimethylbenzene	19.79	105	1302625	24.604	ng	100
80) alpha-Methylstyrene	19.92	118	716182	26.243	ng	99
81) 2-Ethyltoluene	19.95	105	1520902	25.134	ng	100
82) 1,2,4-Trimethylbenzene	20.15	105	1267836	25.528	ng	100
83) n-Decane	20.24	57	630090	26.039	ng	99
84) Benzyl Chloride	20.27	91	1160009	29.993	ng	100
85) 1,3-Dichlorobenzene	20.28	146	839911	25.980	ng	100
86) 1,4-Dichlorobenzene	20.34	146	850948	25.223	ng	100
87) sec-Butylbenzene	20.39	105	1709118	24.499	ng	100
88) 4-Isopropyltoluene (p-...	20.52	119	1564419	25.058	ng	100
89) 1,2,3-Trimethylbenzene	20.52	105	1232917	24.650	ng	99
90) 1,2-Dichlorobenzene	20.64	146	784381	25.478	ng	100
91) d-Limonene	20.65	68	433333	25.962	ng	100
92) 1,2-Dibromo-3-Chloropr...	21.02	157	310955	27.558	ng	99
93) n-Undecane	21.34	57	664388	26.355	ng	100
94) 1,2,4-Trichlorobenzene	22.15	180	675406	28.107	ng	100
95) Naphthalene	22.26	128	1891826	27.681	ng	100
96) n-Dodecane	22.25	57	626717	28.561	ng	99
97) Hexachlorobutadiene	22.58	225	443435	25.362	ng	99
98) Cyclohexanone	18.33	55	439390	28.719	ng	98
99) tert-Butylbenzene	20.15	119	1251392	24.373	ng	100
100) n-Butylbenzene	20.89	91	1333140	25.401	ng	100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_08\31\08312005.D Vial: 1
Acq On : 31 Aug 2020 9:00 Operator: WA
Sample : LCS R13083120_25ng Inst : MS13
Misc : S34-06182001/S34-08212011 (9/19)

Quant Time: Aug 31 09:24:37 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M



Response Factor Report MS13

Method Path : I:\MS13\METHODS\
Method File : R13072520.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Sat Jul 25 16:35:10 2020
Response Via : Initial Calibration

Calibration Files
0.1 =07252002.D 0.2 =07252003.D 0.5 =07252004.D 1.0 =07252005.D 5.0 =07252006.D 25 =07252007.D 50 =07252008.D
100 =07252009.D

		Compound	0.1	0.2	0.5	1.0	5.0	25	50	100	Avg	%RSD
1)	IR	Bromochloromethane...	----------	ISTD	----------							
2)	T	Propene	1.225	1.209	1.105	1.131	1.307	1.216	1.146	1.140	1.185	5.61
3)	T	Dichlorodifluo...	2.297	2.120	1.977	2.035	2.196	2.121	1.999	1.827	2.072	6.98
4)	T	Chloromethane	1.688	1.664	1.496	1.569	1.416	1.511	1.280	0.809	1.429	19.79
5)	T	1,2-Dichloro-1...	1.231	1.169	1.047	1.105	1.192	1.184	1.136	1.098	1.146	5.25
6)	T	Vinyl Chloride	1.620	1.514	1.409	1.476	1.615	1.569	1.459	1.356	1.502	6.36
7)	T	1,3-Butadiene	1.092	1.078	1.153	1.203	1.264	1.322	1.173	1.020	1.163	8.60
8)	T	Bromomethane	1.040	1.032	0.946	0.978	1.057	1.057	1.011	0.933	1.007	4.86
9)	T	Chloroethane	0.789	0.814	0.750	0.772	0.842	0.826	0.791	0.725	0.789	4.99
10)	T	Ethanol	0.853	0.846	0.718	0.756	0.786	0.750	0.685	0.607	0.750	10.90
11)	T	Acetonitrile	1.773	1.871	1.611	1.746	1.937	1.932	1.826	1.723	1.802	6.19
12)	T	Acrolein		0.508	0.578	0.644	0.724	0.724	0.699	0.658	0.648	12.40
13)	T	Acetone	0.904	0.867	0.751	0.778	0.815	0.736	0.653	0.543	0.756	15.38
14)	T	Trichlorofluor...	2.025	1.867	1.731	1.748	1.863	1.818	1.738	1.629	1.802	6.63
15)	T	2-Propanol (Is...	2.353	2.328	2.211	2.406	2.497	2.448	2.204	1.749	2.274	10.39
16)	T	Acrylonitrile		1.023	1.065	1.262	1.460	1.451	1.399	1.304	1.281	13.86
17)	T	1,1-Dichloroet...	1.147	1.064	0.984	1.007	1.081	1.076	1.046	0.979	1.048	5.39
18)	T	2-Methyl-2-Pro...	2.336	2.459	2.242	2.388	2.554	2.526	2.251	1.355	2.264	17.02
19)	T	Methylene Chlo...	1.203	1.132	0.999	1.058	1.121	1.113	1.065	0.971	1.083	6.95
20)	T	3-Chloro-1-pro...	1.382	1.501	1.360	1.449	1.551	1.499	1.416	1.285	1.430	6.09
21)	T	Trichlorotrifl...	1.084	1.085	0.966	0.966	1.045	1.047	1.027	0.959	1.022	5.12
22)	T	Carbon Disulfide	6.110	5.159	4.150	3.982	4.150	3.945	3.741	3.388	4.328	20.34
23)	T	trans-1,2-Dich...	1.169	1.341	1.247	1.345	1.491	1.472	1.404	1.292	1.345	8.16
24)	T	1,1-Dichloroet...	1.728	1.799	1.710	1.732	1.881	1.812	1.720	1.565	1.743	5.33
25)	T	Methyl tert-Bu...	3.324	3.167	2.866	3.048	3.290	3.213	3.066	2.763	3.092	6.41
26)	T	Vinyl Acetate	0.165	0.226	0.226	0.249	0.279	0.263	0.237	0.197	0.230	15.73
27)	T	2-Butanone (MEK)			0.546	0.651	0.748	0.749	0.725	0.669	0.681	11.46
28)	T	cis-1,2-Dichlo...	1.359	1.342	1.300	1.317	1.439	1.396	1.337	1.223	1.339	4.81
29)	T	Diisopropyl Ether	0.980	1.044	0.979	1.017	1.096	0.906	0.805	0.654	0.935	15.41
30)	T	Ethyl Acetate		0.248	0.293	0.355	0.393	0.361	0.316	0.254	0.317	17.49
31)	T	n-Hexane	1.919	1.844	1.699	1.690	1.822	1.615	1.439	1.186	1.652	14.56
32)	T	Chloroform	1.775	1.808	1.625	1.697	1.780	1.740	1.666	1.537	1.703	5.37
33)	S	1,2-Dichloroet...	1.282	1.281	1.297	1.288	1.290	1.264	1.258	1.240	1.275	1.51
34)	T	Tetrahydrofura...	0.855	0.728	0.657	0.693	0.739	0.716	0.688	0.635	0.714	9.37
35)	T	Ethyl tert-But...	1.166	1.244	1.147	1.222	1.310	1.297	1.253	1.150	1.224	5.25
36)	T	1,2-Dichloroet...	1.087	1.196	1.079	1.151	1.243	1.223	1.178	1.100	1.157	5.47
37)	IR	1,4-Difluorobenzen...	----------	ISTD	----------							
38)	T	1,1,1-Trichlor...	0.372	0.359	0.328	0.343	0.370	0.365	0.353	0.332	0.353	4.74
39)	T	Isopropyl Acetate		0.148	0.141	0.148	0.161	0.150	0.135	0.114	0.143	10.45
40)	T	1-Butanol			0.147	0.191	0.244	0.243	0.218	0.181	0.204	18.63
41)	T	Benzene	1.091	1.058	0.950	0.968	1.027	0.975	0.888	0.718	0.960	12.16
42)	T	Carbon Tetrach...	0.351	0.334	0.313	0.320	0.349	0.350	0.342	0.322	0.335	4.50

WDA 7/26/20

00989129

Method Path : I:\MS13\METHODS\
Method File : R13072520.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

43)	T	Cyclohexane	0.436	0.426	0.382	0.385	0.408	0.386	0.355	0.301	0.385	11.13
44)	T	tert-Amyl Meth...	0.715	0.696	0.625	0.650	0.705	0.695	0.659	0.597	0.668	6.29
45)	T	1,2-Dichloropr...	0.260	0.248	0.227	0.232	0.249	0.240	0.227	0.206	0.236	7.12
46)	T	Bromodichlorom...	0.304	0.309	0.287	0.301	0.327	0.322	0.308	0.286	0.305	4.83
47)	T	Trichloroethene	0.287	0.285	0.253	0.266	0.293	0.293	0.283	0.262	0.278	5.50
48)	T	1,4-Dioxane	0.139	0.185	0.167	0.188	0.205	0.212	0.201	0.179	0.185	12.75
49)	T	2,2,4-Trimethy...	1.143	1.098	0.979	0.989	1.045	0.988	0.909	0.785	0.992	11.22
50)	T	Methyl Methacr...		0.068	0.082	0.092	0.110	0.109	0.104	0.093	0.094	16.25
51)	T	n-Heptane	0.258	0.271	0.235	0.249	0.264	0.252	0.237	0.210	0.247	7.73
52)	T	cis-1,3-Dichlo...	0.297	0.352	0.346	0.371	0.420	0.417	0.398	0.363	0.371	11.07
53)	T	4-Methyl-2-pen...			0.164	0.193	0.221	0.222	0.208	0.187	0.199	11.30
54)	T	trans-1,3-Dich...			0.272	0.312	0.371	0.375	0.361	0.335	0.338	11.82
55)	T	1,1,2-Trichlor...	0.222	0.247	0.223	0.234	0.252	0.248	0.237	0.220	0.235	5.52
56)	IR	Chlorobenzene-d5 (...	----------ISTD----------									
57)	S	Toluene-d8 (SS2)	2.523	2.519	2.507	2.489	2.498	2.523	2.514	2.508	2.510	0.48
58)	T	Toluene	2.692	2.438	2.156	2.224	2.382	2.343	2.222	1.963	2.303	9.40
59)	T	2-Hexanone			0.706	0.829	1.006	1.074	0.997	0.885	0.916	14.82
60)	T	Dibromochlorom...	0.580	0.613	0.558	0.601	0.680	0.703	0.692	0.652	0.635	8.60
61)	T	1,2-Dibromoethane	0.477	0.565	0.528	0.580	0.649	0.662	0.640	0.596	0.587	10.86
62)	T	n-Butyl Acetate		0.770	0.767	0.932	1.121	1.194	1.114	0.981	0.983	17.41
63)	T	n-Octane	0.462	0.497	0.445	0.468	0.481	0.462	0.428	0.368	0.451	8.77
64)	T	Tetrachloroethene	0.818	0.759	0.662	0.697	0.745	0.769	0.757	0.719	0.741	6.46
65)	T	Chlorobenzene	1.766	1.684	1.464	1.519	1.622	1.630	1.558	1.407	1.581	7.46
66)	T	Ethylbenzene	2.676	2.716	2.433	2.520	2.682	2.624	2.452	2.141	2.531	7.54
67)	T	m- & p-Xylenes	2.256	2.158	1.935	1.977	2.040	1.981	1.881	1.593	1.978	9.99
68)	T	Bromoform	0.489	0.504	0.468	0.503	0.584	0.640	0.640	0.613	0.555	12.91
69)	T	Styrene	1.372	1.431	1.391	1.509	1.700	1.734	1.661	1.471	1.534	9.41
70)	T	o-Xylene	2.241	2.182	1.934	1.982	2.075	2.017	1.890	1.613	1.992	9.73
71)	T	n-Nonane	0.960	1.007	0.938	0.966	1.001	0.935	0.836	0.677	0.915	12.01
72)	T	1,1,2,2-Tetrac...	0.974	0.956	0.885	0.922	0.971	0.949	0.879	0.744	0.910	8.39
73)	S	Bromofluoroben...	0.825	0.819	0.820	0.818	0.836	0.850	0.869	0.864	0.838	2.48
74)	T	Cumene	2.914	2.790	2.465	2.539	2.718	2.675	2.499	2.140	2.592	9.19
75)	T	alpha-Pinene	1.281	1.272	1.228	1.280	1.399	1.385	1.302	1.124	1.284	6.75
76)	T	n-Propylbenzene	3.314	3.236	2.932	3.022	3.198	3.104	2.879	2.427	3.014	9.30
77)	T	3-Ethyltoluene	2.547	2.592	2.491	2.614	2.615	2.776	2.512	2.246	2.549	5.90
78)	T	4-Ethyltoluene	2.830	2.683	2.334	2.353	2.688	2.496	2.385	1.942	2.464	11.27
79)	T	1,3,5-Trimethy...	2.528	2.259	2.113	2.168	2.251	2.244	2.108	1.816	2.186	9.12
80)	T	alpha-Methylst...	0.991	0.999	1.034	1.114	1.255	1.302	1.239	1.080	1.127	10.88
81)	T	2-Ethyltoluene	2.738	2.618	2.461	2.499	2.607	2.592	2.413	2.058	2.498	8.22
82)	T	1,2,4-Trimethy...	2.221	2.125	2.043	2.113	2.231	2.171	1.933	1.567	2.050	10.64
83)	T	n-Decane	0.901	0.944	1.068	1.108	1.138	1.093	0.971	0.769	0.999	12.60
84)	T	Benzyl Chloride	1.343	1.410	1.353	1.522	1.824	1.951	1.831	1.541	1.597	14.94
85)	T	1,3-Dichlorobe...	1.380	1.398	1.243	1.277	1.380	1.420	1.369	1.211	1.335	5.93
86)	T	1,4-Dichlorobe...	1.524	1.485	1.284	1.338	1.402	1.454	1.400	1.254	1.393	6.86
87)	T	sec-Butylbenzene	3.242	3.121	2.807	2.878	2.994	2.965	2.733	2.303	2.880	9.90
88)	T	4-Isopropyltol...	2.827	2.796	2.554	2.683	2.812	2.703	2.376	1.870	2.578	12.55
89)	T	1,2,3-Trimethy...	2.216	2.159	2.116	2.142	2.236	2.174	1.922	1.555	2.065	11.01
90)	T	1,2-Dichlorobe...	1.362	1.351	1.212	1.246	1.336	1.353	1.262	1.047	1.271	8.41
91)	T	d-Limonene	0.582	0.609	0.720	0.768	0.826	0.796	0.686	0.526	0.689	15.70
92)	T	1,2-Dibromo-3-...	0.350	0.425	0.395	0.428	0.504	0.555	0.550	0.519	0.466	16.40
93)	T	n-Undecane			1.006	1.095	1.163	1.153	1.022	0.806	1.041	12.68
94)	T	1,2,4-Trichlor...	0.820	0.800	0.837	0.932	1.086	1.197	1.178	1.086	0.992	16.54

Method Path : I:\MS13\METHODS\
Method File : R13072520.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

95)	T	Naphthalene	2.597	2.200	2.465	2.835	3.288	3.449	3.163	2.578	2.822	15.57
96)	T	n-Dodecane			0.764	0.936	1.063	1.081	0.905	0.686	0.906	17.42
97)	T	Hexachlorobuta...	0.771	0.735	0.638	0.652	0.715	0.773	0.766	0.725	0.722	7.25
98)	T	Cyclohexanone		0.498	0.513	0.577	0.644	0.780	0.744	0.666	0.632	17.22
99)	T	tert-Butylbenzene	2.444	2.390	2.083	2.137	2.232	2.166	1.936	1.571	2.120	12.97
100)	T	n-Butylbenzene	2.155	2.201	2.118	2.223	2.341	2.340	2.153	1.805	2.167	7.76

(#) = Out of Range

99 of 140

Primary Source Standards Concentrations (Working & Initial Calibration)

1ng/L Std. ID: | 40ng/L Std. ID:
4ng/L Std. ID: S34-07232007 | 200ng/L Std. ID: S34-07232001
20ng/L Std. ID: S34-07232006 | 1000ng/L Std. ID:

7/27/20

Dilution Factors:		1	5	25	50	250	1000	Working STD Conc.(ng/L):	4	4	20	20	20	200	200	200
	Source Std.		Primary Working Standards					Injection (L):	0.025	0.050	0.0250	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
Propene	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
Dichlorodifluoromethane	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
Chloromethane	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
Freon-114	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 Chloride	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
1,3-Butadiene	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
Bromomethane	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
Chloroethane	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
Ethanol	5.21	5210	1042	208.4	104.2	20.84	5.21		0.521	1.042	2.605	5.21	26.05	130.25	260.5	521
Acetonitrile	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
Acrolein	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
Acetone	5.33	5330	1066	213.2	106.6	21.32	5.33		0.533	1.066	2.665	5.33	26.65	133.25	266.5	533
Trichlorofluoromethane	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
Isopropanol	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
Acrylonitrile	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
1,1-Dichloroethene	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
tert-Butanol	2.16	2160	432	86.4	43.2	8.64	2.16		0.216	0.432	1.080	2.16	10.80	54.00	108.0	216
Methylene Chloride	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
Allyl Chloride	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
Dichlorotrifluoroethane	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	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
trans-1,2-Dichloroethene	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
1,1-Dichloroethane	1.09	1090	218	43.6	21.8	4.36	1.09		0.109	0.218	0.545	1.09	5.45	27.25	54.5	109
Methyl tert-Butyl Ether	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
Vinyl Acetate	5.35	5350	1070	214.0	107.0	21.40	5.35		0.535	1.070	2.675	5.35	26.75	133.75	267.5	535
2-Butanone	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
cis-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
Diisopropyl Ether	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
Ethyl Acetate	2.17	2170	434	86.8	43.4	8.68	2.17		0.217	0.434	1.085	2.17	10.85	54.25	108.5	217
n-Hexane	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
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	1.09	1090	218	43.6	21.8	4.36	1.09		0.109	0.218	0.545	1.09	5.45	27.25	54.5	109
Ethyl tert-Butyl Ether	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
1,2-Dichloroethane	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
1,1,1-Trichloroethane	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
Isopropyl Acetate	2.11	2110	422	84.4	42.2	8.44	2.11		0.211	0.422	1.055	2.11	10.55	52.75	105.5	211
1-Butanol	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
Benzene	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
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	2.12	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
tert-Amyl Methyl Ether	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
1,2-Dichloropropane	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
Bromodichloromethane	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
Trichloroethene	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
1,4-Dioxane	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
Isooctane	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
Methyl Methacrylate	2.15	2150	430	86.0	43.0	8.60	2.15		0.215	0.430	1.075	2.15	10.75	53.75	107.5	215
n-Heptane	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

10-6-20

Q:\TO15 Std. Concentrations\MS13 Std. Conc\2020\R13072520.M\ICAL Conc. (Primary Source)

Date Updated: 04/22/20
Version: 3

Primary Source Standards Concentrations (Working & Initial Calibration)

1ng/L Std. ID:		**40ng/L Std. ID:**	
4ng/L Std. ID:	**S34-07232007**	**200ng/L Std. ID:**	**S34-07232001**
20ng/L Std. ID:	**S34-07232006**	**1000ng/L Std. ID:**	

Dilution Factors:		**1**	**5**	**25**	**50**	**250**	**1000**	**Working STD Conc.(ng/L):**	**4**	**4**	**20**	**20**	**20**	**200**	**200**	**200**
	Source Std.			**Primary Working Standards**				**Injection (L):**	**0.025**	**0.050**	**0.0250**	**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	1.04	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
4-Methyl-2-pentanone	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
trans-1,3-Dichloropropene	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
1,1,2-Trichloroethane	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
Toluene	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
2-Hexanone	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
Dibromochloromethane	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
1,2-Dibromoethane	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
n-Butyl Acetate	1.09	1090	218	43.6	21.8	4.36	1.09		0.109	0.218	0.545	1.09	5.45	27.25	54.5	109
n-Octane	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
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	1.07	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
Ethylbenzene	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
m-&p-Xylene	2.14	2140	428	85.6	42.8	8.56	2.14		0.214	0.428	1.070	2.14	10.70	53.50	107.0	214
Bromoform	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
Styrene	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
o-Xylene	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
n-Nonane	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
1,1,2,2-Tetrachloroethane	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
Cumene	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
alpha-Pinene	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
n-Propylbenzene	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
3-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
4-Ethyltoluene	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
1,3,5-Trimethylbenzene	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
alpha-Methylstyrene	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
2-Ethyltoluene	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
1,2,4-Trimethylbenzene	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
n-Decane	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
Benzyl Chloride	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
1,3-Dichlorobenzene	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
1,4-Dichlorobenzene	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
sec-Butylbenzene	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
p-Isopropyltoluene	1.09	1090	218	43.6	21.8	4.36	1.09		0.109	0.218	0.545	1.09	5.45	27.25	54.5	109
1,2,3-Trimethylbenzene	1.09	1090	218	43.6	21.8	4.36	1.09		0.109	0.218	0.545	1.09	5.45	27.25	54.5	109
1,2-Dichlorobenzene	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
d-Limonene	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
1,2-Dibromo-3-chloropropane	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
n-Undecane	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
1,2,4-Trichlorobenzene	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
Naphthalene	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
n-Dodecane	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	1.06	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
Methacrylonitrile	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
Cyclohexanone	1.00	1000	200	40.0	20.0	4.00	1.00		0.100	0.200	0.500	1.00	5.00	25.00	50.0	100
tert-Butylbenzene	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
n-Butylbenzene	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

TO15 SOP

Calibration Status Report MS13

Method : I:\MS13\METHODS\R13072520.M (RTE Integrator)
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration

#	ID	Conc	ISTD Conc	Path\File
1	0.1	0	13	I:\MS13\DATA\2020_07\25\07252002.D
2	0.2	0	13	I:\MS13\DATA\2020_07\25\07252003.D
3	0.5	1	13	I:\MS13\DATA\2020_07\25\07252004.D
4	1.0	1	13	I:\MS13\DATA\2020_07\25\07252005.D
5	5.0	5	13	I:\MS13\DATA\2020_07\25\07252006.D
6	25	27	13	I:\MS13\DATA\2020_07\25\07252007.D
7	50	53	13	I:\MS13\DATA\2020_07\25\07252008.D
8	100	106	13	I:\MS13\DATA\2020_07\25\07252009.D

7/26/20

#	ID	Update Time	Quant Time	Acquisition Time
1	0.1	Jul 25 16:32 2020	Jul 25 16:25 2020	25 Jul 2020 11:48
2	0.2	Jul 25 16:32 2020	Jul 25 16:12 2020	25 Jul 2020 12:22
3	0.5	Jul 25 16:32 2020	Jul 25 16:12 2020	25 Jul 2020 12:56
4	1.0	Jul 25 16:33 2020	Jul 25 16:12 2020	25 Jul 2020 13:30
5	5.0	Jul 25 16:33 2020	Jul 25 16:12 2020	25 Jul 2020 14:04
6	25	Jul 25 16:34 2020	Jul 25 16:12 2020	25 Jul 2020 14:38
7	50	Jul 25 16:34 2020	Jul 25 16:12 2020	25 Jul 2020 15:12
8	100	Jul 25 16:35 2020	Jul 25 16:12 2020	25 Jul 2020 15:46

R13072520.M Sun Jul 26 17:27:45 2020

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_07\25\07252002.D Vial: 13
Acq On : 25 Jul 2020 11:48 Operator: WA
Sample : 0.1ng R13072520 ICAL STD Inst : MS13
Misc : S34-06182001/S34-07232007 (8/21)

Quant Time: Jul 25 16:25:27 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:10:57 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M

7/26/20

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.18	130	135154	12.500	ng		-0.02
37) 1,4-Difluorobenzene (IS2)	13.31	114	588281	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	17.63	82	257263	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.04	65	173213	10.008	ng		-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 80.08%				
57) Toluene-d8 (SS2)	15.76	98	649080	12.463	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.68%				
73) Bromofluorobenzene (SS3)	19.02	174	212341	12.872	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 102.96%				
Target Compounds							Qvalue
2) Propene	4.21	42	1404	0.102	ng		91
3) Dichlorodifluoromethan...	4.37	85	2633	0.094	ng	#	92
4) Chloromethane	4.64	50	1935	0.111	ng		89
5) 1,2-Dichloro-1,1,2,2-t...	4.91	135	1398	0.074	ng		89
6) Vinyl Chloride	5.06	62	1892	0.085	ng		85
7) 1,3-Butadiene	5.33	54	1251	0.081	ng		96
8) Bromomethane	5.74	94	1214	0.104	ng		98
9) Chloroethane	6.08	64	921	0.111	ng		67
10) Ethanol	6.43	45	4804	0.496	ng		90
11) Acetonitrile	6.70	41	2013	0.097	ng	#	56
12) Acrolein	0.00	56	0	N.D.	d		
13) Acetone	7.12	58	5209	0.547	ng		95
14) Trichlorofluoromethane	7.33	101	2321	0.096	ng		97
15) 2-Propanol (Isopropanol)	7.64	45	5343	0.181	ng		82
16) Acrylonitrile	7.87	53	615	N.D.			
17) 1,1-Dichloroethene	8.29	96	1339	0.109	ng		91
18) 2-Methyl-2-Propanol (t...	8.53	59	5455	0.182	ng	#	78
19) Methylene Chloride	8.48	84	1379	0.106	ng		98
20) 3-Chloro-1-propene (Al...	8.65	41	1614	0.089	ng		81
21) Trichlorotrifluoroethane	8.91	151	1266	0.105	ng		98
22) Carbon Disulfide	8.76	76	7069	0.144	ng		94
23) trans-1,2-Dichloroethene	9.76	61	1365	0.082	ng		92
24) 1,1-Dichloroethane	10.01	63	2036	0.099	ng		90
25) Methyl tert-Butyl Ether	10.17	73	3882	0.104	ng		81
26) Vinyl Acetate	10.28	86	957	0.264	ng	#	1
27) 2-Butanone (MEK)	0.00	72	0	N.D.			
28) cis-1,2-Dichloroethene	11.01	61	1558	0.094	ng		97
29) Diisopropyl Ether	11.35	87	1144	0.092	ng	#	80
30) Ethyl Acetate	0.00	61	0	N.D.	d		
31) n-Hexane	11.31	57	2241	0.112	ng	#	88
32) Chloroform	11.36	83	2053	0.092	ng		99
34) Tetrahydrofuran (THF)	11.86	72	1008	0.126	ng		88
35) Ethyl tert-Butyl Ether	11.95	87	1361	0.090	ng	#	87
36) 1,2-Dichloroethane	12.17	62	1269	0.072	ng		69
38) 1,1,1-Trichloroethane	12.44	97	1871	0.091	ng		94
39) Isopropyl Acetate	12.91	61	1232	0.148	ng	#	82
40) 1-Butanol	13.00	56	600	N.D.			
41) Benzene	12.93	78	5443	0.106	ng		92
42) Carbon Tetrachloride	13.07	117	1735	0.089	ng		96
43) Cyclohexane	13.21	84	4351	0.215	ng		95
44) tert-Amyl Methyl Ether	13.59	73	3635	0.103	ng		92
45) 1,2-Dichloropropane	13.78	63	1319	0.117	ng		86
46) Bromodichloromethane	13.96	83	1547	0.088	ng		94
47) Trichloroethene	14.02	130	1443	0.096	ng		97
48) 1,4-Dioxane	14.06	88	707	0.066	ng	#	51
49) 2,2,4-Trimethylpentane...	14.09	57	5757	0.120	ng		92
50) Methyl Methacrylate	14.26	100	395	0.073	ng	#	1

Data File : I:\MS13\DATA\2020_07\25\07252002.D Vial: 13
Acq On : 25 Jul 2020 11:48 Operator: WA
Sample : 0.1ng R13072520 ICAL STD Inst : MS13
Misc : S34-06182001/S34-07232007 (8/21)

Quant Time: Jul 25 16:25:27 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:10:57 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M

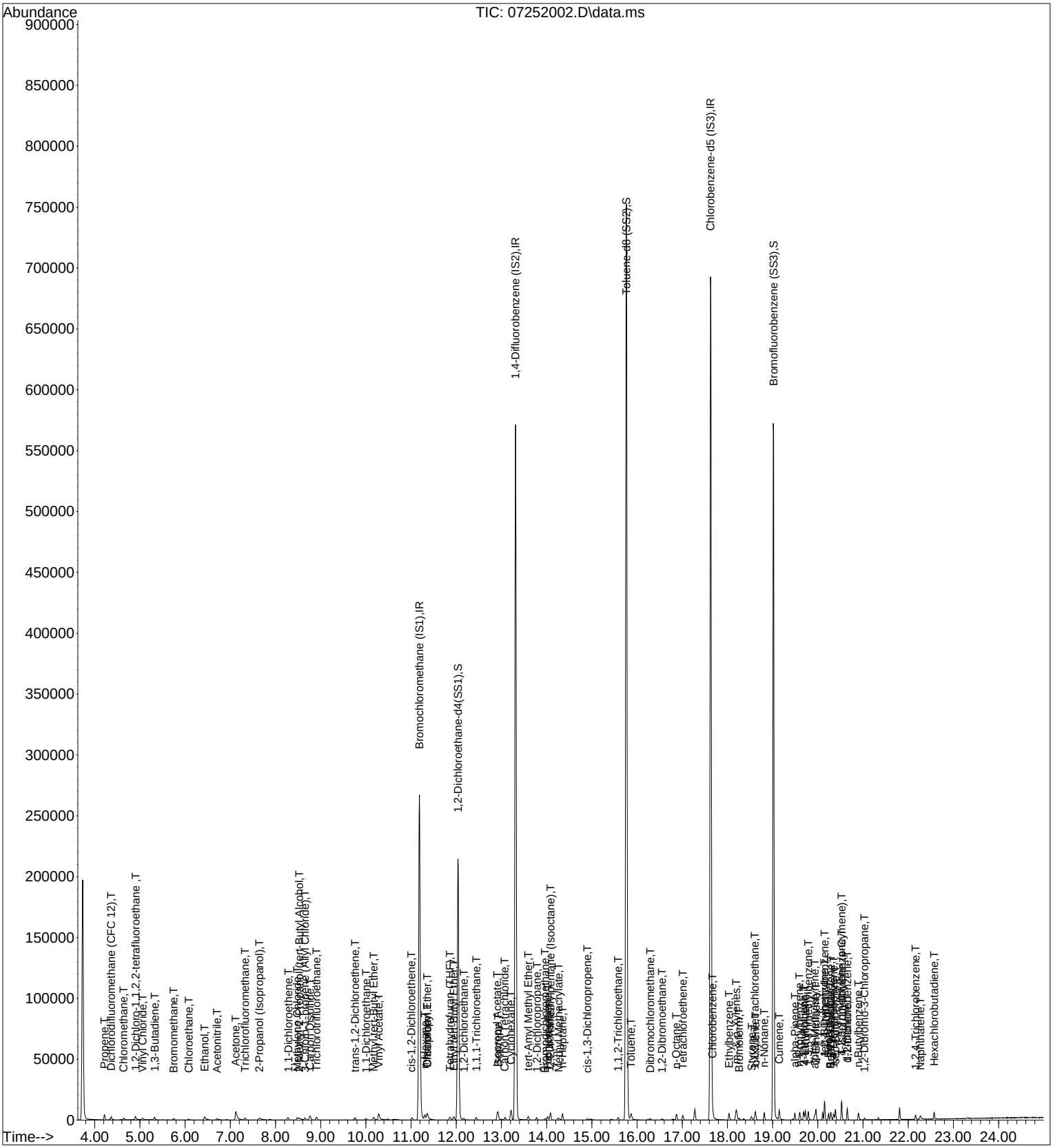
Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
51) n-Heptane	14.35	71	1310	0.105 ng		96
52) cis-1,3-Dichloropropene	14.90	75	1454	0.072 ng		75
53) 4-Methyl-2-pentanone	14.97	58	508	N.D.		
54) trans-1,3-Dichloropropene	0.00	75	0	N.D. d		
55) 1,1,2-Trichloroethane	15.58	97	1116	0.091 ng		90
58) Toluene	15.87	91	5929	0.113 ng		93
59) 2-Hexanone	16.24	43	507	N.D.		
60) Dibromochloromethane	16.29	129	1278	0.084 ng		98
61) 1,2-Dibromoethane	16.55	107	1050	0.075 ng		95
62) n-Butyl Acetate	16.79	43	1236	N.D.		
63) n-Octane	16.87	57	1028	0.100 ng		94
64) Tetrachloroethene	17.01	166	1751	0.104 ng		90
65) Chlorobenzene	17.67	112	3890	0.108 ng		95
66) Ethylbenzene	18.04	91	5893	0.100 ng		96
67) m- & p-Xylenes	18.19	91	9938	0.212 ng		93
68) Bromoform	18.26	173	1077	0.074 ng		78
69) Styrene	18.54	104	2994	0.081 ng		94
70) o-Xylene	18.62	91	4935	0.104 ng		96
71) n-Nonane	18.82	43	2113	0.094 ng		95
72) 1,1,2,2-Tetrachloroethane	18.60	83	2146	0.098 ng		99
74) Cumene	19.15	105	6478	0.109 ng		95
75) alpha-Pinene	19.49	93	2821	0.093 ng		98
76) n-Propylbenzene	19.59	91	7366	0.105 ng		94
77) 3-Ethyltoluene	19.69	105	5557	0.094 ng		98
78) 4-Ethyltoluene	19.73	105	6290	0.107 ng		100
79) 1,3,5-Trimethylbenzene	19.79	105	5515	0.108 ng		93
80) alpha-Methylstyrene	19.93	118	2183	0.078 ng		96
81) 2-Ethyltoluene	19.96	105	6087	0.103 ng		96
82) 1,2,4-Trimethylbenzene	20.15	105	4891	0.091 ng		100
83) n-Decane	20.24	57	1984	0.083 ng		90
84) Benzyl Chloride	20.28	91	2985	0.065 ng		83
85) 1,3-Dichlorobenzene	20.29	146	3039	0.093 ng		100
86) 1,4-Dichlorobenzene	20.35	146	3357	0.105 ng		99
87) sec-Butylbenzene	20.39	105	7139	0.107 ng		96
88) 4-Isopropyltoluene (p-...	20.53	119	6341	0.098 ng		97
89) 1,2,3-Trimethylbenzene	20.53	105	4971	0.093 ng		97
90) 1,2-Dichlorobenzene	20.65	146	2999	0.096 ng		99
91) d-Limonene	20.65	68	1293	0.068 ng		96
92) 1,2-Dibromo-3-Chloropr...	21.03	157	757	0.067 ng		91
93) n-Undecane	21.34	57	746	N.D.		
94) 1,2,4-Trichlorobenzene	22.16	180	1805	0.076 ng	#	97
95) Naphthalene	22.27	128	5505	0.075 ng		90
96) n-Dodecane	22.25	57	202	N.D.		
97) Hexachlorobutadiene	22.58	225	1682	0.107 ng		93
98) Cyclohexanone	18.36	55	871	N.D.		
99) tert-Butylbenzene	20.15	119	5382	0.102 ng		98
100) n-Butylbenzene	20.90	91	4745	0.089 ng		96

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_07\25\07252002.D Vial: 13
Acq On : 25 Jul 2020 11:48 Operator: WA
Sample : 0.1ng R13072520 ICAL STD Inst : MS13
Misc : S34-06182001/S34-07232007 (8/21)

Quant Time: Jul 25 16:25:27 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:10:57 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_07\25\07252003.D Vial: 13
Acq On : 25 Jul 2020 12:22 Operator: WA
Sample : 0.2ng R13072520 ICAL STD Inst : MS13
Misc : S34-06182001/S34-07232007 (8/21)

Quant Time: Jul 25 16:12:29 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:10:57 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M

7/26/20

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.18	130	136160	12.500	ng		-0.02
37) 1,4-Difluorobenzene (IS2)	13.31	114	589855	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	17.63	82	258342	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.04	65	174454	10.005	ng		-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 80.08%				
57) Toluene-d8 (SS2)	15.76	98	650669	12.441	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.52%				
73) Bromofluorobenzene (SS3)	19.02	174	211525	12.769	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 102.16%				
Target Compounds							Qvalue
2) Propene	4.21	42	2791	0.202	ng		98
3) Dichlorodifluoromethan...	4.37	85	4896	0.173	ng		97
4) Chloromethane	4.63	50	3843	0.220	ng		96
5) 1,2-Dichloro-1,1,2,2-t...	4.91	135	2675	0.141	ng		98
6) Vinyl Chloride	5.05	62	3562	0.158	ng		96
7) 1,3-Butadiene	5.32	54	2489	0.159	ng		93
8) Bromomethane	5.74	94	2427	0.206	ng		98
9) Chloroethane	6.07	64	1915	0.228	ng		93
10) Ethanol	6.41	45	9608	0.986	ng		97
11) Acetonitrile	6.69	41	4281	0.205	ng		82
12) Acrolein	6.90	56	1141	0.158	ng		80
13) Acetone	7.10	58	10069	1.050	ng		94
14) Trichlorofluoromethane	7.32	101	4311	0.177	ng		97
15) 2-Propanol (Isopropanol)	7.62	45	10649	0.358	ng		99
16) Acrylonitrile	7.85	53	2339	0.165	ng		91
17) 1,1-Dichloroethene	8.27	96	2503	0.202	ng		99
18) 2-Methyl-2-Propanol (t...	8.50	59	11570	0.383	ng		91
19) Methylene Chloride	8.48	84	2613	0.198	ng		95
20) 3-Chloro-1-propene (Al...	8.65	41	3532	0.194	ng		91
21) Trichlorotrifluoroethane	8.90	151	2552	0.210	ng		100
22) Carbon Disulfide	8.76	76	12025	0.244	ng		96
23) trans-1,2-Dichloroethene	9.75	61	3156	0.189	ng		98
24) 1,1-Dichloroethane	10.00	63	4273	0.207	ng		99
25) Methyl tert-Butyl Ether	10.16	73	7451	0.198	ng		98
26) Vinyl Acetate	10.27	86	2629	0.720	ng	#	42
27) 2-Butanone (MEK)	10.59	72	951	0.106	ng	#	1
28) cis-1,2-Dichloroethene	11.01	61	3099	0.187	ng		97
29) Diisopropyl Ether	11.34	87	2457	0.197	ng	#	70
30) Ethyl Acetate	11.37	61	1172	0.244	ng		86
31) n-Hexane	11.31	57	4338	0.215	ng	#	96
32) Chloroform	11.36	83	4215	0.188	ng		96
34) Tetrahydrofuran (THF)	11.84	72	1728	0.215	ng		91
35) Ethyl tert-Butyl Ether	11.93	87	2926	0.191	ng		94
36) 1,2-Dichloroethane	12.16	62	2815	0.158	ng		88
38) 1,1,1-Trichloroethane	12.44	97	3627	0.177	ng		99
39) Isopropyl Acetate	12.90	61	2943	0.353	ng		96
40) 1-Butanol	12.96	56	2481	0.183	ng	#	72
41) Benzene	12.92	78	10580	0.205	ng		99
42) Carbon Tetrachloride	13.07	117	3305	0.169	ng		99
43) Cyclohexane	13.21	84	8525	0.421	ng		95
44) tert-Amyl Methyl Ether	13.59	73	7098	0.200	ng		98
45) 1,2-Dichloropropane	13.77	63	2532	0.224	ng		91
46) Bromodichloromethane	13.97	83	3151	0.179	ng		98
47) Trichloroethene	14.02	130	2877	0.192	ng		96
48) 1,4-Dioxane	14.06	88	1886	0.175	ng		79
49) 2,2,4-Trimethylpentane...	14.08	57	11089	0.231	ng		98
50) Methyl Methacrylate	14.25	100	1378	0.253	ng	#	61

Data File : I:\MS13\DATA\2020_07\25\07252003.D Vial: 13
Acq On : 25 Jul 2020 12:22 Operator: WA
Sample : 0.2ng R13072520 ICAL STD Inst : MS13
Misc : S34-06182001/S34-07232007 (8/21)

Quant Time: Jul 25 16:12:29 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:10:57 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M

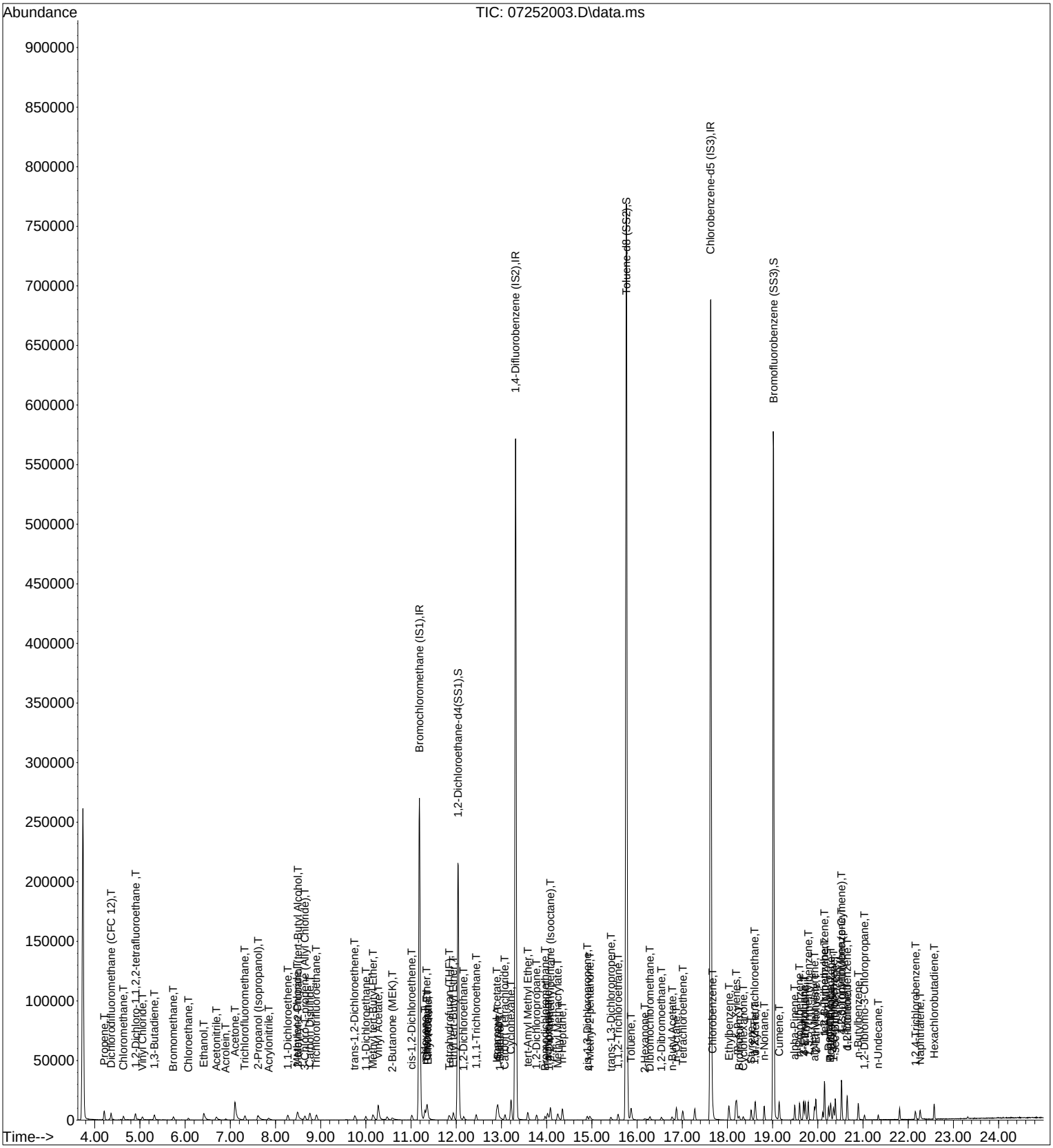
Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
51) n-Heptane	14.35	71	2760	0.220	ng		97
52) cis-1,3-Dichloropropene	14.90	75	3451	0.170	ng		88
53) 4-Methyl-2-pentanone	14.96	58	1594	0.147	ng	#	83
54) trans-1,3-Dichloropropene	15.42	75	2455	0.135	ng		92
55) 1,1,2-Trichloroethane	15.58	97	2497	0.203	ng		98
58) Toluene	15.87	91	10783	0.205	ng		100
59) 2-Hexanone	16.17	43	2053	0.077	ng		99
60) Dibromochloromethane	16.28	129	2711	0.176	ng		91
61) 1,2-Dibromoethane	16.54	107	2500	0.179	ng		97
62) n-Butyl Acetate	16.78	43	3467	0.120	ng		87
63) n-Octane	16.87	57	2218	0.216	ng		94
64) Tetrachloroethene	17.01	166	3264	0.193	ng		96
65) Chlorobenzene	17.67	112	7446	0.205	ng		97
66) Ethylbenzene	18.04	91	12012	0.203	ng		96
67) m- & p-Xylenes	18.19	91	19085	0.405	ng		95
68) Bromoform	18.26	173	2227	0.153	ng		97
69) Styrene	18.52	104	6271	0.170	ng		98
70) o-Xylene	18.62	91	9650	0.202	ng		93
71) n-Nonane	18.82	43	4455	0.198	ng		92
72) 1,1,2,2-Tetrachloroethane	18.60	83	4230	0.192	ng		99
74) Cumene	19.15	105	12453	0.208	ng		96
75) alpha-Pinene	19.49	93	5628	0.185	ng		98
76) n-Propylbenzene	19.59	91	14447	0.205	ng		95
77) 3-Ethyltoluene	19.69	105	11356	0.191	ng		99
78) 4-Ethyltoluene	19.72	105	11976	0.203	ng		97
79) 1,3,5-Trimethylbenzene	19.79	105	9897	0.193	ng		97
80) alpha-Methylstyrene	19.92	118	4419	0.158	ng		92
81) 2-Ethyltoluene	19.96	105	11687	0.198	ng		98
82) 1,2,4-Trimethylbenzene	20.15	105	9398	0.174	ng		98
83) n-Decane	20.24	57	4177	0.174	ng		92
84) Benzyl Chloride	20.27	91	6295	0.136	ng		88
85) 1,3-Dichlorobenzene	20.29	146	6182	0.188	ng		99
86) 1,4-Dichlorobenzene	20.35	146	6570	0.205	ng		100
87) sec-Butylbenzene	20.39	105	13802	0.207	ng		96
88) 4-Isopropyltoluene (p-...	20.52	119	12596	0.193	ng		98
89) 1,2,3-Trimethylbenzene	20.52	105	9727	0.180	ng		100
90) 1,2-Dichlorobenzene	20.65	146	5974	0.191	ng		99
91) d-Limonene	20.65	68	2718	0.143	ng		93
92) 1,2-Dibromo-3-Chloropr...	21.03	157	1844	0.162	ng		92
93) n-Undecane	21.34	57	1505	0.063	ng		92
94) 1,2,4-Trichlorobenzene	22.16	180	3540	0.148	ng		94
95) Naphthalene	22.26	128	9365	0.127	ng		91
96) n-Dodecane	22.25	57	443	N.D.			
97) Hexachlorobutadiene	22.58	225	3220	0.204	ng		99
98) Cyclohexanone	18.35	55	2058	0.115	ng		94
99) tert-Butylbenzene	20.15	119	10572	0.199	ng		99
100) n-Butylbenzene	20.89	91	9733	0.181	ng		95

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_07\25\07252003.D Vial: 13
Acq On : 25 Jul 2020 12:22 Operator: WA
Sample : 0.2ng R13072520 ICAL STD Inst : MS13
Misc : S34-06182001/S34-07232007 (8/21)

Quant Time: Jul 25 16:12:29 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:10:57 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_07\25\07252004.D Vial: 14
Acq On : 25 Jul 2020 12:56 Operator: WA
Sample : 0.5ng R13072520 ICAL STD Inst : MS13
Misc : S34-06182001/S34-07232006 (8/21)

Quant Time: Jul 25 16:12:32 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:10:57 2020 7/26/20
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.18	130	135337	12.500	ng		-0.02
37) 1,4-Difluorobenzene (IS2)	13.31	114	586187	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	17.63	82	258263	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.04	65	175527	10.128	ng		-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 81.04%				
57) Toluene-d8 (SS2)	15.76	98	647487	12.384	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.04%				
73) Bromofluorobenzene (SS3)	19.02	174	211711	12.784	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 102.24%				
Target Compounds							Qvalue
2) Propene	4.20	42	6340	0.462	ng		98
3) Dichlorodifluoromethan...	4.35	85	11347	0.404	ng		99
4) Chloromethane	4.63	50	8586	0.494	ng		99
5) 1,2-Dichloro-1,1,2,2-t...	4.89	135	5951	0.315	ng		98
6) Vinyl Chloride	5.05	62	8237	0.368	ng		96
7) 1,3-Butadiene	5.31	54	6614	0.426	ng		97
8) Bromomethane	5.73	94	5528	0.471	ng		98
9) Chloroethane	6.07	64	4385	0.526	ng		96
10) Ethanol	6.41	45	20253	2.090	ng		100
11) Acetonitrile	6.68	41	9157	0.442	ng		89
12) Acrolein	6.88	56	3221	0.449	ng		89
13) Acetone	7.09	58	21674	2.273	ng		96
14) Trichlorofluoromethane	7.32	101	9935	0.410	ng		99
15) 2-Propanol (Isopropanol)	7.59	45	25141	0.849	ng		99
16) Acrylonitrile	7.83	53	6055	0.429	ng		97
17) 1,1-Dichloroethene	8.27	96	5751	0.468	ng		99
18) 2-Methyl-2-Propanol (t...	8.47	59	26212	0.872	ng		96
19) Methylene Chloride	8.47	84	5735	0.438	ng		98
20) 3-Chloro-1-propene (Al...	8.65	41	7953	0.440	ng		93
21) Trichlorotrifluoroethane	8.91	151	5649	0.469	ng		100
22) Carbon Disulfide	8.75	76	24040	0.490	ng		97
23) trans-1,2-Dichloroethene	9.76	61	7290	0.439	ng		100
24) 1,1-Dichloroethane	10.00	63	10090	0.491	ng		96
25) Methyl tert-Butyl Ether	10.15	73	16757	0.448	ng		99
26) Vinyl Acetate	10.27	86	6548	1.805	ng	#	57
27) 2-Butanone (MEK)	10.56	72	3131	0.352	ng	#	80
28) cis-1,2-Dichloroethene	11.01	61	7459	0.452	ng		98
29) Diisopropyl Ether	11.34	87	5725	0.461	ng	#	94
30) Ethyl Acetate	11.35	61	3447	0.722	ng		96
31) n-Hexane	11.31	57	9933	0.495	ng		98
32) Chloroform	11.36	83	9411	0.422	ng		99
34) Tetrahydrofuran (THF)	11.83	72	3874	0.484	ng	#	88
35) Ethyl tert-Butyl Ether	11.92	87	6706	0.441	ng		96
36) 1,2-Dichloroethane	12.17	62	6309	0.356	ng		98
38) 1,1,1-Trichloroethane	12.44	97	8233	0.404	ng		98
39) Isopropyl Acetate	12.89	61	6970	0.840	ng		97
40) 1-Butanol	12.94	56	7187	0.533	ng	#	71
41) Benzene	12.92	78	23614	0.460	ng		99
42) Carbon Tetrachloride	13.07	117	7718	0.397	ng		99
43) Cyclohexane	13.21	84	18985	0.943	ng		95
44) tert-Amyl Methyl Ether	13.57	73	15823	0.448	ng		98
45) 1,2-Dichloropropane	13.77	63	5737	0.510	ng		98
46) Bromodichloromethane	13.97	83	7260	0.416	ng		97
47) Trichloroethene	14.02	130	6342	0.425	ng		100
48) 1,4-Dioxane	14.03	88	4225	0.394	ng	#	63
49) 2,2,4-Trimethylpentane...	14.08	57	24556	0.514	ng		98
50) Methyl Methacrylate	14.23	100	4130	0.763	ng	#	78

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_07\25\07252004.D Vial: 14
Acq On : 25 Jul 2020 12:56 Operator: WA
Sample : 0.5ng R13072520 ICAL STD Inst : MS13
Misc : S34-06182001/S34-07232006 (8/21)

Quant Time: Jul 25 16:12:32 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:10:57 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M

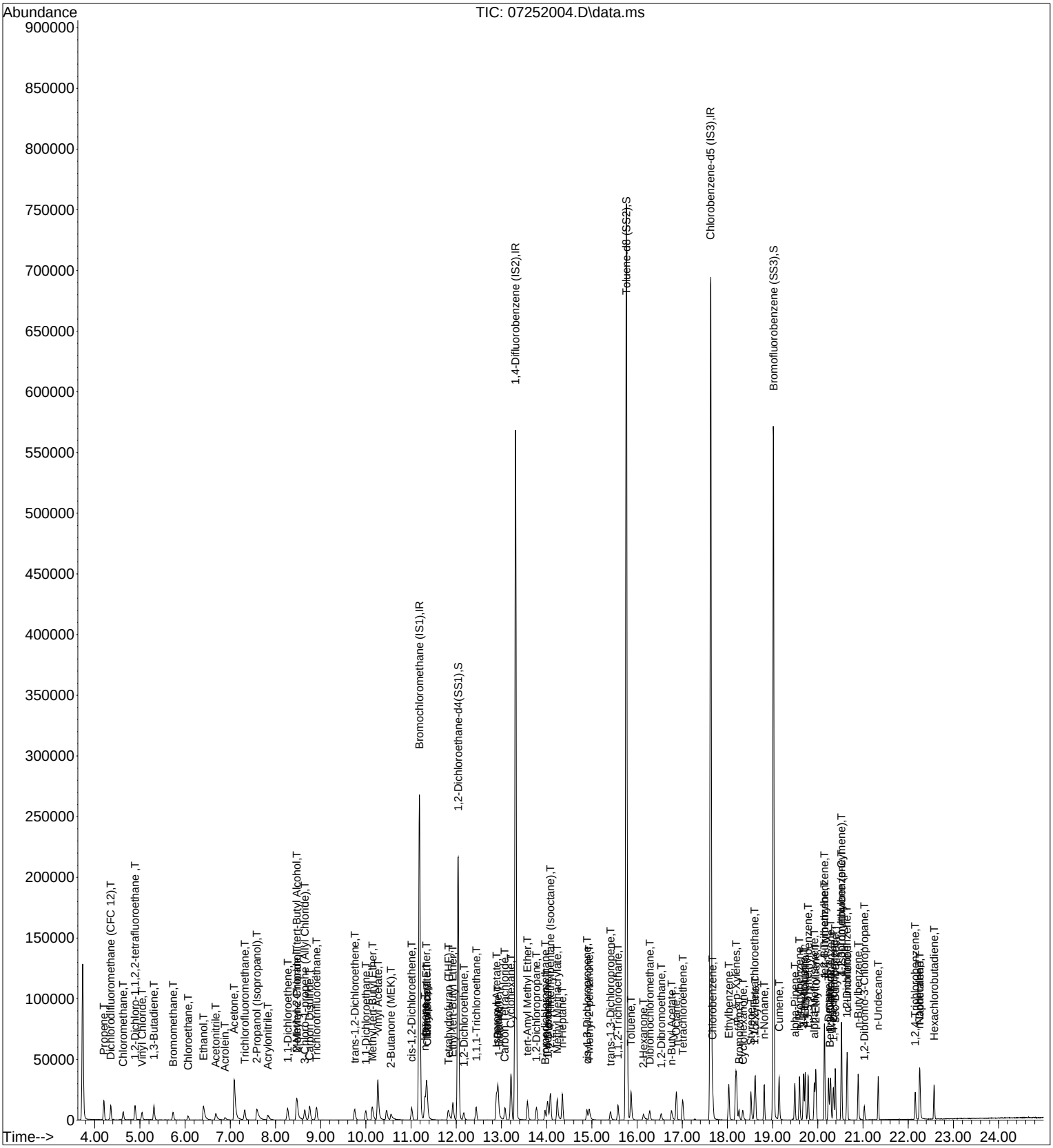
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.35	71	5963	0.479	ng	97
52) cis-1,3-Dichloropropene	14.89	75	8444	0.418	ng	96
53) 4-Methyl-2-pentanone	14.94	58	4074	0.378	ng	79
54) trans-1,3-Dichloropropene	15.41	75	6760	0.373	ng	94
55) 1,1,2-Trichloroethane	15.58	97	5587	0.457	ng	99
58) Toluene	15.87	91	23828	0.454	ng	99
59) 2-Hexanone	16.14	43	7805	0.293	ng	90
60) Dibromochloromethane	16.28	129	6163	0.401	ng	98
61) 1,2-Dibromoethane	16.54	107	5836	0.417	ng	97
62) n-Butyl Acetate	16.77	43	8636	0.299	ng	98
63) n-Octane	16.87	57	4968	0.483	ng	94
64) Tetrachloroethene	17.01	166	7107	0.420	ng	100
65) Chlorobenzene	17.67	112	16182	0.447	ng	99
66) Ethylbenzene	18.03	91	26899	0.454	ng	97
67) m- & p-Xylenes	18.19	91	42786	0.908	ng	96
68) Bromoform	18.26	173	5176	0.356	ng	96
69) Styrene	18.52	104	15228	0.413	ng	100
70) o-Xylene	18.62	91	21375	0.447	ng	96
71) n-Nonane	18.82	43	10370	0.461	ng	96
72) 1,1,2,2-Tetrachloroethane	18.60	83	9784	0.444	ng	100
74) Cumene	19.15	105	27497	0.459	ng	97
75) alpha-Pinene	19.49	93	13572	0.447	ng	99
76) n-Propylbenzene	19.59	91	32707	0.465	ng	96
77) 3-Ethyltoluene	19.69	105	27280	0.460	ng	99
78) 4-Ethyltoluene	19.72	105	26039	0.442	ng	98
79) 1,3,5-Trimethylbenzene	19.78	105	23143	0.452	ng	98
80) alpha-Methylstyrene	19.92	118	11426	0.408	ng	97
81) 2-Ethyltoluene	19.95	105	27462	0.465	ng	97
82) 1,2,4-Trimethylbenzene	20.15	105	22578	0.419	ng	97
83) n-Decane	20.24	57	11806	0.492	ng	96
84) Benzyl Chloride	20.27	91	15099	0.326	ng	92
85) 1,3-Dichlorobenzene	20.28	146	13738	0.419	ng	99
86) 1,4-Dichlorobenzene	20.35	146	14196	0.443	ng	100
87) sec-Butylbenzene	20.39	105	31028	0.465	ng	97
88) 4-Isopropyltoluene (p-...	20.52	119	28764	0.441	ng	98
89) 1,2,3-Trimethylbenzene	20.52	105	23822	0.442	ng	97
90) 1,2-Dichlorobenzene	20.64	146	13395	0.428	ng	99
91) d-Limonene	20.65	68	8036	0.424	ng	96
92) 1,2-Dibromo-3-Chloropr...	21.03	157	4282	0.375	ng	93
93) n-Undecane	21.34	57	11223	0.469	ng	98
94) 1,2,4-Trichlorobenzene	22.16	180	9250	0.388	ng	99
95) Naphthalene	22.26	128	26227	0.357	ng	97
96) n-Dodecane	22.25	57	8212	0.350	ng	93
97) Hexachlorobutadiene	22.58	225	6985	0.443	ng	98
98) Cyclohexanone	18.34	55	5300	0.298	ng	93
99) tert-Butylbenzene	20.15	119	23021	0.434	ng	98
100) n-Butylbenzene	20.89	91	23415	0.435	ng	96

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_07\25\07252004.D Vial: 14
Acq On : 25 Jul 2020 12:56 Operator: WA
Sample : 0.5ng R13072520 ICAL STD Inst : MS13
Misc : S34-06182001/S34-07232006 (8/21)

Quant Time: Jul 25 16:12:32 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:10:57 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_07\25\07252005.D Vial: 14
Acq On : 25 Jul 2020 13:30 Operator: WA
Sample : 1.0ng R13072520 ICAL STD Inst : MS13
Misc : S34-06182001/S34-07232006 (8/21)

Quant Time: Jul 25 16:12:34 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:10:57 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M

WA 7/26/20

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.18	130	136978	12.500	ng		-0.02
37) 1,4-Difluorobenzene (IS2)	13.31	114	594110	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	17.63	82	261840	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.04	65	176365	10.055	ng		-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 80.40%				
57) Toluene-d8 (SS2)	15.76	98	651758	12.296	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.40%				
73) Bromofluorobenzene (SS3)	19.02	174	214269	12.761	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 102.08%				
Target Compounds							Qvalue
2) Propene	4.19	42	13140	0.946	ng		99
3) Dichlorodifluoromethan...	4.34	85	23640	0.833	ng		99
4) Chloromethane	4.62	50	18224	1.036	ng		98
5) 1,2-Dichloro-1,1,2,2-t...	4.88	135	12717	0.665	ng		100
6) Vinyl Chloride	5.03	62	17465	0.771	ng		99
7) 1,3-Butadiene	5.30	54	13972	0.889	ng		98
8) Bromomethane	5.73	94	11569	0.975	ng		99
9) Chloroethane	6.06	64	9132	1.081	ng		97
10) Ethanol	6.40	45	43145	4.399	ng		99
11) Acetonitrile	6.66	41	20091	0.958	ng		91
12) Acrolein	6.86	56	7271	1.001	ng		100
13) Acetone	7.07	58	45463	4.711	ng		96
14) Trichlorofluoromethane	7.31	101	20299	0.827	ng		100
15) 2-Propanol (Isopropanol)	7.57	45	55367	1.848	ng		99
16) Acrylonitrile	7.82	53	14524	1.016	ng		99
17) 1,1-Dichloroethene	8.26	96	11918	0.958	ng		98
18) 2-Methyl-2-Propanol (t...	8.45	59	56529	1.859	ng		98
19) Methylene Chloride	8.47	84	12291	0.928	ng		96
20) 3-Chloro-1-propene (Al...	8.64	41	17143	0.936	ng		98
21) Trichlorotrifluoroethane	8.90	151	11438	0.937	ng		93
22) Carbon Disulfide	8.75	76	46690	0.940	ng		99
23) trans-1,2-Dichloroethene	9.74	61	15913	0.946	ng		99
24) 1,1-Dichloroethane	9.99	63	20692	0.995	ng		98
25) Methyl tert-Butyl Ether	10.13	73	36074	0.954	ng		98
26) Vinyl Acetate	10.26	86	14627	3.984	ng	#	64
27) 2-Butanone (MEK)	10.53	72	7567	0.840	ng	#	90
28) cis-1,2-Dichloroethene	11.01	61	15295	0.915	ng		100
29) Diisopropyl Ether	11.33	87	12034	0.957	ng		96
30) Ethyl Acetate	11.34	61	8433	1.746	ng		92
31) n-Hexane	11.30	57	20004	0.984	ng		98
32) Chloroform	11.36	83	19893	0.881	ng		98
34) Tetrahydrofuran (THF)	11.80	72	8278	1.022	ng		91
35) Ethyl tert-Butyl Ether	11.92	87	14468	0.940	ng		97
36) 1,2-Dichloroethane	12.17	62	13617	0.760	ng		99
38) 1,1,1-Trichloroethane	12.44	97	17448	0.845	ng		99
39) Isopropyl Acetate	12.89	61	14866	1.768	ng		96
40) 1-Butanol	12.91	56	18850	1.378	ng		86
41) Benzene	12.92	78	48786	0.937	ng		99
42) Carbon Tetrachloride	13.08	117	15986	0.811	ng		98
43) Cyclohexane	13.21	84	38747	1.899	ng		95
44) tert-Amyl Methyl Ether	13.57	73	33360	0.932	ng		98
45) 1,2-Dichloropropane	13.77	63	11898	1.043	ng		100
46) Bromodichloromethane	13.97	83	15448	0.873	ng		99
47) Trichloroethene	14.02	130	13530	0.895	ng		100
48) 1,4-Dioxane	14.01	88	9657	0.889	ng		96
49) 2,2,4-Trimethylpentane...	14.08	57	50308	1.039	ng		100
50) Methyl Methacrylate	14.23	100	9441	1.721	ng		89

Data File : I:\MS13\DATA\2020_07\25\07252005.D Vial: 14
Acq On : 25 Jul 2020 13:30 Operator: WA
Sample : 1.0ng R13072520 ICAL STD Inst : MS13
Misc : S34-06182001/S34-07232006 (8/21)

Quant Time: Jul 25 16:12:34 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:10:57 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M

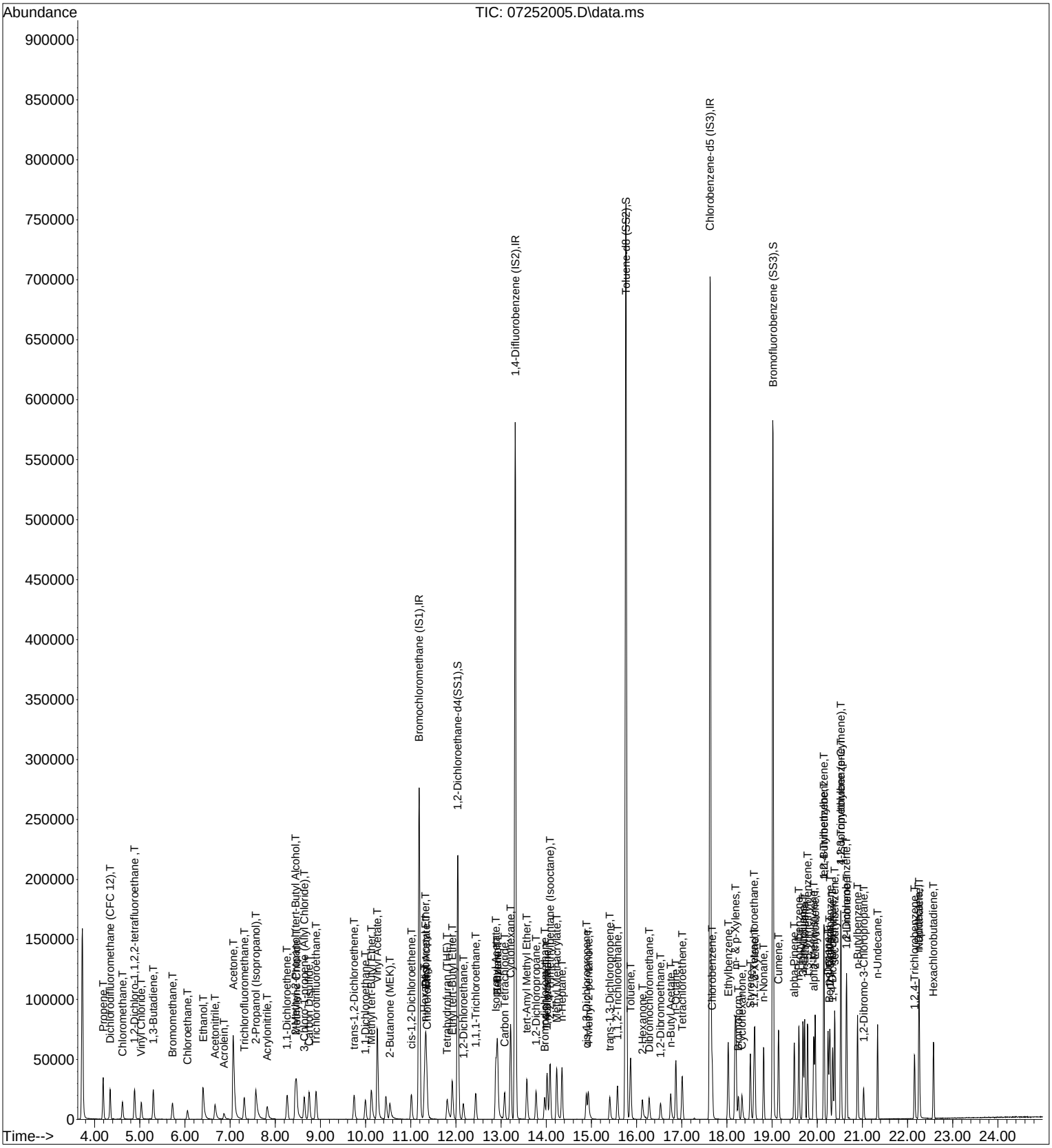
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.35	71	12779	1.013	ng	99
52) cis-1,3-Dichloropropene	14.89	75	18323	0.896	ng	98
53) 4-Methyl-2-pentanone	14.93	58	9732	0.891	ng	91
54) trans-1,3-Dichloropropene	15.41	75	15740	0.857	ng	96
55) 1,1,2-Trichloroethane	15.58	97	11897	0.960	ng	98
58) Toluene	15.87	91	49839	0.936	ng	99
59) 2-Hexanone	16.13	43	18582	0.688	ng	99
60) Dibromochloromethane	16.28	129	13472	0.865	ng	99
61) 1,2-Dibromoethane	16.53	107	13011	0.917	ng	100
62) n-Butyl Acetate	16.76	43	21273	0.726	ng	98
63) n-Octane	16.87	57	10598	1.017	ng	93
64) Tetrachloroethene	17.01	166	15195	0.886	ng	100
65) Chlorobenzene	17.67	112	34040	0.927	ng	100
66) Ethylbenzene	18.03	91	56485	0.940	ng	98
67) m- & p-Xylenes	18.19	91	88626	1.856	ng	97
68) Bromoform	18.25	173	11266	0.764	ng	98
69) Styrene	18.52	104	33503	0.895	ng	99
70) o-Xylene	18.62	91	44425	0.916	ng	98
71) n-Nonane	18.81	43	21661	0.950	ng	95
72) 1,1,2,2-Tetrachloroethane	18.60	83	20663	0.925	ng	99
74) Cumene	19.14	105	57441	0.946	ng	99
75) alpha-Pinene	19.49	93	28684	0.932	ng	100
76) n-Propylbenzene	19.60	91	68357	0.959	ng	98
77) 3-Ethyltoluene	19.68	105	58046	0.965	ng	100
78) 4-Ethyltoluene	19.72	105	53237	0.891	ng	100
79) 1,3,5-Trimethylbenzene	19.78	105	48137	0.926	ng	99
80) alpha-Methylstyrene	19.92	118	24967	0.878	ng	98
81) 2-Ethyltoluene	19.95	105	56542	0.944	ng	98
82) 1,2,4-Trimethylbenzene	20.15	105	47350	0.867	ng	99
83) n-Decane	20.24	57	24834	1.021	ng	98
84) Benzyl Chloride	20.27	91	34434	0.732	ng	95
85) 1,3-Dichlorobenzene	20.28	146	28617	0.860	ng	100
86) 1,4-Dichlorobenzene	20.34	146	29992	0.923	ng	100
87) sec-Butylbenzene	20.39	105	64499	0.953	ng	98
88) 4-Isopropyltoluene (p-...	20.52	119	61254	0.926	ng	98
89) 1,2,3-Trimethylbenzene	20.52	105	48904	0.894	ng	99
90) 1,2-Dichlorobenzene	20.64	146	27921	0.879	ng	100
91) d-Limonene	20.65	68	17365	0.903	ng	95
92) 1,2-Dibromo-3-Chloropr...	21.03	157	9423	0.815	ng	89
93) n-Undecane	21.34	57	24767	1.021	ng	97
94) 1,2,4-Trichlorobenzene	22.16	180	20899	0.864	ng	99
95) Naphthalene	22.26	128	61162	0.821	ng	98
96) n-Dodecane	22.25	57	20400	0.858	ng	94
97) Hexachlorobutadiene	22.57	225	14483	0.906	ng	99
98) Cyclohexanone	18.33	55	12084	0.669	ng	96
99) tert-Butylbenzene	20.15	119	47887	0.891	ng	99
100) n-Butylbenzene	20.89	91	49825	0.914	ng	97

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_07\25\07252005.D Vial: 14
Acq On : 25 Jul 2020 13:30 Operator: WA
Sample : 1.0ng R13072520 ICAL STD Inst : MS13
Misc : S34-06182001/S34-07232006 (8/21)

Quant Time: Jul 25 16:12:34 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:10:57 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_07\25\07252006.D Vial: 14
Acq On : 25 Jul 2020 14:04 Operator: WA
Sample : 5.0ng R13072520 ICAL STD Inst : MS13
Misc : S34-06182001/S34-07232006 (8/21)

Quant Time: Jul 25 16:12:36 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:10:57 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M

VOA 7/26/20

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.19	130	126982	12.500	ng		-0.02
37) 1,4-Difluorobenzene (IS2)	13.31	114	547021	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	17.63	82	241293	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.04	65	163773	10.072	ng		-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 80.56%				
57) Toluene-d8 (SS2)	15.76	98	602817	12.341	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.72%				
73) Bromofluorobenzene (SS3)	19.02	174	201664	13.033	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 104.24%				
Target Compounds							Qvalue
2) Propene	4.17	42	70391	5.469	ng		100
3) Dichlorodifluoromethan...	4.33	85	118209	4.491	ng		100
4) Chloromethane	4.59	50	76238	4.674	ng		99
5) 1,2-Dichloro-1,1,2,2-t...	4.87	135	63596	3.586	ng		99
6) Vinyl Chloride	5.01	62	88613	4.219	ng		99
7) 1,3-Butadiene	5.28	54	68033	4.667	ng		99
8) Bromomethane	5.71	94	57995	5.271	ng		99
9) Chloroethane	6.04	64	46206	5.902	ng		100
10) Ethanol	6.40	45	207952	22.873	ng		100
11) Acetonitrile	6.66	41	103292	5.314	ng		99
12) Acrolein	6.85	56	37903	5.630	ng		100
13) Acetone	7.05	58	220702	24.670	ng		97
14) Trichlorofluoromethane	7.30	101	100327	4.410	ng		100
15) 2-Propanol (Isopropanol)	7.55	45	266347	9.591	ng		99
16) Acrylonitrile	7.81	53	77854	5.874	ng		99
17) 1,1-Dichloroethene	8.25	96	59278	5.140	ng		97
18) 2-Methyl-2-Propanol (t...	8.42	59	280198	9.940	ng		99
19) Methylene Chloride	8.47	84	60360	4.916	ng		97
20) 3-Chloro-1-propene (Al...	8.63	41	85079	5.012	ng		98
21) Trichlorotrifluoroethane	8.90	151	57316	5.066	ng		97
22) Carbon Disulfide	8.74	76	225530	4.898	ng		99
23) trans-1,2-Dichloroethene	9.74	61	81816	5.249	ng		99
24) 1,1-Dichloroethane	10.00	63	104146	5.403	ng		100
25) Methyl tert-Butyl Ether	10.11	73	180495	5.147	ng		100
26) Vinyl Acetate	10.26	86	75851	22.289	ng	#	81
27) 2-Butanone (MEK)	10.51	72	40291	4.826	ng		97
28) cis-1,2-Dichloroethene	11.01	61	77450	4.999	ng		99
29) Diisopropyl Ether	11.31	87	60133	5.161	ng	#	91
30) Ethyl Acetate	11.32	61	43341	9.679	ng		96
31) n-Hexane	11.30	57	99937	5.304	ng		100
32) Chloroform	11.36	83	96758	4.622	ng		100
34) Tetrahydrofuran (THF)	11.78	72	40923	5.452	ng		99
35) Ethyl tert-Butyl Ether	11.91	87	71869	5.037	ng		97
36) 1,2-Dichloroethane	12.16	62	68210	4.106	ng		99
38) 1,1,1-Trichloroethane	12.44	97	86642	4.555	ng		100
39) Isopropyl Acetate	12.87	61	74371	9.608	ng		96
40) 1-Butanol	12.89	56	111127	8.826	ng		95
41) Benzene	12.92	78	238290	4.973	ng		100
42) Carbon Tetrachloride	13.08	117	80243	4.420	ng		100
43) Cyclohexane	13.21	84	189082	10.065	ng		97
44) tert-Amyl Methyl Ether	13.56	73	166516	5.055	ng		99
45) 1,2-Dichloropropane	13.77	63	58904	5.608	ng		99
46) Bromodichloromethane	13.96	83	77349	4.747	ng		100
47) Trichloroethene	14.02	130	68654	4.934	ng		100
48) 1,4-Dioxane	14.00	88	48499	4.848	ng		99
49) 2,2,4-Trimethylpentane...	14.08	57	244579	5.484	ng		100
50) Methyl Methacrylate	14.22	100	51526	10.203	ng		95

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_07\25\07252006.D Vial: 14
Acq On : 25 Jul 2020 14:04 Operator: WA
Sample : 5.0ng R13072520 ICAL STD Inst : MS13
Misc : S34-06182001/S34-07232006 (8/21)

Quant Time: Jul 25 16:12:36 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:10:57 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M

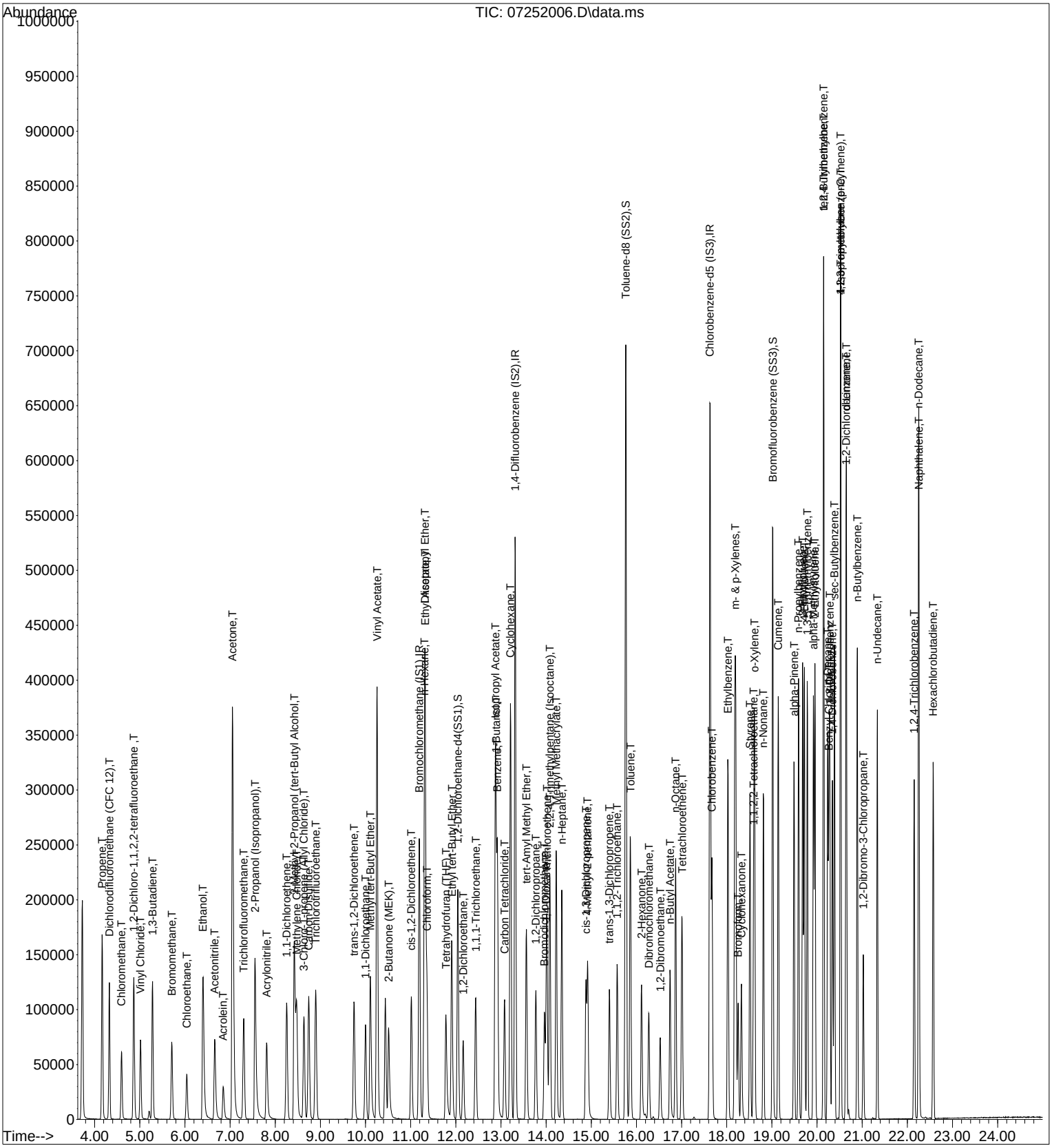
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.35	71	62289	5.363	ng	99
52) cis-1,3-Dichloropropene	14.88	75	95565	5.073	ng	100
53) 4-Methyl-2-pentanone	14.92	58	51251	5.098	ng	96
54) trans-1,3-Dichloropropene	15.40	75	86023	5.085	ng	99
55) 1,1,2-Trichloroethane	15.57	97	59098	5.178	ng	100
58) Toluene	15.87	91	245998	5.013	ng	100
59) 2-Hexanone	16.11	43	103933	4.174	ng	98
60) Dibromochloromethane	16.28	129	70238	4.896	ng	99
61) 1,2-Dibromoethane	16.53	107	67075	5.128	ng	100
62) n-Butyl Acetate	16.74	43	117883	4.364	ng	98
63) n-Octane	16.87	57	50133	5.219	ng	98
64) Tetrachloroethene	17.01	166	74738	4.729	ng	100
65) Chlorobenzene	17.67	112	167525	4.949	ng	100
66) Ethylbenzene	18.02	91	277023	5.002	ng	99
67) m- & p-Xylenes	18.19	91	421341	9.576	ng	99
68) Bromoform	18.25	173	60334	4.439	ng	99
69) Styrene	18.51	104	173962	5.045	ng	100
70) o-Xylene	18.62	91	214308	4.794	ng	98
71) n-Nonane	18.81	43	103348	4.920	ng	97
72) 1,1,2,2-Tetrachloroethane	18.59	83	100329	4.872	ng	100
74) Cumene	19.14	105	283304	5.065	ng	99
75) alpha-Pinene	19.49	93	144526	5.097	ng	100
76) n-Propylbenzene	19.59	91	333341	5.072	ng	99
77) 3-Ethyltoluene	19.68	105	267497	4.823	ng	100
78) 4-Ethyltoluene	19.72	105	280166	5.089	ng	99
79) 1,3,5-Trimethylbenzene	19.78	105	230303	4.810	ng	99
80) alpha-Methylstyrene	19.92	118	129624	4.949	ng	100
81) 2-Ethyltoluene	19.95	105	271709	4.921	ng	99
82) 1,2,4-Trimethylbenzene	20.15	105	230381	4.577	ng	100
83) n-Decane	20.24	57	117518	5.243	ng	98
84) Benzyl Chloride	20.26	91	190095	4.388	ng	98
85) 1,3-Dichlorobenzene	20.28	146	142532	4.650	ng	100
86) 1,4-Dichlorobenzene	20.34	146	144820	4.834	ng	99
87) sec-Butylbenzene	20.39	105	309224	4.959	ng	99
88) 4-Isopropyltoluene (p-...	20.52	119	295840	4.852	ng	99
89) 1,2,3-Trimethylbenzene	20.52	105	235263	4.669	ng	100
90) 1,2-Dichlorobenzene	20.64	146	137999	4.717	ng	100
91) d-Limonene	20.65	68	86112	4.858	ng	97
92) 1,2-Dibromo-3-Chloropr...	21.02	157	51087	4.794	ng	96
93) n-Undecane	21.34	57	121254	5.426	ng	98
94) 1,2,4-Trichlorobenzene	22.15	180	112188	5.032	ng	100
95) Naphthalene	22.26	128	326835	4.760	ng	100
96) n-Dodecane	22.25	57	106702	4.868	ng	96
97) Hexachlorobutadiene	22.57	225	73112	4.962	ng	99
98) Cyclohexanone	18.33	55	62144	3.734	ng	98
99) tert-Butylbenzene	20.15	119	230489	4.655	ng	99
100) n-Butylbenzene	20.89	91	241742	4.812	ng	99

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_07\25\07252006.D Vial: 14
Acq On : 25 Jul 2020 14:04 Operator: WA
Sample : 5.0ng R13072520 ICAL STD Inst : MS13
Misc : S34-06182001/S34-07232006 (8/21)

Quant Time: Jul 25 16:12:36 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:10:57 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_07\25\07252007.D Vial: 15
Acq On : 25 Jul 2020 14:38 Operator: WA
Sample : 25ng R13072520 ICAL STD Inst : MS13
Misc : S34-06182001/S34-07232001 (8/21)

Quant Time: Jul 25 16:12:38 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:10:57 2020 7/26/20
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.21	130	124567	12.500	ng	0.00
37) 1,4-Difluorobenzene (IS2)	13.32	114	536363	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	17.63	82	231583	12.500	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.05	65	157512	9.874	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 78.96%			
57) Toluene-d8 (SS2)	15.76	98	584285	12.463	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.68%			
73) Bromofluorobenzene (SS3)	19.02	174	196845	13.255	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 106.08%			
Target Compounds						Qvalue
2) Propene	4.17	42	321075	25.428	ng	100
3) Dichlorodifluoromethan...	4.33	85	560070	21.689	ng	100
4) Chloromethane	4.60	50	399130	24.943	ng	100
5) 1,2-Dichloro-1,1,2,2-t...	4.87	135	309702	17.804	ng	100
6) Vinyl Chloride	5.02	62	422041	20.485	ng	100
7) 1,3-Butadiene	5.29	54	349133	24.414	ng	100
8) Bromomethane	5.73	94	284381	26.349	ng	100
9) Chloroethane	6.05	64	222265	28.941	ng	100
10) Ethanol	6.44	45	973792	109.188	ng	100
11) Acetonitrile	6.68	41	505406	26.506	ng	100
12) Acrolein	6.86	56	185838	28.138	ng	100
13) Acetone	7.07	58	977427	111.373	ng	100
14) Trichlorofluoromethane	7.31	101	480025	21.510	ng	100
15) 2-Propanol (Isopropanol)	7.58	45	1280631	47.010	ng	100
16) Acrylonitrile	7.83	53	379467	29.185	ng	100
17) 1,1-Dichloroethene	8.26	96	289511	25.591	ng	100
18) 2-Methyl-2-Propanol (t...	8.44	59	1359372	49.158	ng	100
19) Methylene Chloride	8.49	84	294003	24.410	ng	100
20) 3-Chloro-1-propene (Al...	8.65	41	403373	24.224	ng	100
21) Trichlorotrifluoroethane	8.90	151	281837	25.395	ng	100
22) Carbon Disulfide	8.75	76	1051633	23.282	ng	100
23) trans-1,2-Dichloroethene	9.76	61	396021	25.898	ng	100
24) 1,1-Dichloroethane	10.01	63	491937	26.017	ng	100
25) Methyl tert-Butyl Ether	10.11	73	864600	25.131	ng	100
26) Vinyl Acetate	10.27	86	349984	104.836	ng	100
27) 2-Butanone (MEK)	10.51	72	197854	24.156	ng	100
28) cis-1,2-Dichloroethene	11.02	61	368650	24.256	ng	100
29) Diisopropyl Ether	11.32	87	243715	21.323	ng	100
30) Ethyl Acetate	11.33	61	194902	44.368	ng	100
31) n-Hexane	11.30	57	434621	23.512	ng	100
32) Chloroform	11.37	83	463868	22.587	ng	100
34) Tetrahydrofuran (THF)	11.78	72	194429	26.407	ng	100
35) Ethyl tert-Butyl Ether	11.91	87	349083	24.942	ng	100
36) 1,2-Dichloroethane	12.17	62	329015	20.190	ng	100
38) 1,1,1-Trichloroethane	12.45	97	418939	22.460	ng	100
39) Isopropyl Acetate	12.87	61	339777	44.768	ng	100
40) 1-Butanol	12.90	56	542012	43.901	ng	100
41) Benzene	12.93	78	1109182	23.606	ng	100
42) Carbon Tetrachloride	13.08	117	394650	22.169	ng	100
43) Cyclohexane	13.22	84	877476	47.639	ng	100
44) tert-Amyl Methyl Ether	13.56	73	805282	24.931	ng	100
45) 1,2-Dichloropropane	13.77	63	278165	27.007	ng	100
46) Bromodichloromethane	13.97	83	372677	23.326	ng	100
47) Trichloroethene	14.02	130	335949	24.624	ng	100
48) 1,4-Dioxane	13.99	88	246046	25.082	ng	100
49) 2,2,4-Trimethylpentane...	14.09	57	1134131	25.935	ng	100
50) Methyl Methacrylate	14.23	100	252098	50.911	ng	100

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_07\25\07252007.D Vial: 15
Acq On : 25 Jul 2020 14:38 Operator: WA
Sample : 25ng R13072520 ICAL STD Inst : MS13
Misc : S34-06182001/S34-07232001 (8/21)

Quant Time: Jul 25 16:12:38 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:10:57 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M

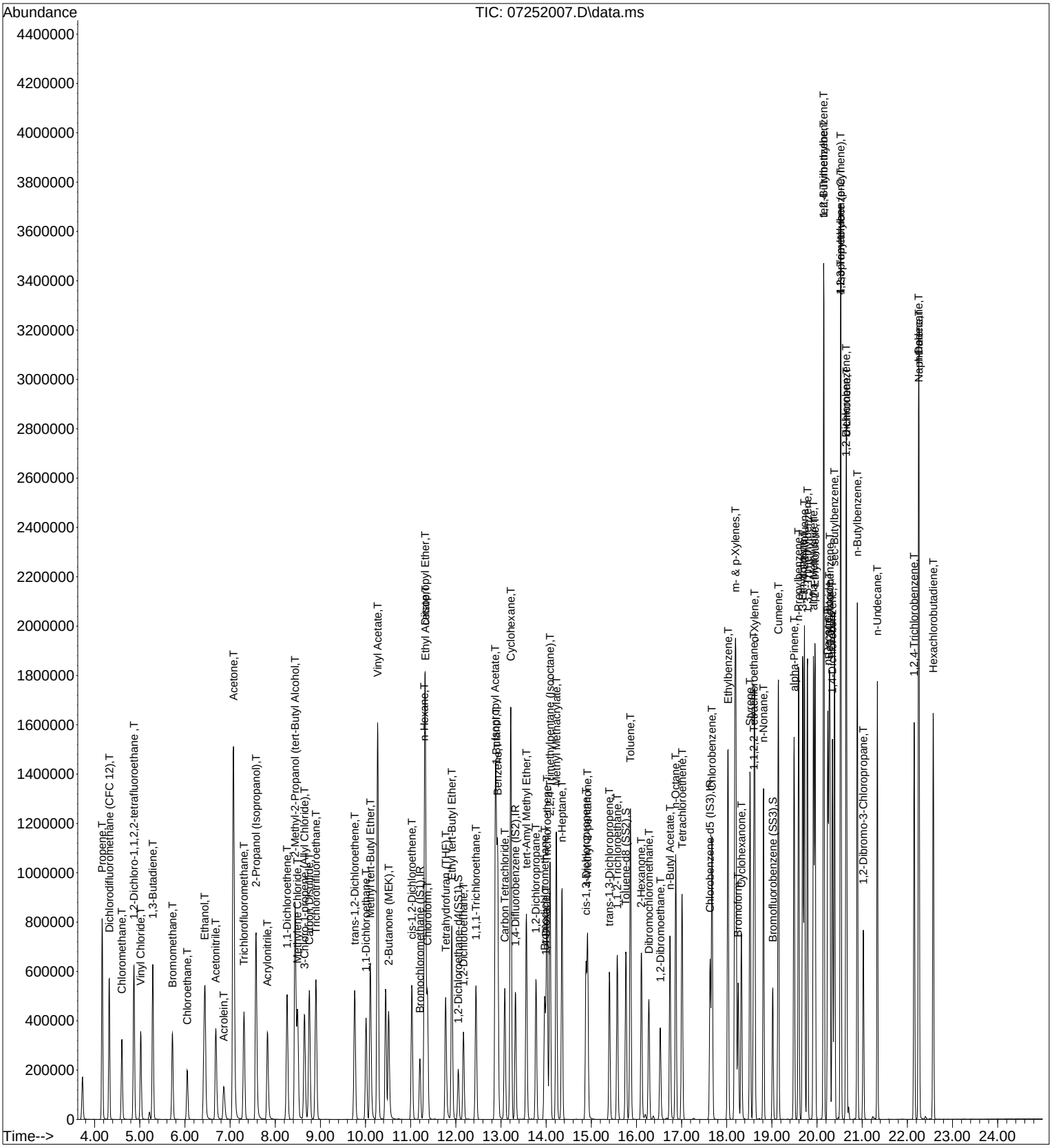
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.35	71	291462	25.594	ng	100
52) cis-1,3-Dichloropropene	14.88	75	465481	25.200	ng	100
53) 4-Methyl-2-pentanone	14.92	58	252974	25.661	ng	100
54) trans-1,3-Dichloropropene	15.40	75	425994	25.682	ng	100
55) 1,1,2-Trichloroethane	15.58	97	284891	25.455	ng	100
58) Toluene	15.87	91	1161372	24.660	ng	100
59) 2-Hexanone	16.11	43	532300	22.274	ng	100
60) Dibromochloromethane	16.28	129	348383	25.302	ng	100
61) 1,2-Dibromoethane	16.53	107	327867	26.119	ng	100
62) n-Butyl Acetate	16.74	43	602887	23.252	ng	100
63) n-Octane	16.87	57	230974	25.053	ng	100
64) Tetrachloroethene	17.01	166	370519	24.426	ng	100
65) Chlorobenzene	17.67	112	807646	24.860	ng	100
66) Ethylbenzene	18.03	91	1300400	24.466	ng	100
67) m- & p-Xylenes	18.19	91	1963723	46.499	ng	100
68) Bromoform	18.25	173	317404	24.334	ng	100
69) Styrene	18.51	104	851311	25.726	ng	100
70) o-Xylene	18.62	91	999417	23.296	ng	100
71) n-Nonane	18.82	43	463313	22.982	ng	100
72) 1,1,2,2-Tetrachloroethane	18.60	83	470158	23.786	ng	100
74) Cumene	19.15	105	1338293	24.928	ng	100
75) alpha-Pinene	19.49	93	686346	25.220	ng	100
76) n-Propylbenzene	19.59	91	1552845	24.619	ng	100
77) 3-Ethyltoluene	19.68	105	1362657	25.602	ng	100
78) 4-Ethyltoluene	19.72	105	1248795	23.633	ng	100
79) 1,3,5-Trimethylbenzene	19.79	105	1101570	23.970	ng	100
80) alpha-Methylstyrene	19.92	118	645057	25.662	ng	100
81) 2-Ethyltoluene	19.95	105	1296532	24.468	ng	100
82) 1,2,4-Trimethylbenzene	20.15	105	1076137	22.274	ng	100
83) n-Decane	20.24	57	541819	25.184	ng	100
84) Benzyl Chloride	20.27	91	975762	23.468	ng	100
85) 1,3-Dichlorobenzene	20.28	146	703893	23.925	ng	100
86) 1,4-Dichlorobenzene	20.34	146	720743	25.067	ng	100
87) sec-Butylbenzene	20.39	105	1469352	24.554	ng	100
88) 4-Isopropyltoluene (p-...	20.52	119	1364440	23.316	ng	100
89) 1,2,3-Trimethylbenzene	20.52	105	1097787	22.699	ng	100
90) 1,2-Dichlorobenzene	20.64	146	670619	23.883	ng	100
91) d-Limonene	20.65	68	398291	23.414	ng	100
92) 1,2-Dibromo-3-Chloropr...	21.02	157	270025	26.404	ng	100
93) n-Undecane	21.34	57	576689	26.889	ng	100
94) 1,2,4-Trichlorobenzene	22.15	180	593455	27.735	ng	100
95) Naphthalene	22.26	128	1645391	24.968	ng	100
96) n-Dodecane	22.25	57	520554	24.743	ng	100
97) Hexachlorobutadiene	22.58	225	379697	26.851	ng	100
98) Cyclohexanone	18.33	55	361211	22.614	ng	100
99) tert-Butylbenzene	20.15	119	1073518	22.591	ng	100
100) n-Butylbenzene	20.89	91	1159507	24.049	ng	100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_07\25\07252007.D Vial: 15
Acq On : 25 Jul 2020 14:38 Operator: WA
Sample : 25ng R13072520 ICAL STD Inst : MS13
Misc : S34-06182001/S34-07232001 (8/21)

Quant Time: Jul 25 16:12:38 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:10:57 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_07\25\07252008.D Vial: 15
Acq On : 25 Jul 2020 15:12 Operator: WA
Sample : 50ng R13072520 ICAL STD Inst : MS13
Misc : S34-06182001/S34-07232001 (8/21)

Quant Time: Jul 25 16:12:40 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:10:57 2020 7/26/20
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.21	130	123976	12.500	ng		0.00
37) 1,4-Difluorobenzene (IS2)	13.32	114	533638	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	17.63	82	230188	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.06	65	155911	9.821	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 78.56%				
57) Toluene-d8 (SS2)	15.77	98	578755	12.420	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.36%				
73) Bromofluorobenzene (SS3)	19.02	174	199945	13.546	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 108.40%				
Target Compounds							Qvalue
2) Propene	4.17	42	602530	47.945	ng		99
3) Dichlorodifluoromethan...	4.32	85	1050568	40.877	ng		100
4) Chloromethane	4.60	50	672874	42.250	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.87	135	591677	34.177	ng		100
6) Vinyl Chloride	5.02	62	781439	38.111	ng		100
7) 1,3-Butadiene	5.29	54	616368	43.307	ng		99
8) Bromomethane	5.73	94	541609	50.422	ng		100
9) Chloroethane	6.06	64	423797	55.445	ng		100
10) Ethanol	6.47	45	1768841	199.279	ng		100
11) Acetonitrile	6.70	41	950909	50.108	ng		99
12) Acrolein	6.87	56	356832	54.285	ng		100
13) Acetone	7.09	58	1726214	197.631	ng		100
14) Trichlorofluoromethane	7.31	101	913727	41.139	ng		99
15) 2-Propanol (Isopropanol)	7.59	45	2295138	84.652	ng		100
16) Acrylonitrile	7.84	53	728440	56.291	ng		100
17) 1,1-Dichloroethene	8.27	96	560365	49.769	ng		98
18) 2-Methyl-2-Propanol (t...	8.46	59	2411497	87.621	ng		100
19) Methylene Chloride	8.50	84	559728	46.693	ng		98
20) 3-Chloro-1-propene (Al...	8.65	41	758436	45.764	ng		98
21) Trichlorotrifluoroethane	8.90	151	550055	49.800	ng		98
22) Carbon Disulfide	8.76	76	1985027	44.156	ng		100
23) trans-1,2-Dichloroethene	9.76	61	751971	49.410	ng		98
24) 1,1-Dichloroethane	10.02	63	929865	49.412	ng		100
25) Methyl tert-Butyl Ether	10.11	73	1642141	47.958	ng		99
26) Vinyl Acetate	10.28	86	630107	189.646	ng	#	87
27) 2-Butanone (MEK)	10.52	72	381365	46.783	ng		98
28) cis-1,2-Dichloroethene	11.03	61	702808	46.463	ng		99
29) Diisopropyl Ether	11.32	87	430885	37.879	ng		94
30) Ethyl Acetate	11.34	61	340107	77.791	ng		97
31) n-Hexane	11.30	57	770495	41.882	ng		99
32) Chloroform	11.38	83	883831	43.242	ng		100
34) Tetrahydrofuran (THF)	11.78	72	372124	50.782	ng		98
35) Ethyl tert-Butyl Ether	11.91	87	671332	48.196	ng		97
36) 1,2-Dichloroethane	12.17	62	630827	38.895	ng		100
38) 1,1,1-Trichloroethane	12.45	97	805854	43.424	ng		100
39) Isopropyl Acetate	12.88	61	610180	80.806	ng		98
40) 1-Butanol	12.91	56	966173	78.657	ng		99
41) Benzene	12.93	78	2008457	42.963	ng		99
42) Carbon Tetrachloride	13.08	117	765764	43.236	ng		100
43) Cyclohexane	13.22	84	1608071	87.750	ng		98
44) tert-Amyl Methyl Ether	13.56	73	1519709	47.289	ng		100
45) 1,2-Dichloropropane	13.78	63	524023	51.137	ng		100
46) Bromodichloromethane	13.97	83	709662	44.645	ng		100
47) Trichloroethene	14.02	130	646395	47.621	ng		99
48) 1,4-Dioxane	13.99	88	462298	47.368	ng		98
49) 2,2,4-Trimethylpentane...	14.09	57	2076918	47.738	ng		100
50) Methyl Methacrylate	14.23	100	476618	96.745	ng		96

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_07\25\07252008.D Vial: 15
Acq On : 25 Jul 2020 15:12 Operator: WA
Sample : 50ng R13072520 ICAL STD Inst : MS13
Misc : S34-06182001/S34-07232001 (8/21)

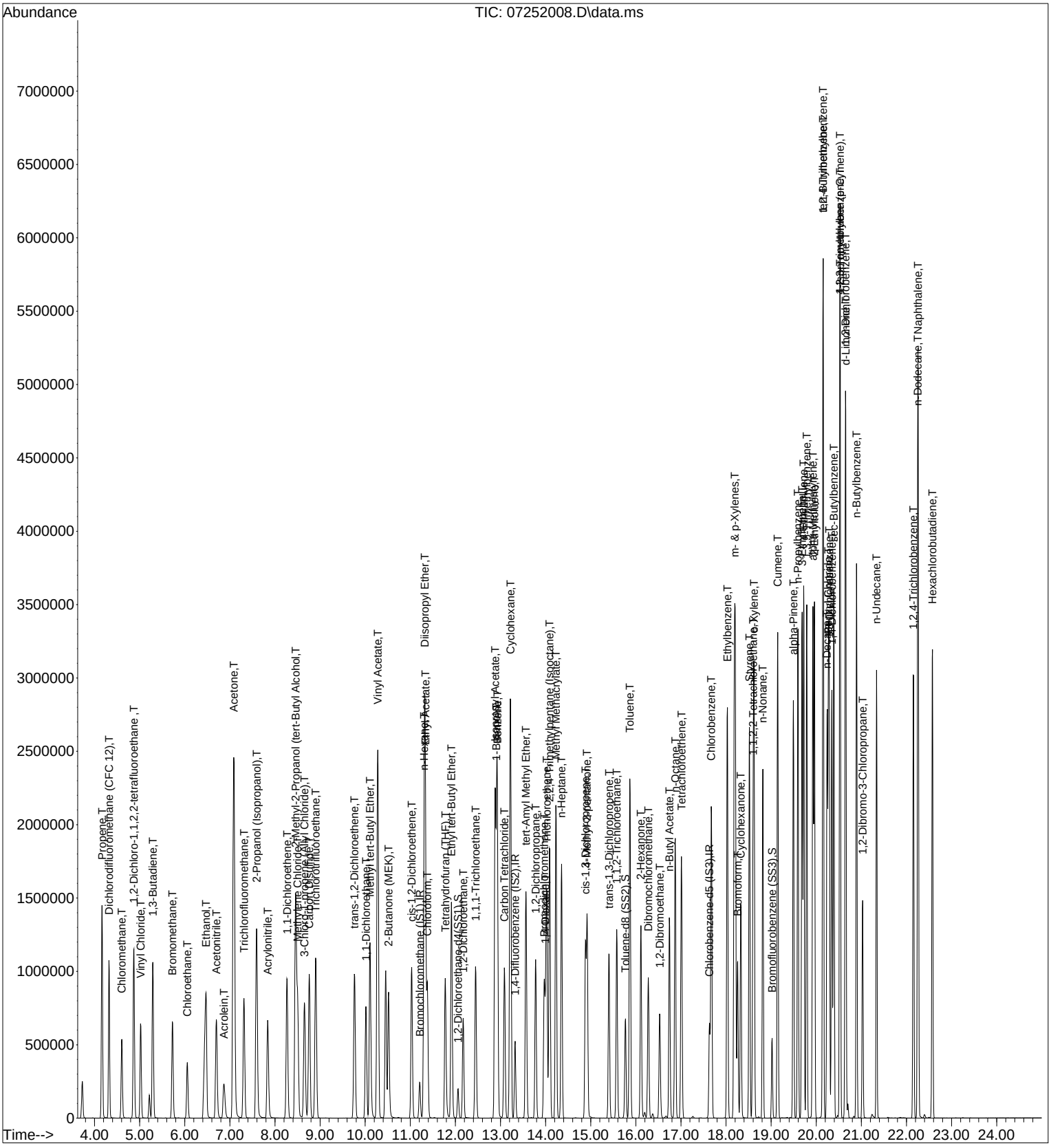
Quant Time: Jul 25 16:12:40 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:10:57 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.35	71	546180	48.206	ng	99
52) cis-1,3-Dichloropropene	14.88	75	883730	48.087	ng	99
53) 4-Methyl-2-pentanone	14.92	58	470973	48.019	ng	97
54) trans-1,3-Dichloropropene	15.41	75	816593	49.481	ng	100
55) 1,1,2-Trichloroethane	15.58	97	541291	48.611	ng	100
58) Toluene	15.87	91	2189087	46.764	ng	100
59) 2-Hexanone	16.11	43	981992	41.340	ng	98
60) Dibromochloromethane	16.28	129	682053	49.835	ng	100
61) 1,2-Dibromoethane	16.53	107	630325	50.518	ng	99
62) n-Butyl Acetate	16.74	43	1118504	43.400	ng	99
63) n-Octane	16.87	57	425383	46.420	ng	98
64) Tetrachloroethene	17.01	166	724541	48.053	ng	99
65) Chlorobenzene	17.67	112	1534603	47.522	ng	99
66) Ethylbenzene	18.03	91	2415533	45.721	ng	99
67) m- & p-Xylenes	18.19	91	3705586	88.277	ng	99
68) Bromoform	18.26	173	630510	48.632	ng	100
69) Styrene	18.52	104	1621565	49.299	ng	100
70) o-Xylene	18.62	91	1861688	43.657	ng	100
71) n-Nonane	18.82	43	823477	41.095	ng	98
72) 1,1,2,2-Tetrachloroethane	18.60	83	865821	44.069	ng	100
74) Cumene	19.15	105	2484727	46.563	ng	98
75) alpha-Pinene	19.49	93	1282266	47.403	ng	100
76) n-Propylbenzene	19.59	91	2862716	45.662	ng	99
77) 3-Ethyltoluene	19.69	105	2451547	46.339	ng	99
78) 4-Ethyltoluene	19.72	105	2371487	45.152	ng	99
79) 1,3,5-Trimethylbenzene	19.79	105	2057326	45.038	ng	99
80) alpha-Methylstyrene	19.93	118	1220462	48.847	ng	100
81) 2-Ethyltoluene	19.96	105	2399208	45.551	ng	99
82) 1,2,4-Trimethylbenzene	20.15	105	1904863	39.667	ng	100
83) n-Decane	20.24	57	956180	44.713	ng	99
84) Benzyl Chloride	20.27	91	1820372	44.047	ng	99
85) 1,3-Dichlorobenzene	20.29	146	1349175	46.136	ng	100
86) 1,4-Dichlorobenzene	20.35	146	1379543	48.271	ng	100
87) sec-Butylbenzene	20.39	105	2692684	45.270	ng	99
88) 4-Isopropyltoluene (p-...	20.53	119	2384704	40.998	ng	98
89) 1,2,3-Trimethylbenzene	20.53	105	1929200	40.133	ng	100
90) 1,2-Dichlorobenzene	20.65	146	1243128	44.541	ng	100
91) d-Limonene	20.65	68	682364	40.357	ng	96
92) 1,2-Dibromo-3-Chloropr...	21.03	157	531996	52.336	ng	98
93) n-Undecane	21.34	57	1016097	47.664	ng	98
94) 1,2,4-Trichlorobenzene	22.16	180	1160093	54.546	ng	100
95) Naphthalene	22.26	128	3000143	45.801	ng	99
96) n-Dodecane	22.25	57	867012	41.460	ng	97
97) Hexachlorobutadiene	22.58	225	747885	53.209	ng	100
98) Cyclohexanone	18.33	55	685366	43.168	ng	99
99) tert-Butylbenzene	20.15	119	1907285	40.380	ng	99
100) n-Butylbenzene	20.89	91	2121221	44.262	ng	99

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Data File : I:\MS13\DATA\2020_07\25\07252008.D Vial: 15
Acq On : 25 Jul 2020 15:12 Operator: WA
Sample : 50ng R13072520 ICAL STD Inst : MS13
Misc : S34-06182001/S34-07232001 (8/21)

Quant Time: Jul 25 16:12:40 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:10:57 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_07\25\07252009.D Vial: 15
Acq On : 25 Jul 2020 15:46 Operator: WA
Sample : 100ng R13072520 ICAL STD Inst : MS13
Misc : S34-06182001/S34-07232001 (8/21)

Quant Time: Jul 25 16:12:42 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:10:57 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M

WA 7/26/20

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.22	130	126887	12.500	ng		0.01
37) 1,4-Difluorobenzene (IS2)	13.33	114	539697	12.500	ng		0.01
56) Chlorobenzene-d5 (IS3)	17.63	82	234338	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.07	65	157297	9.681	ng		0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 77.44%				
57) Toluene-d8 (SS2)	15.77	98	587712	12.389	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.12%				
73) Bromofluorobenzene (SS3)	19.02	174	202480	13.475	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 107.76%				
Target Compounds							Qvalue
2) Propene	4.18	42	1227029	95.399	ng		98
3) Dichlorodifluoromethan...	4.33	85	1966014	74.742	ng		100
4) Chloromethane	4.61	50	870510	53.405	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.88	135	1170678	66.070	ng		99
6) Vinyl Chloride	5.03	62	1486764	70.846	ng		99
7) 1,3-Butadiene	5.30	54	1097541	75.345	ng		99
8) Bromomethane	5.74	94	1023313	93.082	ng		100
9) Chloroethane	6.07	64	794307	101.535	ng		100
10) Ethanol	6.52	45	3212085	353.574	ng		100
11) Acetonitrile	6.73	41	1836250	94.541	ng		99
12) Acrolein	6.88	56	688415	102.326	ng		100
13) Acetone	7.11	58	2937023	328.540	ng		96
14) Trichlorofluoromethane	7.33	101	1752898	77.111	ng		99
15) 2-Propanol (Isopropanol)	7.62	45	3727706	134.336	ng		99
16) Acrylonitrile	7.86	53	1390174	104.962	ng		100
17) 1,1-Dichloroethene	8.28	96	1073686	93.172	ng		97
18) 2-Methyl-2-Propanol (t...	8.48	59	2970318	105.450	ng		99
19) Methylene Chloride	8.51	84	1044664	85.147	ng		95
20) 3-Chloro-1-propene (Al...	8.66	41	1409238	83.082	ng		96
21) Trichlorotrifluoroethane	8.91	151	1050862	92.959	ng		96
22) Carbon Disulfide	8.77	76	3679816	79.977	ng		100
23) trans-1,2-Dichloroethene	9.77	61	1416854	90.962	ng		97
24) 1,1-Dichloroethane	10.02	63	1731899	89.919	ng		99
25) Methyl tert-Butyl Ether	10.11	73	3029368	86.442	ng		99
26) Vinyl Acetate	10.30	86	1070672	314.852	ng	#	77
27) 2-Butanone (MEK)	10.53	72	719664	86.258	ng		93
28) cis-1,2-Dichloroethene	11.04	61	1316259	85.023	ng		98
29) Diisopropyl Ether	11.33	87	717264	61.608	ng	#	89
30) Ethyl Acetate	11.35	61	559021	124.929	ng		93
31) n-Hexane	11.31	57	1300120	69.049	ng		98
32) Chloroform	11.39	83	1669439	79.804	ng		100
34) Tetrahydrofuran (THF)	11.78	72	703079	93.745	ng		96
35) Ethyl tert-Butyl Ether	11.92	87	1261028	88.454	ng		94
36) 1,2-Dichloroethane	12.18	62	1206138	72.660	ng		99
38) 1,1,1-Trichloroethane	12.45	97	1535988	81.839	ng		100
39) Isopropyl Acetate	12.89	61	1038094	135.932	ng		96
40) 1-Butanol	12.94	56	1627153	130.980	ng		96
41) Benzene	12.94	78	3287781	69.540	ng		99
42) Carbon Tetrachloride	13.09	117	1459272	81.468	ng		100
43) Cyclohexane	13.23	84	2750796	148.422	ng		95
44) tert-Amyl Methyl Ether	13.57	73	2785715	85.710	ng		99
45) 1,2-Dichloropropane	13.78	63	960881	92.715	ng		99
46) Bromodichloromethane	13.97	83	1331917	82.851	ng		100
47) Trichloroethene	14.03	130	1209644	88.116	ng		99
48) 1,4-Dioxane	14.01	88	836435	84.740	ng		97
49) 2,2,4-Trimethylpentane...	14.10	57	3627693	82.446	ng		97
50) Methyl Methacrylate	14.24	100	866656	173.940	ng		90

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_07\25\07252009.D Vial: 15
Acq On : 25 Jul 2020 15:46 Operator: WA
Sample : 100ng R13072520 ICAL STD Inst : MS13
Misc : S34-06182001/S34-07232001 (8/21)

Quant Time: Jul 25 16:12:42 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:10:57 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M

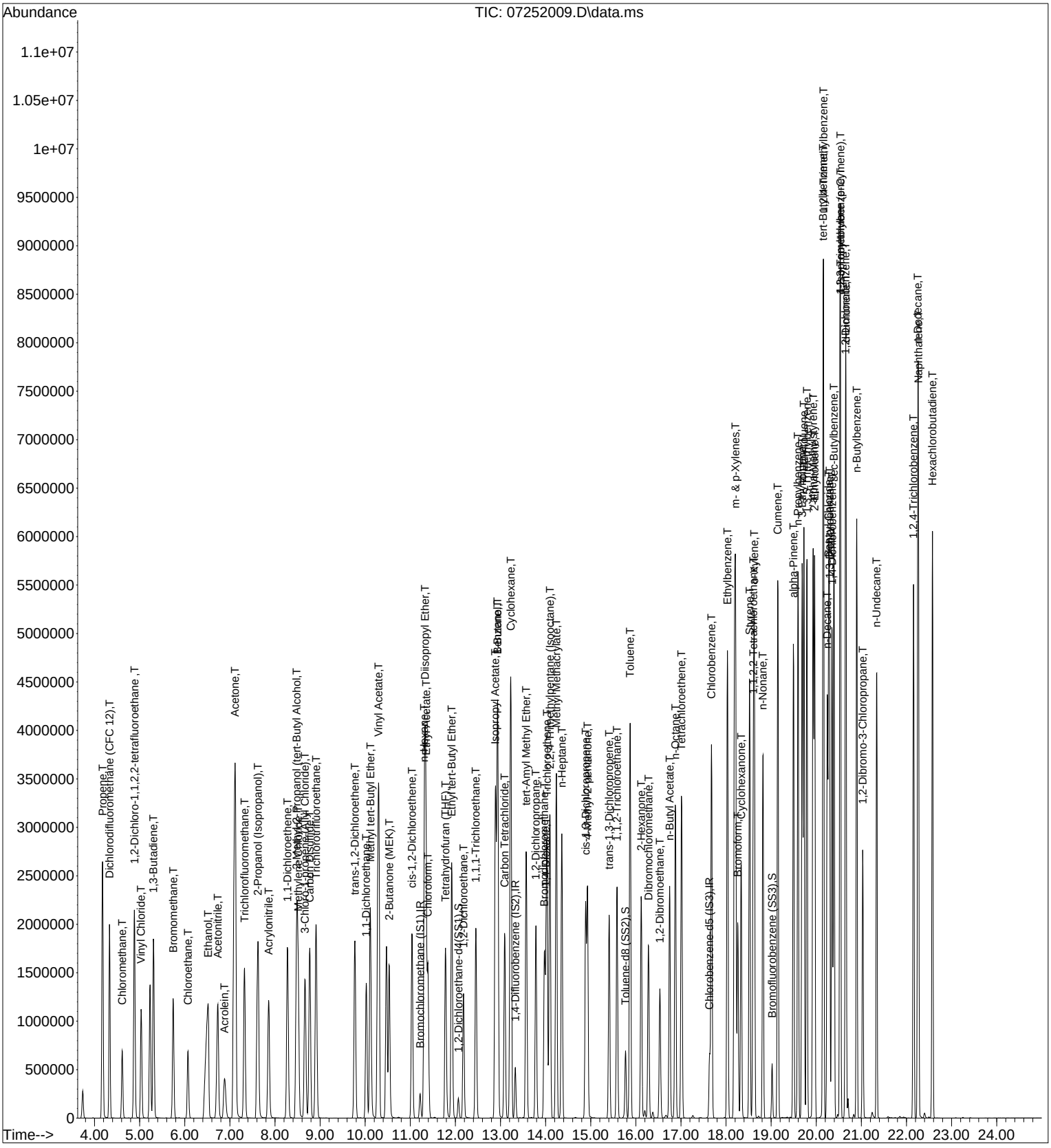
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.36	71	981309	85.638	ng	98
52) cis-1,3-Dichloropropene	14.89	75	1632128	87.812	ng	99
53) 4-Methyl-2-pentanone	14.93	58	854379	86.132	ng	94
54) trans-1,3-Dichloropropene	15.41	75	1533490	91.879	ng	99
55) 1,1,2-Trichloroethane	15.58	97	1017378	90.341	ng	99
58) Toluene	15.87	91	3937807	82.631	ng	99
59) 2-Hexanone	16.12	43	1775503	73.422	ng	97
60) Dibromochloromethane	16.28	129	1307574	93.848	ng	100
61) 1,2-Dibromoethane	16.53	107	1195026	94.080	ng	99
62) n-Butyl Acetate	16.75	43	2004822	76.413	ng	98
63) n-Octane	16.87	57	745384	79.900	ng	95
64) Tetrachloroethene	17.01	166	1401262	91.289	ng	100
65) Chlorobenzene	17.68	112	2822076	85.843	ng	99
66) Ethylbenzene	18.03	91	4294904	79.855	ng	97
67) m- & p-Xylenes	18.21	91	6389670	149.523	ng	99
68) Bromoform	18.26	173	1228998	93.116	ng	99
69) Styrene	18.52	104	2922540	87.277	ng	99
70) o-Xylene	18.63	91	3235864	74.539	ng	99
71) n-Nonane	18.82	43	1357427	66.542	ng	95
72) 1,1,2,2-Tetrachloroethane	18.60	83	1493026	74.647	ng	100
74) Cumene	19.15	105	4333062	79.762	ng	97
75) alpha-Pinene	19.49	93	2255526	81.906	ng	98
76) n-Propylbenzene	19.59	91	4914868	77.006	ng	96
77) 3-Ethyltoluene	19.69	105	4463671	82.878	ng	97
78) 4-Ethyltoluene	19.73	105	3932938	73.555	ng	96
79) 1,3,5-Trimethylbenzene	19.79	105	3609408	77.616	ng	98
80) alpha-Methylstyrene	19.93	118	2167179	85.201	ng	99
81) 2-Ethyltoluene	19.96	105	4167081	77.715	ng	97
82) 1,2,4-Trimethylbenzene	20.16	105	3143620	64.303	ng	100
83) n-Decane	20.24	57	1543492	70.899	ng	97
84) Benzyl Chloride	20.27	91	3120258	74.162	ng	97
85) 1,3-Dichlorobenzene	20.29	146	2428667	81.579	ng	99
86) 1,4-Dichlorobenzene	20.35	146	2515048	86.445	ng	99
87) sec-Butylbenzene	20.39	105	4618760	76.276	ng	96
88) 4-Isopropyltoluene (p-...	20.53	119	3821714	64.539	ng	96
89) 1,2,3-Trimethylbenzene	20.53	105	3177284	64.926	ng	99
90) 1,2-Dichlorobenzene	20.65	146	2100546	73.929	ng	99
91) d-Limonene	20.66	68	1064911	61.866	ng	90
92) 1,2-Dibromo-3-Chloropr...	21.03	157	1021492	98.711	ng	97
93) n-Undecane	21.34	57	1632469	75.220	ng	96
94) 1,2,4-Trichlorobenzene	22.16	180	2179209	100.648	ng	100
95) Naphthalene	22.26	128	4977199	74.637	ng	99
96) n-Dodecane	22.25	57	1337262	62.814	ng	95
97) Hexachlorobutadiene	22.58	225	1439818	100.624	ng	99
98) Cyclohexanone	18.34	55	1248320	77.233	ng	97
99) tert-Butylbenzene	20.15	119	3152087	65.553	ng	99
100) n-Butylbenzene	20.90	91	3620503	74.208	ng	97

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_07\25\07252009.D Vial: 15
Acq On : 25 Jul 2020 15:46 Operator: WA
Sample : 100ng R13072520 ICAL STD Inst : MS13
Misc : S34-06182001/S34-07232001 (8/21)

Quant Time: Jul 25 16:12:42 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:10:57 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M



Data File : I:\MS13\DATA\2020_07\25\07252012.D Vial: 1
Acq On : 25 Jul 2020 17:29 Operator: WA
Sample : 25ng R13072520 ICV STD Inst : MS13
Misc : S34-06182001/S34-07152002 (8/13)

Quant Time: Jul 26 17:29:28 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020 7/26/20
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.21	130	128679	12.500	ng	-0.01
37) 1,4-Difluorobenzene (IS2)	13.32	114	548932	12.500	ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.63	82	239235	12.500	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.05	65	160468	12.227	ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 97.84%			
57) Toluene-d8 (SS2)	15.76	98	596319	12.413	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.28%			
73) Bromofluorobenzene (SS3)	19.02	174	209348	13.059	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 104.48%			
Target Compounds						Qvalue
2) Propene	4.16	42	301272	24.698	ng	99
3) Dichlorodifluoromethan...	4.32	85	541314	25.384	ng	100
4) Chloromethane	4.60	50	374842	25.476	ng	100
5) 1,2-Dichloro-1,1,2,2-t...	4.87	135	299234	25.376	ng	100
6) Vinyl Chloride	5.01	62	401114	25.938	ng	100
7) 1,3-Butadiene	5.28	54	317582	26.529	ng	99
8) Bromomethane	5.71	94	262061	25.289	ng	100
9) Chloroethane	6.04	64	209358	25.790	ng	100
10) Ethanol	6.44	45	941654	121.942	ng	100
11) Acetonitrile	6.68	41	493198	26.581	ng	99
12) Acrolein	6.85	56	178302	26.729	ng	100
13) Acetone	7.07	58	962376	123.663	ng	99
14) Trichlorofluoromethane	7.30	101	462807	24.943	ng	99
15) 2-Propanol (Isopropanol)	7.57	45	1258608	53.754	ng	100
16) Acrylonitrile	7.83	53	371409	28.175	ng	100
17) 1,1-Dichloroethene	8.26	96	285348	26.451	ng	99
18) 2-Methyl-2-Propanol (t...	8.44	59	1346950	57.798	ng	100
19) Methylene Chloride	8.49	84	285649	25.626	ng	100
20) 3-Chloro-1-propene (Al...	8.65	41	378255	25.687	ng	100
21) Trichlorotrifluoroethane	8.90	151	278744	26.484	ng	99
22) Carbon Disulfide	8.75	76	1011372	22.700	ng	100
23) trans-1,2-Dichloroethene	9.76	61	385206	27.817	ng	98
24) 1,1-Dichloroethane	10.01	63	457227	25.476	ng	100
25) Methyl tert-Butyl Ether	10.10	73	847214	26.614	ng	100
26) Vinyl Acetate	10.27	86	342294	144.338	ng	100
27) 2-Butanone (MEK)	10.51	72	194071	27.663	ng	100
28) cis-1,2-Dichloroethene	11.02	61	364830	26.466	ng	99
29) Diisopropyl Ether	11.31	87	243781	25.325	ng	99
30) Ethyl Acetate	11.33	61	193486	59.277	ng	99
31) n-Hexane	11.30	57	430929	25.344	ng	100
32) Chloroform	11.37	83	456279	26.021	ng	99
34) Tetrahydrofuran (THF)	11.78	72	192579	26.203	ng	100
35) Ethyl tert-Butyl Ether	11.91	87	346910	27.538	ng	99
36) 1,2-Dichloroethane	12.17	62	319954	26.860	ng	100
38) 1,1,1-Trichloroethane	12.45	97	416399	26.877	ng	100
39) Isopropyl Acetate	12.87	61	334792	53.498	ng	100
40) 1-Butanol	12.90	56	520833	58.142	ng	98
41) Benzene	12.93	78	1078951	25.606	ng	100
42) Carbon Tetrachloride	13.08	117	383633	26.061	ng	99
43) Cyclohexane	13.22	84	867581	51.348	ng	100
44) tert-Amyl Methyl Ether	13.56	73	788353	26.881	ng	100
45) 1,2-Dichloropropane	13.77	63	272605	26.290	ng	100
46) Bromodichloromethane	13.97	83	362710	27.040	ng	100
47) Trichloroethene	14.02	130	331510	27.191	ng	99
48) 1,4-Dioxane	14.00	88	246527	30.414	ng	100
49) 2,2,4-Trimethylpentane...	14.09	57	1104065	25.342	ng	100
50) Methyl Methacrylate	14.23	100	248375	60.144	ng	99

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_07\25\07252012.D Vial: 1
Acq On : 25 Jul 2020 17:29 Operator: WA
Sample : 25ng R13072520 ICV STD Inst : MS13
Misc : S34-06182001/S34-07152002 (8/13)

Quant Time: Jul 26 17:29:28 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M

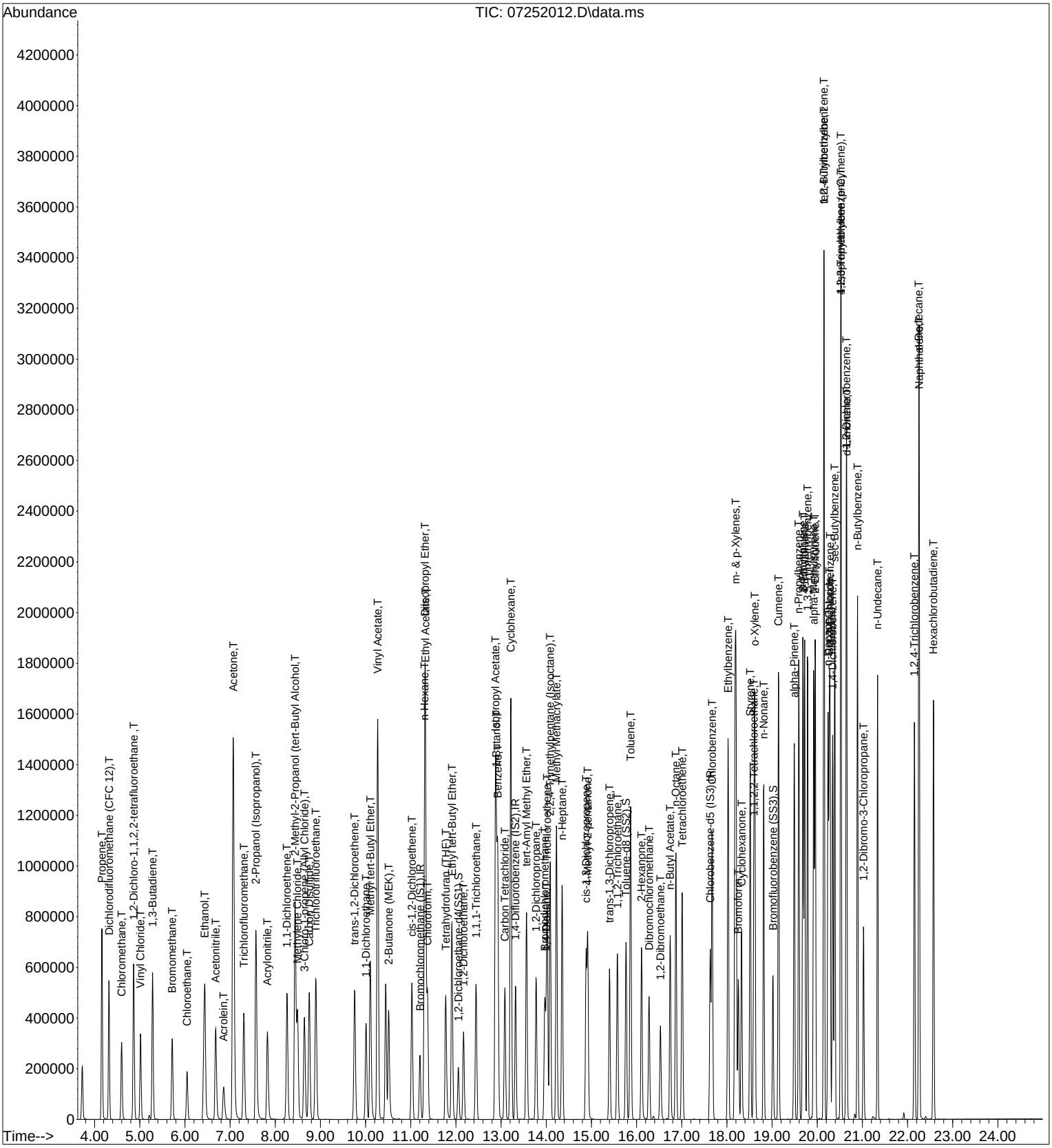
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.35	71	287558	26.518	ng	100
52) cis-1,3-Dichloropropene	14.88	75	481416	29.585	ng	99
53) 4-Methyl-2-pentanone	14.92	58	248379	28.389	ng	99
54) trans-1,3-Dichloropropene	15.40	75	414806	27.975	ng	100
55) 1,1,2-Trichloroethane	15.58	97	279974	27.081	ng	100
58) Toluene	15.87	91	1147873	26.048	ng	100
59) 2-Hexanone	16.11	43	527036	30.055	ng	100
60) Dibromochloromethane	16.28	129	344320	28.337	ng	100
61) 1,2-Dibromoethane	16.53	107	322622	28.710	ng	99
62) n-Butyl Acetate	16.74	43	597476	31.770	ng	99
63) n-Octane	16.87	57	225592	26.109	ng	99
64) Tetrachloroethene	17.01	166	369632	26.075	ng	100
65) Chlorobenzene	17.67	112	800361	26.449	ng	100
66) Ethylbenzene	18.02	91	1278404	26.395	ng	100
67) m- & p-Xylenes	18.20	91	1943841	51.358	ng	100
68) Bromoform	18.25	173	317636	29.898	ng	100
69) Styrene	18.51	104	838412	28.563	ng	100
70) o-Xylene	18.62	91	990479	25.985	ng	100
71) n-Nonane	18.82	43	457117	26.105	ng	100
72) 1,1,2,2-Tetrachloroethane	18.59	83	467944	26.864	ng	100
74) Cumene	19.14	105	1310360	26.410	ng	100
75) alpha-Pinene	19.49	93	661387	26.915	ng	99
76) n-Propylbenzene	19.59	91	1522538	26.395	ng	100
77) 3-Ethyltoluene	19.68	105	1382535	28.338	ng	100
78) 4-Ethyltoluene	19.72	105	1175561	24.929	ng	100
79) 1,3,5-Trimethylbenzene	19.78	105	1088644	26.022	ng	100
80) alpha-Methylstyrene	19.92	118	605989	28.101	ng	99
81) 2-Ethyltoluene	19.95	105	1279773	26.765	ng	100
82) 1,2,4-Trimethylbenzene	20.15	105	1061297	27.044	ng	100
83) n-Decane	20.24	57	527988	27.613	ng	100
84) Benzyl Chloride	20.27	91	952888	31.180	ng	100
85) 1,3-Dichlorobenzene	20.28	146	697332	27.298	ng	100
86) 1,4-Dichlorobenzene	20.34	146	711756	26.700	ng	100
87) sec-Butylbenzene	20.39	105	1441562	26.151	ng	100
88) 4-Isopropyltoluene (p-...	20.52	119	1328099	26.922	ng	100
89) 1,2,3-Trimethylbenzene	20.52	105	1041601	26.355	ng	100
90) 1,2-Dichlorobenzene	20.64	146	666274	27.389	ng	100
91) d-Limonene	20.65	68	376119	28.518	ng	99
92) 1,2-Dibromo-3-Chloropr...	21.02	157	264482	29.664	ng	99
93) n-Undecane	21.34	57	564404	28.334	ng	100
94) 1,2,4-Trichlorobenzene	22.15	180	580340	30.563	ng	100
95) Naphthalene	22.26	128	1620650	30.009	ng	100
96) n-Dodecane	22.25	57	507968	29.296	ng	99
97) Hexachlorobutadiene	22.57	225	379169	27.445	ng	100
98) Cyclohexanone	18.33	55	355302	29.389	ng	100
99) tert-Butylbenzene	20.15	119	1053100	25.957	ng	100
100) n-Butylbenzene	20.89	91	1139099	27.467	ng	100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_07\25\07252012.D Vial: 1
Acq On : 25 Jul 2020 17:29 Operator: WA
Sample : 25ng R13072520 ICV STD Inst : MS13
Misc : S34-06182001/S34-07152002 (8/13)

Quant Time: Jul 26 17:29:28 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M



Initial Calibration Verification/LABORATORY CONTROL SAMPLE CHECK SHEET

WA 7/26/20

Data File Name: **07252012.D** Acq. Method File: **TO15.M**
Data File Path: **I:\MS13\DATA\2020_07\25** Sample Name: **25ng R13072520 ICV STD**
Operator: **WA** Misc Info: **S34-06182001/S34-07152002 (**
Date Acquired: **7/25/2020 17:29** Instrument Name: **MS13**

#	Compound Name	Ret. Time	Amt. (ng)	Spike Amt.(ng)	% Rec.	Lower Limit	Upper Limit	* OR Fail	ICV/AZ 70-130%
2)	**Propene**	**4.16**	**24.7**	26.25	94	**51**	**133**	*	*
3)	**Dichlorodifluoromethane (CFC 1**	**4.32**	**25.4**	**26.25**	97	**64**	**115**	*	*
4)	**Chloromethane**	**4.60**	**25.5**	**26.50**	96	**49**	**127**	*	*
5)	**1,2-Dichloro-1,1,2,2-tetrafluoroet**	**4.87**	**25.4**	**25.75**	99	**65**	**114**	*	*
6)	**Vinyl Chloride**	**5.01**	**25.9**	**26.50**	98	**61**	**129**	*	*
7)	**1,3-Butadiene**	**5.28**	**26.5**	**26.50**	100	**54**	**140**	*	*
8)	**Bromomethane**	**5.71**	**25.3**	**26.50**	95	**68**	**120**	*	*
9)	**Chloroethane**	**6.04**	**25.8**	**26.75**	96	**63**	**123**	*	*
10)	**Ethanol**	**6.44**	**122**	**132.50**	92	**49**	**134**	*	*
11)	**Acetonitrile**	**6.68**	**26.6**	**26.75**	99	**50**	**137**	*	*
12)	**Acrolein**	**6.85**	**26.7**	**25.75**	104	**62**	**128**	*	*
13)	**Acetone**	**7.07**	**124**	**133.50**	93	**56**	**125**	*	*
14)	**Trichlorofluoromethane**	**7.30**	**24.9**	**26.50**	94	**64**	**115**	*	*
15)	**2-Propanol (Isopropanol)**	**7.57**	**53.8**	**52.75**	102	**57**	**133**	*	*
16)	**Acrylonitrile**	**7.83**	**28.2**	**26.50**	106	**64**	**136**	*	*
17)	**1,1-Dichloroethene**	**8.26**	**26.5**	**26.75**	99	**68**	**115**	*	*
18)	2-Methyl-2-Propanol (tert-Butyl Alc	8.44	57.8	53.75	108	56	132	*	*
19)	**Methylene Chloride**	**8.49**	**25.6**	**26.25**	98	**68**	**114**	*	*
20)	**3-Chloro-1-propene (Allyl Chloric**	**8.65**	**25.7**	**26.75**	96	**55**	**139**	*	*
21)	**Trichlorotrifluoroethane**	**8.90**	**26.5**	**27.00**	98	**65**	**115**	*	*
22)	**Carbon Disulfide**	**8.75**	**22.7**	**26.50**	86	**68**	**113**	*	*
23)	**trans-1,2-Dichloroethene**	**9.76**	**27.8**	**26.75**	104	**65**	**122**	*	*
24)	**1,1-Dichloroethane**	**10.01**	**25.5**	**26.50**	96	**63**	**118**	*	*
25)	**Methyl tert-Butyl Ether**	**10.10**	**26.6**	**26.75**	99	**57**	**131**	*	*
26)	**Vinyl Acetate**	**10.27**	**144**	**133.25**	108	**71**	**128**	*	*
27)	**2-Butanone (MEK)**	**10.51**	**27.7**	**26.50**	105	**67**	**123**	*	*
28)	**cis-1,2-Dichloroethene**	**11.02**	**26.5**	**26.50**	100	**64**	**120**	*	*
29)	Diisopropyl Ether	11.31	25.3	27.00	94	62	121	*	*
30)	**Ethyl Acetate**	**11.33**	**59.3**	**54.00**	110	**64**	**131**	*	*
31)	**n-Hexane**	**11.30**	**25.3**	**27.00**	94	**58**	**125**	*	*
32)	**Chloroform**	**11.37**	**26.0**	**26.75**	97	**65**	**114**	*	*
34)	**Tetrahydrofuran (THF)**	**11.78**	**26.2**	**27.50**	95	**65**	**115**	*	*
35)	Ethyl tert-Butyl Ether	11.91	27.5	26.75	103	61	130	*	*
36)	**1,2-Dichloroethane**	**12.17**	**26.9**	**26.75**	101	**59**	**120**	*	*
38)	**1,1,1-Trichloroethane**	**12.45**	**26.9**	**26.75**	101	**66**	**115**	*	*
39)	Isopropyl Acetate	12.87	53.5	52.50	102	65	129	*	*
40)	1-Butanol	12.90	58.1	53.25	109	58	140	*	*
41)	**Benzene**	**12.93**	**25.6**	**26.25**	98	**66**	**109**	*	*
42)	**Carbon Tetrachloride**	**13.08**	**26.1**	**26.00**	100	**66**	**119**	*	*
43)	**Cyclohexane**	**13.22**	**51.3**	**52.75**	97	**67**	**117**	*	*
44)	tert-Amyl Methyl Ether	13.56	26.9	**26.75**	101	62	133	*	*
45)	**1,2-Dichloropropane**	**13.77**	**26.3**	**26.75**	98	**66**	**119**	*	*
46)	**Bromodichloromethane**	**13.97**	**27.0**	**27.25**	99	**71**	**119**	*	*
47)	**Trichloroethene**	**14.02**	**27.2**	**27.00**	101	**70**	**114**	*	*
48)	**1,4-Dioxane**	**14.00**	**30.4**	**27.00**	113	**71**	**117**	*	*
49)	2,2,4-Trimethylpentane (Isooctane)	14.09	25.3	26.75	95	61	122	*	*

Initial Calibration Verification/LABORATORY CONTROL SAMPLE CHECK SHEET

Data File Name: **07252012.D** **TO15.M**
Data File Path: **I:\MS13\DATA\2020_07\25** Sample Name: **25ng R13072520 ICV STD**
Operator: **WA** Misc Info: **S34-06182001/S34-07152002 (**
Date Acquired: **7/25/2020** **17:29** Instrument Name: **MS13**

#	Compound Name	Ret. Time	Amt. (ng)	Spike Amt.(ng)	% Rec.	Lower Limit	Upper Limit	* OR Fail	ICV/AZ 70-130%
50)	**Methyl Methacrylate**	**14.23**	**60.1**	**53.75**	112	**76**	**121**	*	*
51)	**n-Heptane**	**14.35**	**26.5**	**26.75**	99	**66**	**119**	*	*
52)	**cis-1,3-Dichloropropene**	**14.88**	**29.6**	**26.75**	111	**72**	**125**	*	*
53)	**4-Methyl-2-pentanone**	**14.92**	**28.4**	**26.50**	107	**68**	**130**	*	*
54)	**trans-1,3-Dichloropropene**	**15.40**	**28.0**	**26.50**	106	**71**	**132**	*	*
55)	**1,1,2-Trichloroethane**	**15.58**	**27.1**	**26.75**	101	**70**	**117**	*	*
58)	**Toluene**	**15.87**	**26.0**	**26.50**	98	**67**	**113**	*	*
59)	**2-Hexanone**	**16.11**	**30.1**	**27.00**	111	**62**	**135**	*	*
60)	**Dibromochloromethane**	**16.28**	**28.3**	**26.75**	106	**73**	**126**	*	*
61)	**1,2-Dibromoethane**	**16.53**	**28.7**	**26.75**	107	**71**	**122**	*	*
62)	**n-Butyl Acetate**	**16.74**	**31.8**	**27.25**	117	**65**	**134**	*	*
63)	**n-Octane**	**16.87**	**26.1**	**27.00**	97	**63**	**120**	*	*
64)	**Tetrachloroethene**	**17.01**	**26.1**	**26.00**	100	**64**	**120**	*	*
65)	**Chlorobenzene**	**17.67**	**26.4**	**26.75**	99	**65**	**116**	*	*
66)	**Ethylbenzene**	**18.02**	**26.4**	**26.50**	100	**65**	**117**	*	*
67)	**m- & p-Xylenes**	**18.20**	**51.4**	**53.25**	97	**64**	**121**	*	*
68)	**Bromoform**	**18.25**	**29.9**	**26.75**	112	**72**	**130**	*	*
69)	**Styrene**	**18.51**	**28.6**	**26.50**	108	**72**	**126**	*	*
70)	**o-Xylene**	**18.62**	**26.0**	**26.75**	97	**64**	**120**	*	*
71)	**n-Nonane**	**18.82**	**26.1**	**26.75**	98	**56**	**132**	*	*
72)	**1,1,2,2-Tetrachloroethane**	**18.59**	**26.9**	**26.75**	101	**66**	**122**	*	*
74)	**Cumene**	**19.14**	**26.4**	**26.75**	99	**64**	**121**	*	*
75)	**alpha-Pinene**	**19.49**	**26.9**	**26.50**	102	**62**	**136**	*	*
76)	**n-Propylbenzene**	**19.59**	**26.4**	**26.75**	99	**65**	**123**	*	*
77)	3-Ethyltoluene	19.68	28.3	26.75	106	62	123	*	*
78)	**4-Ethyltoluene**	**19.72**	**24.9**	**26.25**	**95**	**71**	**126**	*	*
79)	**1,3,5-Trimethylbenzene**	**19.78**	**26.0**	**26.50**	**98**	**65**	**120**	*	*
80)	alpha-Methylstyrene	19.92	28.1	26.50	**106**	70	132	*	*
81)	2-Ethyltoluene	19.95	26.8	26.75	**100**	66	121	*	*
82)	**1,2,4-Trimethylbenzene**	**20.15**	**27.0**	**26.50**	**102**	**63**	**129**	*	*
83)	n-Decane	20.24	27.6	26.75	**103**	61	131	*	*
84)	**Benzyl Chloride**	**20.27**	**31.2**	**26.75**	**117**	**66**	**138**	*	*
85)	**1,3-Dichlorobenzene**	**20.28**	**27.3**	**26.75**	**102**	**65**	**127**	*	*
86)	**1,4-Dichlorobenzene**	**20.34**	**26.7**	**26.75**	**100**	**66**	**125**	*	*
87)	sec-Butylbenzene	20.39	26.2	26.50	**99**	68	123	*	*
88)	4-Isopropyltoluene (p-Cymene)	20.52	26.9	27.25	**99**	61	129	*	*
89)	1,2,3-Trimethylbenzene	20.52	26.4	27.00	**98**	60	134	*	*
90)	**1,2-Dichlorobenzene**	**20.64**	**27.4**	**26.75**	**102**	**67**	**128**	*	*
91)	**d-Limonene**	**20.65**	**28.5**	**26.50**	**108**	**65**	**136**	*	*
92)	**1,2-Dibromo-3-Chloropropane**	**21.02**	**29.7**	**26.75**	**111**	**73**	**133**	*	*
93)	n-Undecane	21.34	28.3	27.00	**105**	64	131	*	*
94)	**1,2,4-Trichlorobenzene**	**22.15**	**30.6**	**27.00**	**113**	**62**	**140**	*	*
95)	**Naphthalene**	**22.26**	**30.0**	**26.50**	**113**	**57**	**149**	*	*
96)	n-Dodecane	22.25	29.3	26.50	**111**	41	181	*	*
97)	**Hexachlorobutadiene**	**22.57**	**27.4**	**26.75**	**102**	57	129	*	*
98)	Cyclohexanone	18.33	29.4	25.25	116	61	131	*	*
99)	tert-Butylbenzene	20.15	26.0	26.50	98	62	130	*	*
100)	n-Butylbenzene	20.89	27.5	26.75	103	67	124	*	*

Bold = 75 Compound List

 *** = Pass I:\MS13\0-Instrument Info\0-Security Certificates\ICV_LCS_2019_10111902.CRT** 7/26/2020 5:30 PM

Data File : I:\MS13\DATA\2020_08\31\08312002.D Vial: 1
Acq On : 31 Aug 2020 7:10 Operator: WA
Sample : CCV R13083120_25ng Inst : MS13
Misc : S34-06182001/S34-08212011 (9/19)

Quant Time: Aug 31 09:07:12 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M

8/31/20

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	122	-0.01
2	T	Propene	1.185	1.220	-3.0	122	-0.01
3	T	Dichlorodifluoromethane (CF	2.072	2.067	0.2	119	0.00
4	T	Chloromethane	1.429	1.583	-10.8	128	0.00
5	T	1,2-Dichloro-1,1,2,2-tetraf	1.146	1.145	0.1	118	-0.01
6	T	Vinyl Chloride	1.502	1.567	-4.3	122	-0.01
7	T	1,3-Butadiene	1.163	1.300	-11.8	120	-0.02
8	T	Bromomethane	1.007	1.059	-5.2	122	-0.02
9	T	Chloroethane	0.789	0.842	-6.7	125	-0.02
10	T	Ethanol	0.750	0.759	-1.2	124	-0.07
11	T	Acetonitrile	1.802	1.876	-4.1	119	-0.05
12	T	Acrolein	0.648	0.688	-6.2	116	-0.02
13	T	Acetone	0.756	0.700	7.4	116	-0.04
14	T	Trichlorofluoromethane	1.802	1.712	5.0	115	-0.02
15	T	2-Propanol (Isopropanol)	2.274	2.373	-4.4	118	-0.05
16	T	Acrylonitrile	1.281	1.386	-8.2	117	-0.03
17	T	1,1-Dichloroethene	1.048	1.026	2.1	116	-0.01
18	T	2-Methyl-2-Propanol (tert-B	2.264	2.375	-4.9	115	-0.04
19	T	Methylene Chloride	1.083	1.060	2.1	116	-0.02
20	T	3-Chloro-1-propene (Allyl C	1.430	1.435	-0.3	117	-0.02
21	T	Trichlorotrifluoroethane	1.022	0.988	3.3	115	-0.01
22	T	Carbon Disulfide	4.328	3.785	12.5	117	-0.02
23	T	trans-1,2-Dichloroethene	1.345	1.398	-3.9	116	-0.01
24	T	1,1-Dichloroethane	1.743	1.729	0.8	117	-0.01
25	T	Methyl tert-Butyl Ether	3.092	3.046	1.5	116	-0.01
26	T	Vinyl Acetate	0.230	0.254	-10.4	118	-0.03
27	T	2-Butanone (MEK)	0.681	0.716	-5.1	117	-0.02
28	T	cis-1,2-Dichloroethene	1.339	1.324	1.1	116	-0.01
29	T	Diisopropyl Ether	0.935	0.888	5.0	120	0.00
30	T	Ethyl Acetate	0.317	0.359	-13.2	122	-0.02
31	T	n-Hexane	1.652	1.570	5.0	119	0.00
32	T	Chloroform	1.703	1.697	0.4	119	-0.02
33	S	1,2-Dichloroethane-d4(SS1)	1.275	1.282	-0.5	124	-0.01
34	T	Tetrahydrofuran (THF)	0.714	0.684	4.2	117	0.00
35	T	Ethyl tert-Butyl Ether	1.224	1.245	-1.7	117	0.00
36	T	1,2-Dichloroethane	1.157	1.160	-0.3	116	-0.01
37	IR	1,4-Difluorobenzene (IS2)	1.000	1.000	0.0	120	-0.01
38	T	1,1,1-Trichloroethane	0.353	0.352	0.3	116	0.00
39	T	Isopropyl Acetate	0.143	0.148	-3.5	119	-0.01
40	T	1-Butanol	0.204	0.241	-18.1	120	-0.04
41	T	Benzene	0.960	0.965	-0.5	119	-0.01
42	T	Carbon Tetrachloride	0.335	0.340	-1.5	117	0.00
43	T	Cyclohexane	0.385	0.374	2.9	117	-0.01
44	T	tert-Amyl Methyl Ether	0.668	0.672	-0.6	116	0.00
45	T	1,2-Dichloropropane	0.236	0.233	1.3	117	-0.01
46	T	Bromodichloromethane	0.305	0.312	-2.3	117	0.00
47	T	Trichloroethene	0.278	0.284	-2.2	117	-0.01
48	T	1,4-Dioxane	0.185	0.206	-11.4	117	-0.01
49	T	2,2,4-Trimethylpentane (Iso	0.992	0.965	2.7	118	-0.01
50	T	Methyl Methacrylate	0.094	0.107	-13.8	117	-0.02
51	T	n-Heptane	0.247	0.242	2.0	116	0.00
52	T	cis-1,3-Dichloropropene	0.371	0.406	-9.4	117	0.00
53	T	4-Methyl-2-pentanone	0.199	0.217	-9.0	117	-0.01
54	T	trans-1,3-Dichloropropene	0.338	0.362	-7.1	116	0.00
55	T	1,1,2-Trichloroethane	0.235	0.239	-1.7	116	0.00

00989164

Data File : I:\MS13\DATA\2020_08\31\08312002.D Vial: 1
Acq On : 31 Aug 2020 7:10 Operator: WA
Sample : CCV R13083120_25ng Inst : MS13
Misc : S34-06182001/S34-08212011 (9/19)

Quant Time: Aug 31 09:07:12 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
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	127	0.00
57	S	Toluene-d8 (SS2)	2.510	2.474	1.4	125	0.00
58	T	Toluene	2.303	2.227	3.3	121	0.00
59	T	2-Hexanone	0.916	0.997	-8.8	118	-0.01
60	T	Dibromochloromethane	0.635	0.650	-2.4	118	0.00
61	T	1,2-Dibromoethane	0.587	0.604	-2.9	116	0.00
62	T	n-Butyl Acetate	0.983	1.114	-13.3	119	0.00
63	T	n-Octane	0.451	0.422	6.4	116	0.00
64	T	Tetrachloroethene	0.741	0.707	4.6	117	0.00
65	T	Chlorobenzene	1.581	1.491	5.7	116	0.00
66	T	Ethylbenzene	2.531	2.397	5.3	116	0.00
67	T	m- & p-Xylenes	1.978	1.822	7.9	117	-0.01
68	T	Bromoform	0.555	0.617	-11.2	123	0.00
69	T	Styrene	1.534	1.580	-3.0	116	-0.01
70	T	o-Xylene	1.992	1.846	7.3	117	-0.01
71	T	n-Nonane	0.915	0.859	6.1	117	0.00
72	T	1,1,2,2-Tetrachloroethane	0.910	0.869	4.5	117	-0.01
73	S	Bromofluorobenzene (SS3)	0.838	0.904	-7.9	135	0.00
74	T	Cumene	2.592	2.436	6.0	116	0.00
75	T	alpha-Pinene	1.284	1.281	0.2	118	0.00
76	T	n-Propylbenzene	3.014	2.837	5.9	116	0.00
77	T	3-Ethyltoluene	2.549	2.568	-0.7	118	0.00
78	T	4-Ethyltoluene	2.464	2.259	8.3	115	0.00
79	T	1,3,5-Trimethylbenzene	2.186	2.071	5.3	117	0.00
80	T	alpha-Methylstyrene	1.127	1.208	-7.2	118	-0.01
81	T	2-Ethyltoluene	2.498	2.382	4.6	117	-0.01
82	T	1,2,4-Trimethylbenzene	2.050	2.000	2.4	117	-0.01
83	T	n-Decane	0.999	1.051	-5.2	122	0.00
84	T	Benzyl Chloride	1.597	1.842	-15.3	120	0.00
85	T	1,3-Dichlorobenzene	1.335	1.321	1.0	118	-0.01
86	T	1,4-Dichlorobenzene	1.393	1.343	3.6	118	-0.01
87	T	sec-Butylbenzene	2.880	2.744	4.7	118	0.00
88	T	4-Isopropyltoluene (p-Cymen	2.578	2.489	3.5	117	-0.01
89	T	1,2,3-Trimethylbenzene	2.065	1.984	3.9	116	-0.01
90	T	1,2-Dichlorobenzene	1.271	1.232	3.1	116	0.00
91	T	d-Limonene	0.689	0.731	-6.1	117	0.00
92	T	1,2-Dibromo-3-Chloropropane	0.466	0.508	-9.0	116	0.00
93	T	n-Undecane	1.041	1.052	-1.1	116	0.00
94	T	1,2,4-Trichlorobenzene	0.992	1.076	-8.5	114	0.00
95	T	Naphthalene	2.822	3.074	-8.9	113	0.00
96	T	n-Dodecane	0.906	1.062	-17.2	125	0.00
97	T	Hexachlorobutadiene	0.722	0.715	1.0	118	0.00
98	T	Cyclohexanone	0.632	0.767	-21.4	125	-0.02
99	T	tert-Butylbenzene	2.120	1.998	5.8	117	0.00
100	T	n-Butylbenzene	2.167	2.113	2.5	115	0.00

(#) = Out of Range SPCC's out = 0 CCC's out = 0

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_08\31\08312002.D Vial: 1
Acq On : 31 Aug 2020 7:10 Operator: WA
Sample : CCV R13083120_25ng Inst : MS13
Misc : S34-06182001/S34-08212011 (9/19)

Quant Time: Aug 31 09:07:12 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020 8/31/20
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.21	130	152067	12.500	ng	-0.01
37) 1,4-Difluorobenzene (IS2)	13.32	114	645236	12.500	ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.63	82	294668	12.500	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.05	65	195007	12.574	ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.56%			
57) Toluene-d8 (SS2)	15.76	98	729013	12.320	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.56%			
73) Bromofluorobenzene (SS3)	19.02	174	266495	13.497	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 108.00%			
Target Compounds						Qvalue
2) Propene	4.17	42	393300	27.284	ng	100
3) Dichlorodifluoromethan...	4.33	85	666441	26.445	ng	100
4) Chloromethane	4.60	50	510267	29.347	ng	99
5) 1,2-Dichloro-1,1,2,2-t...	4.87	135	365727	26.244	ng	100
6) Vinyl Chloride	5.02	62	514741	28.166	ng	100
7) 1,3-Butadiene	5.29	54	419000	29.618	ng	98
8) Bromomethane	5.73	94	347825	28.403	ng	99
9) Chloroethane	6.05	64	276726	28.846	ng	100
10) Ethanol	6.44	45	1202961	131.821	ng	100
11) Acetonitrile	6.68	41	599185	27.326	ng	100
12) Acrolein	6.86	56	215514	27.338	ng	99
13) Acetone	7.07	58	1135373	123.455	ng	98
14) Trichlorofluoromethane	7.31	101	551947	25.172	ng	100
15) 2-Propanol (Isopropanol)	7.58	45	1515349	54.766	ng	99
16) Acrylonitrile	7.83	53	442671	28.416	ng	100
17) 1,1-Dichloroethene	8.26	96	337038	26.438	ng	99
18) 2-Methyl-2-Propanol (t...	8.44	59	1560206	56.653	ng	100
19) Methylene Chloride	8.49	84	341773	25.946	ng	99
20) 3-Chloro-1-propene (Al...	8.65	41	471233	27.079	ng	99
21) Trichlorotrifluoroethane	8.90	151	324687	26.104	ng	99
22) Carbon Disulfide	8.75	76	1231804	23.395	ng	100
23) trans-1,2-Dichloroethene	9.76	61	459351	28.070	ng	100
24) 1,1-Dichloroethane	10.01	63	573243	27.028	ng	100
25) Methyl tert-Butyl Ether	10.10	73	1000350	26.592	ng	100
26) Vinyl Acetate	10.27	86	412725	147.270	ng	96
27) 2-Butanone (MEK)	10.51	72	230736	27.831	ng	99
28) cis-1,2-Dichloroethene	11.02	61	426954	26.209	ng	99
29) Diisopropyl Ether	11.32	87	291557	25.630	ng	95
30) Ethyl Acetate	11.33	61	236909	61.417	ng	100
31) n-Hexane	11.30	57	515554	25.658	ng	100
32) Chloroform	11.37	83	552406	26.657	ng	100
34) Tetrahydrofuran (THF)	11.78	72	226640	26.094	ng	99
35) Ethyl tert-Butyl Ether	11.91	87	408884	27.466	ng	100
36) 1,2-Dichloroethane	12.17	62	381044	27.069	ng	100
38) 1,1,1-Trichloroethane	12.45	97	485838	26.679	ng	100
39) Isopropyl Acetate	12.87	61	402843	54.764	ng	98
40) 1-Butanol	12.90	56	647872	61.529	ng	99
41) Benzene	12.92	78	1320298	26.657	ng	100
42) Carbon Tetrachloride	13.08	117	460788	26.631	ng	100
43) Cyclohexane	13.22	84	1023194	51.520	ng	100
44) tert-Amyl Methyl Ether	13.56	73	936929	27.179	ng	100
45) 1,2-Dichloropropane	13.77	63	324522	26.625	ng	100
46) Bromodichloromethane	13.97	83	435076	27.594	ng	100
47) Trichloroethene	14.02	130	391602	27.325	ng	99
48) 1,4-Dioxane	13.99	88	286759	30.097	ng	100
49) 2,2,4-Trimethylpentane...	14.09	57	1332946	26.029	ng	100
50) Methyl Methacrylate	14.22	100	295616	60.899	ng	100

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_08\31\08312002.D Vial: 1
Acq On : 31 Aug 2020 7:10 Operator: WA
Sample : CCV R13083120_25ng Inst : MS13
Misc : S34-06182001/S34-08212011 (9/19)

Quant Time: Aug 31 09:07:12 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M

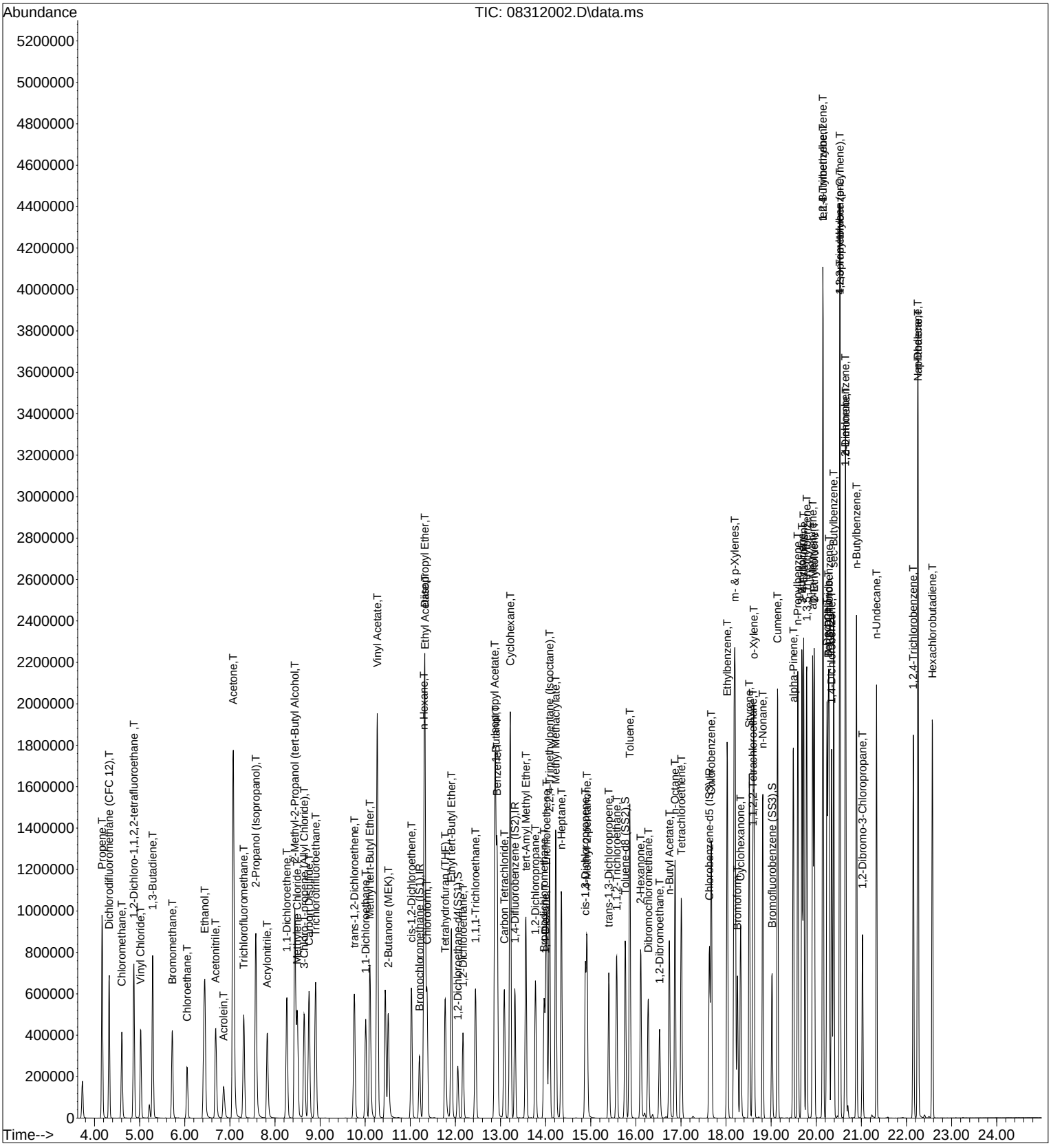
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.35	71	337766	26.499	ng	100
52) cis-1,3-Dichloropropene	14.88	75	545042	28.496	ng	100
53) 4-Methyl-2-pentanone	14.92	58	296900	28.870	ng	99
54) trans-1,3-Dichloropropene	15.40	75	495000	28.401	ng	100
55) 1,1,2-Trichloroethane	15.58	97	330409	27.190	ng	99
58) Toluene	15.87	91	1404425	25.875	ng	100
59) 2-Hexanone	16.11	43	628928	29.118	ng	100
60) Dibromochloromethane	16.28	129	409892	27.387	ng	100
61) 1,2-Dibromoethane	16.53	107	380753	27.509	ng	99
62) n-Butyl Acetate	16.74	43	715366	30.883	ng	99
63) n-Octane	16.87	57	268724	25.250	ng	100
64) Tetrachloroethene	17.01	166	433585	24.832	ng	100
65) Chlorobenzene	17.67	112	940195	25.225	ng	100
66) Ethylbenzene	18.02	91	1511367	25.335	ng	100
67) m- & p-Xylenes	18.19	91	2298113	49.296	ng	100
68) Bromoform	18.25	173	389316	29.751	ng	99
69) Styrene	18.51	104	987249	27.306	ng	100
70) o-Xylene	18.62	91	1164332	24.799	ng	100
71) n-Nonane	18.82	43	541405	25.102	ng	99
72) 1,1,2,2-Tetrachloroethane	18.59	83	548060	25.544	ng	100
74) Cumene	19.14	105	1550175	25.366	ng	100
75) alpha-Pinene	19.49	93	808048	26.698	ng	100
76) n-Propylbenzene	19.59	91	1805633	25.414	ng	100
77) 3-Ethyltoluene	19.68	105	1604034	26.694	ng	100
78) 4-Ethyltoluene	19.72	105	1437564	24.750	ng	100
79) 1,3,5-Trimethylbenzene	19.79	105	1293895	25.110	ng	100
80) alpha-Methylstyrene	19.92	118	761699	28.677	ng	100
81) 2-Ethyltoluene	19.95	105	1516164	25.744	ng	100
82) 1,2,4-Trimethylbenzene	20.15	105	1261285	26.094	ng	100
83) n-Decane	20.24	57	662801	28.142	ng	99
84) Benzyl Chloride	20.27	91	1172150	31.139	ng	100
85) 1,3-Dichlorobenzene	20.28	146	833230	26.481	ng	100
86) 1,4-Dichlorobenzene	20.34	146	847011	25.796	ng	100
87) sec-Butylbenzene	20.39	105	1730419	25.486	ng	100
88) 4-Isopropyltoluene (p-...	20.52	119	1598643	26.310	ng	100
89) 1,2,3-Trimethylbenzene	20.52	105	1274250	26.176	ng	100
90) 1,2-Dichlorobenzene	20.64	146	777020	25.932	ng	99
91) d-Limonene	20.65	68	465570	28.660	ng	99
92) 1,2-Dibromo-3-Chloropr...	21.02	157	314501	28.638	ng	99
93) n-Undecane	21.34	57	669428	27.284	ng	100
94) 1,2,4-Trichlorobenzene	22.15	180	678342	29.004	ng	99
95) Naphthalene	22.26	128	1865927	28.051	ng	100
96) n-Dodecane	22.25	57	650886	30.477	ng	100
97) Hexachlorobutadiene	22.58	225	446613	26.245	ng	100
98) Cyclohexanone	18.32	55	452300	30.374	ng	99
99) tert-Butylbenzene	20.15	119	1260144	25.217	ng	100
100) n-Butylbenzene	20.89	91	1332277	26.082	ng	100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2020_08\31\08312002.D Vial: 1
Acq On : 31 Aug 2020 7:10 Operator: WA
Sample : CCV R13083120_25ng Inst : MS13
Misc : S34-06182001/S34-08212011 (9/19)

Quant Time: Aug 31 09:07:12 2020
Quant Method : I:\MS13\METHODS\R13072520.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Sat Jul 25 16:35:10 2020
Response via : Initial Calibration
DataAcq Meth:TO15.M

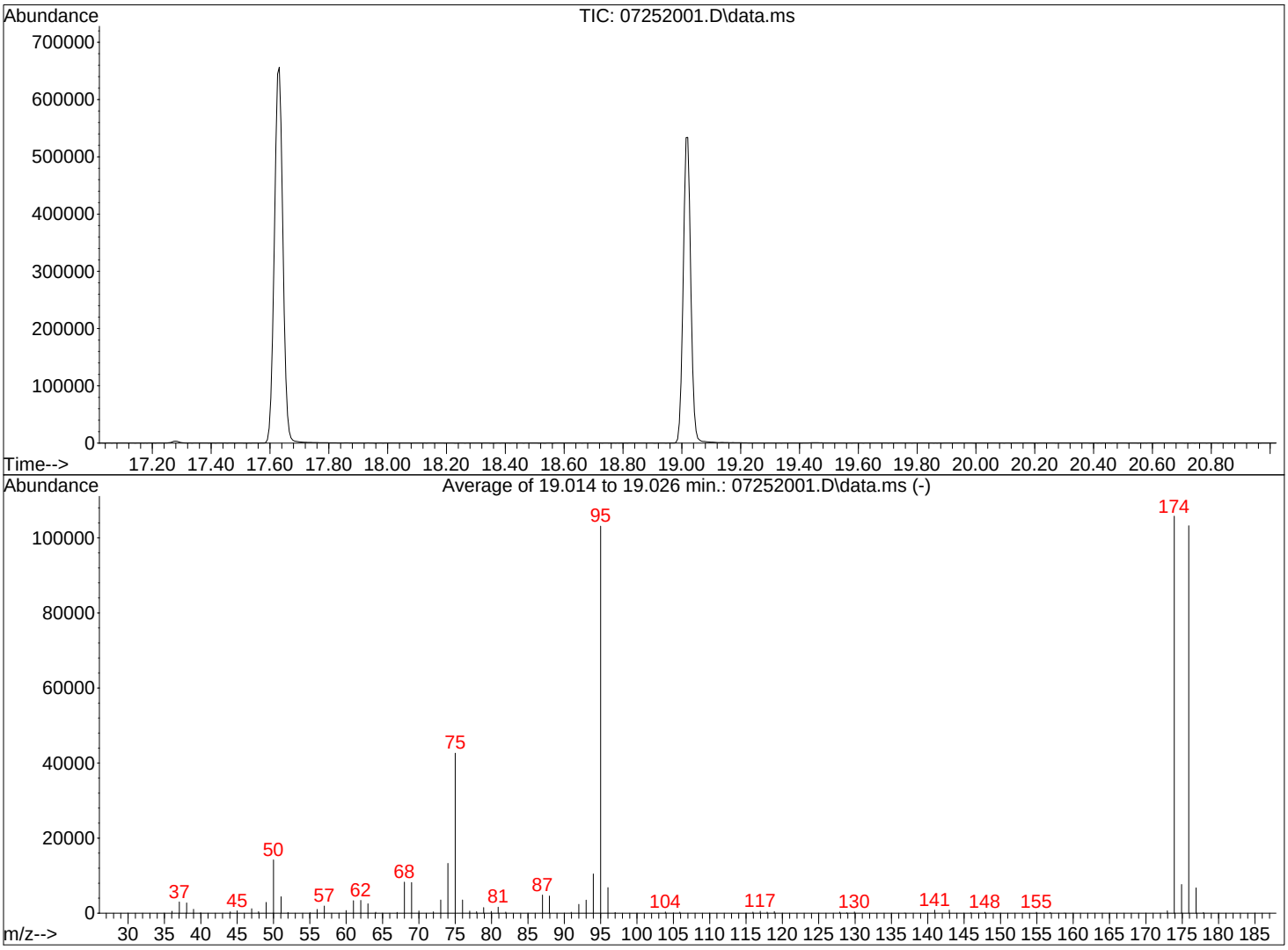


00989168

Data Path : I:\MS13\DATA\2020_07\25\
Data File : 07252001.D
Acq On : 25 Jul 2020 11:15
Operator : WA
Sample : 12.5ng TO15 BFB
Misc : S34-06182001
ALS Vial : 1 Sample Multiplier: 1

Integration File: LSCINT.P

Method : I:\MS13\METHODS\R13072520.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Sat Jul 25 16:35:10 2020



AutoFind: Scans 2705, 2706, 2707; Background Corrected with Scan 2697

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	13.8	14205	PASS
75	95	30	66	41.3	42637	PASS
95	95	100	100	100.0	103139	PASS
96	95	5	9	6.6	6810	PASS
173	174	0.00	2	0.6	635	PASS
174	95	50	120	102.6	105781	PASS
175	174	4	9	7.2	7632	PASS
176	174	93	101	97.6	103227	PASS
177	176	5	9	6.5	6746	PASS

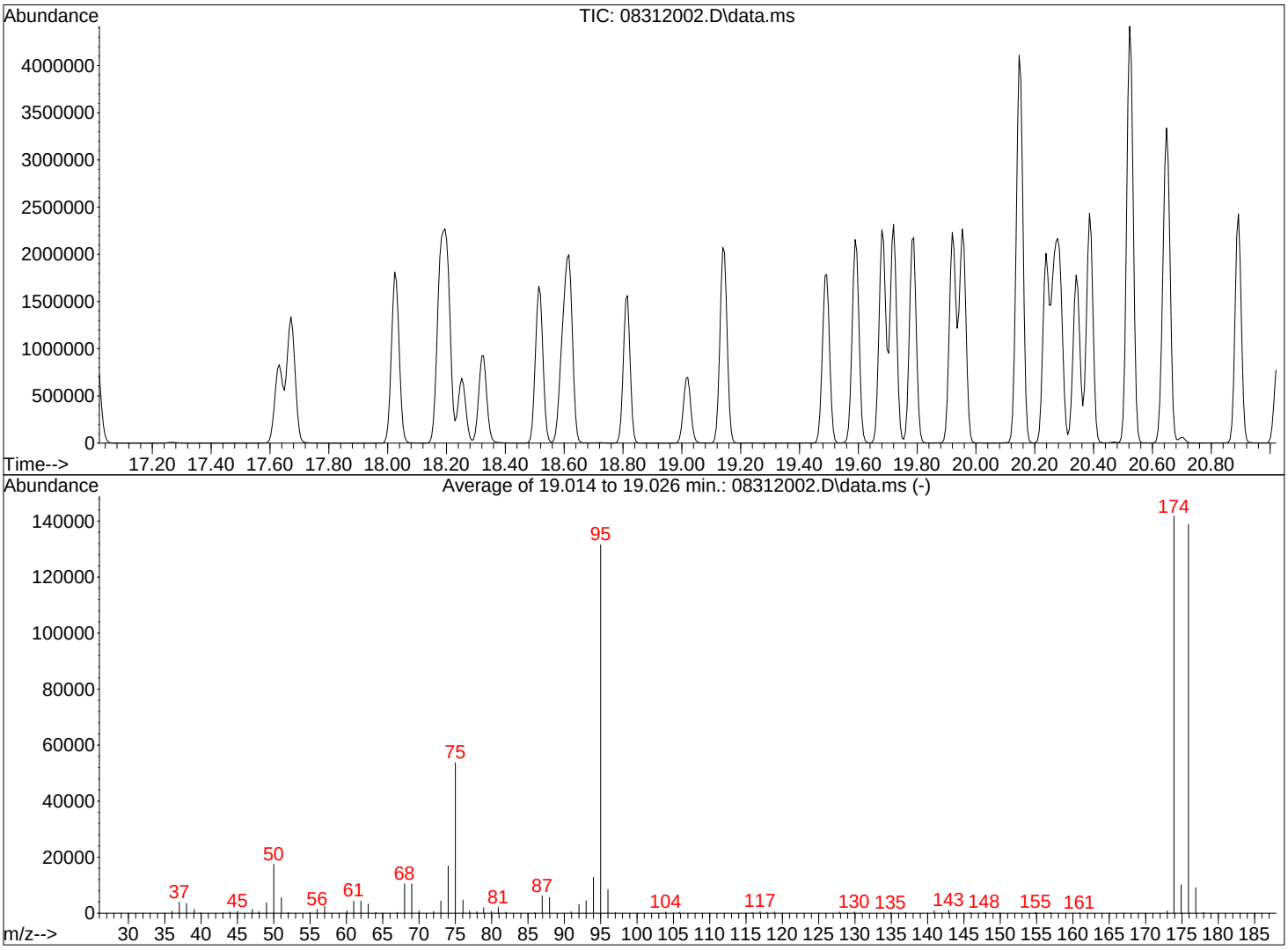
7/26/20

00989169

Data Path : I:\MS13\DATA\2020_08\31\
Data File : 08312002.D
Acq On : 31 Aug 2020 7:10
Operator : WA
Sample : CCV R13083120_25ng
Misc : S34-06182001/S34-08212011 (9/19)
ALS Vial : 1 Sample Multiplier: 1

Integration File: LSCINT.P

Method : I:\MS13\METHODS\R13072520.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Sat Jul 25 16:35:10 2020



AutoFind: Scans 2705, 2706, 2707; Background Corrected with Scan 2697

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	13.3	17506	PASS
75	95	30	66	40.9	53749	PASS
95	95	100	100	100.0	131565	PASS
96	95	5	9	6.4	8404	PASS
173	174	0.00	2	0.6	866	PASS
174	95	50	120	107.8	141776	PASS
175	174	4	9	7.2	10180	PASS
176	174	93	101	97.9	138800	PASS
177	176	5	9	6.6	9102	PASS

8/31/20

Injection Log

Directory: J:\MS13\DATA\2020_07\25\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	7/25/20 11:15	07252001.D	12.5ng TO15 BFB	S34-06182001	WA	1	*Pass*
2	7/25/20 11:48	07252002.D	0.1ng R13072520 ICAL STD	S34-06182001/S34-07232007 (8/21)	WA	13	***R13072520.M***
3	7/25/20 12:22	07252003.D	0.2ng R13072520 ICAL STD	S34-06182001/S34-07232007 (8/21)	WA	13	
4	7/25/20 12:56	07252004.D	0.5ng R13072520 ICAL STD	S34-06182001/S34-07232006 (8/21)	WA	14	
5	7/25/20 13:30	07252005.D	1.0ng R13072520 ICAL STD	S34-06182001/S34-07232006 (8/21)	WA	14	
6	7/25/20 14:04	07252006.D	5.0ng R13072520 ICAL STD	S34-06182001/S34-07232006 (8/21)	WA	14	
7	7/25/20 14:38	07252007.D	25ng R13072520 ICAL STD	S34-06182001/S34-07232001 (8/21)	WA	15	
8	7/25/20 15:12	07252008.D	50ng R13072520 ICAL STD	S34-06182001/S34-07232001 (8/21)	WA	15	
9	7/25/20 15:46	07252009.D	100ng R13072520 ICAL STD	S34-06182001/S34-07232001 (8/21)	WA	15	
10	7/25/20 16:20	07252010.D	Blank	S34-06182001	WA	1	
11	7/25/20 16:54	07252011.D	5.0ng STD check	S34-06182001/S34-07232001 (8/21)	WA	15	
12	7/25/20 17:29	07252012.D	25ng R13072520 ICV STD	S34-06182001/S34-07152002 (8/13)	WA	1	*Pass all cmpds*
13	7/25/20 18:03	07252013.D	25ng R13072520 ICV STD	S34-06182001/S34-07152002 (8/13)	WA	1	*Pass all cmpds*
	R13072520.M: good from 0.1ng --> 100ng, except: Acrolein, Acrylonitrile,Bu-Ac., Cyclohexanone: 0.2ng __> 100ng; MEK, MIBK, 2-hexanone,						
	trans-1,3-DCP, Undecane, Dodecane: 0.5ng --> 100ng; Ethyl-Ac., Bu-Ac, Me-methacrylate: 0.4ng --> 200ng; 1-Butanol: 1ng --> 200ng						

7/27/20

Injection Log

00989171

Directory: I:\MS13\DATA\2020_08\31\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	8/31/20 6:36	08312001.D	CCV C13083120_25ng	S34-06182001/S34-08212014 (9/19)	WA	16	*Passed*
2	8/31/20 7:10	08312002.D	CCV R13083120_25ng	S34-06182001/S34-08212011 (9/19)	WA	1	*Passed*
3	8/31/20 7:44	08312003.D	RL R13083120_0.1ng	S34-06182001/S34-07302002 (8/29)	WA	15	
4	8/31/20 8:19	08312004.D	MB R13083120_1000mL	S34-06182001	WA	1	*Passed*
5	8/31/20 9:00	08312005.D	LCS R13083120_25ng	S34-06182001/S34-08212011 (9/19)	WA	1	*Passed*
6	8/31/20 9:37	08312006.D	P2004783-001dil (15mL)	S34-06182001	WA	5	
7	8/31/20 10:10	08312007.D	P2004783-001dupdil (15mL)	S34-06182001	WA	5	*Passed*
8	8/31/20 10:44	08312008.D	P2004718-001 (3.5mL)	S34-06182001	WA	4	
9	8/31/20 11:18	08312009.D	P2004718-001dil (2.0mL)	S34-06182001	WA	4	
10	8/31/20 11:52	08312010.D	P2004706-001 (5.0mL)	S34-06182001	WA	4	
11	8/31/20 12:26	08312011.D	P2004706-002dil (5.0mL)	S34-06182001	WA	4	
12	8/31/20 13:11	08312012.D	P2004706-002 (50mL)	S34-06182001	WA	6	
13	8/31/20 13:52	08312013.D	P2004784-001 (3.0mL)	S34-06182001	WA	4	
14	8/31/20 14:32	08312014.D	P2004784-002 (400mL)	S34-06182001	WA	13	
15	8/31/20 15:06	08312015.D	P2004726-001 (400mL) pf2	S34-06182001	WA	14	
16	8/31/20 15:39	08312016.D	P2004706-003 (1000mL)	S34-06182001	WA	7	
17	8/31/20 16:13	08312017.D	P2004706-004 (1000mL)	S34-06182001	WA	8	
18	8/31/20 16:47	08312018.D	LCSD R13083120_25ng	S34-06182001/S34-08212011 (9/19)	WA	2	*Passed*
19	8/31/20 17:20	08312019.D	P2004724-001 (1000mL)	S34-06182001	WA	3	
20	8/31/20 17:54	08312020.D	P2004724-002 (1000mL)	S34-06182001	WA	5	
21	8/31/20 18:28	08312021.D	P2004724-003 (400mL)	S34-06182001	WA	9	
22	8/31/20 19:19	08312022.D	P2004793-001 (400mL)	S34-06182001	WA	9	
23	8/31/20 19:52	08312023.D	P2004793-002dil (40mL)	S34-06182001	WA	9	
24	8/31/20 20:26	08312024.D	P2004793-002 (400mL)	S34-06182001	WA	10	
25	8/31/20 20:59	08312025.D	P2004793-003 (400mL)	S34-06182001	WA	11	
26	8/31/20 21:33	08312026.D	P2004793-004 (400mL)	S34-06182001	WA	12	
27	8/31/20 22:08	08312027.D	P2004785-001 (1000mL)	S34-06182001	WA	6	
28	8/31/20 22:42	08312028.D	P2004785-002 (500mL)	S34-06182001	WA	7	
29	8/31/20 23:16	08312029.D	P2004785-002dil (100mL)	S34-06182001	WA	7	
30	8/31/20 23:50	08312030.D	P2004785-003 (500mL)	S34-06182001	WA	8	
31	9/1/20 0:25	08312031.D	P2004785-003dil (100mL)	S34-06182001	WA	8	
32	9/1/20 0:59	08312032.D	P2004717-001 (1000mL)	S34-06182001	WA	13	
33	9/1/20 1:33	08312033.D	P2004717-001dil (100mL)	S34-06182001	WA	10	
34	9/1/20 2:07	08312034.D	CCVend R13083120_25ng	S34-06182001/S34-08212011 (9/19)	WA	1	*Passed*
						WA 9/4/20	

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

WorkOrder: HS20070398

Longhorn GW Treatment Plant Weekly Samples

Bhate Environmental Associates, Inc.

Marcia Olive
445 Union Blvd Ste 129
Lakewood CO 80228

29-Jul-2020

ALS Environmental
ALS Group USA, Corp
1317 South 13th Avenue
Kelso, WA 98626
T : +1 360 577 7222
F : +1 360 636 1068
www.alsglobal.com

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HS20070398 Longhorn GW Treatment Plant Weekly Samples Final

ALS WO# HS20070398

10450 Stancliff Rd. Suite 210
Houston, TX 77099
T: +1 281 530 5656
F: +1 281 530 5887

July 27, 2020

Marcia Olive
Bhate Environmental Associates, Inc.
445 Union Blvd Ste 129
Lakewood, CO 80228

Work Order: **HS20070398**

Laboratory Results for: **Longhorn GW Treatment Plant Weekly Samples**

Dear Marcia Olive,

ALS Environmental received 2 sample(s) on Jul 10, 2020 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
RJ Modashia
Project Manager

ALS Houston, US Date: 27-Jul-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Weekly Samples
Work Order: HS20070398

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS20070398-01	LH18/24-SP650_070920	Water		09-Jul-2020 14:00	10-Jul-2020 09:00	☐
HS20070398-02	LH18/24-SP650_070920-BIX	Water		09-Jul-2020 14:00	10-Jul-2020 09:00	☐

ALS Houston, US Date: 27-Jul-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Weekly Samples
Work Order: HS20070398

CASE NARRATIVE

Work Order Comments

• Analysis of Perchlorate was performed by ALS Houston TX, High Resolution. Laboratory. Final report attached.

The analysis for TOC was subcontracted to ALS Environmental in Kelso WA. Final report attached.

WetChemistry by Method E350.3

Batch ID: R364985

• The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

WetChemistry by Method E365.3

Batch ID: R364860

• The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

ALS Houston, US Date: 27-Jul-20

Client: Bhate Environmental Associates, Inc.
ANALYTICAL REPORT
Project: Longhorn GW Treatment Plant Weekly Samples
WorkOrder:HS20070398
Sample ID: LH18/24-SP650_070920
Lab ID:HS20070398-01
Collection Date: 09-Jul-2020 14:00
Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
AMMONIA AS N BY E350.3(ISE)		**Method:E350.3**						Analyst: MZD
Nitrogen, Ammonia (As N)	**13**	a	**0.20**	**0.20**	**0.20**	**mg/L**	1	14-Jul-2020 10:40
ORTHO PHOSPHATE (PO4) AS P BY E365.3		**Method:E365.3**						Analyst: MZD
Phosphorus, Total Orthophosphate (As P)	**2.17**	a	**0.100**	**0.250**	**0.250**	**mg/L**	10	10-Jul-2020 12:10
SUBCONTRACT ANALYSIS - TOC ANALYSIS		**Method:NA**						Analyst: SUBK
Subcontract Analysis	See Attached		0	0		NA	1	27-Jul-2020 11:17

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

ALS Houston, US Date: 27-Jul-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Weekly Samples
Sample ID: LH18/24-SP650_070920-BIX
Collection Date: 09-Jul-2020 14:00

ANALYTICAL REPORT
WorkOrder:HS20070398
Lab ID:HS20070398-02
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	24-Jul-2020 18:42

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

ALS Houston, US Date: 27-Jul-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS20070398

DATES REPORT

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
Batch ID: R364860 (0)	**Test Name :** ORTHO PHOSPHATE (PO4) AS P BY E365.3				**Matrix:** Water	
HS20070398-01	LH18/24-SP650_070920	09 Jul 2020 14:00			10 Jul 2020 12:10	10
Batch ID: R364985 (0)	**Test Name :** AMMONIA AS N BY E350.3(ISE)				**Matrix:** Water	
HS20070398-01	LH18/24-SP650_070920	09 Jul 2020 14:00			14 Jul 2020 10:40	1
Batch ID: R365632 (0)	**Test Name :** SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)				**Matrix:** Water	
HS20070398-02	LH18/24-SP650_070920-BIX	09 Jul 2020 14:00			24 Jul 2020 18:42	1
Batch ID: R365663 (0)	**Test Name :** SUBCONTRACT ANALYSIS - TOC ANALYSIS				**Matrix:** Water	
HS20070398-01	LH18/24-SP650_070920	09 Jul 2020 14:00			27 Jul 2020 11:17	1

ALS Houston, US Date: 27-Jul-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS20070398

QC BATCH REPORT

Batch ID: R364860 (0) **Instrument:** UV-2450 **Method:** ORTHO PHOSPHATE (PO4) AS P BY E365.3

MBLK Sample ID: **MBLK-R364860** Units: **mg/L** Analysis Date: **10-Jul-2020 12:10**
Client ID: Run ID: **UV-2450_364860** SeqNo: **5658124** 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)	0.0250	0.0250								U

LCS Sample ID: **LCS-R364860** Units: **mg/L** Analysis Date: **10-Jul-2020 12:10**
Client ID: Run ID: **UV-2450_364860** SeqNo: **5658123** 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)	0.273	0.0250	0.25	0	109	85 - 115				

MS Sample ID: **HS20070398-01MS** Units: **mg/L** Analysis Date: **10-Jul-2020 12:10**
Client ID: **LH18/24-SP650_070920** Run ID: **UV-2450_364860** SeqNo: **5658126** 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)	4.64	0.250	2.5	2.17	98.8	80 - 120				

MSD Sample ID: **HS20070398-01MSD** Units: **mg/L** Analysis Date: **10-Jul-2020 12:10**
Client ID: **LH18/24-SP650_070920** Run ID: **UV-2450_364860** SeqNo: **5658125** 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)	4.66	0.250	2.5	2.17	99.6	80 - 120	4.64	0.43	20	

The following samples were analyzed in this batch: HS20070398-01

ALS Houston, US Date: 27-Jul-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS20070398

QC BATCH REPORT

Batch ID: R364985 (0) **Instrument: WetChem_HS** **Method: AMMONIA AS N BY E350.3(ISE)**

MBLK Sample ID: **MBLK-364985** Units: **mg/L** Analysis Date: **14-Jul-2020 10:40**
Client ID: Run ID: **WetChem_HS_364985** SeqNo: **5660916** 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)	0.20	0.20								U

LCS Sample ID: **LCS-364985** Units: **mg/L** Analysis Date: **14-Jul-2020 10:40**
Client ID: Run ID: **WetChem_HS_364985** SeqNo: **5660917** 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)	10.59	0.20	10	0	106	80 - 120				

MS Sample ID: **HS20070413-01MS** Units: **mg/L** Analysis Date: **14-Jul-2020 10:40**
Client ID: Run ID: **WetChem_HS_364985** SeqNo: **5660919** 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)	11.63	0.20	10	0.749	109	80 - 120				

MSD Sample ID: **HS20070413-01MSD** Units: **mg/L** Analysis Date: **14-Jul-2020 10:40**
Client ID: Run ID: **WetChem_HS_364985** SeqNo: **5660920** 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)	11.63	0.20	10	0.749	109	80 - 120	11.63	0.0258	20	

The following samples were analyzed in this batch: HS20070398-01

ALS Houston, US Date: 27-Jul-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Weekly Samples
WorkOrder: **HS20070398**

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	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

Acronym	Description
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 Quantitaion Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Arkansas	20-030-0	26-Mar-2021
Dept of Defense	ANAB L2231 V009	22-Dec-2021
Illinois	2000322020-4	09-May-2021
Kansas	E-10352 2019-2020	31-Jul-2020
North Carolina	624-2020	31-Dec-2020
Oklahoma	2019-141	31-Aug-2020
Texas	T104704231-20-26	30-Apr-2021

ALS Houston, US Date: 27-Jul-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Weekly Samples
Work Order: HS20070398

SAMPLE TRACKING

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS20070398-01	LH18/24-SP650_070920	Login	7/10/2020 10:44:34 AM	PMG	WET345
HS20070398-01	LH18/24-SP650_070920	Login	7/10/2020 10:44:34 AM	PMG	WET345
HS20070398-01	LH18/24-SP650_070920	Login	7/10/2020 10:44:34 AM	PMG	Sub
HS20070398-02	LH18/24-SP650_070920-BIX	Login	7/10/2020 10:44:34 AM	PMG	Sub

ALS Houston, US Date: 27-Jul-20

Sample Receipt Checklist

Work Order ID: HS20070398 **Date/Time Received:** **10-Jul-2020 09:00**

Client Name: Bhate Environmental **Received by:** **Jared R. Makan**

Completed By:	/S/ Paresh M. Giga	10-Jul-2020 10:45	**Reviewed by:**	/S/ RJ Modashia	10-Jul-2020 13:46
	eSignature	Date/Time		eSignature	Date/Time

Matrices: **Water** Carrier 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 ☐	COC IDs:None
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):	0.6C U/C	IR31	
Cooler(s)/Kit(s):	44134		
Date/Time sample(s) sent to storage:	7/10/2020 11:00		
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: R.J Modashia

Project: BHATE
LONGHORN ARMY AMMN. PLANT (LHAAP)
GROUNDWATER TREATMENT PLANT (GWTP)
KARNACK, TEXAS

Project No.
NWO1312.0150.0
16.0001

Job:
GROUNDWATER TREATMENT PLANT WEEKLY SAMPLES

Prepared By:
Scott Beesinger

P.O. Number

HS20070398
Bhate Environmental Associates, Inc.
Longhorn GW Treatment Plant Weekly Samples

Field Sample I.D.	Sample Matrix	Date / Time	MS / MSD	No. OF CONTAINERS	Analyses: AMMONIA-N	TOTAL ORGANIC CARBON	ORTHO-PHOSPHATE	PERCHLORATE							Remarks (Preservatives, etc.)	Lab I.D.#
LH18/24-SP650_070?20	Water	07/0?/20 / 14:00		3	X	X									H2SO4	
LH18/24-SP650_070?20	Water	07/0?/20 / 14:00		1			X								NONE	
LH18/24–SP650_070?20_BIX	Water	07/0?/20 / 14:00		1				X							NONE	

Additional Remarks: **Standard TAT on all parameters**

Relinquished By:	Date	Time	Received By:	Date	Time	Relinquished By:	Date	Time	Received By:	Date	Time
Scott Beesinger	07/0?/20	14:30	Fed Ex								

For Lab Use Only

Received At Lab By:	Date	Time	Airbill No.	Opened By:	Date	Time	Temp of Container	Seal No.	Condition

Remarks:

44134 UIC 0.60
#31
effluent

(Word) S:\M-ces\Forms\Chain of Custody - BiWeekly

ALS
10450 Stancliff Rd., Suite 210
Houston, Texas 77099
Tel. +1 281 530 5656
Fax. +1 281 530 5887

Date:
Name:
Company:

CUSTODY SEAL

Time: 1430

Seal Broken By:

Date:

ORIGIN ID:SGRA (903) 930-8199
SCOTT BEFSINGER
GHATE ENVIRONMENTAL ASSOCIATES
1203 B EAST GRAND AVE.
PMU202
MARSHALL, TX 75670
UNITED STATES US

SHIP DATE: 10MAY20
ACTWGT: 1.00 LB MAN
CAD: 3001390/CAFE3211
DIMS: 26x14x14 IN

TO CLIENT SERVICES
ALS LABORATORY GROUP
10450 STANCLIFF ROAD
SUITE 210
HOUSTON TX 77099
(281) 530- 5656
REF: LHAAP - 18/24 - RJ - BO 71831

RMA:

FedEx Express

FedEx
TRK# 0221 1251 0297 2083

FRI - 10 JUL 10:30A
PRIORITY OVERNIGHT

AB SGRA

77099
TX-US IAH

July 24, 2020 Service Request No:E2000626

RJ Modashia
ALS Laboratory Group
10450 Stancliff Road
Suite 210
Houston, TX 77099-4338

Laboratory Results for: HS20070398

Dear RJ,

Enclosed are the results of the sample(s) submitted to our laboratory July 10, 2020
For your reference, these analyses have been assigned our service request number **E2000626.**

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

ALS Environmental

Client:	ALS Houston	**Service Request No.:**	E2000626
Project:	HS20070400	**Date Received:**	07/10/20
Sample Matrix:	W		

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

Nine samples werereceived for analysis at ALS Environmental in Houston on 07/10/20.

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:

EQ2000302: Laboratory Control Spike/Duplicate Laboratory Control Spike (LCS/DLCS) samples were analyzed and reported in lieu of/in addition to a MS/MSD for this extraction batch. The LCS, LCSD, MS, and MSD recoveries are within QC limits.

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 **Service Request:**E2000626
Project: HS20070398

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
E2000626-001	LH18/24-SP650_070920-BIX	7/9/2020	1400

Service Request Summary

Folder #: **E2000626**
Client Name: ALS Environmental - US
Project Name: HS20070398
Project Number:

Report To: RJ Modashia
ALS Laboratory Group
10450 Stancliff Road
Houston, TX 77099-4338
USA
Phone Number: 281-530-5656
Cell Number:
Fax Number: 281-530-5887
E-mail: rj.modashia@alsglobal.com

Project Chemist: Corey Grandits
Originating Lab: HOUSTON
Logged By: CGRANDITS
Date Received: 07/10/20
Internal Due Date: 7/24/2020
QAP: LAB QAP
Qualifier Set: Lab Standard
Formset: Lab Standard
Merged?: Y
Report to MDL?: Y
P.O. Number: HS20070398
EDD: No EDD Specified

1 250 mL-Plastic Bottle HDPE WM CLEAR Unpreserved
Location: EHRMS-WIC 2B
Pressure Gas:

Lab Samp No.	Client Samp No	Matrix	Collected	HOUSTON ClO4 DOD/6850
E2000626-001	LH18/24-SP650_070920-BIX	Water	07/09/20 1400	**IV**

Service Request Summary

Folder #: **E2000626**
Client Name: ALS Environmental - US
Project Name: HS20070398
Project Number:

Report To: RJ Modashia
ALS Laboratory Group
10450 Stancliff Road
Houston, TX 77099-4338
USA
Phone Number: 281-530-5656
Cell Number:
Fax Number: 281-530-5887
E-mail: rj.modashia@alsglobal.com

Project Chemist: Corey Grandits
Originating Lab: HOUSTON
Logged By: CGRANDITS
Date Received: 07/10/20
Internal Due Date: 7/24/2020
QAP: LAB QAP
Qualifier Set: Lab Standard
Formset: Lab Standard
Merged?: Y
Report to MDL?: Y
P.O. Number: HS20070398
EDD: No EDD Specified

1 250 mL-Plastic Bottle HDPE WM CLEAR Unpreserved
Location: EHRMS-WIC 2B
Pressure Gas:

Test Comments:

Group	Test/Method	Samples	Comments
Semivoa GCMS	ClO4 DOD/6850	1	Level II due 7/24,level IV 7/31

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 >=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.
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.
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.
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.

Data Qualifiers

Lab Standard

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

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

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ALS Environmental

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	20-030-0	3/26/2021
Department of Defense	A2LA 2897.01	11/30/2021
Hawaii Department of Health	2020	4/30/2021
Illinois Environmental Protection Agency	2000322020-4	5/9/2021
Kansas Department of Health and Environment	E-10352	7/31/2020
Louisiana Department of Health and Hospitals	LA028-2020	12/31/2020
Maine Department of Health and Human Services	2020016	6/5/2022
Minnesota Department of Health	1785988	12/31/2020
Nebraska Department of Health and Human Services	NE-OS-25-13 (2020)	4/30/2021
Nevada Department of Concervation and Natural Resources	TX026932019-1	7/31/2020
New Hampshire Environmental Laboratory Accreditation Program	209420	4/24/2021
New York Department of Health	11707	3/31/2021
Oklahoma Department of Environmental Quality	2019-067	8/31/2020
Tennessee Department of Environment and Concervation	04016-2020	4/30/2021
Texas Commision on Environmental Quality	T104704231-20-26	4/30/2021
United States Department of Agriculture	P330-19-00299	10/10/2022
Utah Department of Health Environmental Laboratory Certification	TX026932019-9	7/31/2020
Washington Department of Health	C819	11/14/2020

ALS

Chain of Custody

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10450 Stancliff Rd, Suite 210, Houston TX 77099
Phone (713)266-1599 Fax (713)266-0130
www.alsglobal.com

10450 Stancliff Rd., Suite 210
Houston, TX 77099
T: +1 713 266 1599
F: +1 713 266 1599
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 sampleThe 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 6ºC.
- ✓ Tissue samples must be shipped and stored frozen, at -20 to -10ºC.
- ✓ Air samples are shipped and stored cold, at 0 to 6ºC
- ✓ 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
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Preparation Information Benchsheet

Prep Run#: 361870 **Prep WorkFlow:** GenExt28Day **Status:** Prepped
Team: Semivoa GCMS/GRIVERA **Prep Method:** Method **Prep Date/Time:** 7/20/20 10:39

#	Lab Code	Client ID	B#	Method /Test	pH	Cl	Matrix	Amt. Ext.	Sample Description
1	E2000626-001	LH18/24-SP650_070920-BIX	.01	6850/ClO4 DOD			Water	10mL	
2	E2000627-001	50WW08-200708	.01	6850/ClO4 DOD			Ground Water	10mL	
3	E2000627-002	50WW29-200708	.01	6850/ClO4 DOD			Ground Water	10mL	
4	E2000627-003	50WW05-200708	.01	6850/ClO4 DOD			Ground Water	10mL	
5	E2000627-004	50WW14-200709	.01	6850/ClO4 DOD			Ground Water	10mL	
6	E2000627-005	50WW13-200709	.01	6850/ClO4 DOD			Ground Water	10mL	
7	E2000627-006	50WW11-200709	.01	6850/ClO4 DOD			Ground Water	10mL	
8	E2000627-007	50WW11-200709-FD	.01	6850/ClO4 DOD			Ground Water	10mL	
9	E2000627-008	50WW06-200709	.01	6850/ClO4 DOD			Ground Water	10mL	
10	E2000627-009	50WW12-200709	.01	6850/ClO4 DOD			Ground Water	10mL	
11	E2000638-001	LH18/24-SP650_071420-BIX	.01	6850/ClO4 DOD			Ground Water	10mL	
12	E2000639-001	LH18/24-SP650_071420-BIX	.01	6850/ClO4 DOD			Ground Water	10mL	
13	E2000640-001	LH18/24-SP140_071420	.01	6850/ClO4 DOD			Ground Water	10mL	
14	E2000660-001	16EW01-200716	.01	6850/ClO4 DOD			Ground Water	10mL	
15	E2000660-003	16EW02-200716	.01	6850/ClO4 DOD			Ground Water	10mL	
16	E2000660-004	16EW02-200716-FD	.01	6850/ClO4 DOD			Ground Water	10mL	
17	E2000660-005	16IW09-200716	.01	6850/ClO4 DOD			Ground Water	10mL	
18	E2000660-006	16RW05-200716	.01	6850/ClO4 DOD			Ground Water	10mL	
19	EQ2000302-01	MB		6850/ClO4 DOD			Liquid	10mL	
20	EQ2000302-02	LCS		6850/ClO4 DOD			Liquid	10mL	
21	EQ2000302-03	DLCS		6850/ClO4 DOD			Liquid	10mL	
22	EQ2000302-04	50WW14-200709 MS	.01	6850/ClO4 DOD			Liquid	10mL	
23	EQ2000302-05	50WW14-200709 DMS	.01	6850/ClO4 DOD			Liquid	10mL	

Spiking Solutions

Name: Sodium Perchlorate 1 ug/mL (IS) (18-O) as CLO4 Inventory ID 202037 Logbook Ref: Sodium Perchlorate Expires On: 05/22/2021

E2000626-001	100.00µL	E2000627-001	100.00µL	E2000627-002	100.00µL	E2000627-003	100.00µL	E2000627-004	100.00µL	E2000627-005	100.00µL
E2000627-006	100.00µL	E2000627-007	100.00µL	E2000627-008	100.00µL	E2000627-009	100.00µL	E2000638-001	100.00µL	E2000639-001	100.00µL
E2000640-001	100.00µL	E2000660-001	100.00µL	E2000660-003	100.00µL	E2000660-004	100.00µL	E2000660-005	100.00µL	E2000660-006	100.00µL
EQ2000302-02	100.00µL	EQ2000302-03	100.00µL	EQ2000302-04	100.00µL	EQ2000302-05	100.00µL				

Name: Perchlorate Intermediate Stock1 Inventory ID 209764 Logbook Ref: Perchlorate Int. Stock1 51820 Expires On: 11/18/2020

EQ2000302-02	1.00µL	EQ2000302-03	1.00µL	EQ2000302-04	10.00µL	EQ2000302-05	10.00µL

Preparation Information Benchsheet

Prep Run#: 361870 **Prep WorkFlow:** GenExt28Day **Status:** Prepped
Team: Semivoa GCMS/GRIVERA **Prep Method:** Method **Prep Date/Time:** 7/20/20 10:39

Preparation Steps

Step: Preparation
Started: 7/20/20 10:39
Finished: 7/20/20 14:00
By: GRIVERA
Comments

Comments: _____

Reviewed By: _____ Date: _____

Chain of Custody

Relinquished By: _____ Date: _____ Extracts Examined

Received By: _____ Date: _____ Yes No

Analytical Results

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ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	ALS Environmental - US	**Service Request:**	E2000626
Project:	HS20070398	**Date Collected:**	7/ 9/20 1400
Sample Matrix:	Water	**Date Received:**	7/10/20
Sample Name:	LH18/24-SP650_070920-BIX	**Units:**	µg/L
Lab Code:	E2000626-001	**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	**0.975**		0.200	0.100	0.0500	2	7/20/20	7/24/20 14:23	361870	688371	

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	ALS Environmental - US	**Service Request:**	E2000626
Project:	HS20070398	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Batch QC	**Units:**	µg/L
Lab Code:	E2000627-004	**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	**3.69**		1.00	0.500	0.250	10	7/20/20	7/24/20 15:29	361870	688371	

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	ALS Environmental - US	**Service Request:**	E2000626
Project:	HS20070398	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	µg/L
Lab Code:	EQ2000302-01	**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	7/20/20	7/20/20 13:47	361870	688323	

Accuracy & Precision

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ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070398
Sample Matrix: Water

Service Request: E2000626
Date Analyzed: 7/20/20

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: 361870

	Lab Control Sample EQ2000302-02			Duplicate Lab Control Sample EQ2000302-03					
Analyte Name	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Perchlorate	0.102	0.100	102	0.117	0.100	117	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	**Service Request:**	E2000626
Project:	HS20070398	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Lab Control Sample	**Units:**	µg/L
Lab Code:	EQ2000302-02	**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	**0.102**		0.100	0.0500	0.0250	1	7/20/20	7/20/20 13:55	361870	688323	

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	ALS Environmental - US	**Service Request:**	E2000626
Project:	HS20070398	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Duplicate Lab Control Sample	**Units:**	µg/L
Lab Code:	EQ2000302-03	**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	7/20/20	7/20/20 14:03	361870	688323	

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000626
Project:	HS20070398	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
		Date Analyzed:	7/24/20

Matrix Spike Summary

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

Sample Name:	Batch QC	**Units:**	µg/L
Lab Code:	E2000627-004	**Basis:**	NA

Analytical Method: 6850
Prep Method: Method

		Batch QCMS **Matrix Spike** EQ2000302-04			Batch QCDMS **Duplicate Matrix Spike** EQ2000302-05					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Perchlorate	3.69	4.69	1.00	99	4.79	1.00	110	84 - 119	2	15

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

Results flagged with a pound (#) indicate the control criteria is not applicable.

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	**Service Request:**	E2000626
Project:	HS20070398	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Batch QC	**Units:**	µg/L
Lab Code:	EQ2000302-04	**Basis:**	NA
Run Type:	Matrix Spike		

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	**4.69**		1.00	0.500	0.250	10	7/20/20	7/24/20 14:07	361870	688371	

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	ALS Environmental - US	**Service Request:**	E2000626
Project:	HS20070398	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Batch QC	**Units:**	µg/L
Lab Code:	EQ2000302-05	**Basis:**	NA
Run Type:	Duplicate Matrix Spike		

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	**4.79**		1.00	0.500	0.250	10	7/20/20	7/24/20 15:45	361870	688371	

Initial Calibration

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20200720

ALS Environmental

1st Review: Kneir
2nd Review: Hvan

Injection Log
LCMS01 -Shimadzu 8050

ICAL Date: 7/20/2020
Cal. Std. xp: 11/18/2020
ICAL ID: EC2000014

Mobile Phases **A:** 0.75% Formic Acid/Water 3100807-09 **B:** MeOH 3100802-01

			File Name	Acquisition Method	Dilution	R	Comments
1	PERCHLORATE1		20200720_006	Perchlorate6850b.lcm	1x	☒	3100806-05
2	PERCHLORATE2		20200720_007	Perchlorate6850b.lcm	1x	☒	3100806-06
3	PERCHLORATE3		20200720_008	Perchlorate6850b.lcm	1x	☒	3100806-07
4	PERCHLORATE4		20200720_009	Perchlorate6850b.lcm	1x	☒	3100807-01
5	PERCHLORATE5		20200720_016	Perchlorate6850b.lcm	1x	☒	3100807-02
6	PERCHLORATE6		20200720_011	Perchlorate6850b.lcm	1x	☒	3100807-03
7	PERCHLORATE7		20200720_012	Perchlorate6850b.lcm	1x	☒	3100807-04
8	PERCHLORATE8		20200720_013	Perchlorate6850b.lcm	1x	☒	3100807-05
9	PERCHLORATE9		20200720_014	Perchlorate6850b.lcm	1x	☒	3100807-06
10	PERCHLORATE10		20200720_015	Perchlorate6850b.lcm	1x	☒	3100807-07
11	PERCHLORATEICV		20200720_017	Perchlorate6850b.lcm	1x	☒	3100807-08
12	IB		20200720_018	Perchlorate6850b.lcm	1x	☒	
13	IB		20200720_019	Perchlorate6850b.lcm	1x	☒	
14	LODV		20200720_020	Perchlorate6850b.lcm	1x	☒	
15	ICS		20200720_021	Perchlorate6850b.lcm	1x	☒	
16	PERCHLORATE7		20200720_022	Perchlorate6850b.lcm	1x	☒	3100807-04
17	EQ2000302-01		20200720_023	Perchlorate6850b.lcm	1x	☒	
18	EQ2000302-02		20200720_024	Perchlorate6850b.lcm	1x	☒	
19	EQ2000302-03		20200720_025	Perchlorate6850b.lcm	1x	☒	
20	EQ2000302-04		20200720_026	Perchlorate6850b.lcm	1x	☒	
21	EQ2000302-05		20200720_027	Perchlorate6850b.lcm	1x	☒	
22	E2000626-001		20200720_028	Perchlorate6850b.lcm	1x	☒	
23	E2000627-001		20200720_029	Perchlorate6850b.lcm	1x	☒	
24	E2000627-002		20200720_030	Perchlorate6850b.lcm	1x	☒	
25	E2000627-003		20200720_031	Perchlorate6850b.lcm	1x	☒	
26	E2000627-004		20200720_032	Perchlorate6850b.lcm	1x	☒	
27	PERCHLORATE7		20200720_033	Perchlorate6850b.lcm	1x	☒	3100807-04
28	E2000627-005		20200720_034	Perchlorate6850b.lcm	1x	☒	
29	E2000627-006		20200720_035	Perchlorate6850b.lcm	1x	☒	
30	E2000627-007		20200720_036	Perchlorate6850b.lcm	1x	☒	
31	E2000627-008		20200720_037	Perchlorate6850b.lcm	1x	☒	
32	E2000627-009		20200720_038	Perchlorate6850b.lcm	1x	☒	
33	E2000638-001		20200720_039	Perchlorate6850b.lcm	1x	☒	
34	E2000639-001		20200720_040	Perchlorate6850b.lcm	1x	☒	
35	E2000640-001		20200720_041	Perchlorate6850b.lcm	1x	☒	
36	PERCHLORATE7		20200720_042	Perchlorate6850b.lcm	1x	☒	3100807-04
37	EQ2000303-01		20200720_043	Perchlorate6850b.lcm	1x	☒	
38	EQ2000303-02		20200720_044	Perchlorate6850b.lcm	1x	☒	
39	EQ2000303-03		20200720_045	Perchlorate6850b.lcm	1x	☒	
40	E2000641-001		20200720_046	Perchlorate6850b.lcm	1x	☒	
41	E2000641-002		20200720_047	Perchlorate6850b.lcm	1x	☒	
42	E2000641-003		20200720_048	Perchlorate6850b.lcm	1x	☒	
43	E2000641-004		20200720_049	Perchlorate6850b.lcm	1x	☒	
44	E2000641-005		20200720_050	Perchlorate6850b.lcm	1x	☒	
45	E2000641-006		20200720_051	Perchlorate6850b.lcm	1x	☒	
46	E2000641-007		20200720_052	Perchlorate6850b.lcm	1x	☒	
47	PERCHLORATE7		20200720_053	Perchlorate6850b.lcm	1x	☒	3100807-04
48	E2000641-008		20200720_054	Perchlorate6850b.lcm	1x	☒	
49	E2000641-009		20200720_055	Perchlorate6850b.lcm	1x	☒	
50	E2000648-001		20200720_056	Perchlorate6850b.lcm	1x	☒	
51	E2000648-002		20200720_057	Perchlorate6850b.lcm	1x	☒	
52	E2000648-003		20200720_058	Perchlorate6850b.lcm	1x	☒	

Initial Calibration - Detailed Report

Calibration ID: EC2000014 **Instrument ID:** E-LCMS-01
Column Name: 1

#	Lab Code	Sample Name	File Location	Aquisition Date
01	EC2000014-01	PERCHLORATE1	20200720_006	07/20/2020 10:09
02	EC2000014-02	PERCHLORATE2	20200720_007	07/20/2020 10:17
03	EC2000014-03	PERCHLORATE3	20200720_008	07/20/2020 10:24
04	EC2000014-04	PERCHLORATE4	20200720_009	07/20/2020 10:32
06	EC2000014-06	PERCHLORATE6	20200720_011	07/20/2020 10:48
07	EC2000014-07	PERCHLORATE7	20200720_012	07/20/2020 10:56
08	EC2000014-08	PERCHLORATE8	20200720_013	07/20/2020 11:04
09	EC2000014-09	PERCHLORATE9	20200720_014	07/20/2020 11:12
10	EC2000014-10	PERCHLORATE10	20200720_015	07/20/2020 11:20
05	EC2000014-05	PERCHLORATE5	20200720_016	07/20/2020 12:28

Analyte **Curve Fit** **Weighting**

Perchlorate **Average RF** **RSD = 3.545** **Average RF = 0.121**

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.1000	0.1239	02	0.5000	0.1227	03	0.7000	0.1244	04	1.0000	0.1237
05	2.0000	0.1208	06	5.0000	0.1169	07	10.0000	0.1279	08	20.0000	0.1185
09	30.0000	0.1182	10	50.0000	0.1134						

Analyte

Perchlorate

#	Amount	Calculated Conc	%D	#	Amount	Calculated Conc	%D	#	Amount	Calculated Conc	%D
01	0.1000	0.102	2.3	02	0.5000	0.507	1.4	03	0.7000	0.719	2.7
04	1.0000	1.02	2.2	05	2.0000	2.00	-0.2	06	5.0000	4.83	-3.4
07	10.0000	10.6	5.7	08	20.0000	19.6	-2.1	09	30.0000	29.3	-2.3
10	50.0000	46.8	-6.3								

Initial Calibration Verification Summary Report

Calibration ID:	EC2000014	**Instrument ID:**	E-LCMS-01
Datafile ID:	20200720_017	**Column Name:**	1

Analyte	Lab Code	Type	Curve Fit	True Value	Calc Conc	Units	Result	Criteria
Perchlorate	EC2000014-11	T	Average RF	10	10.475	ng/mL	4.8	<= 15

ALS Group Houston

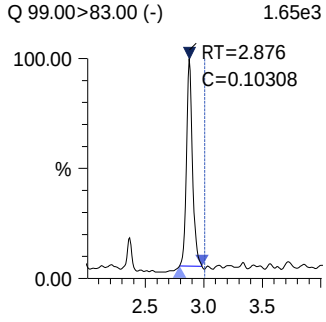
PERCHLORATE1

Date acquired: 7/20/2020 10:09:08 AM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_006.lcd
Vial: 5 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE1	7/20/2020 10:09:08 AM	5665	0.10308	20200720_006	2.876	25.0000	1.0000	5
Sodium Perchlorate-18O4_IS	PERCHLORATE1	7/20/2020 10:09:08 AM	457293	1.00000	20200720_006	2.874	25.0000	1.0000	5

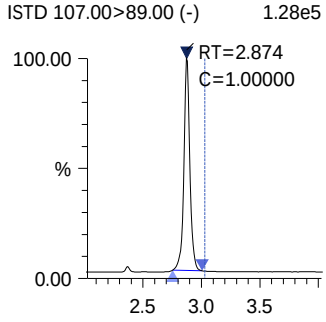
Perchlorate

Conc 0.10308
Area 5665



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 457293



ALS Group Houston

PERCHLORATE2

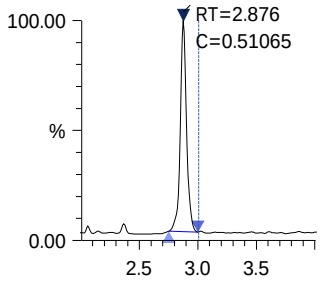
Date acquired: 7/20/2020 10:17:03 AM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_007.lcd
Vial: 6 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE2	7/20/2020 10:17:03 AM	28211	0.51065	20200720_007	2.876	25.0000	1.0000	6
Sodium Perchlorate-18O4_IS	PERCHLORATE2	7/20/2020 10:17:03 AM	459674	1.00000	20200720_007	2.873	25.0000	1.0000	6

Perchlorate

Conc 0.51065
Area 28211

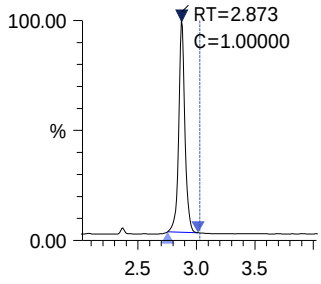
Q 99.00>83.00 (-) 7.64e3



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 459674

ISTD 107.00>89.00 (-) 1.26e5



ALS Group Houston

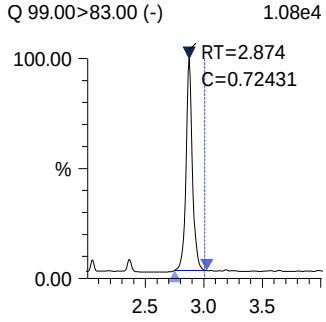
PERCHLORATE3

Date acquired: 7/20/2020 10:24:56 AM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_008.lcd
Vial: 7 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE3	7/20/2020 10:24:56 AM	40510	0.72431	20200720_008	2.874	25.0000	1.0000	7
Sodium Perchlorate-18O4_IS	PERCHLORATE3	7/20/2020 10:24:56 AM	465371	1.00000	20200720_008	2.874	25.0000	1.0000	7

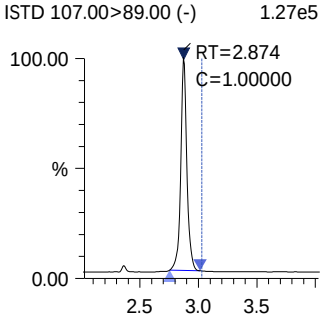
Perchlorate

Conc 0.72431
Area 40510



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 465371



ALS Group Houston

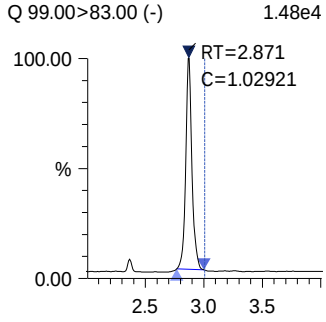
PERCHLORATE4

Date acquired: 7/20/2020 10:32:48 AM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_009.lcd
Vial: 8 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE4	7/20/2020 10:32:48 AM	54285	1.02921	20200720_009	2.871	25.0000	1.0000	8
Sodium Perchlorate-18O4_IS	PERCHLORATE4	7/20/2020 10:32:48 AM	438869	1.00000	20200720_009	2.869	25.0000	1.0000	8

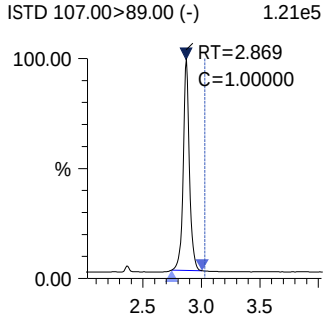
Perchlorate

Conc 1.02921
Area 54285



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 438869



ALS Group Houston

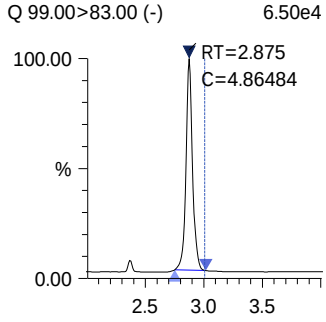
PERCHLORATE6

Date acquired: 7/20/2020 10:48:37 AM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_011.lcd
Vial: 10 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE6	7/20/2020 10:48:37 AM	249126	4.86484	20200720_011	2.875	25.0000	1.0000	10
Sodium Perchlorate-18O4_IS	PERCHLORATE6	7/20/2020 10:48:37 AM	426098	1.00000	20200720_011	2.873	25.0000	1.0000	10

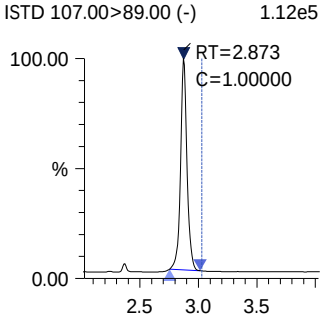
Perchlorate

Conc 4.86484
Area 249126



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 426098



ALS Group Houston

PERCHLORATE7

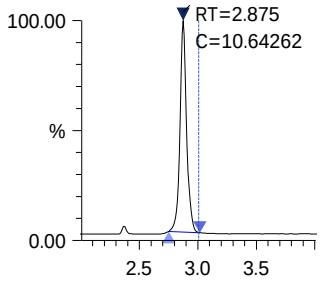
Date acquired: 7/20/2020 10:56:33 AM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_012.lcd
Vial: 4 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE7	7/20/2020 10:56:33 AM	453181	10.64262	20200720_012	2.875	25.0000	1.0000	4
Sodium Perchlorate-18O4_IS	PERCHLORATE7	7/20/2020 10:56:33 AM	354309	1.00000	20200720_012	2.873	25.0000	1.0000	4

Perchlorate

Conc 10.64262
Area 453181

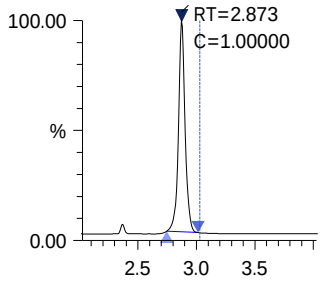
Q 99.00>83.00 (-) 1.16e5



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 354309

ISTD 107.00>89.00 (-) 9.03e4



ALS Group Houston

PERCHLORATE8

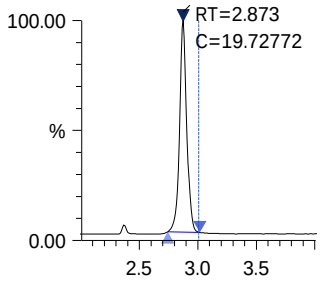
Date acquired: 7/20/2020 11:04:29 AM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_013.lcd
Vial: 11 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE8	7/20/2020 11:04:29 AM	811652	19.72772	20200720_013	2.873	25.0000	1.0000	11
Sodium Perchlorate-18O4_IS	PERCHLORATE8	7/20/2020 11:04:29 AM	342336	1.00000	20200720_013	2.872	25.0000	1.0000	11

Perchlorate

Conc 19.72772
Area 811652

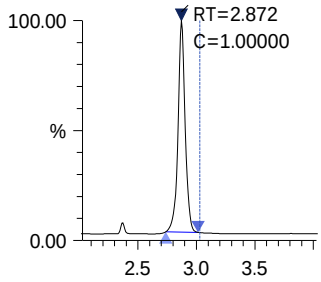
Q 99.00>83.00 (-) 1.93e5



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 342336

ISTD 107.00>89.00 (-) 8.10e4



ALS Group Houston

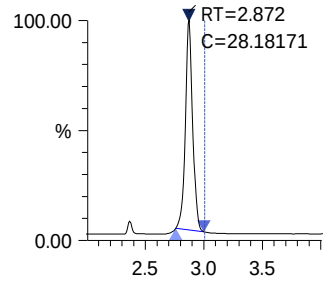
PERCHLORATE9

Date acquired: 7/20/2020 11:12:22 AM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_014.lcd
Vial: 12 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE9	7/20/2020 11:12:22 AM	1067782	28.18171	20200720_014	2.872	25.0000	1.0000	12
Sodium Perchlorate-18O4_IS	PERCHLORATE9	7/20/2020 11:12:22 AM	315264	1.00000	20200720_014	2.871	25.0000	1.0000	12

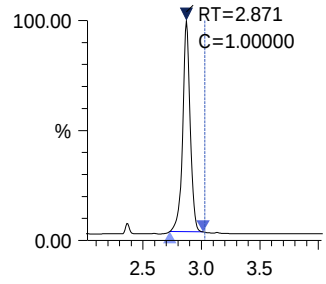
Perchlorate

Conc 28.18171
Area 1067782



Sodium Perchlorate-18O4 _IS

Conc 1.00000
Area 315264



ALS Group Houston

PERCHLORATE10

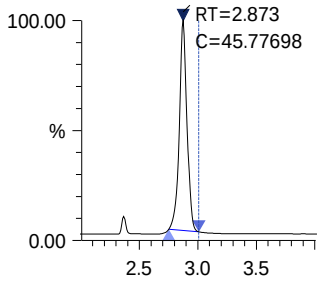
Date acquired: 7/20/2020 11:20:14 AM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_015.lcd
Vial: 13 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE10	7/20/2020 11:20:14 AM	1515028	45.77698	20200720_015	2.873	25.0000	1.0000	13
Sodium Perchlorate-18O4_IS	PERCHLORATE10	7/20/2020 11:20:14 AM	275380	1.00000	20200720_015	2.872	25.0000	1.0000	13

Perchlorate

Conc 45.77698
Area 1515028

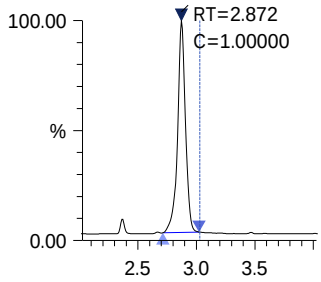
Q 99.00>83.00 (-) 3.39e5



Sodium Perchlorate-18O4 _IS

Conc 1.00000
Area 275380

ISTD 107.00>89.00 (-) 5.90e4



ALS Group Houston

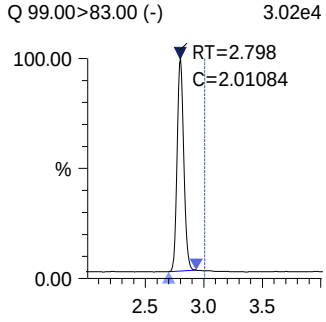
PERCHLORATE5

Date acquired: 7/20/2020 12:28:05 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_016.lcd
Vial: 9 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE5	7/20/2020 12:28:05 PM	119859	2.01084	20200720_016	2.798	25.0000	1.0000	9
Sodium Perchlorate-18O4_IS	PERCHLORATE5	7/20/2020 12:28:05 PM	495966	1.00000	20200720_016	2.795	25.0000	1.0000	9

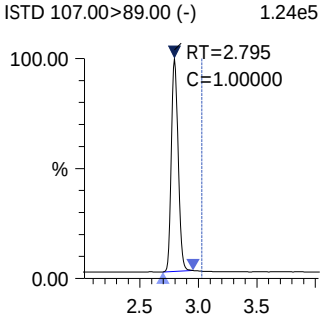
Perchlorate

Conc 2.01084
Area 119859



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 495966



ALS Group Houston

PERCHLORATEICV

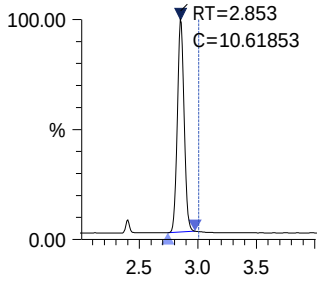
Date acquired: 7/20/2020 12:52:26 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_017.lcd
Vial: 14 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATEICV	7/20/2020 12:52:26 PM	490921	10.61853	20200720_017	2.853	25.0000	1.0000	14
Sodium Perchlorate-18O4_IS	PERCHLORATEICV	7/20/2020 12:52:26 PM	384686	1.00000	20200720_017	2.851	25.0000	1.0000	14

Perchlorate

Conc 10.61853
Area 490921

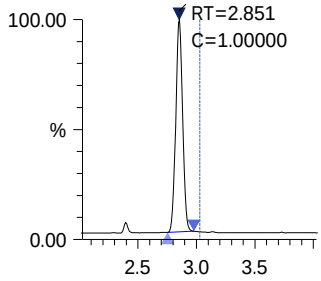
Q 99.00>83.00 (-) 1.21e5



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 384686

ISTD 107.00>89.00 (-) 9.52e4



20200724

ALS Environmental

1st Review: Kneir
2nd Review: Hvan

Injection Log
LCMS01 -Shimadzu 8050

ICAL Date: 7/24/2020
Cal. Std. xp: 11/18/2020
ICAL ID: EC2000016

Mobile Phases **A:** 0.75% Formic Acid/Water 3100807-09 **B:** MeOH 3100802-01

			File Name	Acquisition Method	Dilution	R	Comments
1	PERCHLORATE1		20200724_005	Perchlorate6850b.lcm	1x	☒	3100806-05
2	PERCHLORATE2		20200724_006	Perchlorate6850b.lcm	1x	☒	3100806-06
3	PERCHLORATE3		20200724_007	Perchlorate6850b.lcm	1x	☒	3100806-07
4	PERCHLORATE4		20200724_008	Perchlorate6850b.lcm	1x	☒	3100807-01
5	PERCHLORATE5		20200724_009	Perchlorate6850b.lcm	1x	☒	3100807-02
6	PERCHLORATE6		20200724_010	Perchlorate6850b.lcm	1x	☒	3100807-03
7	PERCHLORATE7		20200724_011	Perchlorate6850b.lcm	1x	☒	3100807-04
8	PERCHLORATE8		20200724_012	Perchlorate6850b.lcm	1x	☒	3100807-05
9	PERCHLORATE9		20200724_013	Perchlorate6850b.lcm	1x	☒	3100807-06
10	PERCHLORATE10		20200724_014	Perchlorate6850b.lcm	1x	☒	3100807-07
11	IB		20200724_015	Perchlorate6850b.lcm	1x	☒	
12	PERCHLORATEICV		20200724_016	Perchlorate6850b.lcm	1x	☒	3100807-08
13	IB		20200724_017	Perchlorate6850b.lcm	1x	☒	
14	LODV		20200724_018	Perchlorate6850b.lcm	1x	☒	
15	ICS		20200724_019	Perchlorate6850b.lcm	1x	☒	
16	PERCHLORATE7		20200724_020	Perchlorate6850b.lcm	1x	☒	3100807-04
17	EQ2000302-04X10		20200724_021	Perchlorate6850b.lcm	10x	☒	
18	EQ2000302-05X10DNU		20200724_022	Perchlorate6850b.lcm	10x	☒	
19	E2000626-001X2		20200724_023	Perchlorate6850b.lcm	2x	☒	
20	E2000627-001X10		20200724_024	Perchlorate6850b.lcm	10x	☒	
21	E2000627-005X100		20200724_025	Perchlorate6850b.lcm	100x	☒	
22	E2000627-006X100		20200724_026	Perchlorate6850b.lcm	100x	☒	
23	E2000627-009X1000		20200724_027	Perchlorate6850b.lcm	1000x	☒	
24	E2000640-001X200		20200724_028	Perchlorate6850b.lcm	200x	☒	
25	PERCHLORATE7		20200724_029	Perchlorate6850b.lcm	1x	☒	3100807-04
26	E2000660-001X10		20200724_030	Perchlorate6850b.lcm	10x	☒	
27	E2000627-004X10		20200724_031	Perchlorate6850b.lcm	10x	☒	
28	PERCHLORATE7		20200724_032	Perchlorate6850b.lcm	1x	☒	3100807-04
29	EQ2000302-05X10		20200724_033	Perchlorate6850b.lcm	10x	☒	
30	PERCHLORATE7		20200724_034	Perchlorate6850b.lcm	1x	☒	3100807-04
31							
32							
33							
34							
35							
36							
37							
38							

Initial Calibration - Detailed Report

Calibration ID: EC2000016 **Instrument ID:** E-LCMS-01
Column Name: 1

#	Lab Code	Sample Name	File Location	Aquisition Date
01	EC2000016-01	PERCHLORATE1	20200724_005	07/24/2020 11:48
02	EC2000016-02	PERCHLORATE2	20200724_006	07/24/2020 11:56
03	EC2000016-03	PERCHLORATE3	20200724_007	07/24/2020 12:04
04	EC2000016-04	PERCHLORATE4	20200724_008	07/24/2020 12:11
05	EC2000016-05	PERCHLORATE5	20200724_009	07/24/2020 12:19
06	EC2000016-06	PERCHLORATE6	20200724_010	07/24/2020 12:27
07	EC2000016-07	PERCHLORATE7	20200724_011	07/24/2020 12:35
08	EC2000016-08	PERCHLORATE8	20200724_012	07/24/2020 12:43
09	EC2000016-09	PERCHLORATE9	20200724_013	07/24/2020 12:51
10	EC2000016-10	PERCHLORATE10	20200724_014	07/24/2020 12:59

Analyte **Curve Fit** **Weighting**

Perchlorate **Average RF** **RSD = 4.659** **Average RF = 0.121**

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.1000	0.1283	02	0.5000	0.13	03	0.7000	0.1207	04	1.0000	0.1251
05	2.0000	0.1211	06	5.0000	0.1202	07	10.0000	0.1211	08	20.0000	0.1168
09	30.0000	0.1121	10	50.0000	0.1148						

Analyte

Perchlorate

#	Amount	Calculated Conc	%D	#	Amount	Calculated Conc	%D	#	Amount	Calculated Conc	%D
01	0.1000	0.106	6.0	02	0.5000	0.537	7.4	03	0.7000	0.698	-0.3
04	1.0000	1.03	3.4	05	2.0000	2.00	0.1	06	5.0000	4.97	-0.7
07	10.0000	10.0	0.1	08	20.0000	19.3	-3.5	09	30.0000	27.8	-7.3
10	50.0000	47.4	-5.1								

Initial Calibration Verification Summary Report

Calibration ID:	EC2000016	**Instrument ID:**	E-LCMS-01
Datafile ID:	20200724_016	**Column Name:**	1

Analyte	Lab Code	Type	Curve Fit	True Value	Calc Conc	Units	Result	Criteria
Perchlorate	EC2000016-11	T	Average RF	10	9.867	ng/mL	-1.3	<= 15

ALS Group Houston

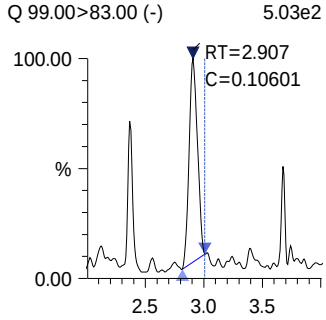
PERCHLORATE1

Date acquired: 7/24/2020 11:48:19 AM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_005.lcd
Vial: 5 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE1	7/24/2020 11:48:19 AM	2348	0.10601	20200724_005	2.907	25.0000	1.0000	5
Sodium Perchlorate-18O4_IS	PERCHLORATE1	7/24/2020 11:48:19 AM	183001	1.00000	20200724_005	2.903	25.0000	1.0000	5

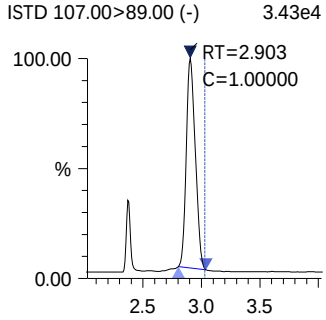
Perchlorate

Conc 0.10601
Area 2348



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 183001



ALS Group Houston

PERCHLORATE2

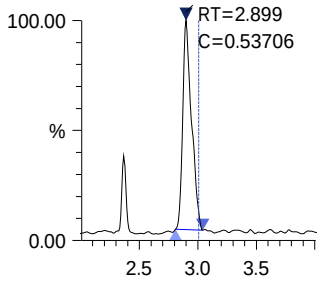
Date acquired: 7/24/2020 11:56:11 AM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_006.lcd
Vial: 6 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE2	7/24/2020 11:56:11 AM	11773	0.53706	20200724_006	2.899	25.0000	1.0000	6
Sodium Perchlorate-18O4_IS	PERCHLORATE2	7/24/2020 11:56:11 AM	181125	1.00000	20200724_006	2.898	25.0000	1.0000	6

Perchlorate

Conc 0.53706
Area 11773

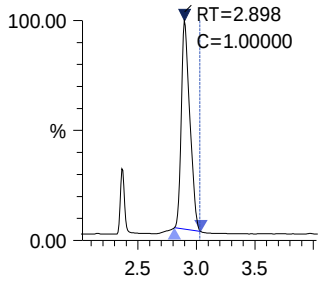
Q 99.00>83.00 (-) 2.32e3



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 181125

ISTD 107.00>89.00 (-) 3.62e4



ALS Group Houston

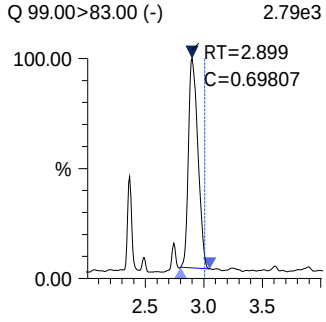
PERCHLORATE3

Date acquired: 7/24/2020 12:04:05 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_007.lcd
Vial: 7 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE3	7/24/2020 12:04:05 PM	15258	0.69807	20200724_007	2.899	25.0000	1.0000	7
Sodium Perchlorate-18O4_IS	PERCHLORATE3	7/24/2020 12:04:05 PM	180602	1.00000	20200724_007	2.896	25.0000	1.0000	7

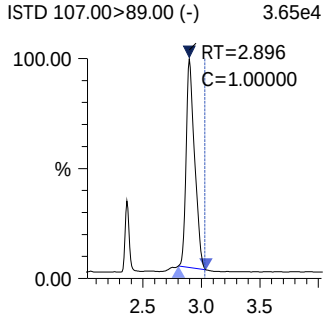
Perchlorate

Conc 0.69807
Area 15258



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 180602



ALS Group Houston

PERCHLORATE4

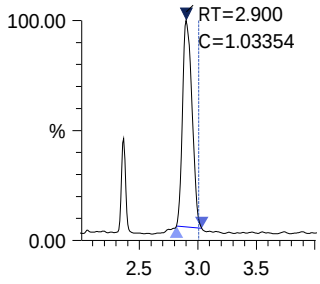
Date acquired: 7/24/2020 12:11:58 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_008.lcd
Vial: 8 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE4	7/24/2020 12:11:58 PM	20922	1.03354	20200724_008	2.900	25.0000	1.0000	8
Sodium Perchlorate-18O4_IS	PERCHLORATE4	7/24/2020 12:11:58 PM	167260	1.00000	20200724_008	2.902	25.0000	1.0000	8

Perchlorate

Conc 1.03354
Area 20922

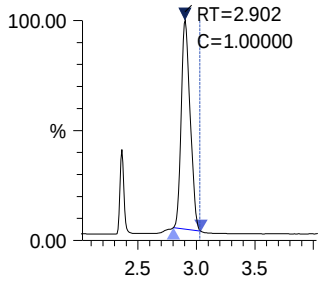
Q 99.00>83.00 (-) 3.87e3



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 167260

ISTD 107.00>89.00 (-) 3.17e4



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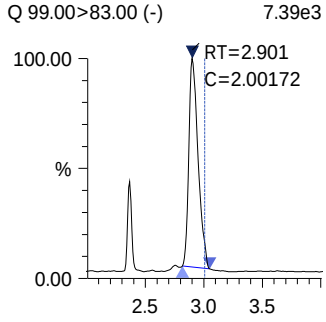
PERCHLORATE5

Date acquired: 7/24/2020 12:19:50 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_009.lcd
Vial: 9 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE5	7/24/2020 12:19:50 PM	39343	2.00172	20200724_009	2.901	25.0000	1.0000	9
Sodium Perchlorate-18O4_IS	PERCHLORATE5	7/24/2020 12:19:50 PM	162397	1.00000	20200724_009	2.899	25.0000	1.0000	9

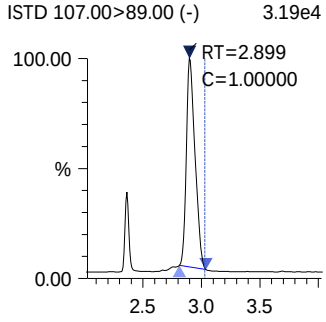
Perchlorate

Conc 2.00172
Area 39343



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 162397



ALS Group Houston

PERCHLORATE6

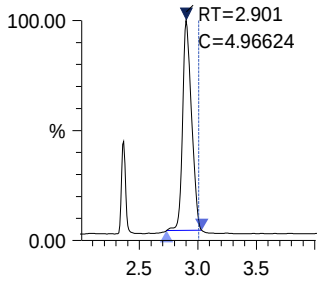
Date acquired: 7/24/2020 12:27:42 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_010.lcd
Vial: 10 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE6	7/24/2020 12:27:42 PM	102216	4.96624	20200724_010	2.901	25.0000	1.0000	10
Sodium Perchlorate-18O4_IS	PERCHLORATE6	7/24/2020 12:27:42 PM	170060	1.00000	20200724_010	2.900	25.0000	1.0000	10

Perchlorate

Conc 4.96624
Area 102216

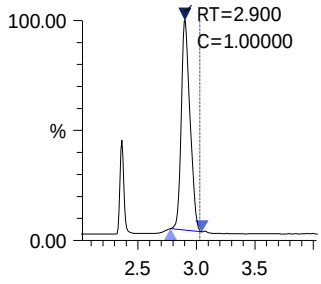
Q 99.00>83.00 (-) 1.97e4



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 170060

ISTD 107.00>89.00 (-) 3.28e4



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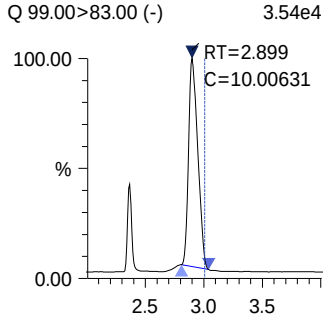
PERCHLORATE7

Date acquired: 7/24/2020 12:35:33 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_011.lcd
Vial: 4 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE7	7/24/2020 12:35:33 PM	187110	10.00631	20200724_011	2.899	25.0000	1.0000	4
Sodium Perchlorate-18O4_IS	PERCHLORATE7	7/24/2020 12:35:33 PM	154502	1.00000	20200724_011	2.897	25.0000	1.0000	4

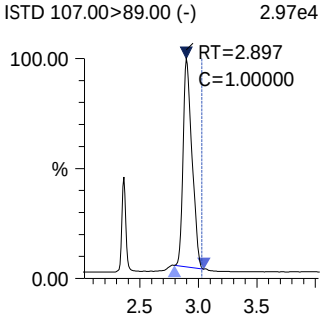
Perchlorate

Conc 10.00631
Area 187110



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 154502



ALS Group Houston

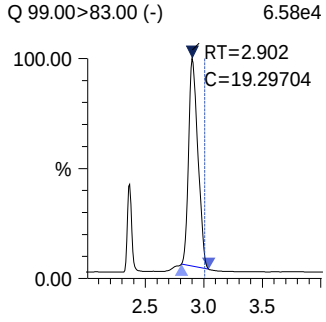
PERCHLORATE8

Date acquired: 7/24/2020 12:43:26 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_012.lcd
Vial: 11 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE8	7/24/2020 12:43:26 PM	349524	19.29704	20200724_012	2.902	25.0000	1.0000	11
Sodium Perchlorate-18O4_IS	PERCHLORATE8	7/24/2020 12:43:26 PM	149657	1.00000	20200724_012	2.900	25.0000	1.0000	11

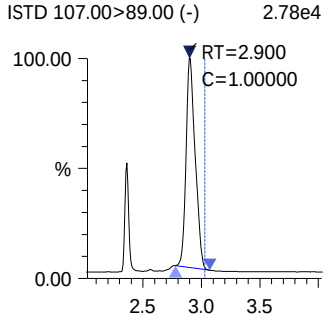
Perchlorate

Conc 19.29704
Area 349524



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 149657



ALS Group Houston

PERCHLORATE9

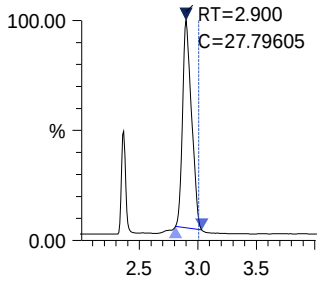
Date acquired: 7/24/2020 12:51:22 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_013.lcd
Vial: 12 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE9	7/24/2020 12:51:22 PM	465757	27.79605	20200724_013	2.900	25.0000	1.0000	12
Sodium Perchlorate-18O4_IS	PERCHLORATE9	7/24/2020 12:51:22 PM	138448	1.00000	20200724_013	2.898	25.0000	1.0000	12

Perchlorate

Conc 27.79605
Area 465757

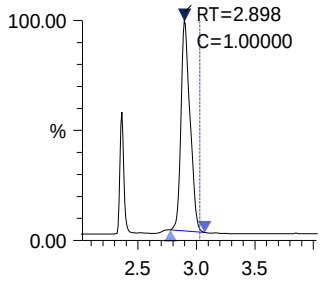
Q 99.00>83.00 (-) 9.05e4



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 138448

ISTD 107.00>89.00 (-) 2.59e4



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PERCHLORATE10

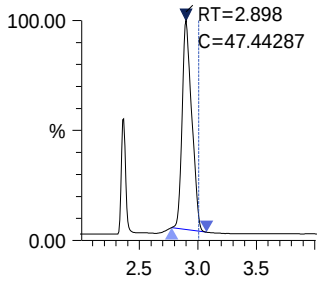
Date acquired: 7/24/2020 12:59:14 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_014.lcd
Vial: 13 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE10	7/24/2020 12:59:14 PM	708682	47.44287	20200724_014	2.898	25.0000	1.0000	13
Sodium Perchlorate-18O4_IS	PERCHLORATE10	7/24/2020 12:59:14 PM	123422	1.00000	20200724_014	2.896	25.0000	1.0000	13

Perchlorate

Conc 47.44287
Area 708682

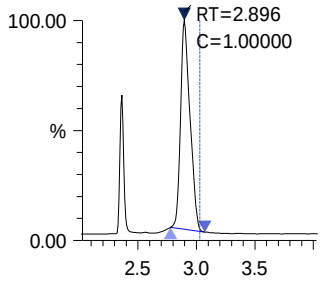
Q 99.00>83.00 (-) 1.28e5



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 123422

ISTD 107.00>89.00 (-) 2.23e4



ALS Group Houston

PERCHLORATEICV

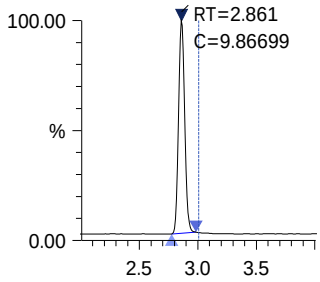
Date acquired: 7/24/2020 1:28:19 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_016.lcd
Vial: 14 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATEICV	7/24/2020 1:28:19 PM	231631	9.86699	20200724_016	2.861	25.0000	1.0000	14
Sodium Perchlorate-18O4_IS	PERCHLORATEICV	7/24/2020 1:28:19 PM	193964	1.00000	20200724_016	2.859	25.0000	1.0000	14

Perchlorate

Conc 9.86699
Area 231631

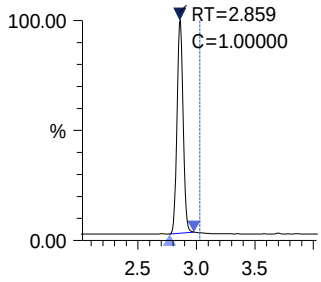
Q 99.00>83.00 (-) 6.30e4



Sodium Perchlorate-18O4 _IS

Conc 1.00000
Area 193964

ISTD 107.00>89.00 (-) 5.33e4



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

20200720

ALS Environmental

Injection Log
LCMS01 -Shimadzu 8050

ICAL Date: 7/20/2020
Cal. Std. xp: 11/18/2020
ICAL ID: EC2000014

1st Review: Kneir
2nd Review: Hvan

Mobile Phases **A:** 0.75% Formic Acid/Water 3100807-09 **B:** MeOH 3100802-01

			File Name	Acquisition Method	Dilution	R	Comments
1	PERCHLORATE1		20200720_006	Perchlorate6850b.lcm	1x	☒	3100806-05
2	PERCHLORATE2		20200720_007	Perchlorate6850b.lcm	1x	☒	3100806-06
3	PERCHLORATE3		20200720_008	Perchlorate6850b.lcm	1x	☒	3100806-07
4	PERCHLORATE4		20200720_009	Perchlorate6850b.lcm	1x	☒	3100807-01
5	PERCHLORATE5		20200720_016	Perchlorate6850b.lcm	1x	☒	3100807-02
6	PERCHLORATE6		20200720_011	Perchlorate6850b.lcm	1x	☒	3100807-03
7	PERCHLORATE7		20200720_012	Perchlorate6850b.lcm	1x	☒	3100807-04
8	PERCHLORATE8		20200720_013	Perchlorate6850b.lcm	1x	☒	3100807-05
9	PERCHLORATE9		20200720_014	Perchlorate6850b.lcm	1x	☒	3100807-06
10	PERCHLORATE10		20200720_015	Perchlorate6850b.lcm	1x	☒	3100807-07
11	PERCHLORATEICV		20200720_017	Perchlorate6850b.lcm	1x	☒	3100807-08
12	IB		20200720_018	Perchlorate6850b.lcm	1x	☒	
13	IB		20200720_019	Perchlorate6850b.lcm	1x	☒	
14	LODV		20200720_020	Perchlorate6850b.lcm	1x	☒	
15	ICS		20200720_021	Perchlorate6850b.lcm	1x	☒	
16	PERCHLORATE7		20200720_022	Perchlorate6850b.lcm	1x	☒	3100807-04
17	EQ2000302-01		20200720_023	Perchlorate6850b.lcm	1x	☒	
18	EQ2000302-02		20200720_024	Perchlorate6850b.lcm	1x	☒	
19	EQ2000302-03		20200720_025	Perchlorate6850b.lcm	1x	☒	
20	EQ2000302-04		20200720_026	Perchlorate6850b.lcm	1x	☒	
21	EQ2000302-05		20200720_027	Perchlorate6850b.lcm	1x	☒	
22	E2000626-001		20200720_028	Perchlorate6850b.lcm	1x	☒	
23	E2000627-001		20200720_029	Perchlorate6850b.lcm	1x	☒	
24	E2000627-002		20200720_030	Perchlorate6850b.lcm	1x	☒	
25	E2000627-003		20200720_031	Perchlorate6850b.lcm	1x	☒	
26	E2000627-004		20200720_032	Perchlorate6850b.lcm	1x	☒	
27	PERCHLORATE7		20200720_033	Perchlorate6850b.lcm	1x	☒	3100807-04
28	E2000627-005		20200720_034	Perchlorate6850b.lcm	1x	☒	
29	E2000627-006		20200720_035	Perchlorate6850b.lcm	1x	☒	
30	E2000627-007		20200720_036	Perchlorate6850b.lcm	1x	☒	
31	E2000627-008		20200720_037	Perchlorate6850b.lcm	1x	☒	
32	E2000627-009		20200720_038	Perchlorate6850b.lcm	1x	☒	
33	E2000638-001		20200720_039	Perchlorate6850b.lcm	1x	☒	
34	E2000639-001		20200720_040	Perchlorate6850b.lcm	1x	☒	
35	E2000640-001		20200720_041	Perchlorate6850b.lcm	1x	☒	
36	PERCHLORATE7		20200720_042	Perchlorate6850b.lcm	1x	☒	3100807-04
37	EQ2000303-01		20200720_043	Perchlorate6850b.lcm	1x	☒	
38	EQ2000303-02		20200720_044	Perchlorate6850b.lcm	1x	☒	
39	EQ2000303-03		20200720_045	Perchlorate6850b.lcm	1x	☒	
40	E2000641-001		20200720_046	Perchlorate6850b.lcm	1x	☒	
41	E2000641-002		20200720_047	Perchlorate6850b.lcm	1x	☒	
42	E2000641-003		20200720_048	Perchlorate6850b.lcm	1x	☒	
43	E2000641-004		20200720_049	Perchlorate6850b.lcm	1x	☒	
44	E2000641-005		20200720_050	Perchlorate6850b.lcm	1x	☒	
45	E2000641-006		20200720_051	Perchlorate6850b.lcm	1x	☒	
46	E2000641-007		20200720_052	Perchlorate6850b.lcm	1x	☒	
47	PERCHLORATE7		20200720_053	Perchlorate6850b.lcm	1x	☒	3100807-04
48	E2000641-008		20200720_054	Perchlorate6850b.lcm	1x	☒	
49	E2000641-009		20200720_055	Perchlorate6850b.lcm	1x	☒	
50	E2000648-001		20200720_056	Perchlorate6850b.lcm	1x	☒	
51	E2000648-002		20200720_057	Perchlorate6850b.lcm	1x	☒	
52	E2000648-003		20200720_058	Perchlorate6850b.lcm	1x	☒	

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070398

Service Request: E2000626
Date Analyzed: 7/20/20

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\20200720\20200720_022

Calibration Date: 7/20/20
Calibration ID: EC2000014
Analysis Lot: 688323
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	10.7	0.1210	0.1285	6.2	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070398

Service Request: E2000626
Date Analyzed: 7/20/20

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\20200720\20200720_033

Calibration Date: 7/20/20
Calibration ID: EC2000014
Analysis Lot: 688323
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	10.1	0.1210	0.1212	0.1	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070398

Service Request: E2000626
Date Analyzed: 7/20/20

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\20200720\20200720_042

Calibration Date: 7/20/20
Calibration ID: EC2000014
Analysis Lot: 688323
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	10.4	0.1210	0.1247	3.0	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070398

Service Request: E2000626
Date Analyzed: 7/22/20

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\20200722\20200722_016

Calibration Date: 7/20/20
Calibration ID: EC2000014
Analysis Lot: 688323
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	10.1	0.1210	0.1215	0.4	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070398

Service Request: E2000626
Date Analyzed: 7/22/20

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\20200722\20200722_024

Calibration Date: 7/20/20
Calibration ID: EC2000014
Analysis Lot: 688323
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	9.89	0.1210	0.1189	-1.8	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070398

Service Request: E2000626
Date Analyzed: 7/23/20

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\20200723\20200723_007

Calibration Date: 7/20/20
Calibration ID: EC2000014
Analysis Lot: 688323
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	10.1	0.1210	0.1214	0.3	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070398

Service Request: E2000626
Date Analyzed: 7/23/20

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\20200723\20200723_017

Calibration Date: 7/20/20
Calibration ID: EC2000014
Analysis Lot: 688323
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	9.34	0.1210	0.1122	-7.3	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070398

Service Request: E2000626
Date Analyzed: 7/24/20

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\20200724\20200724_020

Calibration Date: 7/24/20
Calibration ID: EC2000016
Analysis Lot: 688371
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	10.0	0.1210	0.1213	0.2	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070398

Service Request: E2000626
Date Analyzed: 7/24/20

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\20200724\20200724_029

Calibration Date: 7/24/20
Calibration ID: EC2000016
Analysis Lot: 688371
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	9.86	0.1210	0.1193	-1.4	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070398

Service Request: E2000626
Date Analyzed: 7/24/20

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\20200724\20200724_032

Calibration Date: 7/24/20
Calibration ID: EC2000016
Analysis Lot: 688371
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	9.75	0.1210	0.1180	-2.5	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070398

Service Request: E2000626
Date Analyzed: 7/24/20

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\20200724\20200724_034

Calibration Date: 7/24/20
Calibration ID: EC2000016
Analysis Lot: 688371
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	10.1	0.1210	0.1220	0.8	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000626
Project:	HS20070398	**Date Analyzed:**	7/20/20 13:39

Internal Standard Area and RT Summary

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

File ID:	I:\LCMS01\DATA\20200720\20200720_022	**Lab Code:**	EQ2000310-01
Instrument ID:	E-LCMS-01	**Analysis Lot:**	688323
Analytical Method:	6850	**Signal ID:**	1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	403,151	2.86
	Upper Limit ==>	604,727	4.86
	Lower Limit ==>	201,576	0.86
Associated Analyses			
Continuing Calibration Verification	EQ2000310-01	380,500	2.80
Method Blank	EQ2000302-01	475,788	2.87
Lab Control Sample	EQ2000302-02	485,348	2.87
Duplicate Lab Control Sample	EQ2000302-03	485,451	2.87

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000626
Project:	HS20070398	**Date Analyzed:**	7/20/20 15:22

Internal Standard Area and RT Summary

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

File ID:	I:\LCMS01\DATA\20200720\20200720_033	**Lab Code:**	EQ2000310-02
Instrument ID:	E-LCMS-01	**Analysis Lot:**	688323
Analytical Method:	6850	**Signal ID:**	1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	403,151	2.86
	Upper Limit ==>	604,727	4.86
	Lower Limit ==>	201,576	0.86
Associated Analyses			
Continuing Calibration Verification	EQ2000310-02	373,864	2.79

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000626
Project:	HS20070398	**Date Analyzed:**	7/20/20 16:55

Internal Standard Area and RT Summary

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

File ID:	I:\LCMS01\DATA\20200720\20200720_042	**Lab Code:**	EQ2000310-03
Instrument ID:	E-LCMS-01	**Analysis Lot:**	688323
Analytical Method:	6850	**Signal ID:**	1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	403,151	2.86
	Upper Limit ==>	604,727	4.86
	Lower Limit ==>	201,576	0.86
Associated Analyses			
Continuing Calibration Verification	EQ2000310-03	224,958	2.91

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000626
Project:	HS20070398	**Date Analyzed:**	7/22/20 19:13

Internal Standard Area and RT Summary

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

File ID:	I:\LCMS01\DATA\20200722\20200722_016	**Lab Code:**	EQ2000310-04
Instrument ID:	E-LCMS-01	**Analysis Lot:**	688323
Analytical Method:	6850	**Signal ID:**	1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	403,151	2.86
	Upper Limit ==>	604,727	4.86
	Lower Limit ==>	201,576	0.86
Associated Analyses			
Continuing Calibration Verification	EQ2000310-04	223,422	2.95

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000626
Project:	HS20070398	**Date Analyzed:**	7/22/20 20:16

Internal Standard Area and RT Summary

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

File ID:	I:\LCMS01\DATA\20200722\20200722_024	**Lab Code:**	EQ2000310-05
Instrument ID:	E-LCMS-01	**Analysis Lot:**	688323
Analytical Method:	6850	**Signal ID:**	1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	403,151	2.86
	Upper Limit ==>	604,727	4.86
	Lower Limit ==>	201,576	0.86
Associated Analyses			
Continuing Calibration Verification	EQ2000310-05	232,812	2.95

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000626
Project:	HS20070398	**Date Analyzed:**	7/23/20 11:41

Internal Standard Area and RT Summary

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

File ID:	I:\LCMS01\DATA\20200723\20200723_007	**Lab Code:**	EQ2000310-06
Instrument ID:	E-LCMS-01	**Analysis Lot:**	688323
Analytical Method:	6850	**Signal ID:**	1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	403,151	2.86
	Upper Limit ==>	604,727	4.86
	Lower Limit ==>	201,576	0.86
Associated Analyses			
Continuing Calibration Verification	EQ2000310-06	202,016	2.92

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000626
Project:	HS20070398	**Date Analyzed:**	7/23/20 13:00

Internal Standard Area and RT Summary

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

File ID:	I:\LCMS01\DATA\20200723\20200723_017	**Lab Code:**	EQ2000310-07
Instrument ID:	E-LCMS-01	**Analysis Lot:**	688323
Analytical Method:	6850	**Signal ID:**	1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	403,151	2.86
	Upper Limit ==>	604,727	4.86
	Lower Limit ==>	201,576	0.86
Associated Analyses			
Continuing Calibration Verification	EQ2000310-07	202,415	2.91

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000626
Project:	HS20070398	**Date Analyzed:**	7/24/20 13:59

Internal Standard Area and RT Summary

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

File ID:	I:\LCMS01\DATA\20200724\20200724_020	**Lab Code:**	EQ2000311-01
Instrument ID:	E-LCMS-01	**Analysis Lot:**	688371
Analytical Method:	6850	**Signal ID:**	1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	161,047	2.90
	Upper Limit ==>	241,571	4.90
	Lower Limit ==>	80,524	0.90
Associated Analyses			
Continuing Calibration Verification	EQ2000311-01	149,874	2.90
Batch QCMS	EQ2000302-04	80,779	2.90
LH18/24-SP650_070920-BIX	E2000626-001	108,497	2.90

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000626
Project:	HS20070398	**Date Analyzed:**	7/24/20 15:11

Internal Standard Area and RT Summary

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

File ID:	I:\LCMS01\DATA\20200724\20200724_029	**Lab Code:**	EQ2000311-02
Instrument ID:	E-LCMS-01	**Analysis Lot:**	688371
Analytical Method:	6850	**Signal ID:**	1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	161,047	2.90
	Upper Limit ==>	241,571	4.90
	Lower Limit ==>	80,524	0.90
Associated Analyses			
Continuing Calibration Verification	EQ2000311-02	142,468	2.90
Batch QC	E2000627-004	214,190	2.85

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000626
Project:	HS20070398	**Date Analyzed:**	7/24/20 15:37

Internal Standard Area and RT Summary

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

File ID:	I:\LCMS01\DATA\20200724\20200724_032	**Lab Code:**	EQ2000311-03
Instrument ID:	E-LCMS-01	**Analysis Lot:**	688371
Analytical Method:	6850	**Signal ID:**	1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	161,047	2.90
	Upper Limit ==>	241,571	4.90
	Lower Limit ==>	80,524	0.90
Associated Analyses			
Continuing Calibration Verification	EQ2000311-03	143,487	2.90
Batch QCDMS	EQ2000302-05	121,804	2.85

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000626
Project:	HS20070398	**Date Analyzed:**	7/24/20 15:53

Internal Standard Area and RT Summary

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

File ID:	I:\LCMS01\DATA\20200724\20200724_034	**Lab Code:**	EQ2000311-04
Instrument ID:	E-LCMS-01	**Analysis Lot:**	688371
Analytical Method:	6850	**Signal ID:**	1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	161,047	2.90
	Upper Limit ==>	241,571	4.90
	Lower Limit ==>	80,524	0.90
Associated Analyses			
Continuing Calibration Verification	EQ2000311-04	142,073	2.90

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

ALS Group Houston

PERCHLORATE7

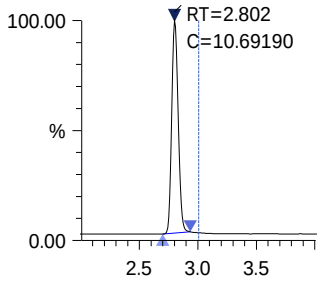
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Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_022.lcd
Vial: 4 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE7	7/20/2020 1:39:32 PM	488934	10.69190	20200720_022	2.802	25.0000	1.0000	4
Sodium Perchlorate-18O4_IS	PERCHLORATE7	7/20/2020 1:39:32 PM	380500	1.00000	20200720_022	2.800	25.0000	1.0000	4

Perchlorate

Conc 10.69190
Area 488934

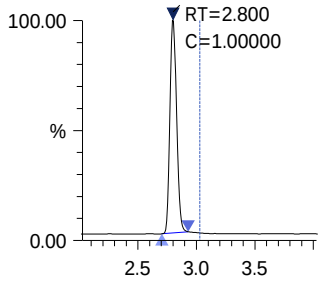
Q 99.00>83.00 (-) 1.26e5



Sodium Perchlorate-18O4 _IS

Conc 1.00000
Area 380500

ISTD 107.00>89.00 (-) 9.71e4



ALS Group Houston

EQ2000302-01

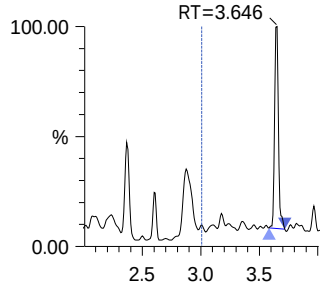
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Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_023.lcd
Vial: 1 | Inj. Volume: 25.0000uL | Tray: 3

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	EQ2000302-01	7/20/2020 1:47:28 PM	----	----	20200720_023	----	25.0000	1.0000	1
Sodium Perchlorate-18O4_IS	EQ2000302-01	7/20/2020 1:47:28 PM	475788	1.00000	20200720_023	2.866	25.0000	1.0000	1

Perchlorate

Conc ----
Area ----

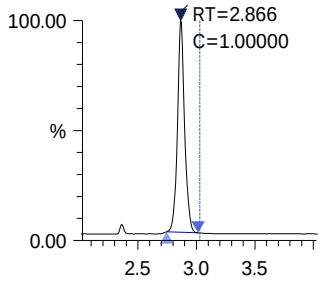
Q 99.00>83.00 (-) 6.94e2



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 475788

ISTD 107.00>89.00 (-) 1.12e5



ALS Group Houston

EQ2000302-02

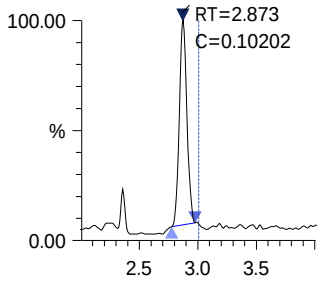
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Data File: I:\LCMS01\DATA\20200720\20200720_024.lcd
Vial: 2 | Inj. Volume: 25.0000uL | Tray: 3

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	EQ2000302-02	7/20/2020 1:55:23 PM	5951	0.10202	20200720_024	2.873	25.0000	1.0000	2
Sodium Perchlorate-18O4_IS	EQ2000302-02	7/20/2020 1:55:23 PM	485348	1.00000	20200720_024	2.868	25.0000	1.0000	2

Perchlorate

Conc 0.10202
Area 5951

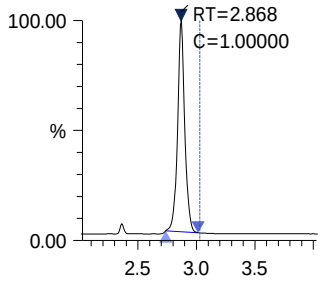
Q 99.00>83.00 (-) 1.38e3



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 485348

ISTD 107.00>89.00 (-) 1.15e5



ALS Group Houston

EQ2000302-03

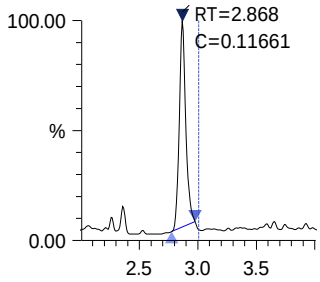
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Vial: 3 | Inj. Volume: 25.0000uL | Tray: 3

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Perchlorate	EQ2000302-03	7/20/2020 2:03:16 PM	6802	0.11661	20200720_025	2.868	25.0000	1.0000	3
Sodium Perchlorate-18O4_IS	EQ2000302-03	7/20/2020 2:03:16 PM	485451	1.00000	20200720_025	2.866	25.0000	1.0000	3

Perchlorate

Conc 0.11661
Area 6802

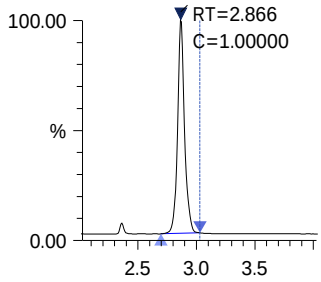
Q 99.00>83.00 (-) 1.83e3



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 485451

ISTD 107.00>89.00 (-) 1.17e5



ALS Group Houston

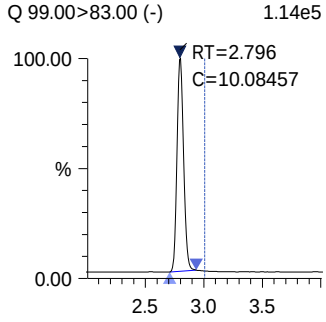
PERCHLORATE7

Date acquired: 7/20/2020 3:22:41 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_033.lcd
Vial: 4 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE7	7/20/2020 3:22:41 PM	453118	10.08457	20200720_033	2.796	25.0000	1.0000	4
Sodium Perchlorate-18O4_IS	PERCHLORATE7	7/20/2020 3:22:41 PM	373864	1.00000	20200720_033	2.794	25.0000	1.0000	4

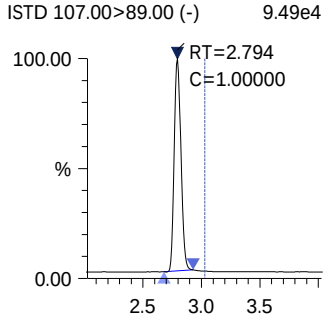
Perchlorate

Conc 10.08457
Area 453118



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 373864



ALS Group Houston

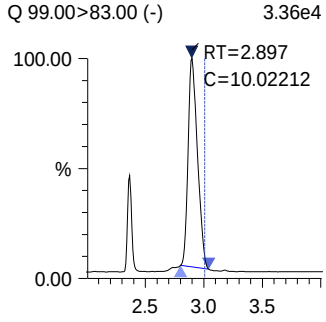
PERCHLORATE7

Date acquired: 7/24/2020 1:59:53 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_020.lcd
Vial: 4 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE7	7/24/2020 1:59:53 PM	181792	10.02212	20200724_020	2.897	25.0000	1.0000	4
Sodium Perchlorate-18O4_IS	PERCHLORATE7	7/24/2020 1:59:53 PM	149874	1.00000	20200724_020	2.897	25.0000	1.0000	4

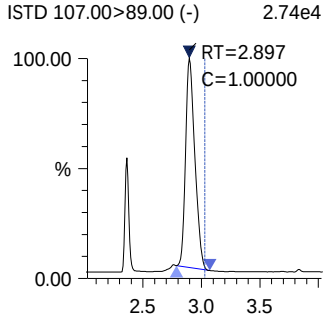
Perchlorate

Conc 10.02212
Area 181792



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 149874



ALS Group Houston

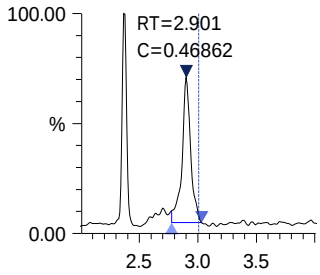
EQ2000302-04X10

Date acquired: 7/24/2020 2:07:48 PM
Acquired by: System Administrator
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Vial: 16 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	EQ2000302-04X10	7/24/2020 2:07:48 PM	4582	0.46862	20200724_021	2.901	25.0000	1.0000	16
Sodium Perchlorate-18O4_IS	EQ2000302-04X10	7/24/2020 2:07:48 PM	80779	1.00000	20200724_021	2.897	25.0000	1.0000	16

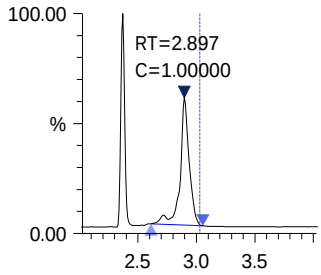
Perchlorate

Conc 0.46862
Area 4582
Q 99.00>83.00 (-) 1.33e3



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 80779
ISTD 107.00>89.00 (-) 2.49e4



ALS Group Houston

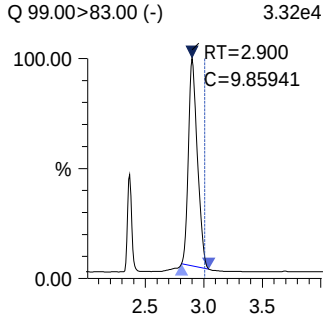
PERCHLORATE7

Date acquired: 7/24/2020 3:11:02 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_029.lcd
Vial: 4 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE7	7/24/2020 3:11:02 PM	170004	9.85941	20200724_029	2.900	25.0000	1.0000	4
Sodium Perchlorate-18O4_IS	PERCHLORATE7	7/24/2020 3:11:02 PM	142468	1.00000	20200724_029	2.899	25.0000	1.0000	4

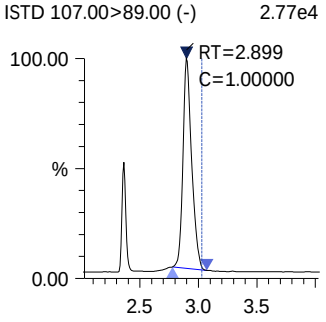
Perchlorate

Conc 9.85941
Area 170004



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 142468



ALS Group Houston

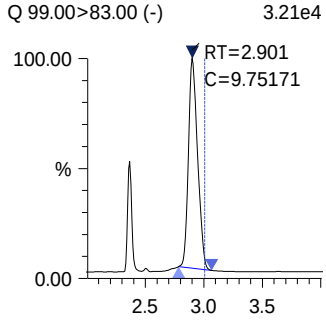
PERCHLORATE7

Date acquired: 7/24/2020 3:37:07 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_032.lcd
Vial: 4 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE7	7/24/2020 3:37:07 PM	169350	9.75171	20200724_032	2.901	25.0000	1.0000	4
Sodium Perchlorate-18O4_IS	PERCHLORATE7	7/24/2020 3:37:07 PM	143487	1.00000	20200724_032	2.899	25.0000	1.0000	4

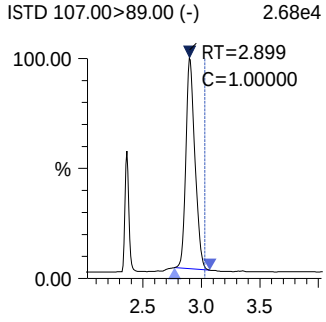
Perchlorate

Conc 9.75171
Area 169350



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 143487



ALS Group Houston

EQ2000302-05X10

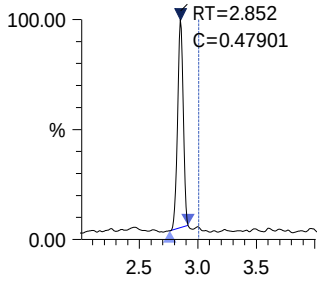
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Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_033.lcd
Vial: 17 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	EQ2000302-05X10	7/24/2020 3:45:36 PM	7062	0.47901	20200724_033	2.852	25.0000	1.0000	17
Sodium Perchlorate-18O4_IS	EQ2000302-05X10	7/24/2020 3:45:36 PM	121804	1.00000	20200724_033	2.850	25.0000	1.0000	17

Perchlorate

Conc 0.47901
Area 7062

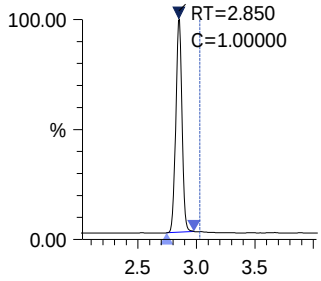
Q 99.00>83.00 (-) 2.13e3



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 121804

ISTD 107.00>89.00 (-) 3.33e4



ALS Group Houston

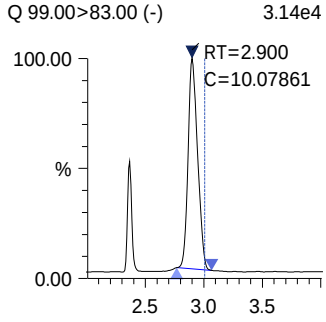
PERCHLORATE7

Date acquired: 7/24/2020 3:53:29 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_034.lcd
Vial: 4 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE7	7/24/2020 3:53:29 PM	173301	10.07861	20200724_034	2.900	25.0000	1.0000	4
Sodium Perchlorate-18O4_IS	PERCHLORATE7	7/24/2020 3:53:29 PM	142073	1.00000	20200724_034	2.899	25.0000	1.0000	4

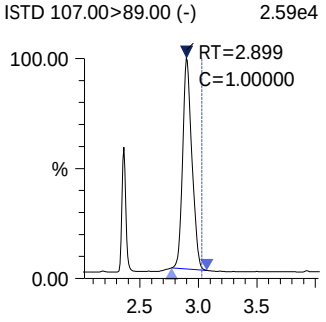
Perchlorate

Conc 10.07861
Area 173301



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 142073



ALS Environmental
ALS Group USA, Corp
1317 South 13th Avenue
Kelso, WA 98626
T : +1 360 577 7222
F : +1 360 636 1068
www.alsglobal.com

July 24, 2020

Analytical Report for Service Request No: K2005948

RJ Modashia
ALS Laboratory Group
10450 Stancliff Road
Suite 210
Houston, TX 77099-4338

RE: ALS Houston DOD TOC

Dear RJ,

Enclosed are the results of the sample(s) submitted to our laboratory July 15, 2020
For your reference, these analyses have been assigned our service request number **K2005948.**

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3350. You may also contact me via email at Kelley.Lovejoy@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Kelley Lovejoy

Kelley Lovejoy
Project Manager

RIGHT SOLUTIONS | RIGHT PARTNER

ALS Environmental
ALS Group USA, Corp
1317 South 13th Avenue
Kelso, WA 98626
T : +1 360 577 7222
F : +1 360 636 1068
www.alsglobal.com

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Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimated value.
J	The result is an estimated value.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
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.
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.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L16-58-R4
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjlabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water-	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

Case Narrative

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

1317 South 13th Ave, Kelso, WA 98626 | 1-360-577-7222 | www.alsglobal.com

Client: ALS Environmental - US
Project: ALS Houston DOD TOC
Sample Matrix: Water

Service Request: K2005948
Date Received: 07/15/2020

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier level IV requested by the client.

Sample Receipt:

One water sample was received for analysis at ALS Environmental on 07/15/2020. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The sample was stored at minimum in accordance with the analytical method requirements.

General Chemistry:

No significant anomalies were noted with this analysis.

Approved by Kelley Lovejoy Date 07/24/2020

Chain of Custody

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

K2005948

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:** **14263**

SUBCONTRACT TO:

ALS Environmental Kelso
1317 S. 13th Avenue
Kelso, WA 98626

Phone: +1 360 501 3312

CUSTOMER INFORMATION:

Company:	ALS Houston
Contact:	RJ Modashia
Address:	10450 Stancliff Rd, Ste 210
Phone:	+1 281 530 5656
Email:	RJ.Modashia@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:	HS20070398
TSR:	Danielle Winnings

	LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
	ANALYSIS REQUESTED			DUE DATE
1.	**HS20070398-01**	**LH18/24-SP650_070920**	**Water**	**09 Jul 2020 14:00**
	TOC Analysis for DOD Level IV			24 Jul 2020

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: 7/13/2020 1800

Received By: _____ Date/Time: 7/15/2020 0930

Cooler ID(s): _____ Temperature(s): _____

PC KL

Cooler Receipt and Preservation Form

Client ALS Houston Service Request *K20* 05948

Received: JUL 15 2020 Opened: JUL 15 2020 By: CG Unloaded: JUL 15 2020 By: CG

1. Samples were received via? *USPS* (*Fed Ex*) *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) (*Cooler*) *Box* *Envelope* *Other* _____ *NA*
3. Were custody seals on coolers? NA (Y) N If yes, how many and where? 2 Front
   If present, were custody seals intact? (Y) N If present, were they signed and dated? (Y) N

Temp Blank	Sample 1	Sample 2	Sample 3	Sample 4	IR GUN	Cooler / COC ID NA	Tracking Number NA	Filed
16.6	16.5	16.7	16.8	16.8	IR02	14263	1891 8878 2832	

4. Packing material: *Inserts* (*Baggies*) (*Bubble Wrap*) *Gel Packs* (*Wet Ice*) *Dry Ice* *Sleeves* _____
5. Were custody papers properly filled out (ink, signed, etc.)? Melted NA (Y) N
6. Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.* NA Y (N)
   If applicable, tissue samples were received: *Frozen* *Partially Thawed* *Thawed*
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA (Y) N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA (Y) N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA (Y) N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA (Y) N
11. Were VOA vials received without headspace? *Indicate in the table below.* (NA) Y N
12. Was C12/Res negative? (NA) Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

General Chemistry

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	ALS Environmental - US	**Service Request:**	K2005948
Project:	ALS Houston DOD TOC	**Date Collected:**	07/9/20
Sample Matrix:	Water	**Date Received:**	07/15/20
Analysis Method:	SM 5310 C	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA

Carbon, Total Organic

Sample Name	Lab Code	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
LH18/24-SP650_070920	K2005948-001	**2.28**	0.50	0.20	0.07	1	07/23/20 17:41	
Method Blank	K2005948-MB	ND U	0.50	0.20	0.07	1	07/23/20 17:41	

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	K2005948
Project:	ALS Houston DOD TOC	**Date Analyzed:**	07/23/20
Sample Matrix:	Water	**Date Extracted:**	NA

Lab Control Sample Summary
Carbon, Total Organic

Analysis Method:	SM 5310 C	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	688295

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K2005948-LCS	24.0	25.0	96	83-117

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US **Service Request:** K2005948
Project: ALS Houston DOD TOC

Continuing Calibration Verification (CCV) Summary

Carbon, Total Organic

Analysis Method: SM 5310 C **Units:** mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance Limits
CCV1	688295	KQ2010054-01	07/23/20 17:41	25.0	25.4	102	90-110
CCV2	688295	KQ2010054-02	07/23/20 17:41	25.0	25.4	102	90-110
CCV3	688295	KQ2010054-03	07/23/20 17:41	25.0	25.0	100	90-110

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US **Service Request:**K2005948
Project: ALS Houston DOD TOC

Continuing Calibration Blank (CCB) Summary
Carbon, Total Organic

Analysis Method: SM 5310 C **Units:**mg/L

	Analysis Lot	Lab Code	Date Analyzed	LOQ	LOD	MDL	Result	Q
CCB1	688295	KQ2010054-05	07/23/20 17:41	0.50	0.20	0.07	ND	U
CCB2	688295	KQ2010054-06	07/23/20 17:41	0.50	0.20	0.07	ND	U
CCB3	688295	KQ2010054-07	07/23/20 17:41	0.50	0.20	0.07	ND	U

Raw Data

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

General Chemistry

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
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Work Request # Original (5873) 5902 5948

Tier: II II IV

Date Analyzed: 7/23/20

Analyst: MK Run # 688295

Analysis: TOC

DATA QUALITY REPORT
INORGANICS

Explain any "no" responses to questions below, and any corrective actions in the comments section below.

1.	Is the method name and number correct and appropriate?	yes/no/NA
2.	Holding times met for all analyses and for all samples?	yes/no/NA
3.	Are calculations correct?	yes/no/NA
4.	Is the reporting basis correct? (Dry Weight)	yes/no/NA
5.	All quality control criteria met?	yes/no
6.	Is the calibration curve correlation coefficient ≥ 0.995?	yes/no/NA
7.	MBs, CCVs, CCBs, LCSs, Dups, and Spikes, analyzed at proper frequency?	yes/no/NA
8.	Are ICVs, CCVs, and CCBs all within acceptance limits?	yes/no/NA
9.	Are results for methods blanks all ND?	yes/no/NA
10.	Are all QC samples within acceptance criteria? (LCS % rec, MS/DMS % rec, DUP or MS/DMS RPDs, etc.)	yes/no/NA
11.	Are all exceptions explained?	yes/no/NA
12.	Have all applicable service requests been reviewed?	yes/no/NA
13.	Are all samples labeled correctly?	yes/no/NA
14.	Have all instructions on the service request been followed? (e.g. Special MRLs, QC on a specific sample, Form V)	yes/no/NA
15.	Are detection limits and units reported correctly?	yes/no/NA
16.	Is the unused space on the benchsheet crossed out?	yes/no/NA
17.	Was analysis turned in by the due date? (n-2) (If not record SR#)	yes/no/NA

COMMENTS:

5873 - High RPD sample is less than 5x's the MRL

Final Approved by: _____ Date: 7/24/20

DQREPORT

Analytical Results Summary

Instrument Name: K-TOC-01 **Analyst:** MKANALY **Analysis Lot:** 688295 **Method/Testcode:** SM 5310 C/TOC T

Lab Code	Target Analytes	QC	Parent Sample	Matrix	Raw Result	Sample Amt.	Final Result	Dil	MDL	PQL	% Rec	% RSD	Date Analyzed	QC?	Tier
K2005873-001	Carbon, Total Organic	N/A		Water	0.70 mg/L	10 mL	0.70 mg/L	1	0.07	0.50			7/23/20 17:41:00	N	II
K2005873-002	Carbon, Total Organic	N/A		Water	0.50 mg/L	10 mL	0.50 mg/L J	1	0.07	0.50			7/23/20 17:41:00	N	II
K2005873-003	Carbon, Total Organic	N/A		Water	0.88 mg/L	10 mL	0.88 mg/L	1	0.07	0.50			7/23/20 17:41:00	N	II
K2005873-004	Carbon, Total Organic	N/A		Water	0.62 mg/L	10 mL	0.62 mg/L	1	0.07	0.50			7/23/20 17:41:00	N	II
K2005873-005	Carbon, Total Organic	N/A		Water	0.47 mg/L	10 mL	0.47 mg/L J	1	0.07	0.50			7/23/20 17:41:00	N	II
K2005873-006	Carbon, Total Organic	N/A		Water	0.09 mg/L	10 mL	0.09 mg/L J	1	0.07	0.50			7/23/20 17:41:00	N	II
K2005873-007	Carbon, Total Organic	N/A		Water	0.68 mg/L	10 mL	0.68 mg/L	1	0.07	0.50			7/23/20 17:41:00	N	II
K2005873-008	Carbon, Total Organic	N/A		Water	0.23 mg/L	10 mL	0.23 mg/L J	1	0.07	0.50			7/23/20 17:41:00	N	II
K2005902-001	Carbon, Total Organic	N/A		Water	1.52 mg/L	10 mL	1.52 mg/L	1	0.07	0.50			7/23/20 17:41:00	N	II
K2005902-002	Carbon, Total Organic	N/A		Water	0.93 mg/L	10 mL	0.93 mg/L	1	0.07	0.50			7/23/20 17:41:00	N	II
K2005902-003	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			7/23/20 17:41:00	N	II
K2005902-004	Carbon, Total Organic	N/A		Water	2.64 mg/L	10 mL	2.64 mg/L	1	0.07	0.50			7/23/20 17:41:00	N	II
K2005902-005	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			7/23/20 17:41:00	N	II
K2005948-001	Carbon, Total Organic	N/A		Water	2.28 mg/L	10 mL	2.28 mg/L	1	0.07	0.50			7/23/20 17:41:00	N	IV
KQ2010054-01	Carbon, Total Organic	CCV		Reagent Water	25.40 mg/L	10 mL	25.4 mg/L	1					7/23/20 17:41:00	N	I
KQ2010054-02	Carbon, Total Organic	CCV		Reagent Water	25.44 mg/L	10 mL	25.4 mg/L	1					7/23/20 17:41:00	N	I
KQ2010054-03	Carbon, Total Organic	CCV		Reagent Water	25.01 mg/L	10 mL	25.0 mg/L	1					7/23/20 17:41:00	N	I
KQ2010054-05	Carbon, Total Organic	CCB		Reagent Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			7/23/20 17:41:00	N	I
KQ2010054-06	Carbon, Total Organic	CCB		Reagent Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			7/23/20 17:41:00	N	I
KQ2010054-07	Carbon, Total Organic	CCB		Reagent Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			7/23/20 17:41:00	N	I
KQ2010054-09	Carbon, Total Organic	MB		Reagent Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			7/23/20 17:41:00	N	I
KQ2010054-10	Carbon, Total Organic	LCS		Reagent Water	24.03 mg/L	10 mL	24.0 mg/L	1	0.07	0.50	96		7/23/20 17:41:00	N	I
KQ2010054-11	Carbon, Total Organic	DUP	K2005873-001	Water	0.80 mg/L	10 mL	0.80 mg/L	1	0.07	0.50		13*	7/23/20 17:41:00	N	II
KQ2010054-12	Carbon, Total Organic	MS	K2005873-001	Water	27.94 mg/L	10 mL	27.9 mg/L	1	0.07	0.50	109		7/23/20 17:41:00	N	II

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

Schedule: 072320

Version: 11
Instrument: Fusion1
Last Saved by: Fusion1 (Fusion1)
Last Saved on: 2020/07/24 07:45 - Friday

Position	Sample Type	Sample ID	Method ID (Calibration ID)	Reps	Use	State
(Clean)	Clean	Clean		1	False	Ready
(Clean)	Clean	Clean		1	False	Ready
(Clean)	Clean	Clean		1	False	Ready
(Blank)	Blank	Reagent/Acid Blank		1	False	Ready
D	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	False	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	False	Ready
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	False	Ready
1	Sample	MB1	CAS_salt_010711 (CAS_salt_010711)	1	False	Ready
2	Check Standard	[TOC] LCS [25.0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	False	Ready
C	Check Standard	[TOC] LCS [25.0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	False	Ready
3	Sample	ICS	CAS_salt_010711 (CAS_salt_010711)	1	False	Ready
4	Sample	K2005873-001	CAS_salt_010711 (CAS_salt_010711)	2	False	Ready
5	Sample	K2005873-001D	CAS_salt_010711 (CAS_salt_010711)	2	False	Ready
6	Sample	K2005873-001MS	CAS_salt_010711 (CAS_salt_010711)	2	False	Ready
7	Sample	K2005873-002	CAS_salt_010711 (CAS_salt_010711)	2	False	Ready
8	Sample	K2005873-003	CAS_salt_010711 (CAS_salt_010711)	2	False	Ready
9	Sample	K2005873-004	CAS_salt_010711 (CAS_salt_010711)	2	False	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	False	Ready
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	False	Ready
10	Sample	K2005873-005	CAS_salt_010711 (CAS_salt_010711)	2	False	Ready
11	Sample	K2005873-006	CAS_salt_010711 (CAS_salt_010711)	2	False	Ready
12	Sample	K2005873-007	CAS_salt_010711 (CAS_salt_010711)	2	False	Ready
13	Sample	K2005873-008	CAS_salt_010711 (CAS_salt_010711)	2	False	Ready
14	Sample	K2005948-001	CAS_salt_010711 (CAS_salt_010711)	2	False	Ready
15	Sample	K2005902-001	CAS_salt_010711 (CAS_salt_010711)	2	False	Ready
16	Sample	K2005902-002	CAS_salt_010711 (CAS_salt_010711)	2	False	Ready
17	Sample	K2005902-003	CAS_salt_010711 (CAS_salt_010711)	2	False	Ready
18	Sample	K2005902-004	CAS_salt_010711 (CAS_salt_010711)	2	False	Ready
19	Sample	K2005902-005	CAS_salt_010711 (CAS_salt_010711)	2	False	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	False	Ready
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	False	Ready
20	Sample	MB2	CAS_salt_010711 (CAS_salt_010711)	1	False	Ready
C	Check Standard	[TOC] LCS [24.0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	False	Ready
C	Check Standard	[TOC] LCS [25.0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	False	Ready
21	Sample	K2005902-006	CAS_salt_010711 (CAS_salt_010711)	2	False	Ready
22	Sample	K2005902-007	CAS_salt_010711 (CAS_salt_010711)	2	False	Ready
23	Sample	K2005902-008	CAS_salt_010711 (CAS_salt_010711)	2	False	Ready
24	Sample	K2005654-001	CAS_salt_010711 (CAS_salt_010711)	2	False	Ready
25	Sample	K2005654-002	CAS_salt_010711 (CAS_salt_010711)	2	False	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	False	Ready
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	False	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
					False	

Rerun

Fusion Report - 072320
Thursday, July 23, 2020 03:12 PM

(View - Reps, Unused Reps, Meta-Data, Signature, History)
Printed on 2020/07/24 08:16 - Friday

Report Summary Information

Company Location:	Gen Chem Lab		
Schedule Name:	072320	Engine Version:	1.1.5.1
Instrument Name:	Fusion1	Firmware Version:	1.2.0696
Report Version:	1 of 1	Connection:	RS232 COM1
Report Creation by Operators (schedule version):	Fusion1 (Fusion1) (v1) Fusion1 (Fusion1) (v4) Fusion1 (Fusion1) (v6) Fusion1 (Fusion1) (v8) Fusion1 (Fusion1) (v9)		
Comment:			

Report Results

Sample Type: Clean — From Schedule Version 1

	Pos	Analysis Type	Sample ID	Start Time
◆	(clean)		Clean	2020/07/23 15:12

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	11.76	25.82	14.05	49.63	05:28
2	TC Clean	4.32	17.84	13.52	49.81	07:17
3	TC Clean	1.16	14.56	13.39	49.92	07:02
4	TC Clean	0.84	14.23	13.39	49.87	07:01

Sample Type: Clean — From Schedule Version 4

	Pos	Analysis Type	Sample ID	Start Time
◆	(clean)		Clean	2020/07/23 15:43

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	-0.26	13.26	13.51	49.63	05:15
2	TC Clean	2.87	16.15	13.28	50.01	07:17
3	TC Clean	1.07	14.64	13.57	49.99	03:53

4	TC Clean	0.53	14.24	13.71	49.79	07:04

Sample Type: Clean From Schedule Version 4

	Pos	Analysis Type	Sample ID	Start Time
◆	(clean)		Clean	2020/07/23 16:12

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	-0.41	12.93	13.34	49.51	05:13
2	TC Clean	3.44	16.74	13.30	49.99	04:12
3	TC Clean	1.85	15.35	13.50	49.78	07:01
4	TC Clean	0.83	14.42	13.59	49.92	07:00

Sample Type: Blank (Creating v1417) From Schedule Version 4

	Pos	Analysis Type	Sample ID	Start Time
◆	(blank)		Reagent/Acid Blank	2020/07/23 16:40

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	-0.30	12.94	13.24	49.61	05:25
2	TC Clean	3.93	17.19	13.27	49.75	07:16
3	TC Clean	1.84	14.91	13.06	49.94	07:01
4	TC Clean	1.34	14.49	13.15	49.83	07:00
5	Reagent Blank	6.55	19.97	13.42	49.71	08:13
6	Acid Blank	0.26	13.58	13.32	49.67	05:32

Sample Type: Sample From Schedule Version 6

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	D	TOC	RB	0.1915 ppm	0.0000 ppm	0.0000%	2020/07/23 17:26

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1915	1.9148	10.68	24.26	13.58	49.96	10:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.3398 (IC) (v1417)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

Sample Type: Check Standard --> CCV 25 ppm From Schedule Version 6

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆	B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	25.4045 ppm (PASS)	0.0000 ppm	0%	2020/07/23 17:41

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	25.4045	254.0447	188.10	201.64	13.54	49.94	10:33

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)	50 ppmC

Sample Type: Check Standard --> CCB From Schedule Version 8

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆	D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2020/07/23 17:56

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	8.09	21.61	13.52	49.98	10:29

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)	0 ppmC

Sample Type: Sample From Schedule Version 8

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	1	TOC	MB1	0.0000 ppm	0.0000 ppm	0.0000%	2020/07/23 18:11

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.60	20.98	13.39	49.92	10:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.3398 (IC) (v1417)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

Sample Type: Check Standard --> LCS WR Sample error From Schedule Version 8

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆	2	TOC	25.0000	1:1	[TOC] LCS [25.0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2020/07/23 18:25

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
2	TOC	25.0 ppm	1	0.0000	0.0000	7.32	20.81	13.50	49.94	10:27

Completion State	Success Action	Method	Calibration	STD Conc - Pos 2
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)	25 ppmC

Sample Type: Check Standard --> LCS From Schedule Version 8

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆	C	TOC	25.0000	1:1	[TOC] LCS [25.0 ppm]	0 / infinity (NA / NA)	24.0291 ppm (PASS)	0.0000 ppm	0%	2020/07/23 18:40

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	24.0291	240.2910	178.45	192.01	13.55	50.00	10:34

Completion State	Success Action	Method	Calibration	STD Conc - Pos C
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)	25 ppmC

Sample Type: Sample From Schedule Version 9

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	3	TOC	ICS	0.1109 ppm	0.0000 ppm	0.0000%	2020/07/23 18:54

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1109	1.1094	10.12	23.63	13.51	49.91	10:33

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.3398 (IC) (v1417)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	4	TOC	K2005873-001	0.6991 ppm	0.0020 ppm	0.2900%	2020/07/23 19:09

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.7005	7.0055	14.25	27.51	13.26	50.01	10:28
2	TOC	0.6977	6.9770	14.23	27.51	13.28	50.00	10:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.3398 (IC) (v1417)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	5	TOC	K2005873-001D	0.7983 ppm	0.0104 ppm	1.3000%	2020/07/23 19:37

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.8056	8.0561	14.99	28.38	13.38	50.01	10:27
2	TOC	0.7909	7.9093	14.89	28.03	13.14	49.94	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.3398 (IC) (v1417)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	6	TOC	K2005873-001MS	27.9408 ppm	0.1348 ppm	0.4800%	2020/07/23 20:05

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	28.0361	280.3608	206.01	219.28	13.27	50.04	10:29
2	TOC	27.8455	278.4548	204.67	217.98	13.31	49.96	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.3398 (IC) (v1417)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	7	TOC	K2005873-002	0.4993 ppm	0.0209 ppm	4.1800%	2020/07/23 20:33

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.5141	5.1409	12.95	26.35	13.40	50.02	10:27
2	TOC	0.4846	4.8458	12.74	25.93	13.19	49.94	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.3398 (IC) (v1417)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	8	TOC	K2005873-003	0.8752 ppm	0.0166 ppm	1.9000%	2020/07/23 21:01

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.8635	8.6349	15.40	28.60	13.21	49.88	10:30
2	TOC	0.8870	8.8701	15.56	28.83	13.27	49.99	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.3398 (IC) (v1417)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	9	TOC	K2005873-004	0.6234 ppm	0.0185 ppm	2.9800%	2020/07/23 21:29

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.6103	6.1031	13.62	26.77	13.15	49.93	10:26
2	TOC	0.6365	6.3654	13.80	27.18	13.38	49.88	10:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.3398 (IC)	CAS_salt_010711	CAS_salt_010711

(v1417) (v4) (v38)

Sample Type: Check Standard --> CCV 25 ppm From Schedule Version 9

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆	B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	25.4444 ppm (PASS)	0.0000 ppm	0%	2020/07/23 21:57

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	25.4444	254.4439	188.38	201.90	13.52	49.84	10:32

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)	50 ppmC

Sample Type: Check Standard --> CCB From Schedule Version 9

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆	D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2020/07/23 22:12

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	7.51	21.16	13.65	49.83	10:30

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)	0 ppmC

Sample Type: Sample From Schedule Version 9

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	10	TOC	K2005873-005	0.4710 ppm	0.0068 ppm	1.4300%	2020/07/23 22:26

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.4662	4.6619	12.61	26.09	13.48	49.80	10:27
2	TOC	0.4757	4.7574	12.68	26.21	13.53	49.81	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.3398 (IC) (v1417)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	11	TOC	K2005873-006	0.0896 ppm	0.0413 ppm	46.1500%	2020/07/23 22:55

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1188	1.1878	10.17	23.62	13.45	49.81	10:25
2	TOC	0.0603	0.6033	9.76	23.15	13.39	49.80	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.3398 (IC) (v1417)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	12	TOC	K2005873-007	0.6755 ppm	0.0516 ppm	7.6400%	2020/07/23 23:23

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.6390	6.3896	13.82	27.51	13.69	49.79	10:25
2	TOC	0.7120	7.1195	14.33	27.92	13.59	49.95	10:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.3398 (IC) (v1417)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	13	TOC	K2005873-008	0.2256 ppm	0.0157 ppm	6.9700%	2020/07/23 23:51

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.2144	2.1443	10.84	24.46	13.62	49.94	10:26
2	TOC	0.2367	2.3667	11.00	24.47	13.47	49.92	10:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.3398 (IC) (v1417)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	14	TOC	K2005948-001	2.2803 ppm	0.0130 ppm	0.5700%	2020/07/24 00:19

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.2895	22.8947	25.40	38.86	13.46	49.89	10:28
2	TOC	2.2711	22.7108	25.27	38.72	13.45	49.87	10:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.3398 (IC) (v1417)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	15	TOC	K2005902-001	1.5222 ppm	0.0115 ppm	0.7500%	2020/07/24 00:47

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.5304	15.3036	20.07	33.54	13.46	49.97	10:25
2	TOC	1.5141	15.1411	19.96	33.34	13.38	50.06	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.3398 (IC)	CAS_salt_010711	CAS_salt_010711

(v1417) (v4) (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	16	TOC	K2005902-002	0.9346 ppm	0.0222 ppm	2.3700%	2020/07/24 01:15

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.9189	9.1894	15.79	29.36	13.57	49.97	10:28
2	TOC	0.9503	9.5030	16.01	29.40	13.39	49.94	10:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.3398 (IC) (v1417)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	17	TOC	K2005902-003	0.0000 ppm	0.0000 ppm	0.0000%	2020/07/24 01:43

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.04	21.57	13.53	50.06	10:29
2	TOC	0.0000	0.0000	8.29	21.83	13.54	50.05	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.3398 (IC) (v1417)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	18	TOC	K2005902-004	2.6424 ppm	0.0641 ppm	2.4300%	2020/07/24 02:11

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.6878	26.8777	28.19	41.83	13.64	50.01	10:28
2	TOC	2.5971	25.9710	27.56	41.15	13.59	49.95	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.3398 (IC) (v1417)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	19	TOC	K2005902-005	0.0000 ppm	0.0000 ppm	0.0000%	2020/07/24 02:39

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.98	21.53	13.55	49.96	10:26
2	TOC	0.0000	0.0000	8.09	21.60	13.51	50.14	10:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.3398 (IC) (v1417)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

Sample Type: Check Standard --> CCV 25 ppm From Schedule Version 9

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time

◆	B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	25.0104 ppm (PASS)	0.0000 ppm	0%	2020/07/24 03:07

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	25.0104	250.1045	185.34	198.84	13.51	50.09	10:31

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)	50 ppmC

Sample Type: Check Standard --> CCB

From Schedule Version 9

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆	D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2020/07/24 03:22

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	7.09	20.62	13.54	50.03	10:30

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)	0 ppmC

Sample Type: Sample

From Schedule Version 9

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	20	TOC	MB2	0.0000 ppm	0.0000 ppm	0.0000%	2020/07/24 03:36

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.83	22.47	13.64	50.01	10:33

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.3398 (IC) (v1417)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

Sample Type: Check Standard --> LCS

From Schedule Version 9

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆	C	TOC	25.0000	1:1	[TOC] LCS [24.0 ppm]	0 / infinity (NA / NA)	23.3420 ppm (PASS)	0.0000 ppm	0%	2020/07/24 03:51

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	23.3420	233.4198	173.63	187.01	13.38	49.98	10:33

Completion State	Success Action	Method	Calibration	STD Conc - Pos C
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)	25 ppmC

Sample Type: Check Standard --> LCS From Schedule Version 9

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆	C	TOC	25.0000	1:1	[TOC] LCS [25.0 ppm]	0 / infinity (NA / NA)	23.2674 ppm (PASS)	0.0000 ppm	0%	2020/07/24 04:05

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	23.2674	232.6742	173.11	186.66	13.55	49.97	10:32

Completion State	Success Action	Method	Calibration	STD Conc - Pos C
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)	25 ppmC

Sample Type: Sample From Schedule Version 9

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	21	TOC	K2005902-006	0.0000 ppm	0.0000 ppm	0.0000%	2020/07/24 04:20

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.79	22.32	13.54	50.16	10:30
2	TOC	0.0000	0.0000	8.40	21.98	13.57	50.09	10:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.3398 (IC) (v1417)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	22	TOC	K2005902-007	0.0000 ppm	0.0000 ppm	0.0000%	2020/07/24 04:48

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.93	21.59	13.66	50.04	10:28
2	TOC	0.0000	0.0000	8.16	21.81	13.65	50.03	10:24

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.3398 (IC) (v1417)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	23	TOC	K2005902-008	0.0000 ppm	0.0000 ppm	0.0000%	2020/07/24 05:16

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.38	21.08	13.70	50.00	10:31

2	TOC	0.0000	0.0000	7.10	20.55	13.45	49.97	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.3398 (IC) (v1417)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	24	TOC	K2005654-001	0.0000 ppm	0.0000 ppm	0.0000%	2020/07/24 05:44

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.43	19.98	13.55	50.17	10:25
2	TOC	0.0000	0.0000	6.68	20.28	13.60	50.08	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.3398 (IC) (v1417)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	25	TOC	K2005654-002	0.0000 ppm	0.0000 ppm	0.0000%	2020/07/24 06:13

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.50	20.09	13.59	50.05	10:26
2	TOC	0.0000	0.0000	6.71	20.43	13.72	50.03	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.3398 (IC) (v1417)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

Sample Type: Check Standard --> CCV 25 ppm From Schedule Version 9

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆	B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	28.7105 ppm (PASS)	0.0000 ppm	0%	2020/07/24 06:41

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	28.7105	287.1047	211.29	224.91	13.62	50.01	10:32

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)	50 ppmC

Sample Type: Check Standard --> CCB From Schedule Version 9

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆	D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2020/07/24 06:55

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	7.72	21.28	13.56	49.99	10:29

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)	0 ppmC

Sample Type: Sample From Schedule Version 9

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	1	TOC		0.0000 ppm	0.0000 ppm	0.0000%	2020/07/24 07:10

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.44	19.84	13.41	50.14	10:31

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.3398 (IC) (v1417)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

Meta Data Used in this Report

Blanks

Version	Reagent (Abs)	Acid (Abs)	DI IC (Abs)	DI TC (Abs)	DI TOC (Abs)	Save Time	Operator
v1416	1.2707	0.0410	0.0000	0.0000	0.0000	2020/07/22 11:14	Fusion1 (Fusion1)
v1417	2.1847	0.2560	0.0000	0.0000	0.0000	2020/07/23 17:26	Fusion1 (Fusion1)

Calibrations

Name: CAS_salt_010711 (TOC)

Version:	v38	Calibration curve formula:	TOC: y = 7.015x + 9.892
Ver Creation:	2020/06/13 16:40	r^2 value:	TOC: r^2 = 0.99974
Comment:			
Operator:	Fusion1 (Fusion1)		
Basic Analysis Type	TOC		

Basic Analysis Type: TOC

Sample ID	Y Raw Value	X Expected	Message	End Time
DI Water	9.5750	0.0000		2020/06/13 15:13
0.500 ppm	12.9010	0.5000		2020/06/13 15:28

1.0 ppm	15.6320	1.0000		2020/06/13 15:42
5.0 ppm	43.2510	5.0000		2020/06/13 15:56
10 ppm	82.4040	10.0000		2020/06/13 16:11
25 ppm	188.6880	25.0000		2020/06/13 16:25
50 ppm	358.6500	50.0000		2020/06/13 16:39

Methods

Name: CAS_salt_010711 (TOC)

Version: v4 Operator: Fusion1 (Fusion1)

Ver Creation: 2019/02/21 17:57

Comment:

Parameter	Value
SampleVolume	10.0 mL
Dilution	1:10
AcidVolume	0.5 ml
ReagentVolume	2.0 ml
UVReactorPrerinse	Off
UVReactorPrerinseVolume	5.0
NumberOfUVReactorPrerinses	1
ICSpargeTime	1.00 mins
DetectorSweepFlow	500 ml/min
PreSpargeTime	2.00 mins
SystemFlow	500 ml/min

Advanced Parameter	Value
NeedleRinseVolume	5.0 ml
VialPrimeVolume	2.0 ml
ICSamplePrimeVolume	2.0 ml
ICSpargeRinseVolume	12.0 ml
BaselineStabilizeTime	0.70 min
DetectorPressureFlow	150 ml/min
SyringeSpeedWaste	10
SyringeSpeedAcid	7
SyringeSpeedReagent	7
SyringeSpeedDIWater	7
NDIRPressurization	60 psig
SyringeSpeedSampleDispense	5
SyringeSpeedSampleAspirate	4
SyringeSpeedUVDispense	5
SyringeSpeedUVAspirate	5
SyringeSpeedICDispense	5
SyringeSpeedICAspirate	5
NDIRPressureStabilize	1.75 min
SampleMixing	Off
SampleMixingCycles	1
SampleMixingVolume	10.0
LowLevelFilterNDIR	Off

Acceptance / Approval

Electronic Signatures

Report Version	User Name	Acceptance	Reason	Date

Report History

Report History

Report Version	User Name	System Reason	User Reason	Date
1	Fusion1 (Fusion1)	Schedule completed	Schedule completed	2020/07/24 07:25

ALS Environmental

StarLIMS Run: 688295

Analysis: DOC/TOC

Method: SM 5310 C, 9060A, 415.1, 9060

CCV: 19-GEN-8-15-C 50 ppm LCS: 19-GEN-8-25J 25.0 ppm

ICAL Date: 6/16/2020

ICAL ID: 19-GEN-8-22-G

ICS ID: 19-GEN-8-4-G

ICS TV: 25.0 ppm ICS % R < 1

Spike ID: 19-GEN-8-15-B 0.05 ml of 5000 ppm stock ---> 10.0 ml = 25.0 ppm x dilution factor

Sodium Persulfate: 19-GEN-08-31A

21 % H3PO4: 19-GEN-08-25A

Equipment ID: K-TOC-03

PIPETTE ID: 124276B, 129001F, N11314F, Marge

FILTER ID: 16967789

Analyzed By:	MC	Date Analyzed:	7/23/20
Reviewed By:	JC	Date Reviewed:	7/24/20

HS20070398 NIT_AMN_W_ISE WC

ALS WO# HS20070398

NH3 AMN-W-ISE 13593

ALS Laboratory Group

Logbook 3122

Ion Selective Electrode Logbook

Analyst: MD			Date: 7/14/20 10:40AM
Method: SM4500NH3-D/EPA 350.3 or SM4500 NH3 B-F			
Probe Calibration Date: 7/14/20	Cal Std ID: 31406/0 (07-12)		Probe ID: X01-11806
Std Level	mV	Conc., mg/L:	Sodium Thiosulfate ID: -
STD 1 (mg/L): 0.2	138.6	0.201	Std Level / mV / Conc., mg/L:
STD 2 (mg/L): 1	96.5	1.014	STD 4 (mg/L): 10 / 38.4 / 10.230
STD 3 (mg/L): 5	58.9	5.059	STD 5 (mg/L): 50 / -2.8 / 49.996
LSC / MS Spike ID: 3100601709			ICAL Date & Slope:
ICV Cal STD ID: 31406/007			100.07 / -59.0mV
DPD Reagent ID: 3100601821			

WO # / SX #	Bottle #	Initial g or ml	Final Vol. ml	Dilution Factor	Initial Conc. mg/L	Final Conc. mg/L	Chlorine Check (+/-)	Comments
CCV		50ml	50ml		10.393			
CCB					0.014			
MBLK					0.013			
LCS					10.593			
HS20070398-01					12.665		-VE	
413-01					0.749		-VE	
413-01MS					11.634			
413-01MSD					11.631			
521-05					0.255			
CCV					10.515			
CCB					0.013			

Batch ID: 366484	366485	Reported By MD	Reviewed By:

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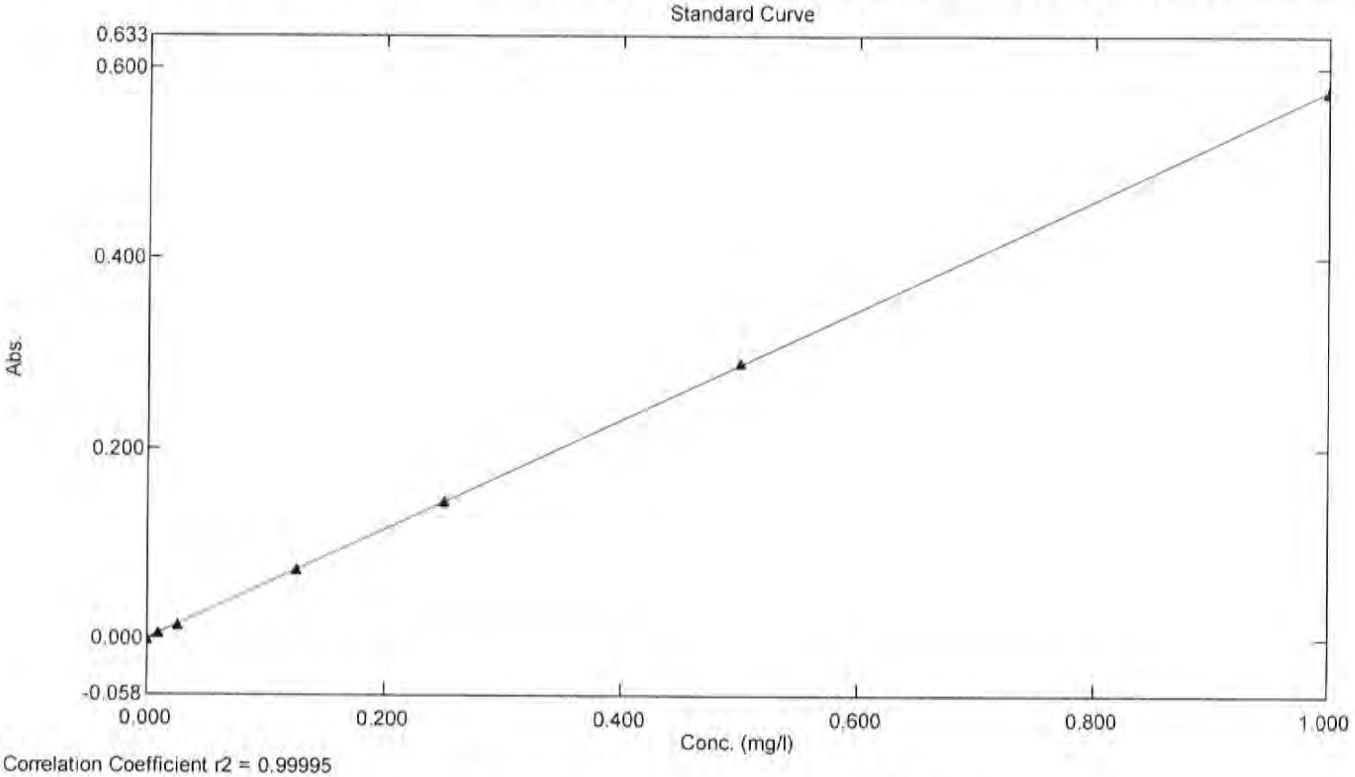
HS20070398 P_ORTHO WC

ALS WO# HS20070398

Standard Table Report

07/15/2020 03:45:00 PM

File Name: C:\Program Files (x86)\Shimadzu\UVProbe\Data\O_PO4_UNKNOWN\2020\071020_P_ORTHO.pho..p



Correlation Coefficient r2 = 0.99995

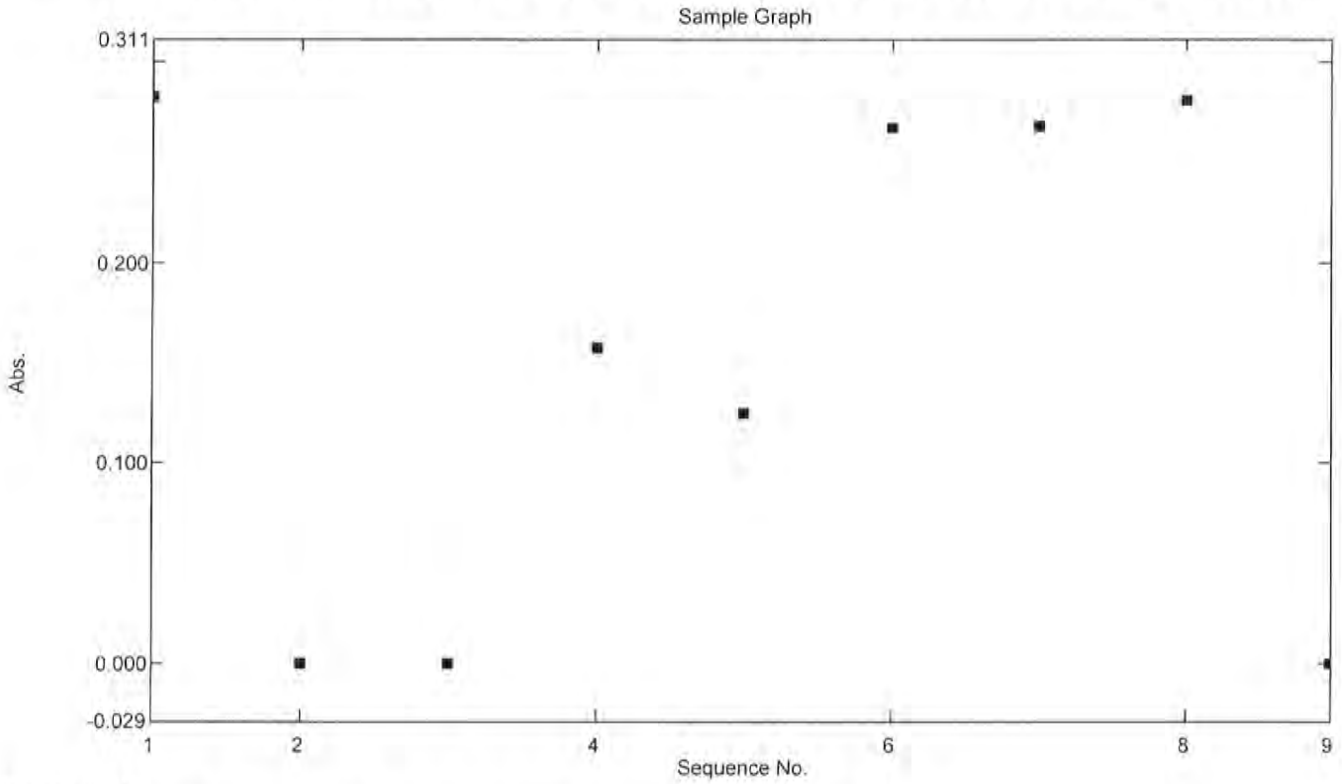
Standard Table

	Sample ID	Type	Ex	Conc	WL880.0	Wgt.Facto	Comments
1	STD1	Standard		0.000	-0.001	1.000	
2	STD2	Standard		0.010	0.005	1.000	
3	STD3	Standard		0.025	0.013	1.000	
4	STD4	Standard		0.125	0.073	1.000	
5	STD5	Standard		0.250	0.145	1.000	
6	STD6	Standard		0.500	0.290	1.000	
7	STD7	Standard		1.000	0.575	1.000	
8							

Sample Table Report

07/15/2020 03:45:08 PM

File Name: C:\Program Files (x86)\Shimadzu\UVProbe\Data\O_PO4_UNKNOWN\2020\071020_P_ORTHO.pho..p



Sample Table

	Sample ID	Type	Ex	Conc	WL880.0	Comments
1	CCV	Unknown		0.491	0.283	313107109 WC-14
2	CCB	Unknown		-0.001	-0.000	
3	MBLK	Unknown		-0.001	-0.000	
4	LCS	Unknown		0.273	0.157	313107108 WC-14
5	HS20070398.01	Unknown		0.217	0.125	PF:10X,12:10PM
6	HS230070398.01	Unknown		0.464	0.268	PF:10X,12:10PM
7	HS20070398.01M	Unknown		0.466	0.269	PF:10X,12:11PM
8	CCV2	Unknown		0.488	0.281	
9	CCB2	Unknown		0.000	0.000	314060906 UV-11
10						

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

WorkOrder: HS20070399

Longhorn GW Treatment Plant Bi Weekly Samples

Bhate Environmental Associates, Inc.

Marcia Olive
445 Union Blvd Ste 129
Lakewood CO 80228

18-Aug-2020

ALS Environmental
ALS Group USA, Corp
1317 South 13th Avenue
Kelso, WA 98626
T : +1 360 577 7222
F : +1 360 636 1068
www.alsglobal.com

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  - COC
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- HS20070399 Wet Chem Raw Data (IC)

HS20070399 Longhorn GW Treatment Plant Bi Weekly Samples Final

ALS WO# HS20070399

10450 Stancliff Rd. Suite 210
Houston, TX 77099
T: +1 281 530 5656
F: +1 281 530 5887

July 14, 2020

Marcia Olive
Bhate Environmental Associates, Inc.
445 Union Blvd Ste 129
Lakewood, CO 80228

Work Order: **HS20070399**

Laboratory Results for: **Longhorn GW Treatment Plant Bi Weekly Samples**

Dear Marcia Olive,

ALS Environmental received 2 sample(s) on Jul 10, 2020 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
RJ Modashia
Project Manager

ALS Houston, US Date: 14-Jul-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi Weekly Samples
Work Order: HS20070399

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS20070399-01	LH18/24-SP650_070920	Water		09-Jul-2020 14:00	10-Jul-2020 09:00	☐
HS20070399-02	Trip Blank	Water	CG-032420-87	09-Jul-2020 14:00	10-Jul-2020 09:00	☐

ALS Houston, US Date: 14-Jul-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi Weekly Samples
Work Order: HS20070399

CASE NARRATIVE

GCMS Volatiles by Method SW8260

Batch ID: R364980

Sample ID: HS20070043-19MS

- MS and MSD are for an unrelated sample

WetChemistry by Method SW9056

Batch ID: R364950

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

ALS Houston, US Date: 14-Jul-20

Client: Bhate Environmental Associates, Inc. **ANALYTICAL REPORT**
Project: Longhorn GW Treatment Plant Bi Weekly Samples WorkOrder:HS20070399
Sample ID: LH18/24-SP650_070920 Lab ID:HS20070399-01
Collection Date: 09-Jul-2020 14:00 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
1,1,1,2-Tetrachloroethane	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 19:17
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 19:17
1,1,2,2-Tetrachloroethane	1.0	U	0.50	1.0	1.0	UG/L	1	13-Jul-2020 19:17
1,1,2-Trichloroethane	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 19:17
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 19:17
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 19:17
1,1-Dichloropropene	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 19:17
1,2,3-Trichlorobenzene	1.0	U	0.40	1.0	1.0	UG/L	1	13-Jul-2020 19:17
1,2,3-Trichloropropane	1.0	U	0.50	1.0	1.0	UG/L	1	13-Jul-2020 19:17
1,2,4-Trichlorobenzene	1.0	U	0.50	1.0	1.0	UG/L	1	13-Jul-2020 19:17
1,2,4-Trimethylbenzene	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 19:17
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 19:17
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 19:17
1,2-Dichlorobenzene	1.0	U	0.50	1.0	1.0	UG/L	1	13-Jul-2020 19:17
1,2-Dichloroethane	**0.89**	J	**0.20**	**0.50**	**1.0**	**UG/L**	1	13-Jul-2020 19:17
1,2-Dichloropropane	1.0	U	0.50	1.0	1.0	UG/L	1	13-Jul-2020 19:17
1,3,5-Trimethylbenzene	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 19:17
1,3-Dichlorobenzene	1.0	U	0.40	1.0	1.0	UG/L	1	13-Jul-2020 19:17
1,3-Dichloropropane	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 19:17
1,4-Dichlorobenzene	1.0	U	0.40	1.0	1.0	UG/L	1	13-Jul-2020 19:17
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 19:17
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	13-Jul-2020 19:17
2-Chlorotoluene	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 19:17
2-Hexanone	2.0	U	1.0	2.0	2.0	UG/L	1	13-Jul-2020 19:17
4-Chlorotoluene	1.0	U	0.40	1.0	1.0	UG/L	1	13-Jul-2020 19:17
4-Isopropyltoluene	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 19:17
4-Methyl-2-pentanone	2.0	U	0.70	2.0	2.0	UG/L	1	13-Jul-2020 19:17
Acetone	1.0	U	0.40	1.0	2.0	UG/L	1	13-Jul-2020 19:17
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 19:17
Bromobenzene	1.0	U	0.40	1.0	1.0	UG/L	1	13-Jul-2020 19:17
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 19:17
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 19:17
Bromoform	1.0	U	0.40	1.0	1.0	UG/L	1	13-Jul-2020 19:17
Bromomethane	1.0	U	0.40	1.0	1.0	UG/L	1	13-Jul-2020 19:17
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	13-Jul-2020 19:17
Carbon tetrachloride	1.0	U	0.50	1.0	1.0	UG/L	1	13-Jul-2020 19:17
Chlorobenzene	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 19:17
Chloroethane	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 19:17
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 19:17

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

ALS Houston, US Date: 14-Jul-20

Client: Bhate Environmental Associates, Inc.
ANALYTICAL REPORT
Project: Longhorn GW Treatment Plant Bi Weekly Samples WorkOrder:HS20070399
Sample ID: LH18/24-SP650_070920 Lab ID:HS20070399-01
Collection Date: 09-Jul-2020 14:00 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 19:17
cis-1,2-Dichloroethene	**16**		**0.20**	**0.50**	**1.0**	**UG/L**	1	13-Jul-2020 19:17
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	13-Jul-2020 19:17
Dibromochloromethane	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 19:17
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 19:17
Dichlorodifluoromethane	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 19:17
Ethylbenzene	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 19:17
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	13-Jul-2020 19:17
Isopropylbenzene	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 19:17
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	13-Jul-2020 19:17
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	13-Jul-2020 19:17
n-Butylbenzene	1.0	U	0.40	1.0	1.0	UG/L	1	13-Jul-2020 19:17
n-Propylbenzene	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 19:17
Naphthalene	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 19:17
o-Xylene	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 19:17
sec-Butylbenzene	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 19:17
Styrene	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 19:17
tert-Butylbenzene	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 19:17
Tetrachloroethene	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 19:17
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 19:17
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 19:17
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 19:17
Trichloroethene	**2.8**		**0.20**	**0.50**	**1.0**	**UG/L**	1	13-Jul-2020 19:17
Trichlorofluoromethane	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 19:17
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 19:17
Surr: 1,2-Dichloroethane-d4	*88.5*			**0**	*81-118*	*%REC*	*1*	*13-Jul-2020 19:17*
Surr: 4-Bromofluorobenzene	*100*			**0**	*85-114*	*%REC*	*1*	*13-Jul-2020 19:17*
Surr: Dibromofluoromethane	*90.3*			**0**	*80-119*	*%REC*	*1*	*13-Jul-2020 19:17*
Surr: Toluene-d8	*103*			**0**	*89-112*	*%REC*	*1*	*13-Jul-2020 19:17*
ANIONS BY SW9056A		**Method:SW9056**						Analyst: YP
Chloride	**301**		**2.00**	**5.00**	**5.00**	**mg/L**	10	12-Jul-2020 13:01
Sulfate	**31.4**		**0.200**	**0.500**	**0.500**	**mg/L**	1	12-Jul-2020 12:43

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

ALS Houston, US Date: 14-Jul-20

Client: Bhate Environmental Associates, Inc.
ANALYTICAL REPORT
Project: Longhorn GW Treatment Plant Bi Weekly Samples
WorkOrder:HS20070399
Sample ID: Trip Blank
Lab ID:HS20070399-02
Collection Date: 09-Jul-2020 14:00
Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C	**Method:SW8260**							Analyst: PC
1,1,1,2-Tetrachloroethane	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 18:53
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 18:53
1,1,2,2-Tetrachloroethane	1.0	U	0.50	1.0	1.0	UG/L	1	13-Jul-2020 18:53
1,1,2-Trichloroethane	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 18:53
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 18:53
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 18:53
1,1-Dichloropropene	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 18:53
1,2,3-Trichlorobenzene	1.0	U	0.40	1.0	1.0	UG/L	1	13-Jul-2020 18:53
1,2,3-Trichloropropane	1.0	U	0.50	1.0	1.0	UG/L	1	13-Jul-2020 18:53
1,2,4-Trichlorobenzene	1.0	U	0.50	1.0	1.0	UG/L	1	13-Jul-2020 18:53
1,2,4-Trimethylbenzene	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 18:53
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 18:53
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 18:53
1,2-Dichlorobenzene	1.0	U	0.50	1.0	1.0	UG/L	1	13-Jul-2020 18:53
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 18:53
1,2-Dichloropropane	1.0	U	0.50	1.0	1.0	UG/L	1	13-Jul-2020 18:53
1,3,5-Trimethylbenzene	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 18:53
1,3-Dichlorobenzene	1.0	U	0.40	1.0	1.0	UG/L	1	13-Jul-2020 18:53
1,3-Dichloropropane	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 18:53
1,4-Dichlorobenzene	1.0	U	0.40	1.0	1.0	UG/L	1	13-Jul-2020 18:53
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 18:53
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	13-Jul-2020 18:53
2-Chlorotoluene	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 18:53
2-Hexanone	2.0	U	1.0	2.0	2.0	UG/L	1	13-Jul-2020 18:53
4-Chlorotoluene	1.0	U	0.40	1.0	1.0	UG/L	1	13-Jul-2020 18:53
4-Isopropyltoluene	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 18:53
4-Methyl-2-pentanone	2.0	U	0.70	2.0	2.0	UG/L	1	13-Jul-2020 18:53
Acetone	1.0	U	0.40	1.0	2.0	UG/L	1	13-Jul-2020 18:53
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 18:53
Bromobenzene	1.0	U	0.40	1.0	1.0	UG/L	1	13-Jul-2020 18:53
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 18:53
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 18:53
Bromoform	1.0	U	0.40	1.0	1.0	UG/L	1	13-Jul-2020 18:53
Bromomethane	1.0	U	0.40	1.0	1.0	UG/L	1	13-Jul-2020 18:53
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	13-Jul-2020 18:53
Carbon tetrachloride	1.0	U	0.50	1.0	1.0	UG/L	1	13-Jul-2020 18:53
Chlorobenzene	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 18:53
Chloroethane	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 18:53
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 18:53

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

ALS Houston, US Date: 14-Jul-20

Client: Bhate Environmental Associates, Inc.
ANALYTICAL REPORT
Project: Longhorn GW Treatment Plant Bi Weekly Samples WorkOrder:HS20070399
Sample ID: Trip Blank Lab ID:HS20070399-02
Collection Date: 09-Jul-2020 14:00 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 18:53
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 18:53
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	13-Jul-2020 18:53
Dibromochloromethane	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 18:53
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 18:53
Dichlorodifluoromethane	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 18:53
Ethylbenzene	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 18:53
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	13-Jul-2020 18:53
Isopropylbenzene	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 18:53
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	13-Jul-2020 18:53
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	13-Jul-2020 18:53
n-Butylbenzene	1.0	U	0.40	1.0	1.0	UG/L	1	13-Jul-2020 18:53
n-Propylbenzene	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 18:53
Naphthalene	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 18:53
o-Xylene	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 18:53
sec-Butylbenzene	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 18:53
Styrene	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 18:53
tert-Butylbenzene	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 18:53
Tetrachloroethene	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 18:53
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 18:53
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 18:53
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 18:53
Trichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 18:53
Trichlorofluoromethane	1.0	U	0.30	1.0	1.0	UG/L	1	13-Jul-2020 18:53
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	13-Jul-2020 18:53
Surr: 1,2-Dichloroethane-d4	*89.5*			**0**	*81-118*	*%REC*	*1*	*13-Jul-2020 18:53*
Surr: 4-Bromofluorobenzene	*99.2*			**0**	*85-114*	*%REC*	*1*	*13-Jul-2020 18:53*
Surr: Dibromofluoromethane	*91.4*			**0**	*80-119*	*%REC*	*1*	*13-Jul-2020 18:53*
Surr: Toluene-d8	*103*			**0**	*89-112*	*%REC*	*1*	*13-Jul-2020 18:53*

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

ALS Houston, US Date: 14-Jul-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi Weekly Samples
WorkOrder: HS20070399

DATES REPORT

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
Batch ID: R364950 (0)	**Test Name :** ANIONS BY SW9056A				**Matrix:** Water	
HS20070399-01	LH18/24-SP650_070920	09 Jul 2020 14:00			12 Jul 2020 13:01	10
HS20070399-01	LH18/24-SP650_070920	09 Jul 2020 14:00			12 Jul 2020 12:43	1
Batch ID: R364980 (0)	**Test Name :** VOLATILES ORGANICS BY METHOD 8260C				**Matrix:** Water	
HS20070399-01	LH18/24-SP650_070920	09 Jul 2020 14:00			13 Jul 2020 19:17	1
HS20070399-02	Trip Blank	09 Jul 2020 14:00			13 Jul 2020 18:53	1

ALS Houston, US Date: 14-Jul-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi Weekly Samples
WorkOrder: HS20070399

QC BATCH REPORT

Batch ID: R364980 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MBLK Sample ID: **VBLKW-200713** Units: **UG/L** Analysis Date: **13-Jul-2020 18:29**
Client ID: Run ID: **VOA6_364980** SeqNo: **5660687** 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	0.50	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	1.0	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: 14-Jul-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi Weekly Samples
WorkOrder: HS20070399

QC BATCH REPORT

Batch ID: R364980 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MBLK Sample ID: **VBLKW-200713** Units: **UG/L** Analysis Date: **13-Jul-2020 18:29**
Client ID: Run ID: **VOA6_364980** SeqNo: **5660687** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	1.0	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	1.0	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	*41.41*	*1.0*	*50*	*0*	*82.8*	*81 - 118*				
Surr: 4-Bromofluorobenzene	*48.99*	*1.0*	*50*	*0*	*98.0*	*85 - 114*				
Surr: Dibromofluoromethane	*45.38*	*1.0*	*50*	*0*	*90.8*	*80 - 119*				
Surr: Toluene-d8	*51.83*	*1.0*	*50*	*0*	*104*	*89 - 112*				

ALS Houston, US Date: 14-Jul-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi Weekly Samples
WorkOrder: HS20070399

QC BATCH REPORT

Batch ID: R364980 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

LCS Sample ID: **VLCSW-200713** Units: **UG/L** Analysis Date: **13-Jul-2020 17:41**
Client ID: Run ID: **VOA6_364980** SeqNo: **5660686** 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	18.57	1.0	20	0	92.9	74 - 131				
1,1,2,2-Tetrachloroethane	19.72	1.0	20	0	98.6	71 - 121				
1,1,2-Trichloroethane	20.64	1.0	20	0	103	80 - 119				
1,1-Dichloroethane	19.67	1.0	20	0	98.3	77 - 125				
1,1-Dichloroethene	17.3	1.0	20	0	86.5	71 - 131				
1,1-Dichloropropene	17.95	1.0	20	0	89.7	78 - 125				
1,2,3-Trichlorobenzene	25.56	1.0	20	0	128	69 - 129				
1,2,3-Trichloropropane	20.21	1.0	20	0	101	73 - 122				
1,2,4-Trichlorobenzene	24.4	1.0	20	0	122	69 - 130				
1,2,4-Trimethylbenzene	19.44	1.0	20	0	97.2	76 - 124				
1,2-Dibromo-3-chloropropane	21.9	1.0	20	0	109	62 - 128				
1,2-Dibromoethane	21.06	1.0	20	0	105	77 - 121				
1,2-Dichlorobenzene	19.38	1.0	20	0	96.9	80 - 119				
1,2-Dichloroethane	20.44	1.0	20	0	102	73 - 128				
1,2-Dichloropropane	19.22	1.0	20	0	96.1	78 - 122				
1,3,5-Trimethylbenzene	18.53	1.0	20	0	92.6	75 - 124				
1,3-Dichlorobenzene	19.49	1.0	20	0	97.4	80 - 119				
1,3-Dichloropropane	19.7	1.0	20	0	98.5	80 - 119				
1,4-Dichlorobenzene	19.39	1.0	20	0	97.0	79 - 118				
2,2-Dichloropropane	19.46	1.0	20	0	97.3	60 - 139				
2-Butanone	43.98	2.0	40	0	110	56 - 143				
2-Chlorotoluene	18.39	1.0	20	0	92.0	79 - 122				
2-Hexanone	42.25	2.0	40	0	106	57 - 139				
4-Chlorotoluene	18.55	1.0	20	0	92.8	78 - 122				
4-Isopropyltoluene	17.95	1.0	20	0	89.8	77 - 127				
4-Methyl-2-pentanone	41.64	2.0	40	0	104	67 - 130				
Acetone	33.55	2.0	40	0	83.9	39 - 160				
Benzene	19.95	1.0	20	0	99.7	79 - 120				
Bromobenzene	19.58	1.0	20	0	97.9	80 - 120				
Bromochloromethane	19.01	1.0	20	0	95.1	78 - 123				
Bromodichloromethane	19.11	1.0	20	0	95.6	79 - 125				
Bromoform	19.24	1.0	20	0	96.2	66 - 130				
Bromomethane	19.98	1.0	20	0	99.9	53 - 141				

ALS Houston, US Date: 14-Jul-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi Weekly Samples
WorkOrder: HS20070399

QC BATCH REPORT

Batch ID: R364980 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

LCS Sample ID: **VLCSW-200713** Units: **UG/L** Analysis Date: **13-Jul-2020 17:41**
Client ID: Run ID: **VOA6_364980** SeqNo: **5660686** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	34.38	2.0	40	0	85.9	64 - 133				
Carbon tetrachloride	17.13	1.0	20	0	85.6	72 - 136				
Chlorobenzene	19.29	1.0	20	0	96.4	82 - 118				
Chloroethane	16.24	1.0	20	0	81.2	60 - 138				
Chloroform	19.98	1.0	20	0	99.9	79 - 124				
Chloromethane	20.48	1.0	20	0	102	50 - 139				
cis-1,2-Dichloroethene	20.31	1.0	20	0	102	78 - 123				
cis-1,3-Dichloropropene	19.42	1.0	20	0	97.1	75 - 124				
Dibromochloromethane	19.54	1.0	20	0	97.7	74 - 126				
Dibromomethane	19.17	1.0	20	0	95.8	79 - 123				
Dichlorodifluoromethane	17.14	1.0	20	0	85.7	32 - 152				
Ethylbenzene	18.92	1.0	20	0	94.6	79 - 121				
Hexachlorobutadiene	19.41	1.0	20	0	97.0	66 - 134				
Isopropylbenzene	17.66	1.0	20	0	88.3	72 - 131				
m,p-Xylene	38.36	2.0	40	0	95.9	80 - 121				
Methylene chloride	18.66	2.0	20	0	93.3	74 - 124				
Naphthalene	25.04	1.0	20	0	125	61 - 128				
n-Butylbenzene	17.8	1.0	20	0	89.0	75 - 128				
n-Propylbenzene	18.04	1.0	20	0	90.2	76 - 126				
o-Xylene	18.8	1.0	20	0	94.0	78 - 122				
sec-Butylbenzene	17.28	1.0	20	0	86.4	77 - 126				
Styrene	19.29	1.0	20	0	96.4	78 - 123				
tert-Butylbenzene	17.87	1.0	20	0	89.4	78 - 124				
Tetrachloroethene	17.3	1.0	20	0	86.5	74 - 129				
Toluene	19.11	1.0	20	0	95.5	80 - 121				
trans-1,2-Dichloroethene	19.48	1.0	20	0	97.4	75 - 124				
trans-1,3-Dichloropropene	19.78	1.0	20	0	98.9	73 - 127				
Trichloroethene	18.71	1.0	20	0	93.5	79 - 123				
Trichlorofluoromethane	15.64	1.0	20	0	78.2	65 - 141				
Vinyl chloride	17.47	1.0	20	0	87.3	58 - 137				
Surr: 1,2-Dichloroethane-d4	*54.24*	*1.0*	*50*	*0*	*108*	*81 - 118*				
Surr: 4-Bromofluorobenzene	*50.01*	*1.0*	*50*	*0*	*100*	*85 - 114*				
Surr: Dibromofluoromethane	*52.35*	*1.0*	*50*	*0*	*105*	*80 - 119*				
Surr: Toluene-d8	*47.84*	*1.0*	*50*	*0*	*95.7*	*89 - 112*				

ALS Houston, US Date: 14-Jul-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi Weekly Samples
WorkOrder: HS20070399

QC BATCH REPORT

Batch ID: R364980 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MS Sample ID: **HS20070043-19MS** Units: **UG/L** Analysis Date: **13-Jul-2020 20:29**
Client ID: Run ID: **VOA6_364980** SeqNo: **5660692** PrepDate: DF: **200**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	4078	200	4000	0	102	78 - 124				
1,1,1-Trichloroethane	4002	200	4000	0	100	74 - 131				
1,1,2,2-Tetrachloroethane	4165	200	4000	0	104	71 - 121				
1,1,2-Trichloroethane	4274	200	4000	0	107	80 - 119				
1,1-Dichloroethane	4023	200	4000	0	101	77 - 125				
1,1-Dichloroethene	3760	200	4000	0	94.0	71 - 131				
1,1-Dichloropropene	4206	200	4000	0	105	78 - 125				
1,2,3-Trichlorobenzene	3628	200	4000	0	90.7	69 - 129				
1,2,3-Trichloropropane	4116	200	4000	0	103	73 - 122				
1,2,4-Trichlorobenzene	3974	200	4000	0	99.4	69 - 130				
1,2,4-Trimethylbenzene	4293	200	4000	0	107	76 - 124				
1,2-Dibromo-3-chloropropane	3846	200	4000	0	96.1	62 - 128				
1,2-Dibromoethane	4396	200	4000	0	110	77 - 121				
1,2-Dichlorobenzene	4188	200	4000	0	105	80 - 119				
1,2-Dichloroethane	4212	200	4000	0	105	73 - 128				
1,2-Dichloropropane	4168	200	4000	0	104	78 - 122				
1,3,5-Trimethylbenzene	4227	200	4000	0	106	75 - 124				
1,3-Dichlorobenzene	4022	200	4000	0	101	80 - 119				
1,3-Dichloropropane	4204	200	4000	0	105	80 - 119				
1,4-Dichlorobenzene	4015	200	4000	0	100	79 - 118				
2,2-Dichloropropane	3666	200	4000	0	91.6	60 - 139				
2-Butanone	7578	400	8000	0	94.7	56 - 143				
2-Chlorotoluene	3883	200	4000	0	97.1	79 - 122				
2-Hexanone	8086	400	8000	0	101	57 - 139				
4-Chlorotoluene	4117	200	4000	0	103	78 - 122				
4-Isopropyltoluene	4228	200	4000	0	106	77 - 127				
4-Methyl-2-pentanone	8508	400	8000	0	106	67 - 130				
Acetone	5564	400	8000	0	69.6	39 - 160				
Benzene	4349	200	4000	0	109	79 - 120				
Bromobenzene	4253	200	4000	0	106	80 - 120				
Bromochloromethane	3664	200	4000	0	91.6	78 - 123				
Bromodichloromethane	3995	200	4000	0	99.9	79 - 125				
Bromoform	4068	200	4000	0	102	66 - 130				
Bromomethane	4279	200	4000	0	107	53 - 141				

ALS Houston, US Date: 14-Jul-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi Weekly Samples
WorkOrder: HS20070399

QC BATCH REPORT

Batch ID: R364980 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MS Sample ID: **HS20070043-19MS** Units: **UG/L** Analysis Date: **13-Jul-2020 20:29**
Client ID: Run ID: **VOA6_364980** SeqNo: **5660692** PrepDate: DF: **200**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	6931	400	8000	0	86.6	64 - 133				
Carbon tetrachloride	4139	200	4000	0	103	72 - 136				
Chlorobenzene	4307	200	4000	0	108	82 - 118				
Chloroethane	3677	200	4000	0	91.9	60 - 138				
Chloroform	3956	200	4000	0	98.9	79 - 124				
Chloromethane	4309	200	4000	0	108	50 - 139				
cis-1,2-Dichloroethene	11910	200	4000	7546	109	78 - 123				
cis-1,3-Dichloropropene	4131	200	4000	0	103	75 - 124				
Dibromochloromethane	4142	200	4000	0	104	74 - 126				
Dibromomethane	4005	200	4000	0	100	79 - 123				
Dichlorodifluoromethane	4269	200	4000	0	107	32 - 152				
Ethylbenzene	4258	200	4000	0	106	79 - 121				
Hexachlorobutadiene	4133	200	4000	0	103	66 - 134				
Isopropylbenzene	4252	200	4000	0	106	72 - 131				
m,p-Xylene	8390	400	8000	0	105	80 - 121				
Methylene chloride	8790	400	4000	5861	73.2	74 - 124				S
Naphthalene	3905	200	4000	0	97.6	61 - 128				
n-Butylbenzene	4300	200	4000	0	108	75 - 128				
n-Propylbenzene	3651	200	4000	0	91.3	76 - 126				
o-Xylene	4161	200	4000	0	104	78 - 122				
sec-Butylbenzene	3782	200	4000	0	94.5	77 - 126				
Styrene	4126	200	4000	0	103	78 - 123				
tert-Butylbenzene	4452	200	4000	0	111	78 - 124				
Tetrachloroethene	4254	200	4000	0	106	74 - 129				
Toluene	4254	200	4000	0	106	80 - 121				
trans-1,2-Dichloroethene	3893	200	4000	0	97.3	75 - 124				
trans-1,3-Dichloropropene	3887	200	4000	0	97.2	73 - 127				
Trichloroethene	9168	200	4000	4889	107	79 - 123				
Trichlorofluoromethane	3785	200	4000	0	94.6	65 - 141				
Vinyl chloride	4065	200	4000	155	97.8	58 - 137				
Surr: 1,2-Dichloroethane-d4	*9021*	*200*	*10000*	*0*	*90.2*	*81 - 118*				
Surr: 4-Bromofluorobenzene	*10110*	*200*	*10000*	*0*	*101*	*85 - 114*				
Surr: Dibromofluoromethane	*9110*	*200*	*10000*	*0*	*91.1*	*80 - 119*				
Surr: Toluene-d8	*9957*	*200*	*10000*	*0*	*99.6*	*89 - 112*				

ALS Houston, US Date: 14-Jul-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi Weekly Samples
WorkOrder: HS20070399

QC BATCH REPORT

Batch ID: R364980 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MSD Sample ID: **HS20070043-19MSD** Units: **UG/L** Analysis Date: **13-Jul-2020 20:54**
Client ID: Run ID: **VOA6_364980** SeqNo: **5660693** PrepDate: DF: **200**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	4203	200	4000	0	105	78 - 124	4078	3.01	20	
1,1,1-Trichloroethane	3766	200	4000	0	94.1	74 - 131	4002	6.08	20	
1,1,2,2-Tetrachloroethane	4714	200	4000	0	118	71 - 121	4165	12.4	20	
1,1,2-Trichloroethane	4408	200	4000	0	110	80 - 119	4274	3.08	20	
1,1-Dichloroethane	3813	200	4000	0	95.3	77 - 125	4023	5.35	20	
1,1-Dichloroethene	3373	200	4000	0	84.3	71 - 131	3760	10.8	20	
1,1-Dichloropropene	4137	200	4000	0	103	78 - 125	4206	1.65	20	
1,2,3-Trichlorobenzene	2965	200	4000	0	74.1	69 - 129	3628	20.1	20	R
1,2,3-Trichloropropane	4715	200	4000	0	118	73 - 122	4116	13.6	20	
1,2,4-Trichlorobenzene	3041	200	4000	0	76.0	69 - 130	3974	26.6	20	R
1,2,4-Trimethylbenzene	4606	200	4000	0	115	76 - 124	4293	7.04	20	
1,2-Dibromo-3-chloropropane	3430	200	4000	0	85.8	62 - 128	3846	11.4	20	
1,2-Dibromoethane	4491	200	4000	0	112	77 - 121	4396	2.14	20	
1,2-Dichlorobenzene	4512	200	4000	0	113	80 - 119	4188	7.46	20	
1,2-Dichloroethane	4327	200	4000	0	108	73 - 128	4212	2.7	20	
1,2-Dichloropropane	4111	200	4000	0	103	78 - 122	4168	1.36	20	
1,3,5-Trimethylbenzene	4505	200	4000	0	113	75 - 124	4227	6.36	20	
1,3-Dichlorobenzene	4474	200	4000	0	112	80 - 119	4022	10.6	20	
1,3-Dichloropropane	4192	200	4000	0	105	80 - 119	4204	0.287	20	
1,4-Dichlorobenzene	4470	200	4000	0	112	79 - 118	4015	10.7	20	
2,2-Dichloropropane	3439	200	4000	0	86.0	60 - 139	3666	6.39	20	
2-Butanone	7508	400	8000	0	93.8	56 - 143	7578	0.937	20	
2-Chlorotoluene	3712	200	4000	0	92.8	79 - 122	3883	4.5	20	
2-Hexanone	8518	400	8000	0	106	57 - 139	8086	5.2	20	
4-Chlorotoluene	4318	200	4000	0	108	78 - 122	4117	4.78	20	
4-Isopropyltoluene	4723	200	4000	0	118	77 - 127	4228	11.1	20	
4-Methyl-2-pentanone	8401	400	8000	0	105	67 - 130	8508	1.27	20	
Acetone	5133	400	8000	0	64.2	39 - 160	5564	8.07	20	
Benzene	4248	200	4000	0	106	79 - 120	4349	2.35	20	
Bromobenzene	4670	200	4000	0	117	80 - 120	4253	9.33	20	
Bromochloromethane	3599	200	4000	0	90.0	78 - 123	3664	1.77	20	
Bromodichloromethane	3746	200	4000	0	93.7	79 - 125	3995	6.44	20	
Bromoform	4231	200	4000	0	106	66 - 130	4068	3.92	20	
Bromomethane	3665	200	4000	0	91.6	53 - 141	4279	15.5	20	

ALS Houston, US Date: 14-Jul-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi Weekly Samples
WorkOrder: HS20070399

QC BATCH REPORT

Batch ID: R364980 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MSD Sample ID: **HS20070043-19MSD** Units: **UG/L** Analysis Date: **13-Jul-2020 20:54**
Client ID: Run ID: **VOA6_364980** SeqNo: **5660693** PrepDate: DF: **200**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual
Carbon disulfide	6322	400	8000	0	79.0	64 - 133	6931	9.19	20	
Carbon tetrachloride	4041	200	4000	0	101	72 - 136	4139	2.4	20	
Chlorobenzene	4207	200	4000	0	105	82 - 118	4307	2.36	20	
Chloroethane	3337	200	4000	0	83.4	60 - 138	3677	9.69	20	
Chloroform	3825	200	4000	0	95.6	79 - 124	3956	3.37	20	
Chloromethane	4084	200	4000	0	102	50 - 139	4309	5.36	20	
cis-1,2-Dichloroethene	11300	200	4000	7546	94.0	78 - 123	11910	5.25	20	
cis-1,3-Dichloropropene	3770	200	4000	0	94.2	75 - 124	4131	9.15	20	
Dibromochloromethane	4257	200	4000	0	106	74 - 126	4142	2.76	20	
Dibromomethane	3988	200	4000	0	99.7	79 - 123	4005	0.42	20	
Dichlorodifluoromethane	3943	200	4000	0	98.6	32 - 152	4269	7.94	20	
Ethylbenzene	4315	200	4000	0	108	79 - 121	4258	1.32	20	
Hexachlorobutadiene	2596	200	4000	0	64.9	66 - 134	4133	45.7	20	SR
Isopropylbenzene	4290	200	4000	0	107	72 - 131	4252	0.899	20	
m,p-Xylene	8642	400	8000	0	108	80 - 121	8390	2.96	20	
Methylene chloride	8224	400	4000	5861	59.1	74 - 124	8790	6.66	20	S
Naphthalene	3118	200	4000	0	78.0	61 - 128	3905	22.4	20	R
n-Butylbenzene	4547	200	4000	0	114	75 - 128	4300	5.58	20	
n-Propylbenzene	4729	200	4000	0	118	76 - 126	3651	25.7	20	R
o-Xylene	3991	200	4000	0	99.8	78 - 122	4161	4.17	20	
sec-Butylbenzene	4584	200	4000	0	115	77 - 126	3782	19.2	20	
Styrene	4255	200	4000	0	106	78 - 123	4126	3.1	20	
tert-Butylbenzene	4778	200	4000	0	119	78 - 124	4452	7.07	20	
Tetrachloroethene	4274	200	4000	0	107	74 - 129	4254	0.466	20	
Toluene	4269	200	4000	0	107	80 - 121	4254	0.352	20	
trans-1,2-Dichloroethene	3801	200	4000	0	95.0	75 - 124	3893	2.39	20	
trans-1,3-Dichloropropene	3942	200	4000	0	98.6	73 - 127	3887	1.4	20	
Trichloroethene	9018	200	4000	4889	103	79 - 123	9168	1.66	20	
Trichlorofluoromethane	3552	200	4000	0	88.8	65 - 141	3785	6.37	20	
Vinyl chloride	3552	200	4000	155	84.9	58 - 137	4065	13.5	20	
Surr: 1,2-Dichloroethane-d4	*8788*	*200*	*10000*	*0*	*87.9*	*81 - 118*	*9021*	*2.62*	*20*	
Surr: 4-Bromofluorobenzene	*9799*	*200*	*10000*	*0*	*98.0*	*85 - 114*	*10110*	*3.13*	*20*	
Surr: Dibromofluoromethane	*9200*	*200*	*10000*	*0*	*92.0*	*80 - 119*	*9110*	*0.989*	*20*	
Surr: Toluene-d8	*10180*	*200*	*10000*	*0*	*102*	*89 - 112*	*9957*	*2.23*	*20*	

ALS Houston, US Date: 14-Jul-20

Client:	Bhate Environmental Associates, Inc.
Project:	Longhorn GW Treatment Plant Bi Weekly Samples
WorkOrder:	HS20070399

QC BATCH REPORT

Batch ID:	**R364980 (0)**	**Instrument:**	**VOA6**	**Method:**	**VOLATILES ORGANICS BY METHOD 8260C**

The following samples were analyzed in this batch: HS20070399-01 HS20070399-02

ALS Houston, US Date: 14-Jul-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi Weekly Samples
WorkOrder: HS20070399

QC BATCH REPORT

Batch ID: R364950 (0) **Instrument:** ICS-Integrion **Method:** ANIONS BY SW9056A

MBLK Sample ID: **MBLK-071020** Units: **mg/L** Analysis Date: **12-Jul-2020 14:14**
Client ID: Run ID: **ICS-Integrion_364950** SeqNo: **5659874** 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

LCS Sample ID: **LCS-071020** Units: **mg/L** Analysis Date: **12-Jul-2020 14:32**
Client ID: Run ID: **ICS-Integrion_364950** SeqNo: **5659875** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	20.06	0.500	20	0	100	80 - 120				
Sulfate	19.63	0.500	20	0	98.2	80 - 120				

MS Sample ID: **HS20070399-01MS** Units: **mg/L** Analysis Date: **12-Jul-2020 13:19**
Client ID: **LH18/24-SP650_070920** Run ID: **ICS-Integrion_364950** SeqNo: **5659871** PrepDate: DF: **10**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	394.8	5.00	100	300.5	94.3	80 - 120				
Sulfate	130.8	5.00	100	33.94	96.9	80 - 120				

MSD Sample ID: **HS20070399-01MSD** Units: **mg/L** Analysis Date: **12-Jul-2020 13:37**
Client ID: **LH18/24-SP650_070920** Run ID: **ICS-Integrion_364950** SeqNo: **5659872** PrepDate: DF: **10**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	387.4	5.00	100	300.5	86.8	80 - 120	394.8	1.91	20	
Sulfate	130.2	5.00	100	33.94	96.3	80 - 120	130.8	0.464	20	

The following samples were analyzed in this batch: HS20070399-01

ALS Houston, US Date: 14-Jul-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi Weekly Samples
WorkOrder: **HS20070399**

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	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

Acronym	Description
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 Quantitaion Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

Unit Reported	Description
mg/L	Milligrams per Liter

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Arkansas	20-030-0	26-Mar-2021
Dept of Defense	ANAB L2231 V009	22-Dec-2021
Illinois	2000322020-4	09-May-2021
Kansas	E-10352 2019-2020	31-Jul-2020
North Carolina	624-2020	31-Dec-2020
Oklahoma	2019-141	31-Aug-2020
Texas	T104704231-20-26	30-Apr-2021

ALS Houston, US Date: 14-Jul-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi Weekly Samples
Work Order: HS20070399

SAMPLE TRACKING

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS20070399-01	LH18/24-SP650_070920	Login	7/10/2020 10:56:34 AM	PMG	WET285
HS20070399-01	LH18/24-SP650_070920	Login	7/10/2020 10:56:34 AM	PMG	VOA197
HS20070399-02	Trip Blank	Login	7/10/2020 10:56:34 AM	PMG	VOA197

ALS Houston, US Date: 14-Jul-20

Sample Receipt Checklist

Work Order ID: HS20070399 **Date/Time Received:** **10-Jul-2020 09:00**

Client Name: Bhate Environmental **Received by:** **Jared R. Makan**

Completed By:	/S/ Paresh M. Giga	10-Jul-2020 10:58	**Reviewed by:**	/S/ RJ Modashia	10-Jul-2020 13:47
	eSignature	Date/Time		eSignature	Date/Time

Matrices: **Water** Carrier 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 ☐	COC IDs:None
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):	0.6C U/C	IR31
Cooler(s)/Kit(s):	44134	
Date/Time sample(s) sent to storage:	7/10/2020 11:05	

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 ATTN: R.J. Modashia

Project: BHATE
LONGHORN ARMY AMMN. PLANT (LHAAP)
GROUNDWATER TREATMENT PLANT (GWTP)
KARNACK, TEXAS

Project No. NWO1312.0150.0 16.0001

Job: GROUNDWATER TREATMENT PLANT BI-WEEKLY SAMPLES

Prepared By: Scott Beesinger

P.O Number

HS20070399

Bhate Environmental Associates, Inc.
Longhorn GW Treatment Plant Bi Weekly Samples

Field Sample I.D.	Sample Matrix	Date / Time	MS / MSD	No. OF CONTAINERS	Analyses: VOC	Analyses: CHLORIDE, SULFATE	Remarks (Preservatives, etc.)	Lab I.D.#
LH18/24-SP650_070?20	Water	07/0?/20 / 14:00		3	3		HCL	
LH18/24-SP650_070?20	Water	07/0?/20 / 14:00		1		1	NONE	
Trip Blank	Water	07/0?/20		2	2		HCL	

Additional Remarks: Standard TAT

Relinquished By:	Date	Time	Received By:	Date	Time	Relinquished By:	Date	Time	Received By:	Date	Time
Scott Beesinger	07/09/20	14:30		7/14/2020	6?:00						

For Lab Use Only

Received At Lab By:	Date	Time	Airbill No.	Opened By:	Date	Time	Temp of Container	Seal No.	Condition

Remarks

44134 VOC 0.60 831

<11-0.0

(Word) S:\1-ces\Forms\Chain of Custody - BiWeekly

ALS
10450 Stancliff Rd., Suite 210
Houston, Texas 77099
Tel. +1 281 530 5656
Fax. +1 281 530 5887

Date: 7/
Name: Sc
Company:

CUSTODY SEAL
Time: 1430
#Bags in Cool
Bottles

Seal Broken
Date: 7/10/12

ORIGIN ID:SGRA (903) 930-6193
SCOTT BEESINGER
BHATE ENVIRONMENTAL ASSOCIATES
1203-B EAST GRAND AVE.
PMB202
MARSHALL, TX 75670
UNITED STATES US

SHIP DATE: 10MAY20
ACTWGT: 1.00 LB MAN
CAD: 3001307CAFE3211
DIMS: 26x14x14 IN

TO CLIENT SERVICES
ALS LABORATORY GROUP
10450 STANCLIFF ROAD
SUITE 210
HOUSTON TX 77099
(281) 530-5656
REF: LHAAP-18/24-RJ-80 71831

49134

RMA:

FedEx Express

FedEx
TRK# 0221 1251 0297 2083

FRI - 10 JUL 10:30A
PRIORITY OVERNIGHT

AB SGRA

77099
TX-US IAH

HS20070399 8260 Raw Data

ALS WO# HS20070399

MSVOA06 -Logbook

Batch: 41087 **Analyst:** Presenta Cabascango

Date: 07-13-2020 **Reviewer:**

Method: 8260 **Laboratory:** Houston

Comments:

#	Samp ID	Type	Analyzed	DF	Init Wt/Vol	Final Vol	File ID	Matrix	Status	pH
1	BFB	TUNE	07-13-2020 10:03 am	1.00	50 mL	50 mL	X071301.D	Liquid	Y	NA
	Auto find/ purged									
2	VSTD000.25	ICAL1	07-13-2020 10:27 am	1.00	50 mL	50 mL	X071302.D	Liquid	Y	NA
	0.10 uL cal std/100 mL DI									
3	VSTD000.5	ICAL2	07-13-2020 10:55 am	1.00	50 mL	50 mL	X071303.D	Liquid	Y	NA
	0.10 uL cal std/50 mL DI									
4	VSTD001	ICAL3	07-13-2020 11:42 am	1.00	50 mL	50 mL	X071304.D	Liquid	Y	NA
	0.20 uL cal std/50 mL DI									
5	VSTD002	ICAL4	07-13-2020 12:06 pm	1.00	50 mL	50 mL	X071305.D	Liquid	Y	NA
	0.40 uL cal std/50 mL DI									
6	VSTD005	ICAL5	07-13-2020 12:30 pm	1.00	50 mL	50 mL	X071306.D	Liquid	Y	NA
	1.0 uL cal std/50 mL DI									
7	VSTD020	ICAL6	07-13-2020 12:54 pm	1.00	50 mL	50 mL	X071307.D	Liquid	Y	NA
	4.0 uL cal std/50 mL DI									
8	VSTD050	ICAL7	07-13-2020 01:18 pm	1.00	50 mL	50 mL	X071308.D	Liquid	Y	NA
	10 uL cal std/50 mL DI									
9	VSTD100	ICAL8	07-13-2020 01:42 pm	1.00	50 mL	50 mL	X071309.D	Liquid	Y	NA
	20 uL cal std/50 mL DI									
10	VSTD150	ICAL9	07-13-2020 02:06 pm	1.00	50 mL	50 mL	X071310.D	Liquid	Y	NA
	30 uL cal std/50 mL DI									
11	VSTD200	ICAL	07-13-2020 02:30 pm	1.00	50 mL	50 mL	X071311.D	Liquid	Y	NA
	40 uL cal std/50 mL DI									
12	BLANK	SAMP	07-13-2020 02:54 pm	1.00	50 mL	50 mL	X071312.D	Liquid	Y	NA
13	CCV	ICV	07-13-2020 03:42 pm	1.00	50 mL	50 mL	X071313.D	Liquid	Y	NA
	10 uL ical std/50 mL DI									
14	BFB	TUNE	07-13-2020 04:06 pm	1.00	50 mL	50 mL	Y071301.D	Liquid	Y	NA
	Auto find/ purged									
15	CCV	CCV	07-13-2020 04:30 pm	1.00	50 mL	50 mL	Y071302.D	Liquid	Y	NA
	10 uL cal std/50 mL DI									
16	BLANK	SAMP	07-13-2020 04:53 pm	1.00	50 mL	50 mL	Y071303.D	Liquid	Y	NA
17	CCB	SAMP	07-13-2020 05:17 pm	1.00	50 mL	50 mL	Y071304.D	Liquid	Y	NA
18	VLCSW-200713	LCS	07-13-2020 05:41 pm	1.00	50 mL	50 mL	Y071305.D	Liquid	Y	NA
	4.0 uL cal std/50 mL DI									
19	BLANK	SAMP	07-13-2020 06:05 pm	1.00	50 mL	50 mL	Y071306.D	Liquid	Y	NA
20	VBLKW-200713	MBLK	07-13-2020 06:29 pm	1.00	50 mL	50 mL	Y071307.D	Liquid	Y	NA
21	HS20070399-02	SAMP	07-13-2020 06:53 pm	1.00	50 mL	50 mL	Y071308.D	Liquid	Y	<2
22	HS20070399-01	SAMP	07-13-2020 07:17 pm	1.00	50 mL	50 mL	Y071309.D	Liquid	Y	<2
23	HS20070043-19	SAMP	07-13-2020 07:41 pm	200.0(	250 µL	50 mL	Y071310.D	Liquid	Y	<2
24	HS20070043-19	SAMP	07-13-2020 08:05 pm	20.00	2.5 mL	50 mL	Y071311.D	Liquid	Y	<2
25	HS20070043-19MS	MS	07-13-2020 08:29 pm	200.0(	250 µL	50 mL	Y071312.D	Liquid	Y	<2
	3.5 uL cal std/40 mL samp									
26	HS20070043-19MSD	MSD	07-13-2020 08:54 pm	200.0(	250 µL	50 mL	Y071313.D	Liquid	Y	<2
	3.5 uL cal std/40 mL samp									
27	HS20070096-06	SAMP	07-13-2020 09:18 pm	100.0(	500 µL	50 mL	Y071314.D	Liquid	Y	<2
28	HS20070043-05	SAMP	07-13-2020 09:42 pm	50.00	1 mL	50 mL	Y071315.D	Liquid	Y	<2
29	HS20070043-05	SAMP	07-13-2020 10:06 pm	500.0(	100 µL	50 mL	Y071316.D	Liquid	Y	<2
30	HS20070043-06	SAMP	07-13-2020 10:30 pm	50.00	1 mL	50 mL	Y071317.D	Liquid	Y	<2
31	HS20070043-06	SAMP	07-13-2020 10:54 pm	500.0(	100 µL	50 mL	Y071318.D	Liquid	Y	<2
32	HS20070043-11	SAMP	07-13-2020 11:18 pm	50.00	1 mL	50 mL	Y071319.D	Liquid	Y	<2

MSVOA06 -Logbook

#	Samp ID	Type	Analyzed	DF	Init Wt/Vol	Final Vol	File ID	Matrix	Status	pH
33	HS20070043-11	SAMP	07-13-2020 11:42 pm	500.0(	100 µL	50 mL	Y071320.D	Liquid	Y	<2
34	CCV-END	CCV	07-14-2020 12:06 am	1.00	50 mL	50 mL	Y071321.D	Liquid	Y	NA
	10 uL cal std/50 mL DI									
35	HS20070493-01	SAMP	07-14-2020 12:30 am	1.00	50 mL	50 mL	Y071322.D	Liquid	Y	<2
36	HS20070096-29	SAMP	07-14-2020 12:54 am	10.00	5 mL	50 mL	Y071323.D	Liquid	Y	<2
37	HS20070096-29	SAMP	07-14-2020 01:18 am	100.0(	500 µL	50 mL	Y071324.D	Liquid	Y	<2
38	HS20070096-24	SAMP	07-14-2020 01:42 am	10.00	5 mL	50 mL	Y071325.D	Liquid	Y	<2
39	HS20070096-24	SAMP	07-14-2020 02:06 am	100.0(	500 µL	50 mL	Y071326.D	Liquid	Y	<2
40	HS20070096-30	SAMP	07-14-2020 02:30 am	25.00	2 mL	50 mL	Y071327.D	Liquid	Y	<2
41	HS20070096-30	SAMP	07-14-2020 02:54 am	250.0(	200 µL	50 mL	Y071328.D	Liquid	Y	<2
42	HS20070096-34	SAMP	07-14-2020 03:18 am	25.00	2 mL	50 mL	Y071329.D	Liquid	Y	<2
43	HS20070096-34	SAMP	07-14-2020 03:42 am	500.0(	100 µL	50 mL	Y071330.D	Liquid	Y	<2
44	BLANK	SAMP	07-14-2020 04:07 am	1.00	50 mL	50 mL	Y071340.D	Liquid	Y	NA

Chemical	Value
SURR SPK ID	31106-38-06-
IS ID	31106-38-06
CAL STD ID	31106-38-01/02
BFB ID	31106-38-06

FORM 3
WATER VOLATILE METHOD SPIKE RECOVERY

Lab Name: Contract:

Lab Code: Case No.: SAS No.: SDG No.: HS20070399

Matrix Spike - Sample No.: ICV

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE AMOUNT ()	% REC #	QC. LIMITS REC.
cis-1,3-Dichloropropene	50.00	49.89	100	80-120
trans-1,3-Dichloroprope	50.00	49.66	99	80-120
1,3-Dichlorobenzene	50.00	52.99	106	80-120
2,2-Dichloropropane	50.00	50.23	100	80-120
1,1-Dichloropropene	50.00	47.08	94	80-120
Dibromomethane	50.00	48.51	97	80-120
1,2-Dibromoethane	50.00	51.71	103	80-120
trans-1,2-Dichloroethen	50.00	43.09	86	80-120
1,1,1,2-Tetrachloroetha	50.00	47.06	94	80-120
1,1,1-Trichloroethane	50.00	46.83	94	80-120
1,1,2,2-Tetrachloroetha	50.00	56.29	112	80-120
1,1,2-Trichloroethane	50.00	50.25	100	80-120
1,1-Dichloroethane	50.00	46.38	93	80-120
1,1-Dichloroethene	50.00	44.05	88	80-120
Trichloroethene	50.00	48.39	97	80-120
1,2,3-Trichlorobenzene	50.00	59.94	120	80-120
Trichlorofluoromethane	50.00	43.43	87	80-120
1,2,4-Trichlorobenzene	50.00	57.24	114	80-120
1,2,4-Trimethylbenzene	50.00	53.74	107	80-120
Tetrachloroethene	50.00	45.37	91	80-120
1,2-Dichlorobenzene	50.00	46.70	93	80-120
1,2-Dichloroethane	50.00	51.43	103	80-120
1,2-Dichloropropane	50.00	49.69	99	80-120
1,3,5-Trimethylbenzene	50.00	50.47	101	80-120
1,3-Dichloropropane	50.00	48.28	96	80-120
1,4-Dichlorobenzene	50.00	42.76	86	80-120
Toluene	50.00	47.83	96	80-120
2-Butanone	100.00	111.87	112	80-120

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

COMMENTS: _____

_____

FORM III VOA

FORM 3
WATER VOLATILE METHOD SPIKE RECOVERY

Lab Name: Contract:

Lab Code: Case No.: SAS No.: SDG No.: HS20070399

Matrix Spike - Sample No.: ICV

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE AMOUNT ()	% REC #	QC. LIMITS REC.
2-Chlorotoluene	50.00	49.98	100	80-120
2-Hexanone	100.00	107.10	107	80-120
4-Chlorotoluene	50.00	50.83	102	80-120
tert-Butylbenzene	50.00	51.14	102	80-120
4-Methyl-2-Pentanone	100.00	104.56	104	80-120
Acetone	100.00	94.49	94	80-120
Benzene	50.00	50.34	101	80-120
Bromobenzene	50.00	54.60	109	80-120
Bromochloromethane	50.00	44.73	89	80-120
Bromodichloromethane	50.00	47.87	96	80-120
Bromoform	50.00	49.43	99	80-120
Bromomethane	50.00	46.91	94	80-120
Carbon Disulfide	100.00	85.77	86	80-120
Carbon Tetrachloride	50.00	46.54	93	80-120
Chlorobenzene	50.00	48.27	96	80-120
Chloroethane	50.00	40.76	82	80-120
Chloroform	50.00	47.66	95	80-120
Chloromethane	50.00	46.97	94	80-120
cis-1,2-Dichloroethene	50.00	49.13	98	80-120
Dibromochloromethane	50.00	48.65	97	80-120
Dichlorodifluoromethane	50.00	49.02	98	80-120
Ethylbenzene	50.00	47.43	95	80-120
Hexachlorobutadiene	50.00	55.49	111	80-120
Isopropylbenzene	50.00	44.27	88	80-120
m,p-Xylenes	100.00	91.24	91	80-120
Methylene Chloride	50.00	43.61	87	80-120
n-Butylbenzene	50.00	45.18	90	80-120
n-Propylbenzene	50.00	48.66	97	80-120

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

COMMENTS: _____

_____

FORM III VOA

FORM 3
WATER VOLATILE METHOD SPIKE RECOVERY

Lab Name: Contract:

Lab Code: Case No.: SAS No.: SDG No.: HS20070399

Matrix Spike - Sample No.: ICV

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE AMOUNT ()	% REC #	QC. LIMITS REC.
Naphthalene	50.00	59.96	120	80-120
o-Xylene	50.00	45.29	90	80-120
sec-Butylbenzene	50.00	50.87	102	80-120
Styrene	50.00	47.05	94	80-120
Vinyl Chloride	50.00	41.64	83	80-120
1,2,3-Trichloropropane	50.00	56.59	113	80-120
p-Isopropyltoluene	50.00	51.34	103	80-120
1,2-Dibromo-3-Chloropro	50.00	59.09	118	80-120

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

COMMENTS: _____

_____

FORM III VOA

FORM 5
VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: Contract:

Lab Code: Case No.: SAS No.: SDG No.: HS20070399

Lab File ID: X071301 BFB Injection Date: 07/13/20

Instrument ID: VOA6 BFB Injection Time: 1003

GC Column: DB624 ID: 0.25 (mm) Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	32.0
75	30.0 - 60.0% of mass 95	53.2
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	7.2
173	Less than 2.0% of mass 174	0.5 (0.8)1
174	Greater than 50.0% of mass 95	56.5
175	5.0 - 9.0% of mass 174	4.8 (8.5)1
176	95.0 - 101.0% of mass 174	54.9 (97.2)1
177	5.0 - 9.0% of mass 176	4.7 (8.6)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	VSTD000.25	VSTD000.25	X071302	07/13/20	1027
02	VSTD000.5	VSTD000.5	X071303	07/13/20	1055
03	VSTD001	VSTD001	X071304	07/13/20	1142
04	VSTD002	VSTD002	X071305	07/13/20	1206
05	VSTD005	VSTD005	X071306	07/13/20	1230
06	VSTD020	VSTD020	X071307	07/13/20	1254
07	VSTD050	VSTD050	X071308	07/13/20	1318
08	VSTD100	VSTD100	X071309	07/13/20	1342
09	VSTD150	VSTD150	X071310	07/13/20	1406
10	VSTD200	VSTD200	X071311	07/13/20	1430
11	ICV	ICV	X071313	07/13/20	1542
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: Contract:

Lab Code: Case No.: SAS No.: SDG No.: HS20070399

Instrument ID: VOA6 Calibration Date(s): 07/13/20 07/13/20

Column: DB624 ID: 0.18 (mm) Calibration Time(s): 1027 1430

LAB FILE ID: RF0.25: X071302 RF0.5: X071303 RF1: X071304
RF2: X071305 RF5: X071306 RF20: X071307

COMPOUND	RF0.25	RF0.5	RF1	RF2	RF5	RF20
cis-1,3-Dichloropropene		0.523	0.567	0.584	0.602	0.578
trans-1,3-Dichloropropene		0.562	0.412	0.600	0.551	0.535
1,3-Dichlorobenzene		1.677	1.589	1.550	1.515	1.483
2,2-Dichloropropane		0.936	0.989	1.012	0.835	0.800
1,1-Dichloropropene		0.569	0.496	0.391	0.451	0.445
Dibromomethane		0.235	0.261	0.255	0.249	0.242
1,2-Dibromoethane		0.339	0.373	0.367	0.383	0.388
trans-1,2-Dichloroethene		0.514	0.561	0.613	0.538	0.489
1,1,1,2-Tetrachloroethane		0.475	0.356	0.376	0.390	0.375
1,1,1-Trichloroethane		0.986	0.894	0.929	0.876	0.884
1,1,2,2-Tetrachloroethane		0.992	0.934	0.957	0.991	0.906
1,1,2-Trichloroethane		0.319	0.237	0.296	0.390	0.314
1,1-Dichloroethane		1.614	1.464	1.521	1.345	1.247
1,1-Dichloroethene		0.507	0.437	0.472	0.433	0.404
Trichloroethene		0.390	0.356	0.356	0.342	0.350
1,2,3-Trichlorobenzene		0.162	0.171	0.182	0.190	0.177
Trichlorofluoromethane		0.895	0.772	0.904	0.764	0.764
1,2,4-Trichlorobenzene		0.257	0.334	0.323	0.369	0.358
1,2,4-Trimethylbenzene		2.978	2.694	2.779	2.754	2.687
Tetrachloroethene		0.372	0.294	0.301	0.324	0.299
1,2-Dichlorobenzene		1.590	1.374	1.426	1.400	1.352
1,2-Dichloroethane		0.620	0.589	0.616	0.503	0.603
1,2-Dichloropropane		0.539	0.430	0.412	0.457	0.463
1,3,5-Trimethylbenzene		2.901	2.819	2.768	2.609	2.633
1,3-Dichloropropane		0.771	0.559	0.613	0.805	0.638
1,4-Dichlorobenzene		1.816	1.606	1.551	1.563	1.469
Toluene		1.679	1.516	1.474	1.907	1.528
2-Butanone		0.356	0.364	0.402	0.422	0.449
2-Chlorotoluene		2.677	2.688	2.329	2.337	2.225
2-Hexanone		0.398	0.378	0.440	0.593	0.487
4-Chlorotoluene		3.189	2.974	2.864	2.703	2.651
tert-Butylbenzene		2.343	2.139	2.238	2.153	2.114
4-Methyl-2-Pentanone		0.567	0.626	0.594	0.846	0.695
Acetone		6844	7883	11772	23758	68543
Benzene		1.447	1.409	1.306	1.157	1.358
Bromobenzene		1.015	0.917	0.970	0.921	0.892
Bromochloromethane		0.424	0.406	0.408	0.355	0.326
Bromodichloromethane		0.483	0.534	0.505	0.500	0.490
romoform		0.262	0.270	0.240	0.327	0.273
omomethane		1581	2906	6118	12533	34876
rbon Disulfide		1.661	1.347	1.532	1.380	1.231
bon Tetrachloride		0.493	0.529	0.411	0.468	0.439
robenzene		1.072	1.041	1.012	0.994	0.974
roethane		0.445	0.521	0.509	0.408	0.387

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: Contract:

Lab Code: Case No.: SAS No.: SDG No.: HS2007039

Instrument ID: VOA6 Calibration Date(s): 07/13/20 07/13/20

Column: DB624 ID: 0.18 (mm) Calibration Time(s): 1027 1430

LAB FILE ID: RF0.25: X071302 RF0.5: X071303 RF1: X071304
RF2: X071305 RF5: X071306 RF20: X071307

COMPOUND	RF0.25	RF0.5	RF1	RF2	RF5	RF20
Chloroform		1.144	1.144	1.148	1.113	1.072
Chloromethane		3489	6654	11467	28703	93790
cis-1,2-Dichloroethene		0.671	0.633	0.710	0.601	0.608
Dibromochloromethane		0.428	0.370	0.387	0.461	0.401
Dichlorodifluoromethane		0.482	0.483	0.526	0.494	0.486
Ethylbenzene		0.570	0.508	0.526	0.515	0.510
Hexachlorobutadiene		0.301	0.252	0.246	0.233	0.272
Isopropylbenzene		1.482	1.572	1.498	1.821	1.496
m,p-Xylenes		0.679	0.626	0.612	0.604	0.613
Methylene Chloride		4271	5799	8593	18680	58274
n-Butylbenzene		2.339	2.257	2.298	2.138	2.341
n-Propylbenzene		3.945	3.943	3.728	3.683	3.718
Naphthalene		536	1603	3601	9070	36314
o-Xylene		0.680	0.640	0.588	0.729	0.594
sec-Butylbenzene		3.586	2.692	3.101	2.977	3.003
Styrene		1.091	1.081	1.021	1.258	1.067
Vinyl Chloride		0.884	0.854	0.860	0.769	0.732
1,2,3-Trichloropropane		0.922	0.798	0.823	0.828	0.792
p-Isopropyltoluene		2.950	2.587	2.455	2.446	2.596
1,2-Dibromo-3-Chloropropane		103	276	578	1652	5688
1,2-Dichloroethane-d4		2548	4323	6078	19086	78060
Dibromofluoromethane		2011	3129	5716	15802	57060
Toluene-d8		1.494	1.286	1.208	1.624	1.277
4-Bromofluorobenzene		3265	4513	7984	21438	75648

FORM VI VOA

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: Contract:

Lab Code: Case No.: SAS No.: SDG No.: HS2007039

Instrument ID: VOA6 Calibration Date(s): 07/13/20 07/13/20

Column: DB624 ID: 0.18 (mm) Calibration Time(s): 1027 1430

LAB FILE ID: RF50: X071308 RF100: X071309 RF150: X071310
RF200: X071311

COMPOUND	RF50	RF100	RF150	RF200
cis-1,3-Dichloropropene	0.580	0.605	0.608	0.596
trans-1,3-Dichloropropene	0.529	0.541	0.553	0.551
1,3-Dichlorobenzene	1.518	1.528	1.481	1.456
2,2-Dichloropropane	0.834	0.855	0.861	0.840
1,1-Dichloropropene	0.444	0.472	0.484	0.463
Dibromomethane	0.241	0.245	0.246	0.245
1,2-Dibromoethane	0.386	0.380	0.380	0.317
trans-1,2-Dichloroethene	0.528	0.538	0.544	0.523
1,1,1,2-Tetrachloroethane	0.380	0.376	0.378	0.370
1,1,1-Trichloroethane	0.881	0.902	0.927	0.917
1,1,2,2-Tetrachloroethane	0.921	0.916	0.809	0.884
1,1,2-Trichloroethane	0.308	0.302	0.302	0.288
1,1-Dichloroethane	1.349	1.348	1.367	1.354
1,1-Dichloroethene	0.446	0.413	0.423	0.401
Trichloroethene	0.359	0.360	0.366	0.359
1,2,3-Trichlorobenzene	0.176	0.146	0.170	0.149
Trichlorofluoromethane	0.824	0.833	0.853	0.830
1,2,4-Trichlorobenzene	0.350	0.289	0.330	0.276
1,2,4-Trimethylbenzene	2.779	2.825	2.749	2.501
Tetrachloroethene	0.292	0.293	0.294	0.285
1,2-Dichlorobenzene	1.335	1.360	1.375	1.336
1,2-Dichloroethane	0.601	0.616	0.602	0.603
1,2-Dichloropropane	0.462	0.468	0.465	0.458
1,3,5-Trimethylbenzene	2.697	2.767	2.687	2.569
1,3-Dichloropropane	0.635	0.627	0.620	0.622
1,4-Dichlorobenzene	1.508	1.526	1.526	1.486
Toluene	1.516	1.502	1.495	1.480
2-Butanone	0.475	0.472	0.486	0.479
2-Chlorotoluene	2.332	2.347	2.205	2.290
2-Hexanone	0.492	0.491	0.503	0.481
4-Chlorotoluene	2.717	2.740	2.679	2.558
tert-Butylbenzene	2.192	2.190	2.204	1.937
4-Methyl-2-Pentanone	0.695	0.700	0.701	0.716
Acetone	175674	288895	434863	
Benzene	1.353	1.402	1.408	1.375
Bromobenzene	0.922	0.915	0.829	0.861
Bromochloromethane	0.312	0.323	0.320	0.305
Bromodichloromethane	0.493	0.508	0.512	0.504
Bromoform	0.274	0.281	0.278	0.284
Bromomethane	89079	166657	238785	310885
Carbon Disulfide	1.384	1.297	1.343	1.228
Carbon Tetrachloride	0.449	0.476	0.492	0.474
Chlorobenzene	0.970	0.978	0.970	0.946
Chloroethane	0.436	0.420	0.417	0.411

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: Contract:

Lab Code: Case No.: SAS No.: SDG No.: HS2007039

Instrument ID: VOA6 Calibration Date(s): 07/13/20 07/13/20

Column: DB624 ID: 0.18 (mm) Calibration Time(s): 1027 1430

LAB FILE ID: RF50: X071308 RF100: X071309 RF150: X071310
RF200: X071311

COMPOUND	RF50	RF100	RF150	RF200
Chloroform	1.052	1.064	1.081	1.060
Chloromethane	240898	484693	733378	989264
cis-1,2-Dichloroethene	0.633	0.635	0.649	0.632
Dibromochloromethane	0.403	0.402	0.406	0.401
Dichlorodifluoromethane	0.530	0.582	0.601	0.569
Ethylbenzene	0.509	0.514	0.510	0.510
Hexachlorobutadiene	0.262	0.195	0.221	
Isopropylbenzene	1.531	1.558	1.516	1.521
m,p-Xylenes	0.616	0.622	0.615	0.609
Methylene Chloride	153830	277730	426028	499769
n-Butylbenzene	2.419	2.445	2.467	2.318
n-Propylbenzene	3.860	3.955	3.649	3.807
Naphthalene	94043	166338	271059	
o-Xylene	0.611	0.614	0.596	0.602
sec-Butylbenzene	3.140	3.186	3.194	2.990
Styrene	1.077	1.082	1.050	1.059
Vinyl Chloride	0.805	0.795	0.856	0.845
1,2,3-Trichloropropane	0.826	0.822	0.720	0.780
p-Isopropyltoluene	2.731	2.759	2.775	2.647
1,2-Dibromo-3-Chloropropane	15053	28602	43451	57589
1,2-Dichloroethane-d4	186102	358725	528876	688409
Dibromofluoromethane	137160	266517	392708	499552
Toluene-d8	1.249	1.216	1.221	1.211
4-Bromofluorobenzene	186024	353354		

FORM VI VOA

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: Contract:

Lab Code: Case No.: SAS No.: SDG No.: HS2007039

Instrument ID: VOA6 Calibration Date(s): 07/13/20 07/13/20

Column: DB624 ID: 0.18 (mm) Calibration Time(s): 1027 1430

COMPOUND	CURVE	COEFFICENTS A0	COEFFICENTS A1	%RSD OR R^2	MAX %RSD OR R^2
cis-1,3-Dichloropropene	AVRG		0.58252029	4.537	15.000
trans-1,3-Dichloropropene	AVRG		0.53724591	9.514	15.000
1,3-Dichlorobenzene	AVRG		1.53274744	4.368	15.000
2,2-Dichloropropane	AVRG		0.88477073	8.513	15.000
1,1-Dichloropropene	AVRG		0.46843486	10.291	15.000
Dibromomethane	AVRG		0.24667795	3.111	15.000
1,2-Dibromoethane	AVRG		0.36814072	6.607	15.000
trans-1,2-Dichloroethene	AVRG		0.53865233	6.378	15.000
1,1,1,2-Tetrachloroethane	AVRG		0.38620707	8.963	15.000
1,1,1-Trichloroethane	AVRG		0.91091461	3.785	15.000
1,1,2,2-Tetrachloroethane	AVRG		0.92316068	6.117	15.000
1,1,2-Trichloroethane	AVRG		0.30614855	12.846	15.000
1,1-Dichloroethane	AVRG		1.40105952	7.958	15.000
1,1-Dichloroethene	AVRG		0.43742258	7.870	15.000
Trichloroethene	AVRG		0.35986567	3.677	15.000
1,2,3-Trichlorobenzene	AVRG		0.16913917	8.538	15.000
Trichlorofluoromethane	AVRG		0.82653912	6.376	15.000
1,2,4-Trichlorobenzene	AVRG		0.32072038	12.024	15.000
1,2,4-Trimethylbenzene	AVRG		2.74956891	4.608	15.000
Tetrachloroethene	AVRG		0.30605196	8.817	15.000
1,2-Dichlorobenzene	AVRG		1.39421152	5.674	15.000
1,2-Dichloroethane	AVRG		0.59495642	5.987	15.000
1,2-Dichloropropane	AVRG		0.46169025	7.492	15.000
1,3,5-Trimethylbenzene	AVRG		2.71670409	3.931	15.000
1,3-Dichloropropane	AVRG		0.65433002	12.149	15.000
1,4-Dichlorobenzene	AVRG		1.56125370	6.658	15.000
Toluene	AVRG		1.56652817	9.044	15.000
2-Butanone	AVRG		0.43400669	11.586	15.000
2-Chlorotoluene	AVRG		2.38132243	7.481	15.000
2-Hexanone	AVRG		0.47363261	13.352	15.000
4-Chlorotoluene	AVRG		2.78627576	6.933	15.000
tert-Butylbenzene	AVRG		2.16780554	5.038	15.000
4-Methyl-2-Pentanone	AVRG		0.68229628	11.939	15.000
Acetone	LINR	-8.07e-002	3.24606784	0.9976668	0.9900000
Benzene	AVRG		1.35722254	6.292	15.000
Bromobenzene	AVRG		0.91571619	5.977	15.000
Bromochloromethane	AVRG		0.35335889	13.245	15.000
Bromodichloromethane	AVRG		0.50310536	2.952	15.000
Bromoform	AVRG		0.27657878	8.281	15.000
Bromomethane	LINR	-2.09e-002	2.92304768	0.9999065	0.9900000
Carbon Disulfide	AVRG		1.37797181	10.158	15.000
Carbon Tetrachloride	AVRG		0.47010629	7.334	15.000
Chlorobenzene	AVRG		0.99529665	4.011	15.000
Chloroethane	AVRG		0.43946280	10.468	15.000

FORM VI VOA

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: Contract:

Lab Code: Case No.: SAS No.: SDG No.: HS2007039

Instrument ID: VOA6 Calibration Date(s): 07/13/20 07/13/20

Column: DB624 ID: 0.18 (mm) Calibration Time(s): 1027 1430

COMPOUND	CURVE	COEFFICENTS A0	COEFFICENTS A1	%RSD OR R^2	MAX %RSD OR R^2
Chloroform	AVRG		1.09766726	3.611	15.000
Chloromethane	LINR	3.425e-002	0.92605757	0.9983901	0.9900000
cis-1,2-Dichloroethene	AVRG		0.64139859	5.112	15.000
Dibromochloromethane	AVRG		0.40675901	6.258	15.000
Dichlorodifluoromethane	AVRG		0.52793429	8.712	15.000
Ethylbenzene	AVRG		0.51925649	3.820	15.000
Hexachlorobutadiene	AVRG		0.24770740	13.176	15.000
Isopropylbenzene	AVRG		1.55508981	6.677	15.000
m,p-Xylenes	AVRG		0.62186624	3.581	15.000
Methylene Chloride	LINR	-2.77e-002	1.74738834	0.9957026	0.9900000
n-Butylbenzene	AVRG		2.33576713	4.369	15.000
n-Propylbenzene	AVRG		3.80986910	3.168	15.000
Naphthalene	LINR	2.494e-002	1.90571828	0.9953494	0.9900000
o-Xylene	AVRG		0.62833825	7.556	15.000
sec-Butylbenzene	AVRG		3.09665977	7.724	15.000
Styrene	AVRG		1.08739135	6.217	15.000
Vinyl Chloride	AVRG		0.82218964	6.078	15.000
1,2,3-Trichloropropane	AVRG		0.81224547	6.591	15.000
p-Isopropyltoluene	AVRG		2.66078824	6.087	15.000
1,2-Dibromo-3-Chloropropane	LINR	2.632e-002	11.5405181	0.9991794	0.9900000
1,2-Dichloroethane-d4	LINR	6.783e-003	1.31478695	0.9998415	0.9900000
Dibromofluoromethane	LINR	-1.65e-003	1.79776555	0.9996449	0.9900000
Toluene-d8	AVRG		1.30969442	11.293	15.000
4-Bromofluorobenzene	LINR	-1.07e-002	2.08902614	0.9998105	0.9900000

FORM VI VOA

Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\X071301.D

Date : 13-JUL-2020 10:03

Client ID: BFB

Instrument: voa6.i

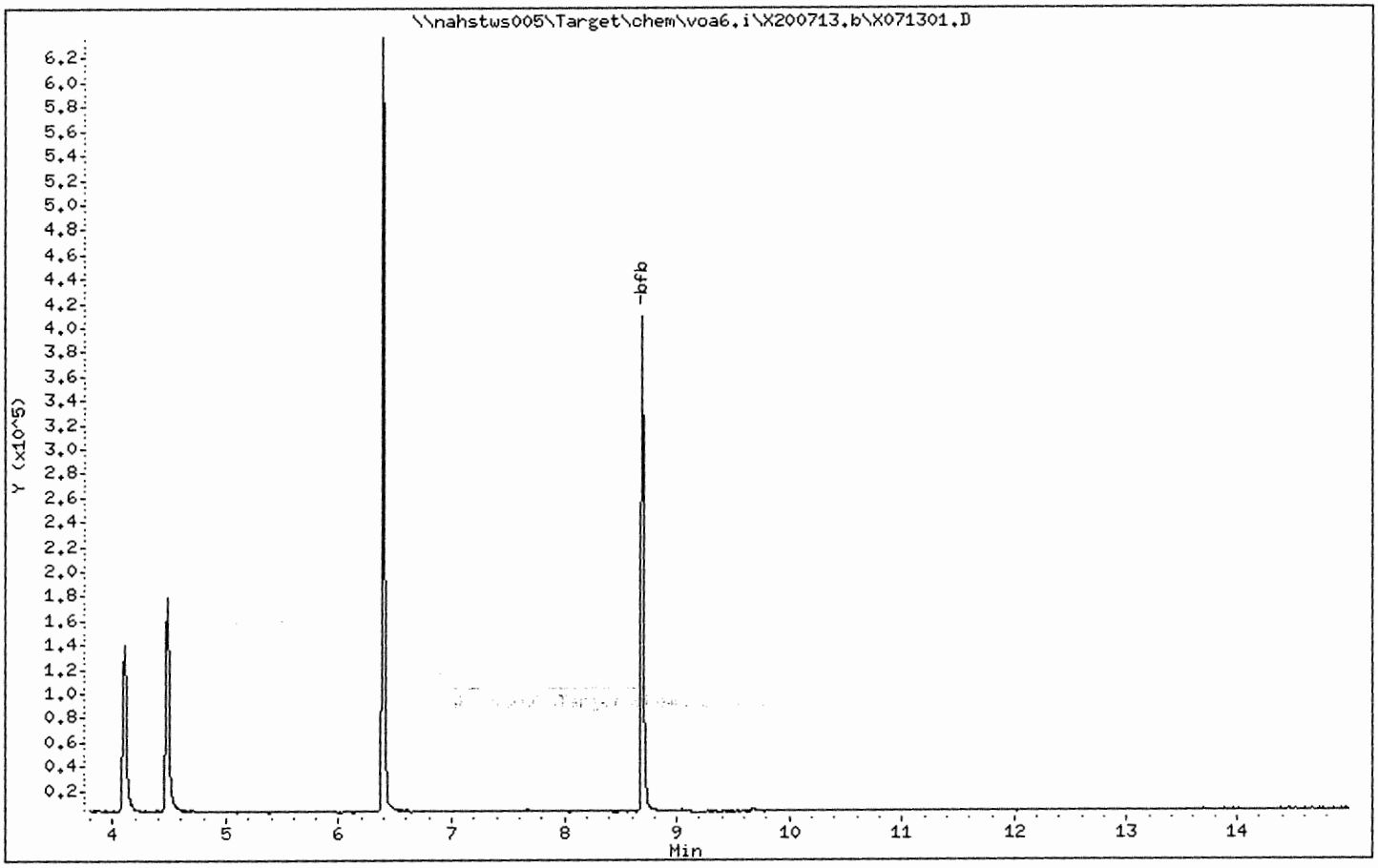
Sample Info: BFB;BFB;3;;BFB

Volume Injected (uL): 2.0

Operator: PC

Column phase: DB624

Column diameter: 0.25



Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\X071301.D

Date : 13-JUL-2020 10:03

Client ID: BFB

Instrument: voa6.i

Sample Info: BFB;BFB;3;;BFB

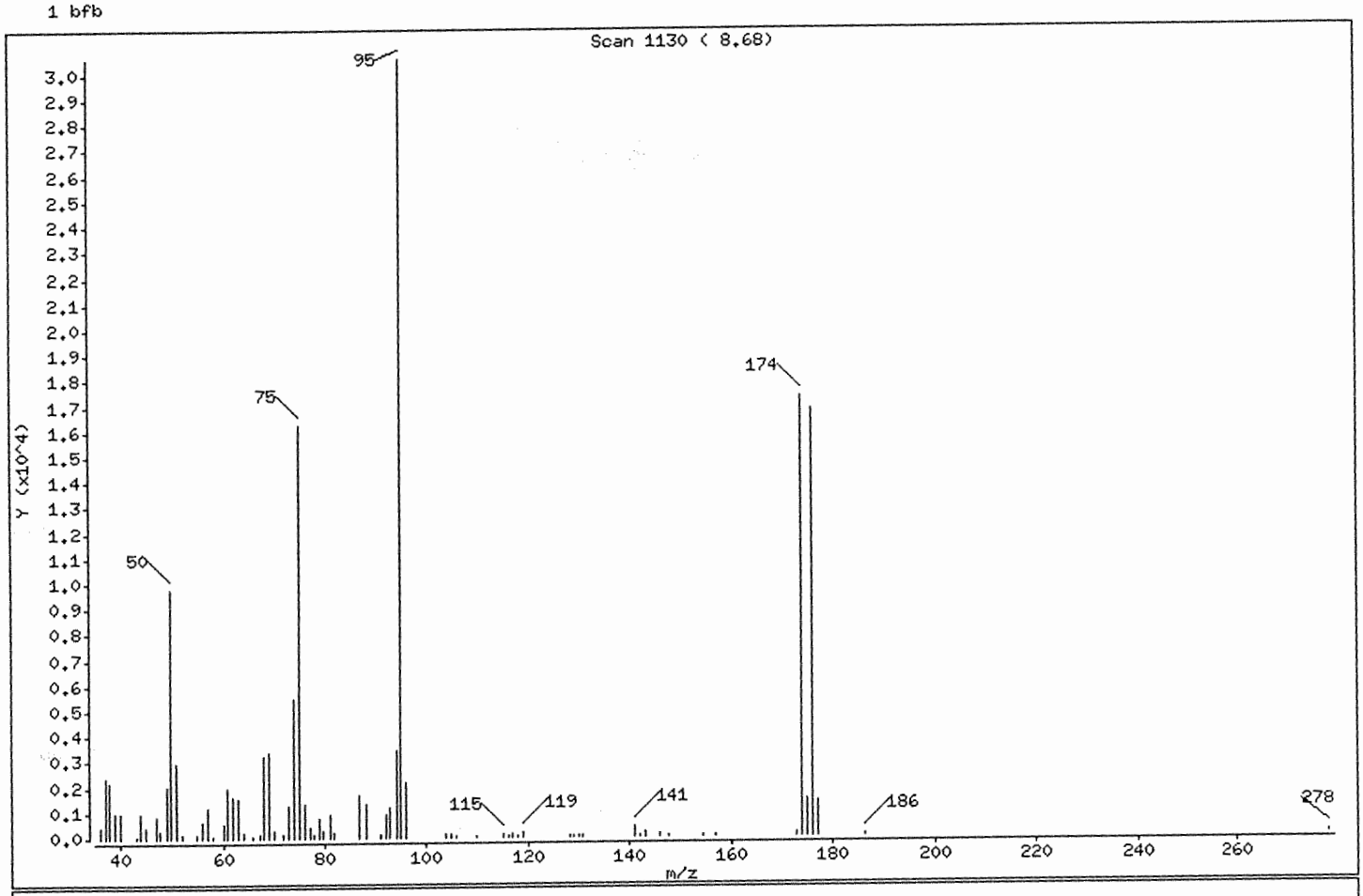
Volume Injected (uL): 2.0

Operator: PC

Column phase: DB624

Column diameter: 0.25

1 bfb



m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
95	Base Peak, 100% relative abundance	100.00
50	15.00 - 40.00% of mass 95	32.02
75	30.00 - 60.00% of mass 95	53.18
96	5.00 - 9.00% of mass 95	7.17
173	Less than 2.00% of mass 174	0.46 (0.82)
174	Greater than 50.00% of mass 95	56.48
175	5.00 - 9.00% of mass 174	4.82 (8.53)
176	95.00 - 101.00% of mass 174	54.89 (97.18)
177	5.00 - 9.00% of mass 176	4.71 (8.58)

Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\X071301.D

Date : 13-JUL-2020 10:03

Client ID: BFB

Instrument: voa6.i

Sample Info: BFB;BFB;3;;BFB

Volume Injected (uL): 2.0

Operator: PC

Column phase: DB624

Column diameter: 0.25

Data File: X071301.D
Spectrum: Scan 1130 (8.68)
Location of Maximum: 95.00
Number of points: 74

m/z	Y	m/z	Y	m/z	Y	m/z	Y
36.00	444	61.00	1942	81.90	205	128.90	99
37.00	2396	62.00	1633	86.90	1699	129.80	104
38.00	2186	62.90	1549	88.00	1344	130.80	64
39.00	986	64.10	217	90.80	174	140.80	443
39.90	954	65.80	50	92.00	885	141.90	67
43.10	89	67.10	114	92.90	1223	142.90	214
44.00	1013	68.00	3245	94.00	3447	145.90	124
45.00	398	68.90	3410	95.00	30624	147.70	70
46.90	833	70.10	279	96.10	2195	154.50	62
47.90	275	72.00	165	103.90	114	156.80	77
49.00	2032	73.00	1257	104.90	127	172.80	142
50.00	9806	74.00	5481	106.00	69	173.90	17296
51.00	2987	75.00	16285	109.90	62	174.90	1476
52.10	147	76.00	1357	115.00	175	175.90	16808
54.90	158	77.10	416	116.10	95	176.90	1442
55.90	654	78.00	140	116.80	127	186.20	58
57.00	1205	78.90	796	118.00	91	278.10	84
58.00	51	79.80	299	118.90	184		
60.00	554	80.90	893	128.10	76		

Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\X071302.D Page 2
Report Date: 13-Aug-2020 14:50

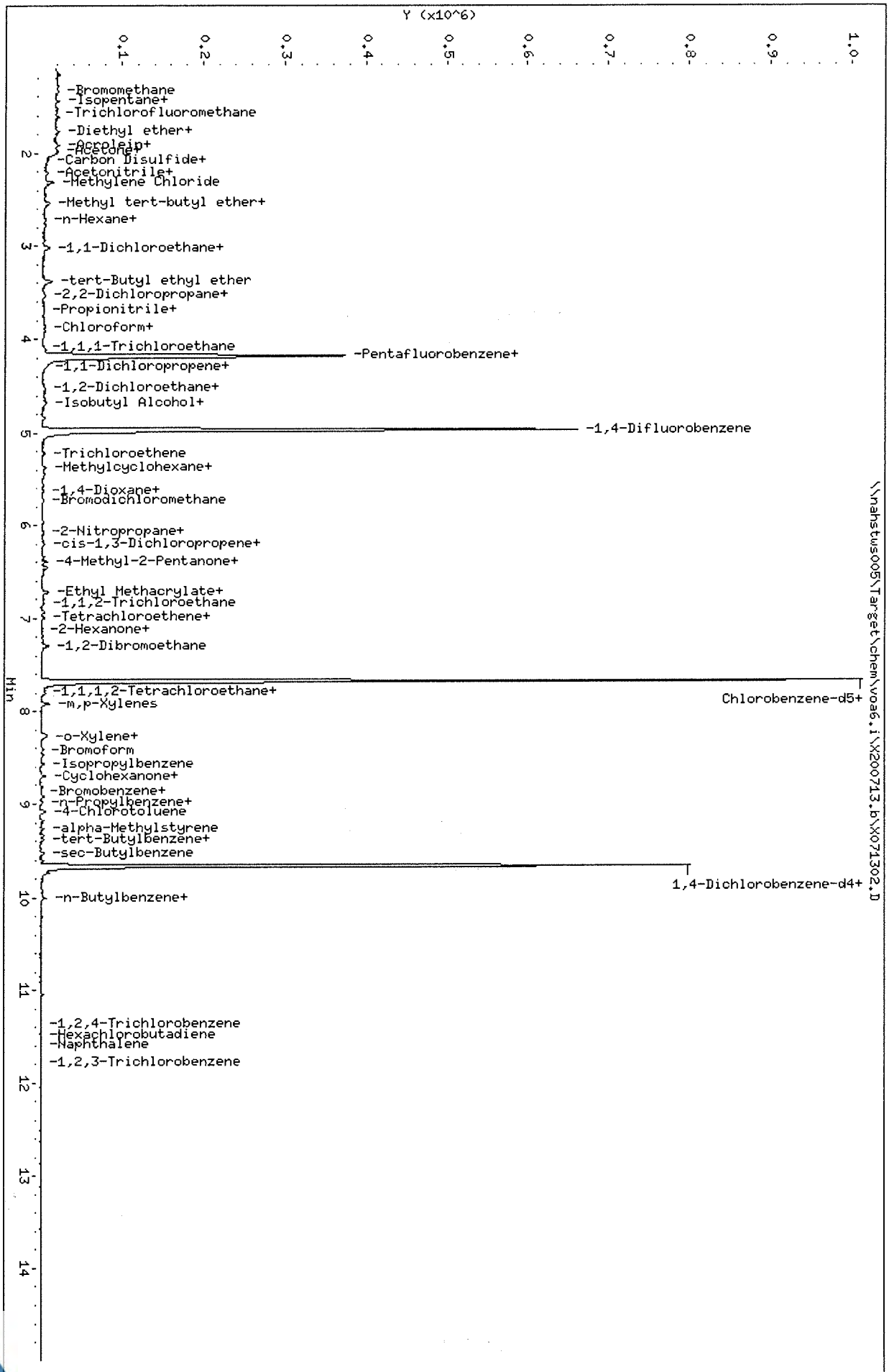
	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/l)	ON-COL (ug/l)
42	1,2-Dichloropropane	63	5.443	5.443	(1.095)	808	0.25000	0.18 (aM)
75	1,3,5-Trimethylbenzene	105	9.074	9.074	(0.939)	2450	0.25000	0.24 (a)
83	1,3-Dichlorobenzene	146	9.612	9.612	(0.994)	1359	0.25000	0.23 (a)
54	1,3-Dichloropropane	76	6.990	6.990	(0.911)	1340	0.25000	0.23 (aM)
84	1,4-Dichlorobenzene	146	9.690	9.690	(1.002)	1772	0.25000	0.30 (a)
26	2,2-Dichloropropane	77	3.523	3.523	(0.841)	1515	0.25000	0.28 (aM)
24	2-Butanone	43	3.638	3.638	(0.868)	1280	0.50000	0.49 (aM)
76	2-Chlorotoluene	91	8.981	8.981	(0.929)	1993	0.25000	0.22 (a)
52	2-Hexanone	43	7.119	7.119	(0.928)	2063	0.50000	0.50 (Ta)
77	4-Chlorotoluene	91	9.082	9.082	(0.939)	2485	0.25000	0.23 (a)
82	p-Isopropyltoluene	119	9.655	9.655	(0.999)	2463	0.25000	0.24 (a)
45	4-Methyl-2-Pentanone	43	6.338	6.338	(0.826)	3086	0.50000	0.52 (a)
10	Acetone	43	1.976	1.976	(0.472)	5077	0.50000	(a)
37	Benzene	78	4.526	4.526	(0.911)	3764	0.25000	0.28 (a)
74	Bromobenzene	156	8.817	8.817	(0.912)	880	0.25000	0.25 (a)
29	Bromochloromethane	128	3.817	3.817	(0.911)	624	0.25000	0.29 (a)
39	Bromodichloromethane	83	5.736	5.736	(1.154)	1083	0.25000	0.22 (aM)
66	Bromoform	173	8.423	8.423	(1.098)	323	0.25000	0.13 (aM)
6	Bromomethane	94	1.338	1.338	(0.320)	906	0.25000	(aM)
19	Carbon Disulfide	76	2.076	2.076	(0.496)	4382	0.50000	0.53 (a)
34	Carbon Tetrachloride	117	4.275	4.275	(0.860)	1403	0.25000	0.30 (aM)
59	Chlorobenzene	112	7.699	7.699	(1.004)	2374	0.25000	0.27 (a)
7	Chloroethane	64	1.403	1.403	(0.335)	458	0.25000	0.17 (aM)
28	Chloroform	83	3.910	3.910	(0.933)	1640	0.25000	0.25 (a)
3	Chloromethane	50	1.080	1.080	(0.258)	2153	0.25000	2.04 (aM)
27	cis-1,2-Dichloroethene	96	3.537	3.537	(0.844)	887	0.25000	0.23 (aM)
46	cis-1,3-Dichloropropene	75	6.173	6.173	(1.242)	1505	0.25000	0.26 (a)
55	Dibromochloromethane	129	7.183	7.183	(0.937)	1059	0.25000	0.30 (a)
44	Dibromomethane	93	5.565	5.565	(1.120)	533	0.25000	0.22 (aM)
2	Dichlorodifluoromethane	85	0.973	0.973	(0.232)	657	0.25000	0.20 (aM)
61	Ethylbenzene	106	7.807	7.807	(1.018)	1157	0.25000	0.26 (a)
91	Hexachlorobutadiene	225	11.481	11.481	(1.187)	252	0.25000	0.27 (aM)
67	Isopropylbenzene	105	8.566	8.566	(1.117)	2799	0.25000	0.21 (a)
62	m,p-Xylenes	106	7.914	7.914	(1.032)	2587	0.50000	0.48 (a)
17	Methylene Chloride	84	2.305	2.305	(0.550)	2897	0.25000	(aM)
87	n-Butylbenzene	91	10.006	10.006	(1.035)	2266	0.25000	0.25 (a)
73	n-Propylbenzene	91	8.924	8.924	(0.923)	3116	0.25000	0.21 (a)
92	Naphthalene	128	11.603	11.603	(1.200)	497	0.25000	1.50 (aM)
63	o-Xylene	106	8.244	8.244	(1.075)	1339	0.25000	0.24 (a)
81	sec-Butylbenzene	105	9.526	9.526	(0.985)	2832	0.25000	0.24 (a)
64	Styrene	104	8.272	8.272	(1.078)	2383	0.25000	0.25 (a)
78	tert-Butylbenzene	119	9.347	9.347	(0.967)	1945	0.25000	0.24 (a)
56	Tetrachloroethene	164	6.933	6.933	(0.904)	735	0.25000	0.28 (a)
50	Toluene	91	6.453	6.453	(0.841)	3684	0.25000	0.27 (a)
20	trans-1,2-Dichloroethene	96	2.549	2.549	(0.608)	837	0.25000	0.26 (Ta)
51	trans-1,3-Dichloropropene	75	6.696	6.696	(1.347)	1333	0.25000	0.25 (a)
38	Trichloroethene	130	5.221	5.221	(1.050)	1101	0.25000	0.31 (a)
8	Trichlorofluoromethane	101	1.568	1.568	(0.374)	1092	0.25000	0.22 (a)
5	Vinyl Chloride	62	1.145	1.145	(0.273)	1137	0.25000	0.23 (a)

QC Flag Legend

T - Target compound detected outside RT window.
a - Target compound detected but, quantitated amount Below Limit Of Quantitation(BLOQ).

QC Flag Legend

M - Compound response manually integrated.



Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\X071302.D
Date : 13-JUL-2020 10:27
Client ID: VSTD000.25
Sample Info: VSTD000.25;VSTD000.25;1;1;
Purge Volume: 5.0
Column phase: DB624

\\nahstws005\Target\chem\voa6.i\X200713.b\X071302.D
Instrument: voa6.i
Operator: PC
Column diameter: 0.18

ALS Laboratory Group

Data file : \\nahstws005\Target\chem\voa6.i\X200713.b\X071303.D
Lab Smp Id: VSTD000.5 Client Smp ID: VSTD000.5
Inj Date : 13-JUL-2020 10:55
Operator : PC Inst ID: voa6.i
Smp Info : VSTD000.5;VSTD000.5;1;2;
Misc Info : HS18090001;WATER;0;1;
Comment :
Method : \\nahstws005\Target\chem\voa6.i\X200713.b\8260W.m
Meth Date : 13-Aug-2020 14:50 voa6.i Quant Type: ISTD
Cal Date : 13-JUL-2020 10:27 Cal File: X071302.D
Als bottle: 3 Calibration Sample, Level: 2
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: bhate.sub
Target Version: 4.14
Processing Host: NAHSTW7056

Concentration Formula: Amt * DF * (Uf/Vo)*1 * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Uf	5.000	ng unit correction factor
Vo	5.000	sample purged
Cpnd Variable		Local Compound Variable

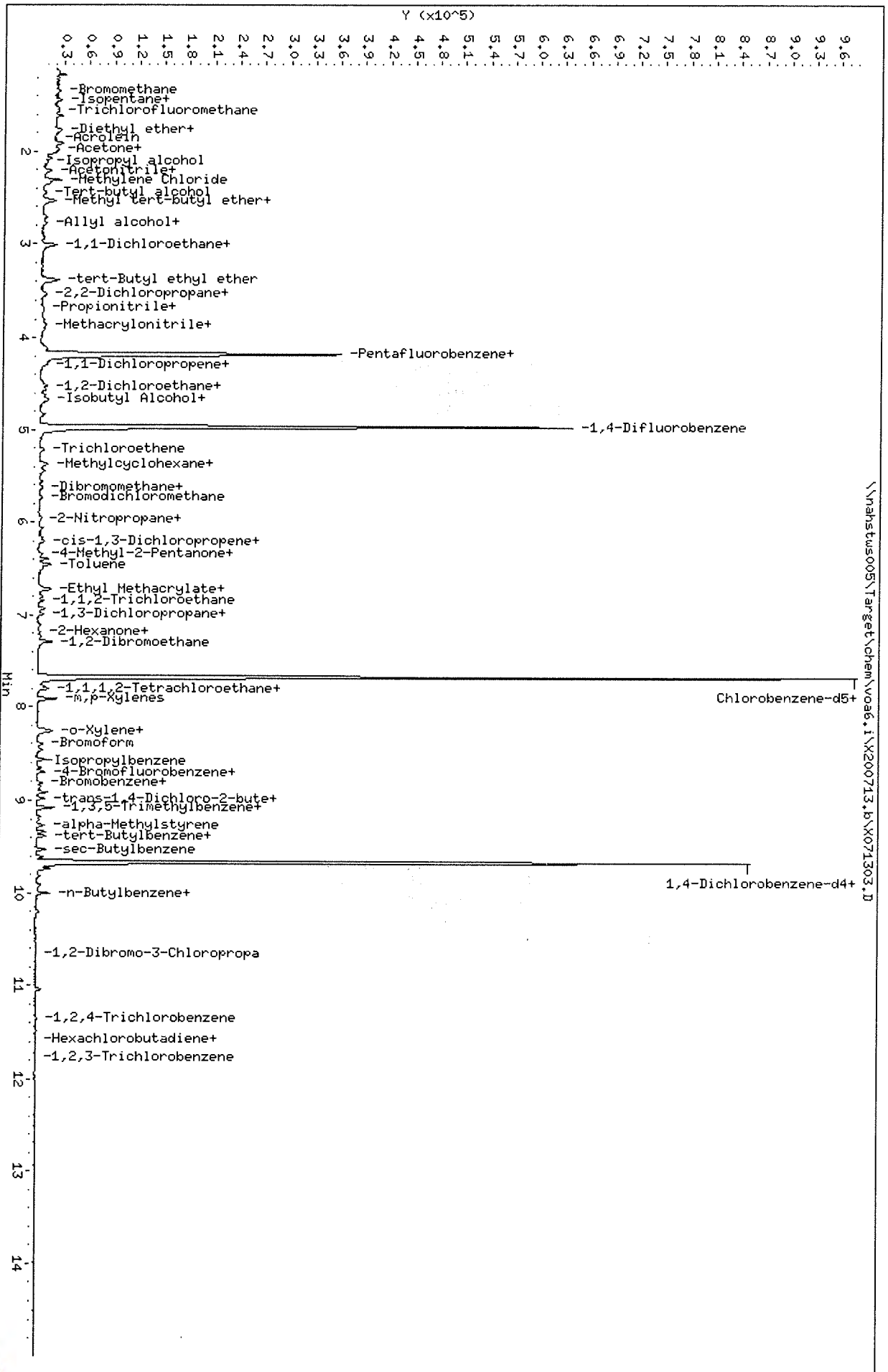
Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/l)	AMOUNTS ON-COL (ug/l)
* 1 Pentafluorobenzene	168	4.189	4.189	(1.000)	286110	50.0000	
* 36 1,4-Difluorobenzene	114	4.970	4.970	(1.000)	463555	50.0000	
* 47 Chlorobenzene-d5	117	7.671	7.671	(1.000)	412015	50.0000	
* 70 1,4-Dichlorobenzene-d4	152	9.669	9.669	(1.000)	194722	50.0000	
$ 30 Dibromofluoromethane	113	4.111	4.111	(0.981)	2011	0.50000	0.54(a)
$ 35 1,2-Dichloroethane-d4	65	4.483	4.483	(1.070)	2548	0.50000	0.92(Ta)
$ 48 Toluene-d8	98	6.396	6.396	(0.834)	6156	0.50000	0.57(a)
$ 69 4-Bromofluorobenzene	95	8.695	8.695	(1.134)	3265	0.50000	0.29(a)
60 1,1,1,2-Tetrachloroethane	131	7.778	7.778	(1.014)	1959	0.50000	0.61(a)
31 1,1,1-Trichloroethane	97	4.096	4.096	(0.978)	2822	0.50000	0.54(a)
68 1,1,2,2-Tetrachloroethane	83	8.845	8.845	(0.915)	1931	0.50000	0.53(aM)
53 1,1,2-Trichloroethane	83	6.847	6.847	(0.893)	1313	0.50000	0.52(a)
22 1,1-Dichloroethane	63	2.921	2.921	(0.697)	4619	0.50000	0.57(Ta)
11 1,1-Dichloroethene	96	1.919	1.919	(0.458)	1452	0.50000	0.58(aM)
32 1,1-Dichloropropene	75	4.290	4.290	(0.863)	2638	0.50000	0.60(a)
93 1,2,3-Trichlorobenzene	180	11.761	11.761	(1.216)	316	0.50000	0.47(aM)
71 1,2,3-Trichloropropane	75	8.867	8.867	(0.917)	1796	0.50000	0.56(aM)
90 1,2,4-Trichlorobenzene	180	11.352	11.352	(1.174)	501	0.50000	0.40(aM)
79 1,2,4-Trimethylbenzene	105	9.390	9.390	(0.971)	5799	0.50000	0.54(a)
89 1,2-Dibromo-3-Chloropropane	155	10.658	10.658	(1.102)	103	0.50000	1.62(aM)
57 1,2-Dibromoethane	107	7.269	7.269	(0.948)	1397	0.50000	0.46(a)
88 1,2-Dichlorobenzene	146	9.999	9.999	(1.034)	3096	0.50000	0.57(a)

Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\X071303.D Page 2
Report Date: 13-Aug-2020 14:50

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/l)	ON-COL (ug/l)
33 1,2-Dichloroethane	62	4.576	4.576	(0.921)	2874	0.50000	0.52(a)
42 1,2-Dichloropropane	63	5.443	5.443	(1.095)	2500	0.50000	0.58(aM)
75 1,3,5-Trimethylbenzene	105	9.075	9.075	(0.939)	5649	0.50000	0.53(a)
83 1,3-Dichlorobenzene	146	9.612	9.612	(0.994)	3265	0.50000	0.54(a)
54 1,3-Dichloropropane	76	6.990	6.990	(0.911)	3175	0.50000	0.58(a)
84 1,4-Dichlorobenzene	146	9.683	9.683	(1.001)	3536	0.50000	0.58(a)
26 2,2-Dichloropropane	77	3.509	3.509	(0.838)	2678	0.50000	0.52(a)
24 2-Butanone	43	3.631	3.631	(0.867)	2037	1.00000	0.82(aM)
76 2-Chlorotoluene	91	8.981	8.981	(0.929)	5213	0.50000	0.56(a)
52 2-Hexanone	43	7.105	7.105	(0.926)	3283	1.00000	0.84(a)
77 4-Chlorotoluene	91	9.082	9.082	(0.939)	6209	0.50000	0.57(a)
82 p-Isopropyltoluene	119	9.655	9.655	(0.999)	5745	0.50000	0.55(a)
45 4-Methyl-2-Pentanone	43	6.338	6.338	(0.826)	4670	1.00000	0.83(a)
10 Acetone	43	1.976	1.976	(0.472)	6844	1.00000	(a)
37 Benzene	78	4.526	4.526	(0.911)	6709	0.50000	0.53(a)
74 Bromobenzene	156	8.817	8.817	(0.912)	1977	0.50000	0.55(a)
29 Bromochloromethane	128	3.810	3.810	(0.909)	1213	0.50000	0.59(aM)
39 Bromodichloromethane	83	5.737	5.737	(1.154)	2238	0.50000	0.47(aM)
66 Bromoform	173	8.423	8.423	(1.098)	1079	0.50000	0.47(aM)
6 Bromomethane	94	1.338	1.338	(0.320)	1581	0.50000	(aM)
19 Carbon Disulfide	76	2.069	2.069	(0.494)	9504	1.00000	1.20(a)
34 Carbon Tetrachloride	117	4.275	4.275	(0.860)	2286	0.50000	0.52(aMH)
59 Chlorobenzene	112	7.699	7.699	(1.004)	4419	0.50000	0.53(a)
7 Chloroethane	64	1.403	1.403	(0.335)	1274	0.50000	0.50(aM)
28 Chloroform	83	3.917	3.917	(0.935)	3272	0.50000	0.52(a)
3 Chloromethane	50	1.081	1.081	(0.258)	3489	0.50000	2.27(a)
27 cis-1,2-Dichloroethene	96	3.545	3.545	(0.846)	1921	0.50000	0.52(a)
46 cis-1,3-Dichloropropene	75	6.166	6.166	(1.241)	2423	0.50000	0.44(a)
55 Dibromochloromethane	129	7.184	7.184	(0.937)	1765	0.50000	0.52(a)
44 Dibromomethane	93	5.565	5.565	(1.120)	1091	0.50000	0.47(a)
2 Dichlorodifluoromethane	85	0.973	0.973	(0.232)	1379	0.50000	0.45(aM)
61 Ethylbenzene	106	7.807	7.807	(1.018)	2349	0.50000	0.54(a)
91 Hexachlorobutadiene	225	11.488	11.488	(1.188)	587	0.50000	0.60(aM)
67 Isopropylbenzene	105	8.566	8.566	(1.117)	6106	0.50000	0.47(a)
62 m,p-Xylenes	106	7.914	7.914	(1.032)	5592	1.00000	1.09(a)
17 Methylene Chloride	84	2.305	2.305	(0.550)	4271	0.50000	(a)
87 n-Butylbenzene	91	9.999	9.999	(1.034)	4555	0.50000	0.50(a)
73 n-Propylbenzene	91	8.917	8.917	(0.922)	7682	0.50000	0.51(a)
92 Naphthalene	128	11.567	11.567	(1.196)	536	0.50000	1.50(aM)
63 o-Xylene	106	8.251	8.251	(1.076)	2802	0.50000	0.54(a)
81 sec-Butylbenzene	105	9.526	9.526	(0.985)	6983	0.50000	0.57(a)
64 Styrene	104	8.272	8.272	(1.078)	4495	0.50000	0.50(a)
78 tert-Butylbenzene	119	9.340	9.340	(0.966)	4563	0.50000	0.54(a)
56 Tetrachloroethene	164	6.940	6.940	(0.905)	1533	0.50000	0.60(a)
50 Toluene	91	6.453	6.453	(0.841)	6919	0.50000	0.53(a)
20 trans-1,2-Dichloroethene	96	2.542	2.542	(0.607)	1470	0.50000	0.47(a)
51 trans-1,3-Dichloropropene	75	6.696	6.696	(1.347)	2606	0.50000	0.52(a)
38 Trichloroethene	130	5.214	5.214	(1.049)	1810	0.50000	0.54(a)
8 Trichlorofluoromethane	101	1.561	1.561	(0.373)	2560	0.50000	0.54(a)
5 Vinyl Chloride	62	1.145	1.145	(0.273)	2528	0.50000	0.53(a)

QC Flag Legend

T - Target compound detected outside RT window.
a - Target compound detected but, quantitated amount
Below Limit Of Quantitation(BLOQ).
M - Compound response manually integrated.
H - Operator selected an alternate compound hit.

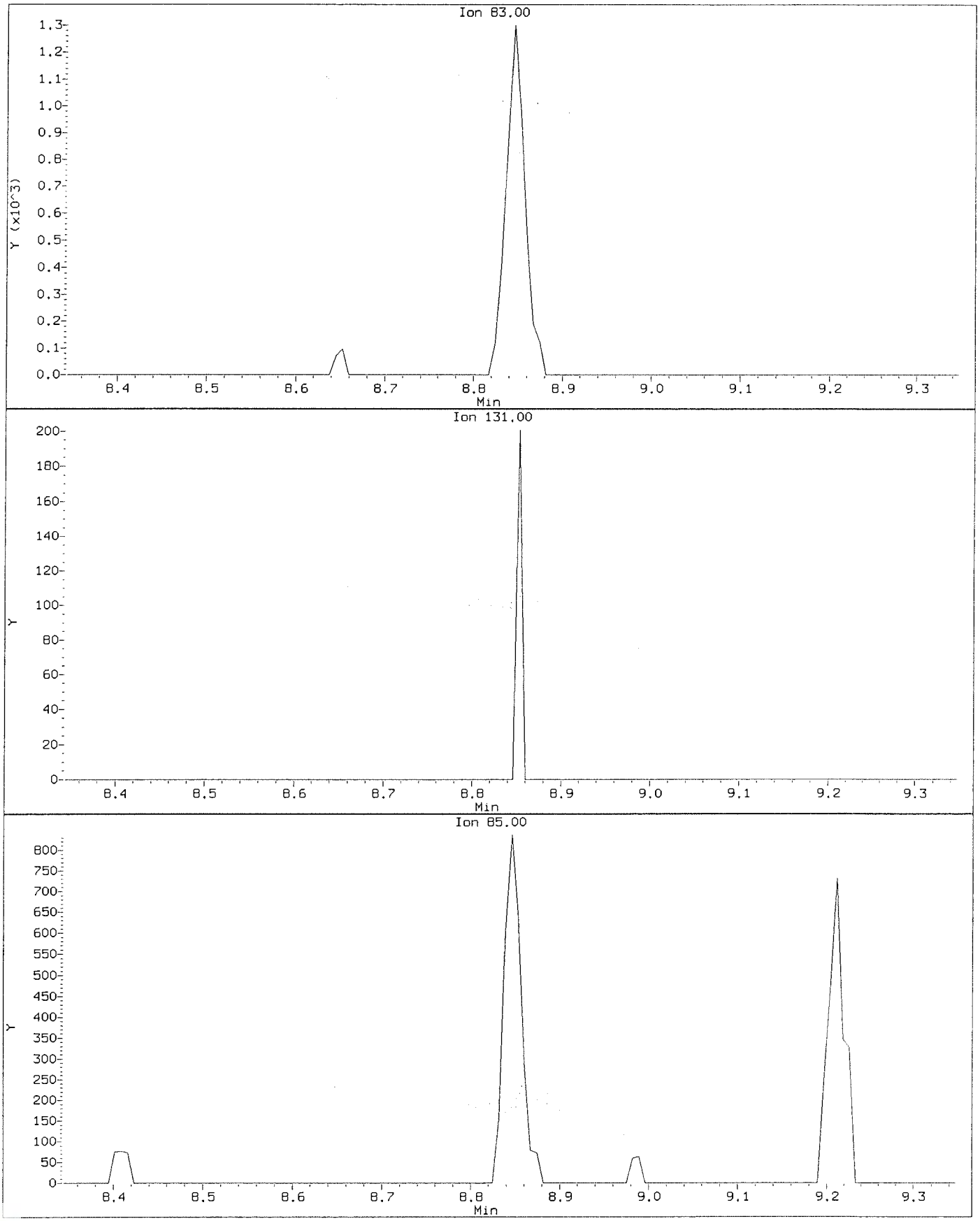


Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\X071303.D
Date : 13-JUL-2020 10:55
Client ID: VSTD000.5
Sample Info: VSTD000.5;VSTD000.5;1;2;
Purge Volume: 5.0
Column phase: DB624

Instrument: voa6.i
Operator: PC
Column diameter: 0.18

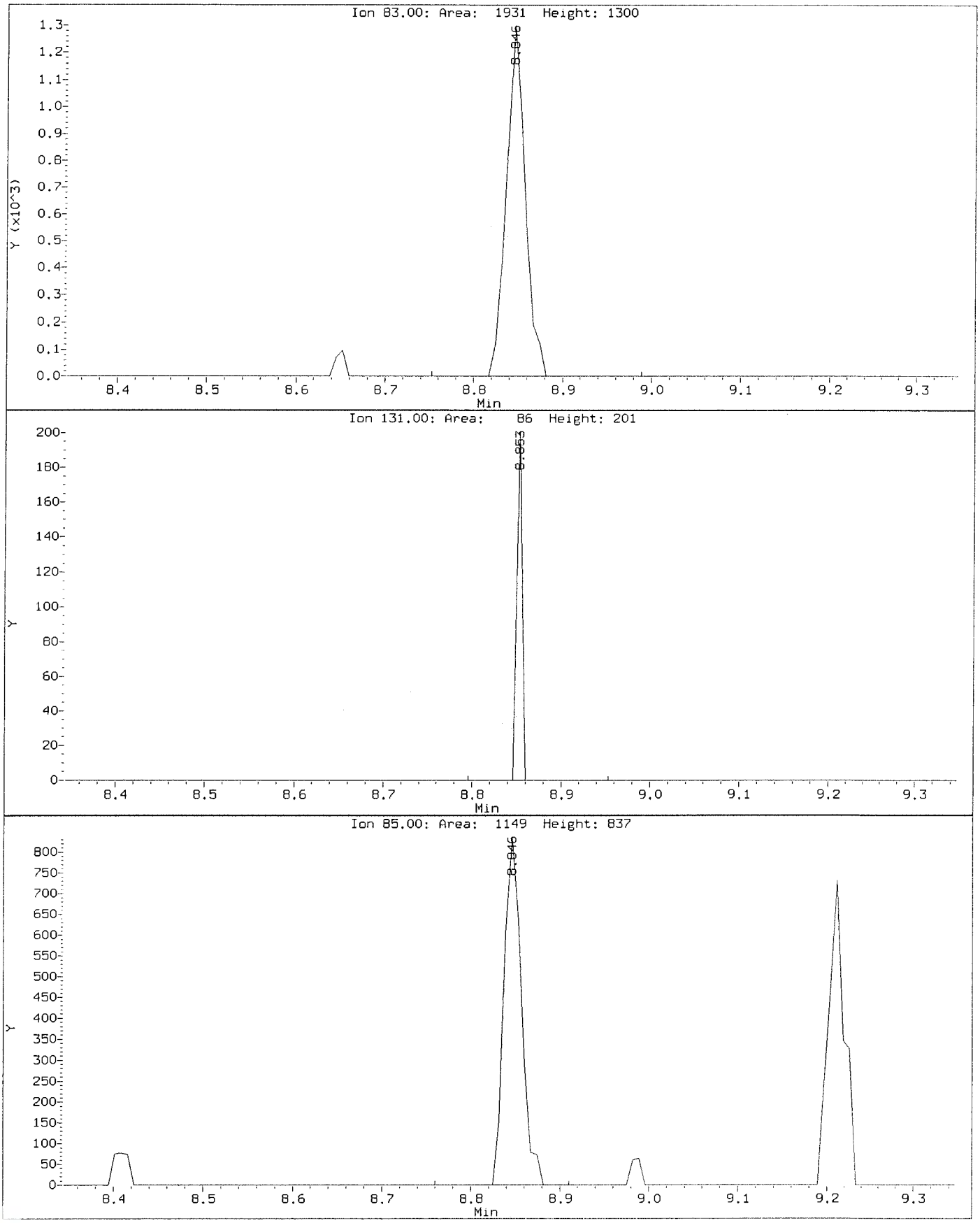
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Client Sample ID: VSTD000.5

Compound: 1,1,2,2-Tetrachloroethane
CAS Number: 79-34-5



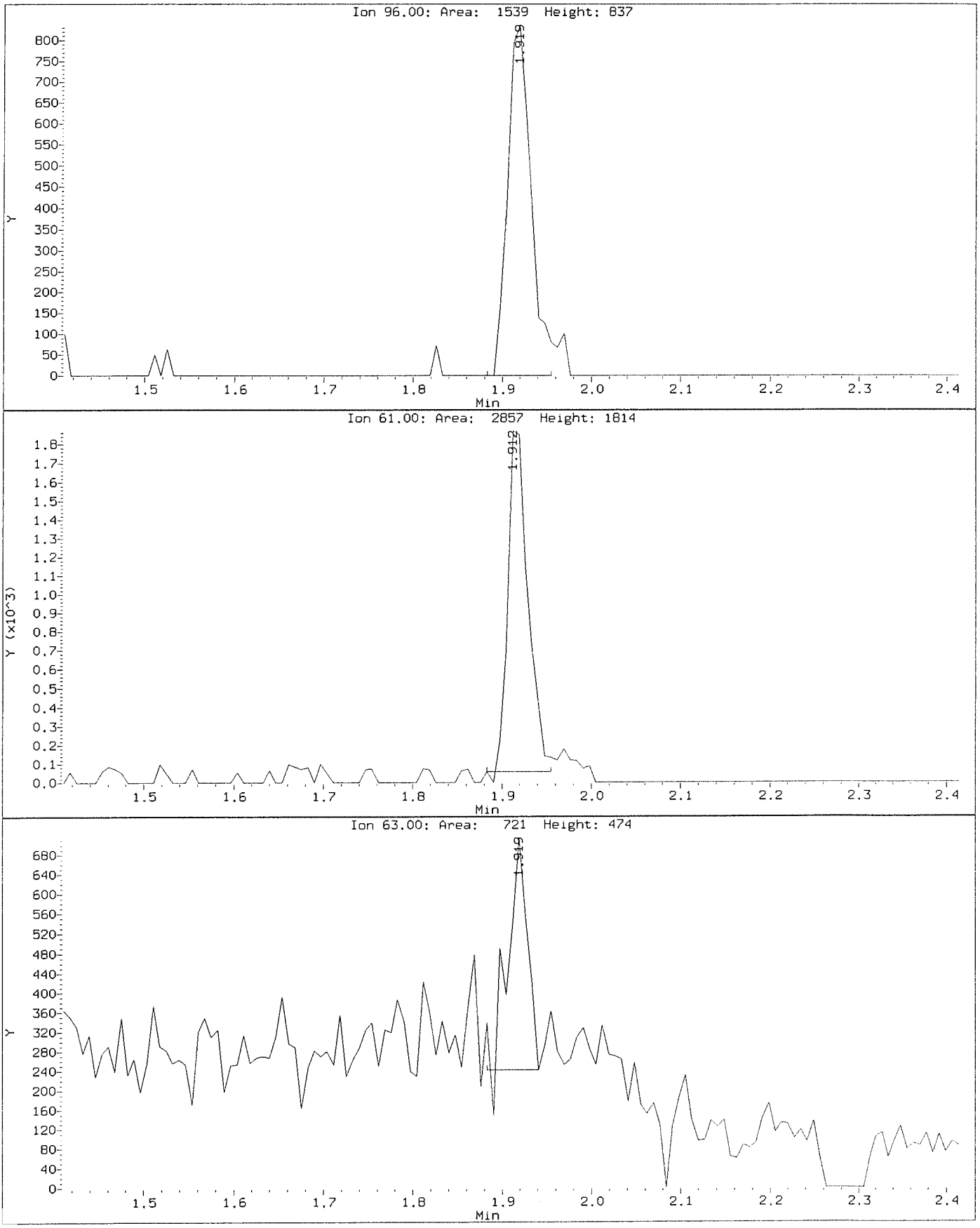
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Compound: 1,1,2,2-Tetrachloroethane
CAS Number: 79-34-5



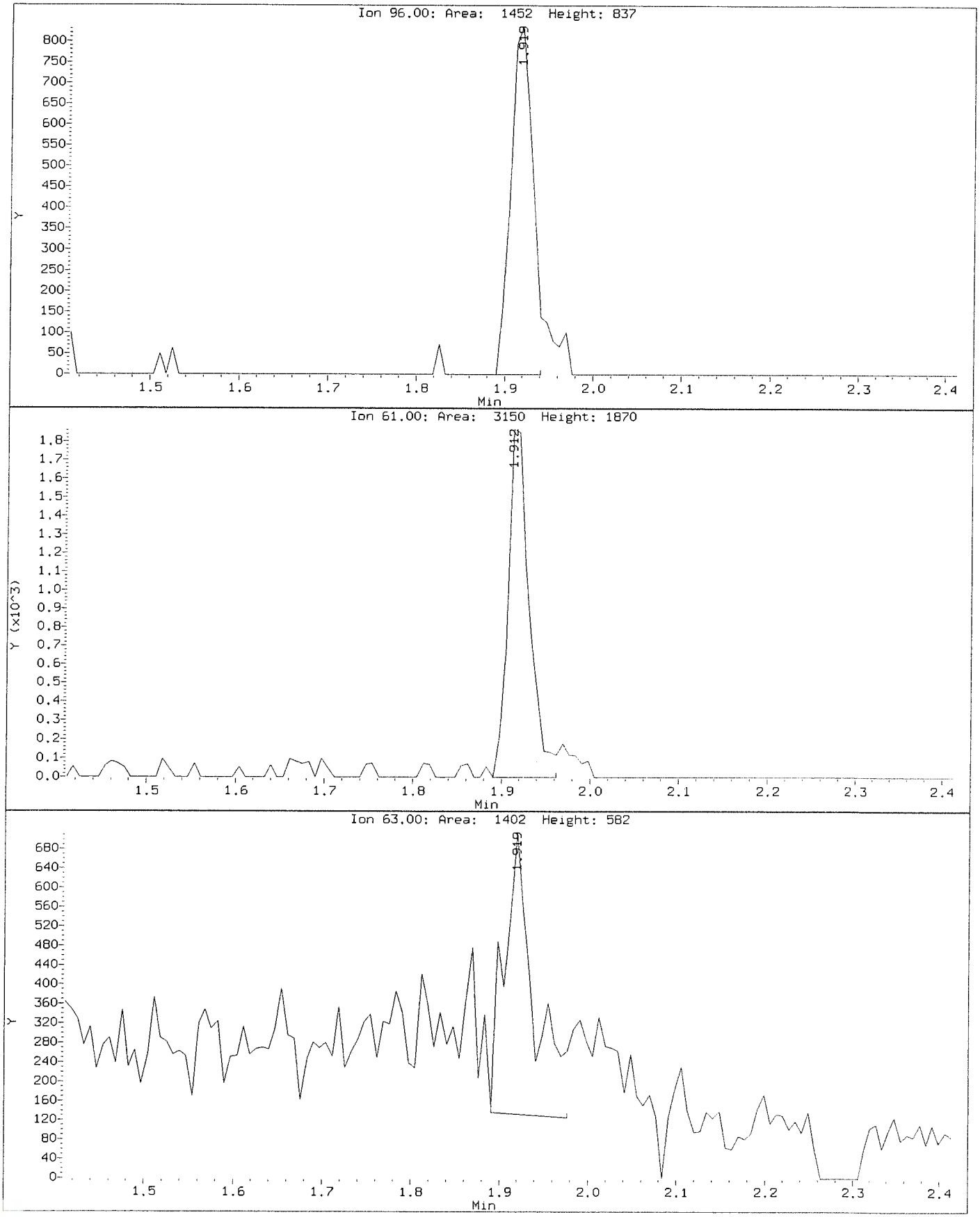
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Instrument: voa6.i
Client Sample ID: VSTD000.5

Compound: 1,1-Dichloroethene
CAS Number: 75-35-4



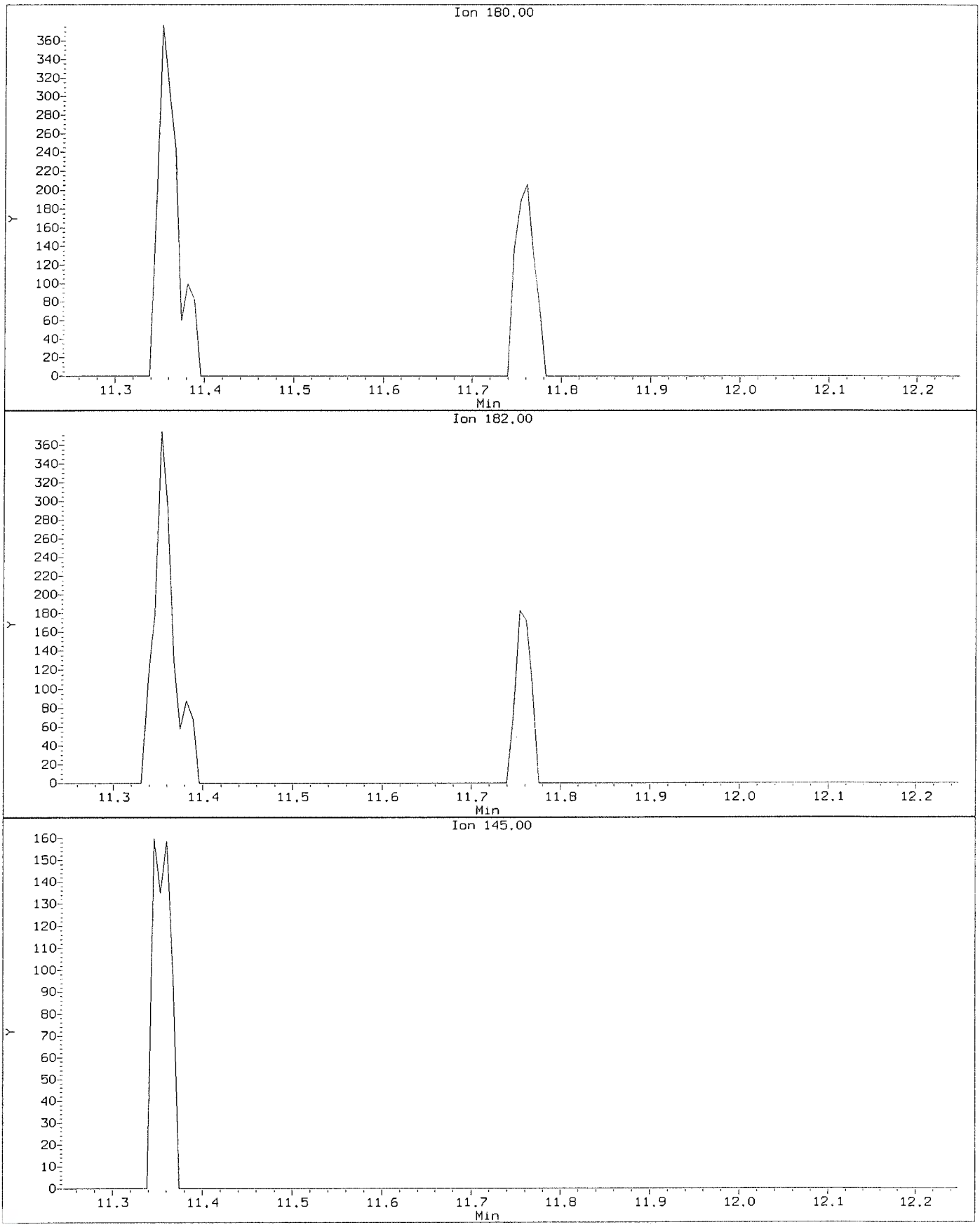
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Instrument: voa6.i
Client Sample ID: VSTD000.5

Compound: 1,1-Dichloroethene
CAS Number: 75-35-4



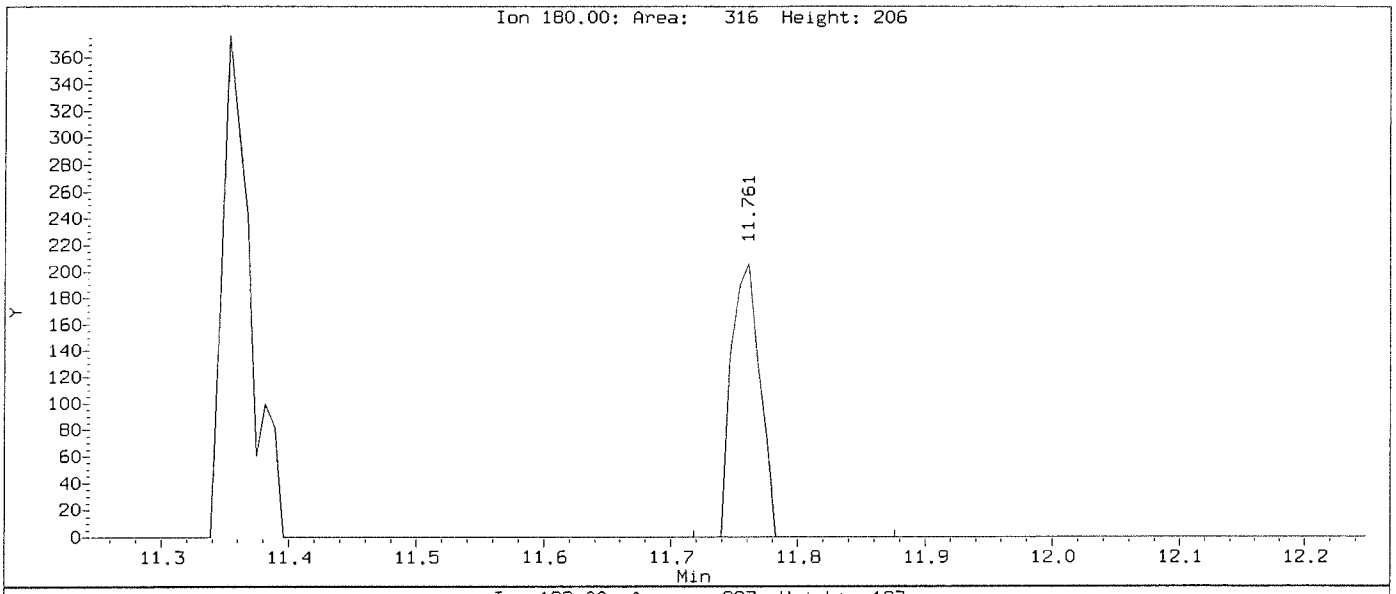
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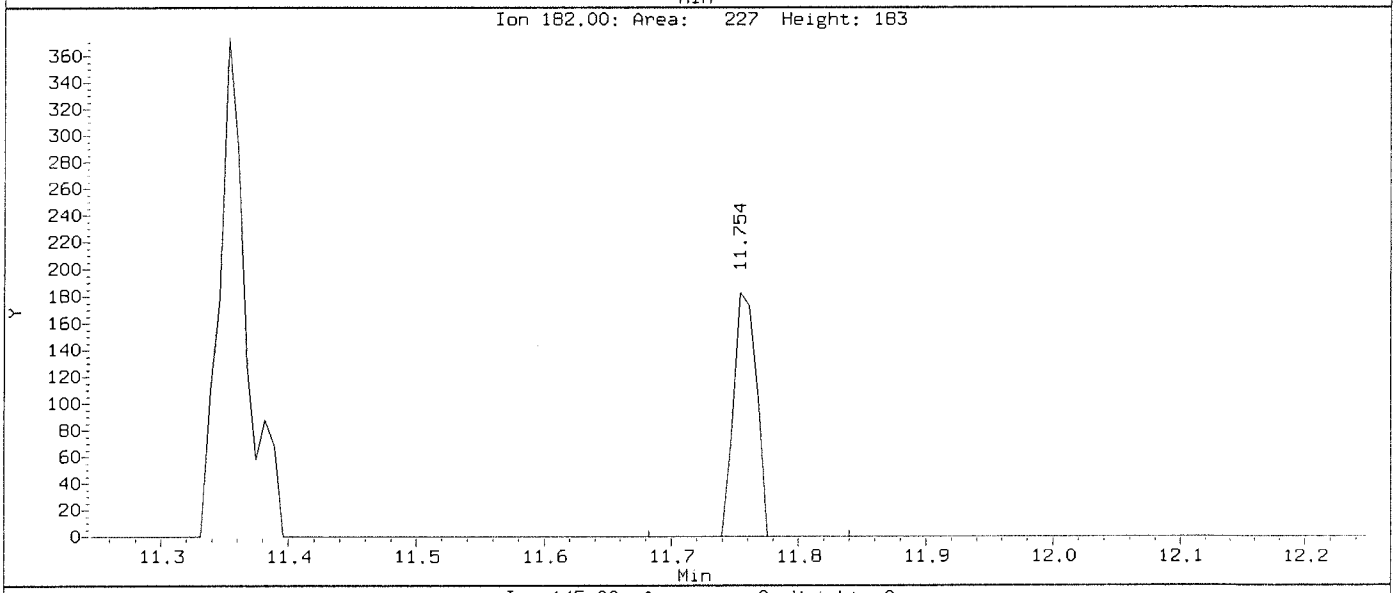
Compound: 1,2,3-Trichlorobenzene
CAS Number: 87-61-6

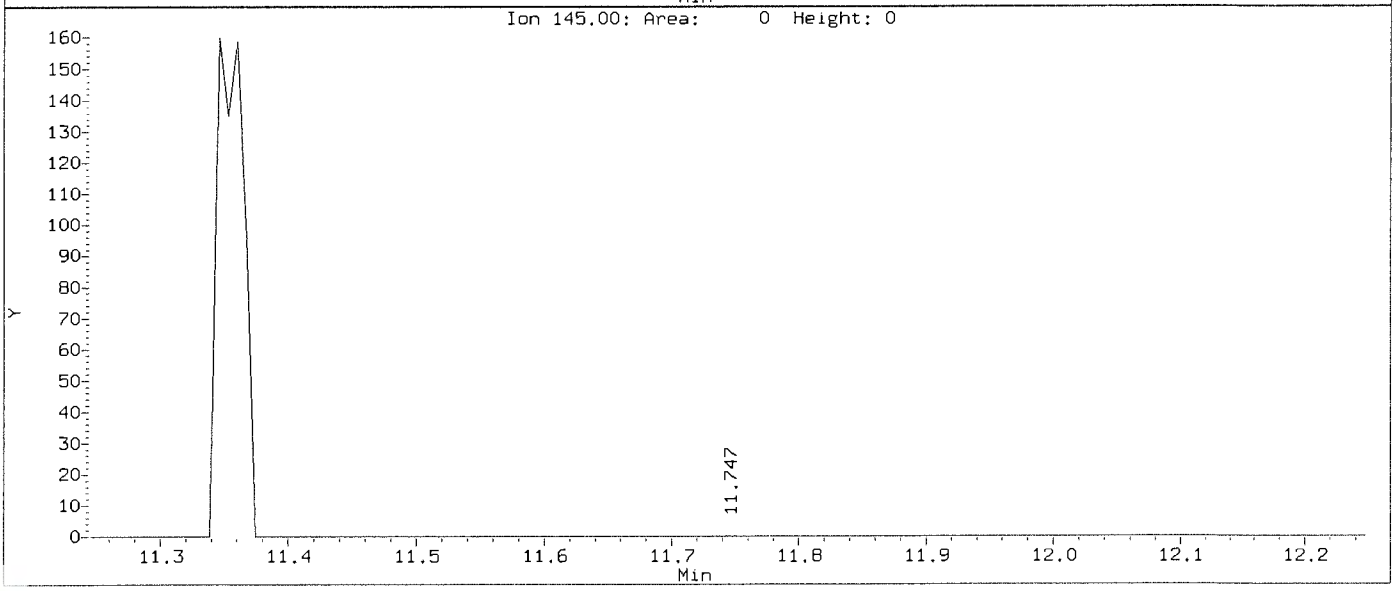


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Instrument: voa6.i
Client Sample ID: VSTD000.5

Compound: 1,2,3-Trichlorobenzene
CAS Number: 87-61-6

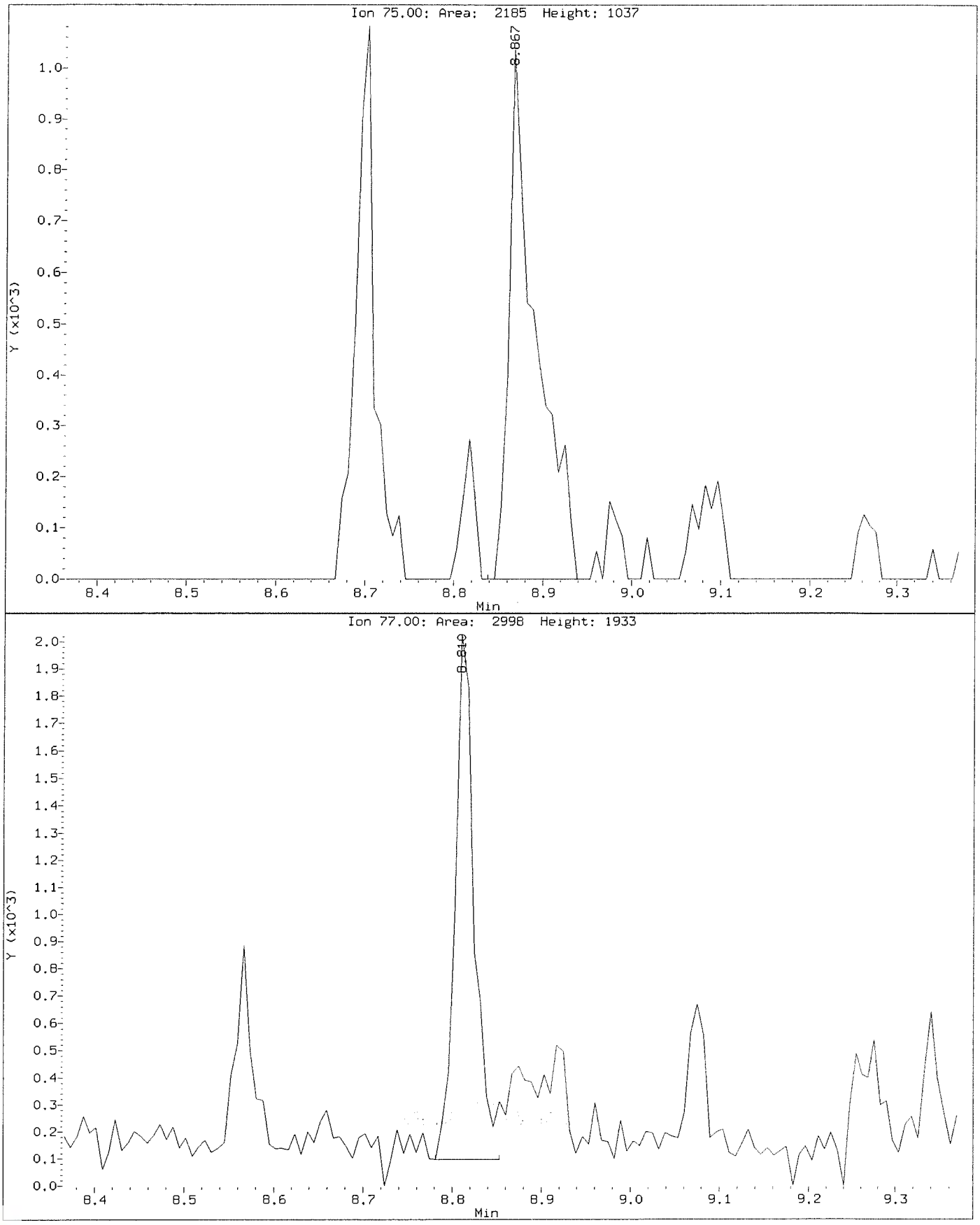






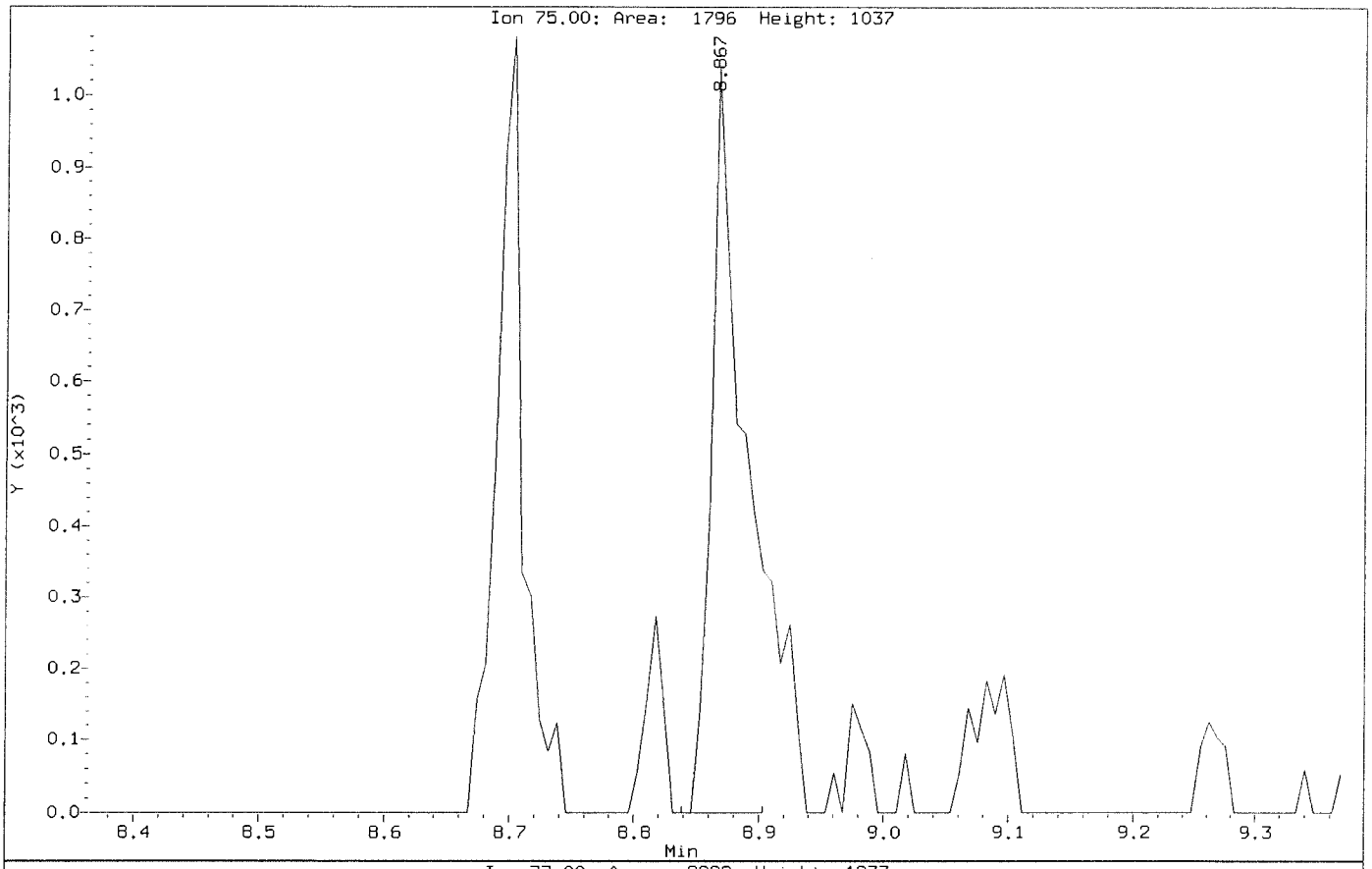
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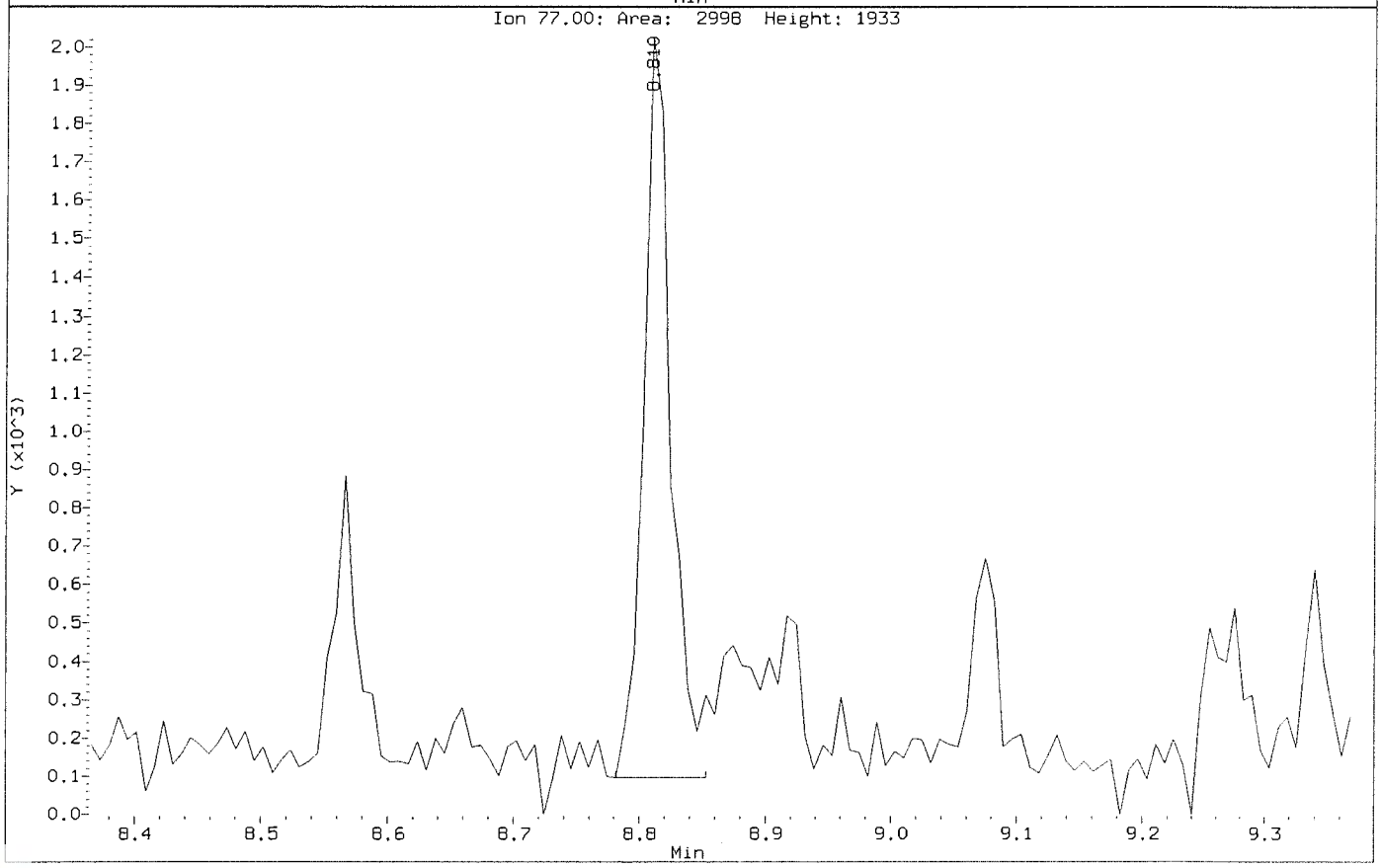
Compound: 1,2,3-Trichloropropane
CAS Number: 96-18-4



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Instrument: voa6.i
Client Sample ID: VSTD000.5

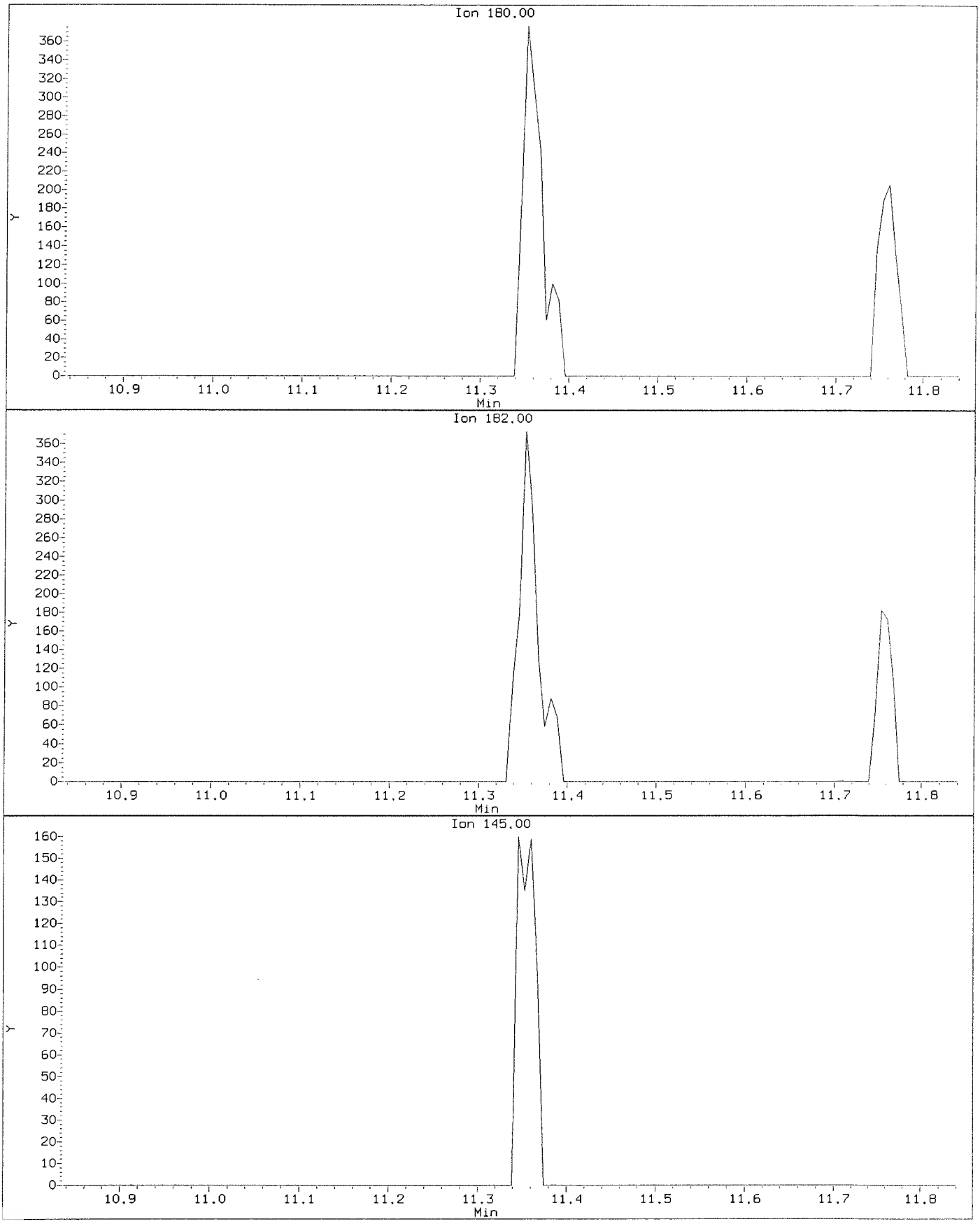
Compound: 1,2,3-Trichloropropane
CAS Number: 96-18-4





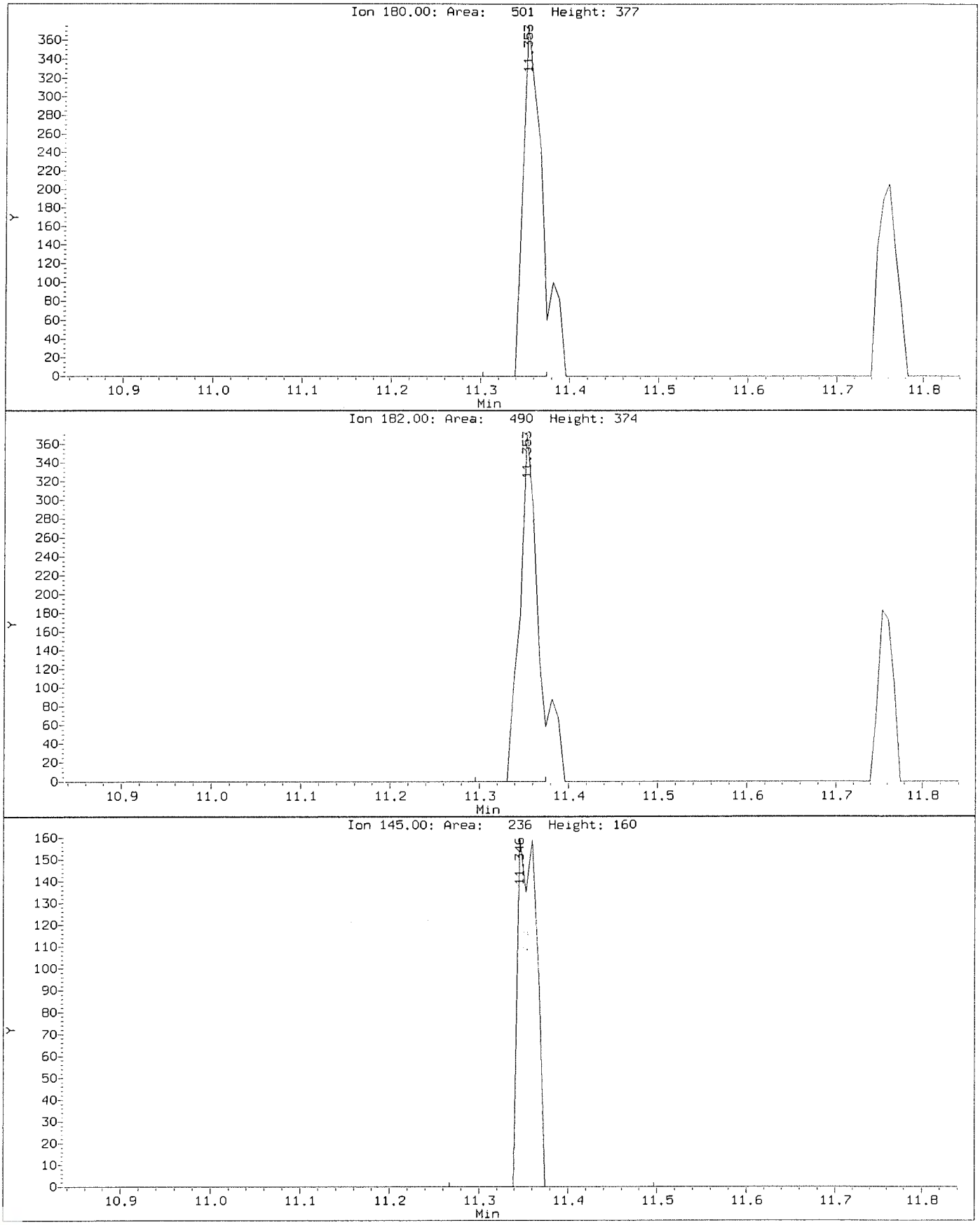
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Instrument: voa6.i
Client Sample ID: VSTD000.5

Compound: 1,2,4-Trichlorobenzene
CAS Number: 120-82-1



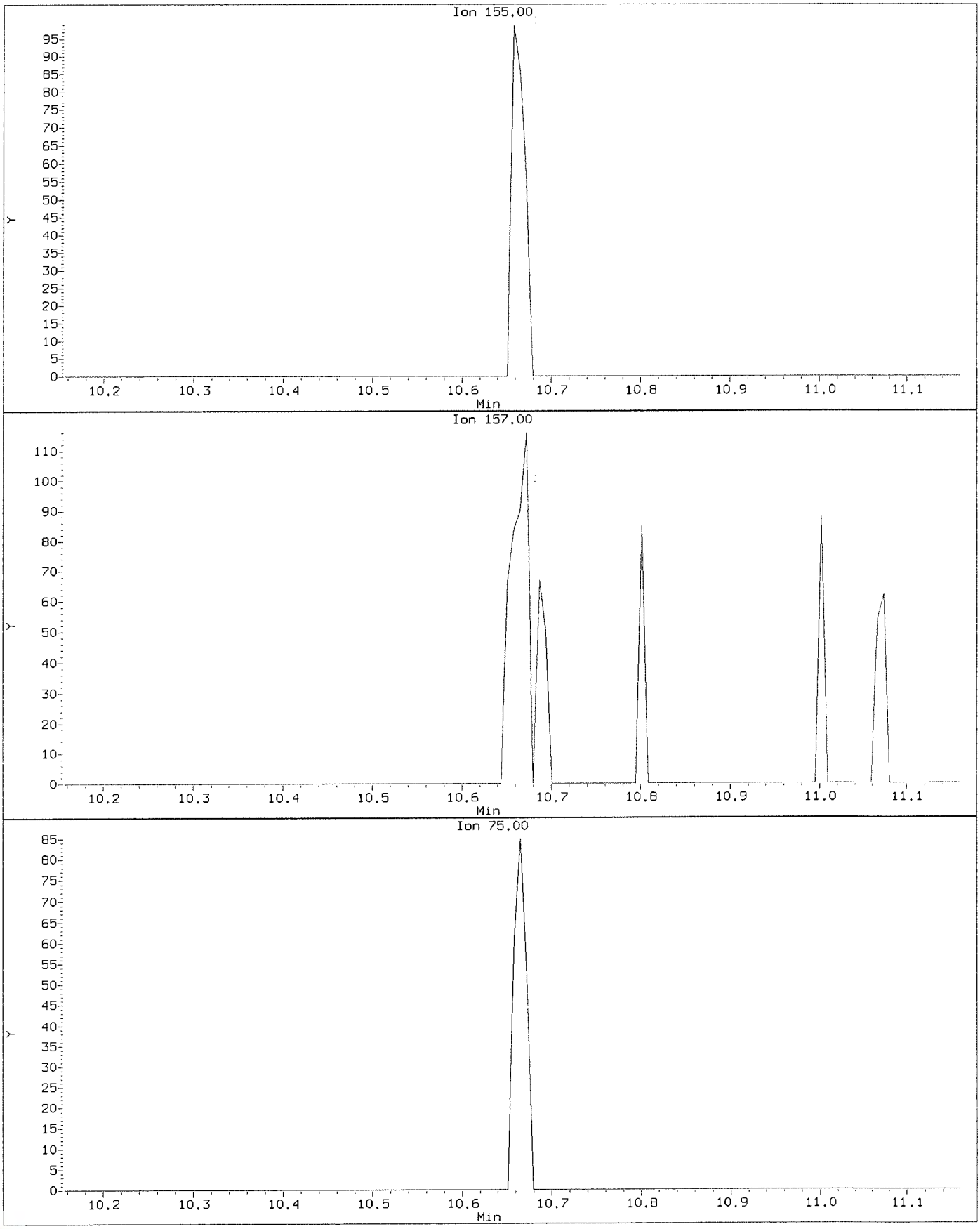
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Instrument: voa6.i
Client Sample ID: VSTD000.5

Compound: 1,2,4-Trichlorobenzene
CAS Number: 120-82-1



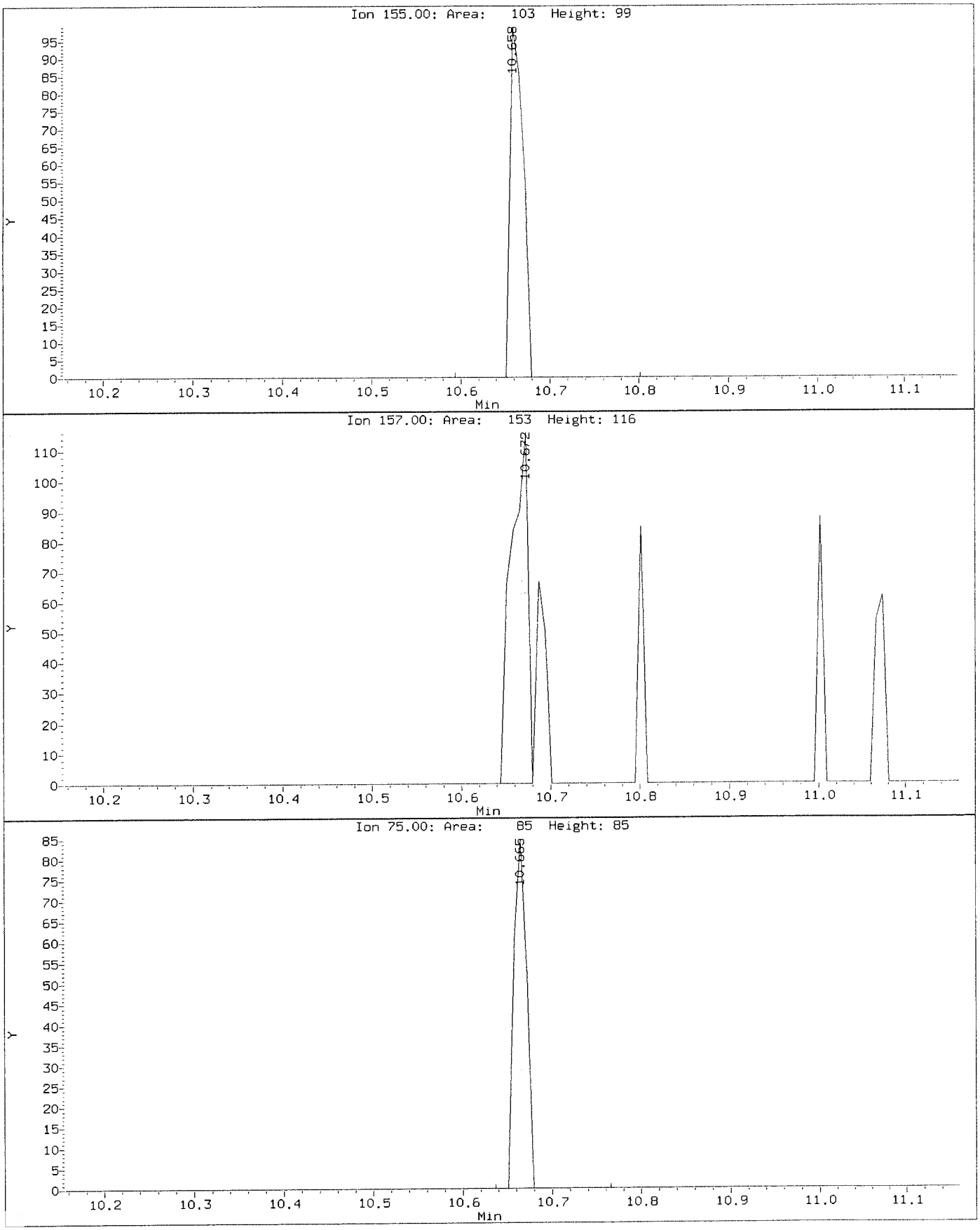
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Instrument: voa6.i
Client Sample ID: VSTD000.5

Compound: 1,2-Dibromo-3-Chloropropane
CAS Number: 96-12-8



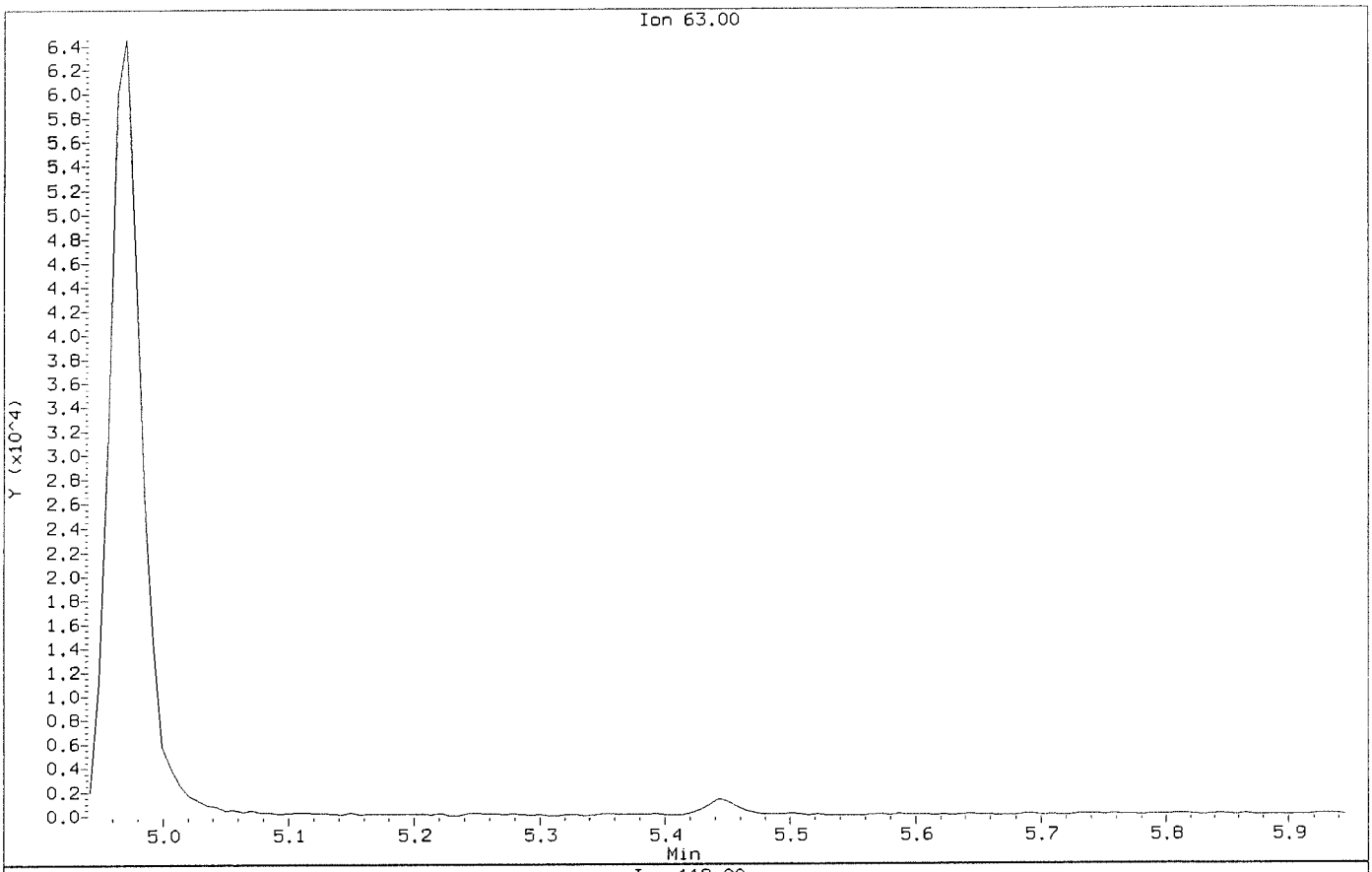
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Client Sample ID: VSTD000.5

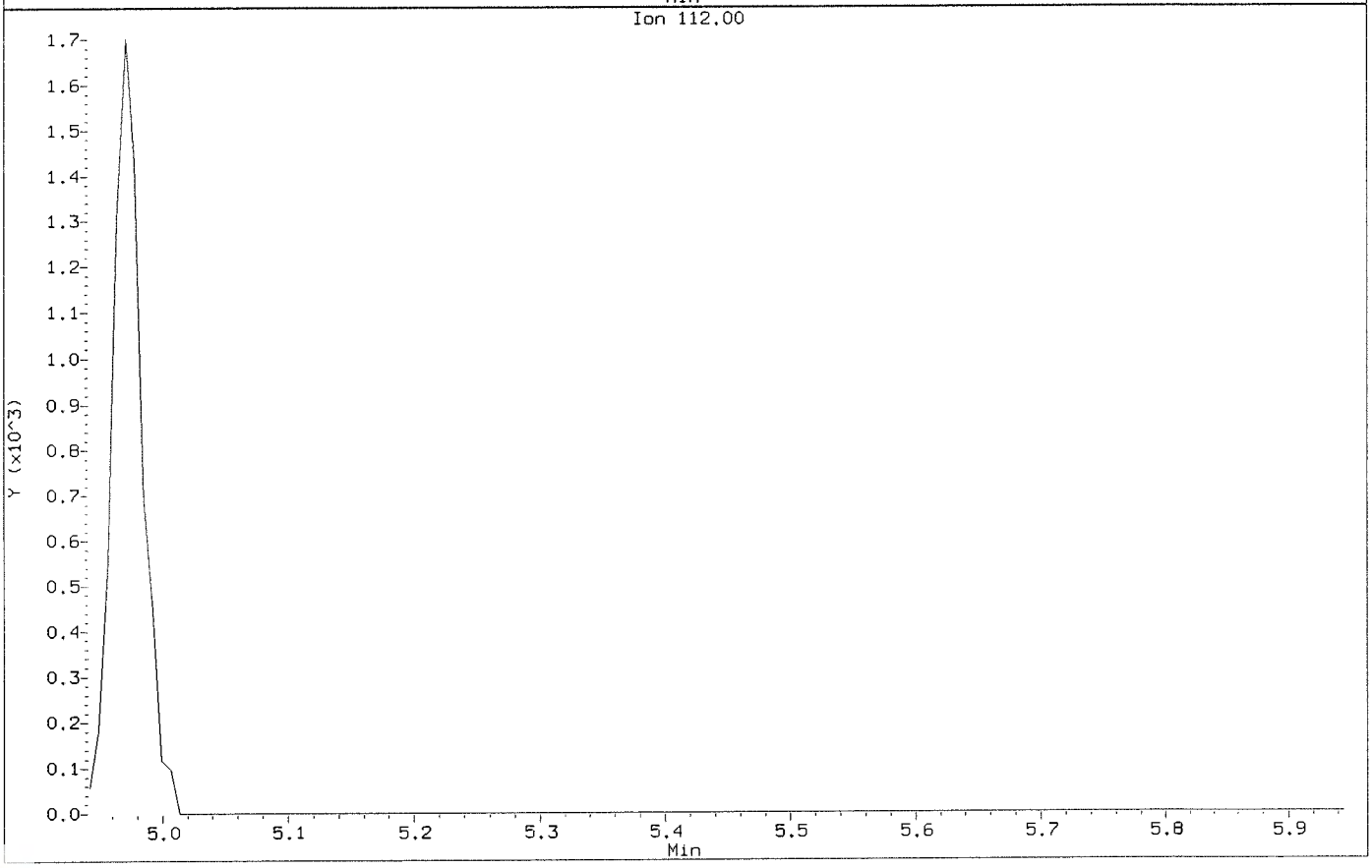
Compound: 1,2-Dibromo-3-Chloropropane
CAS Number: 96-12-8



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Instrument: voa6.i
Client Sample ID: VSTD000.5

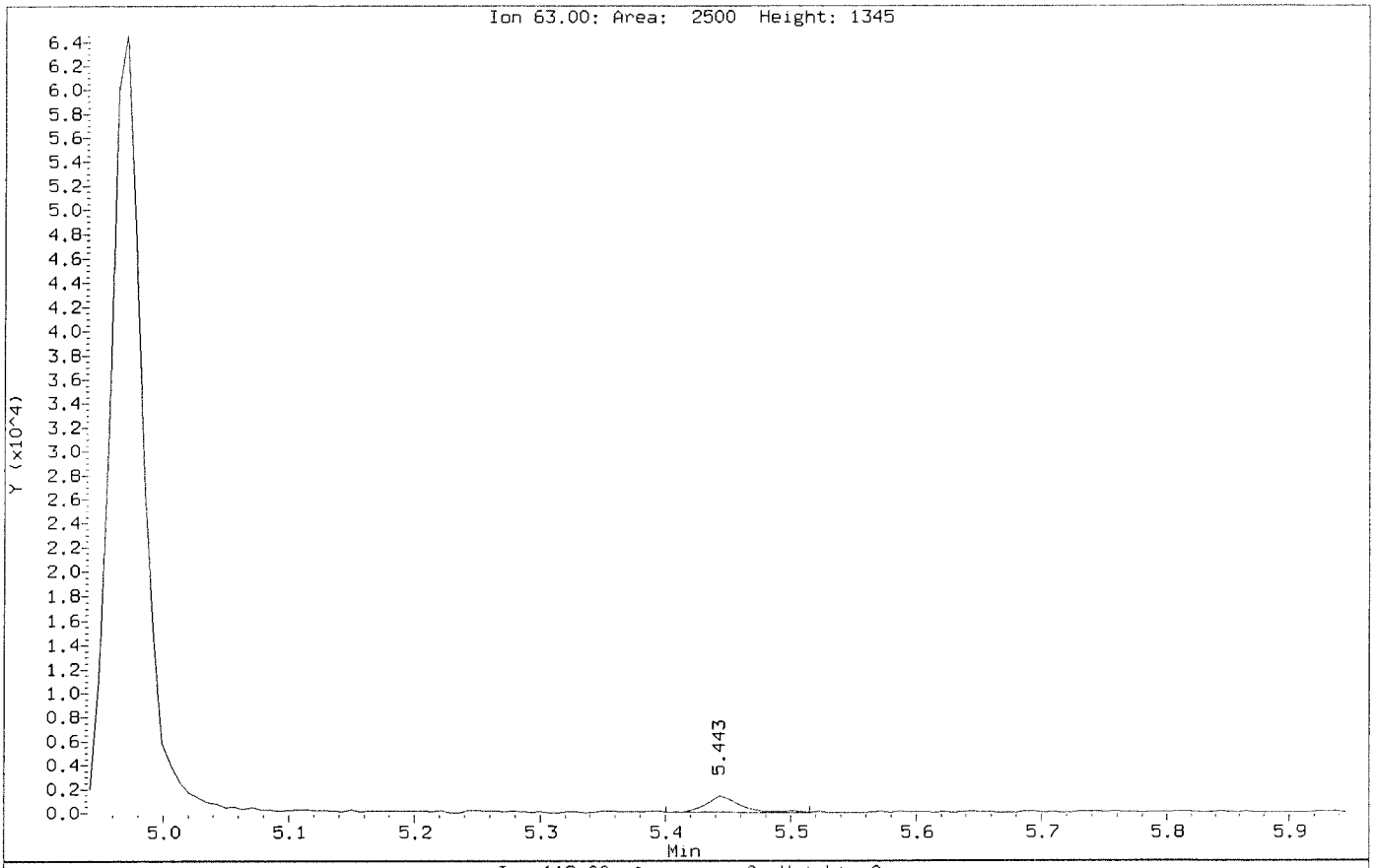
Compound: 1,2-Dichloropropane
CAS Number: 78-87-5

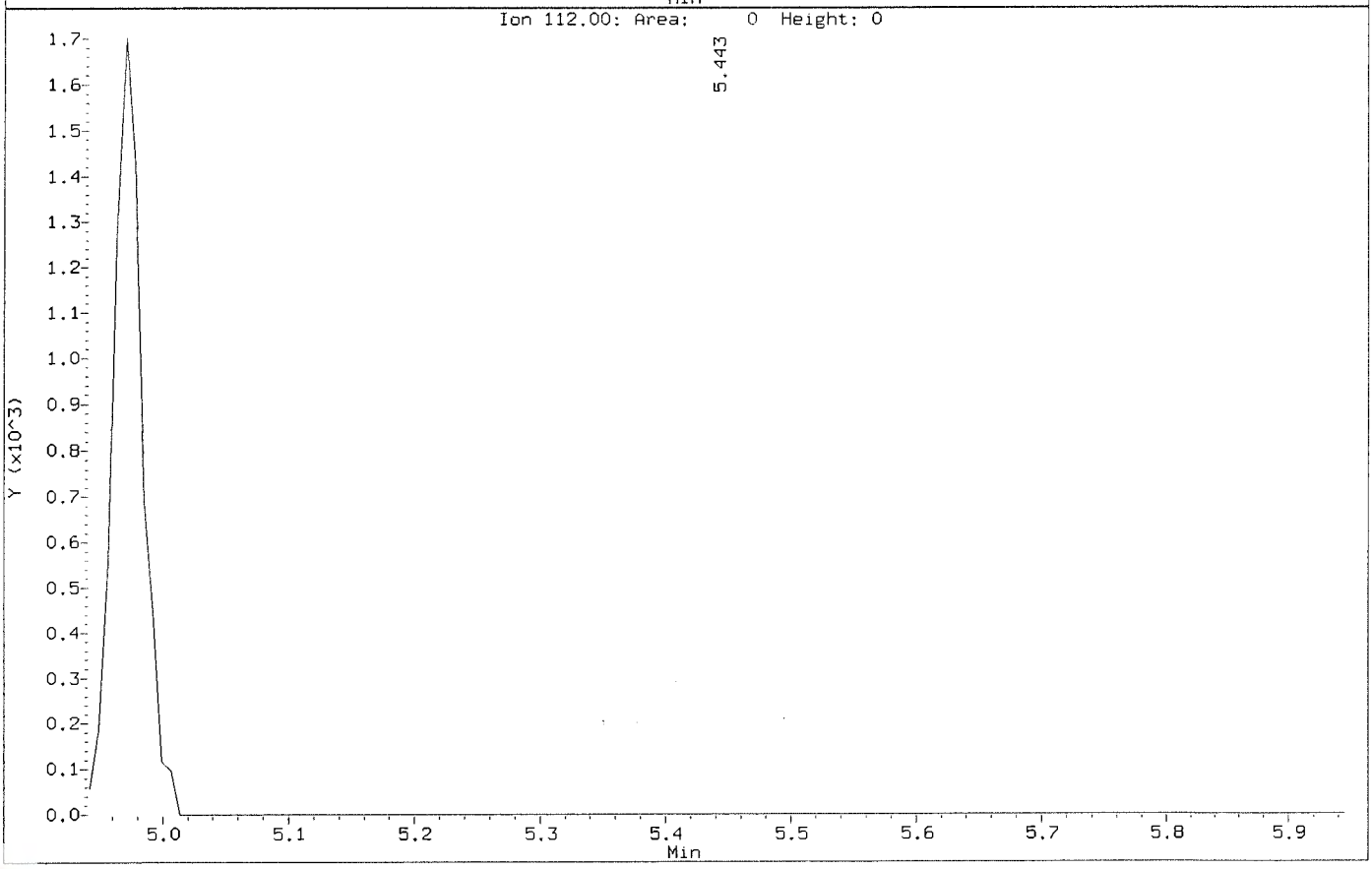




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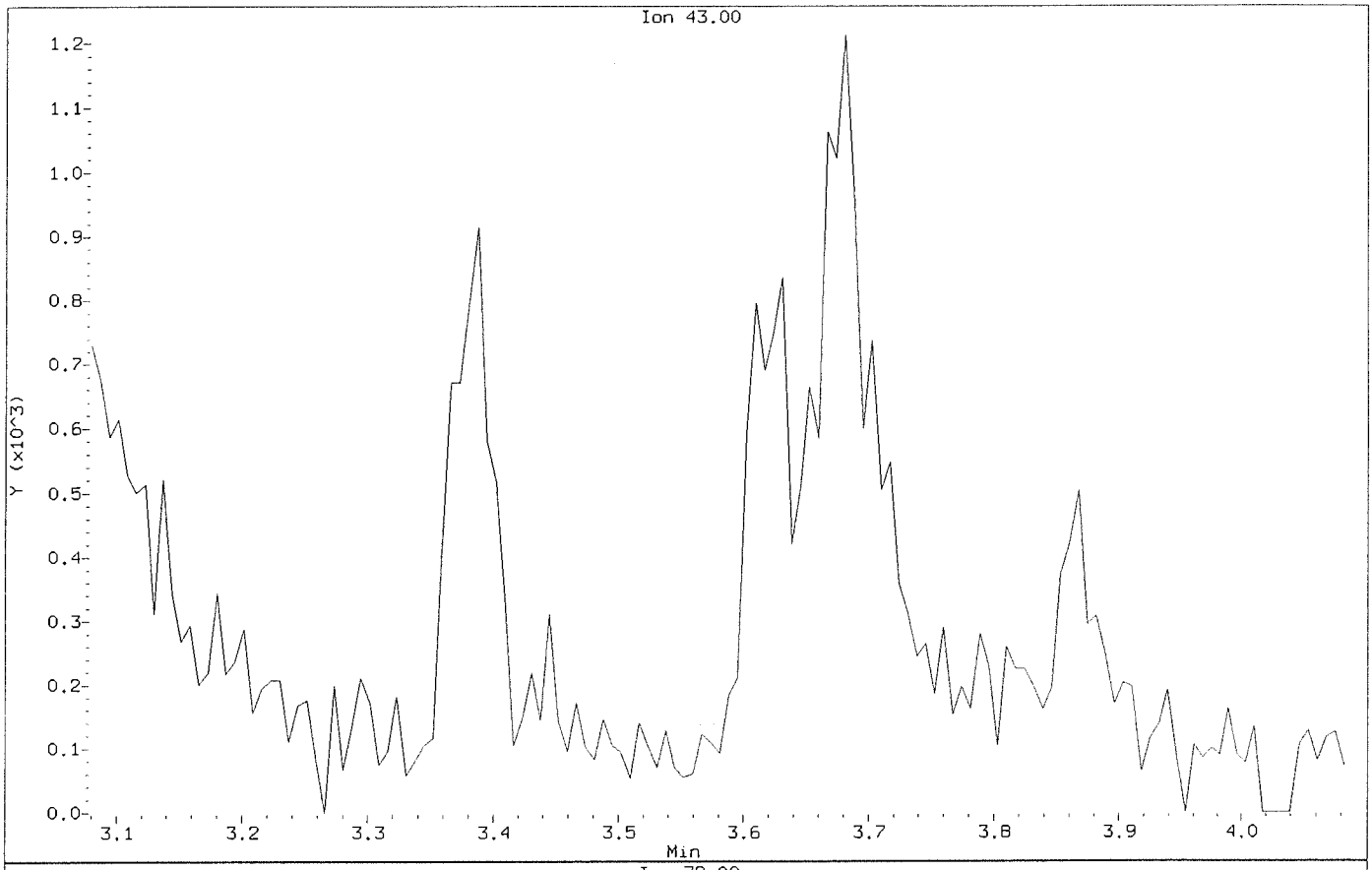
Compound: 1,2-Dichloropropane
CAS Number: 78-87-5

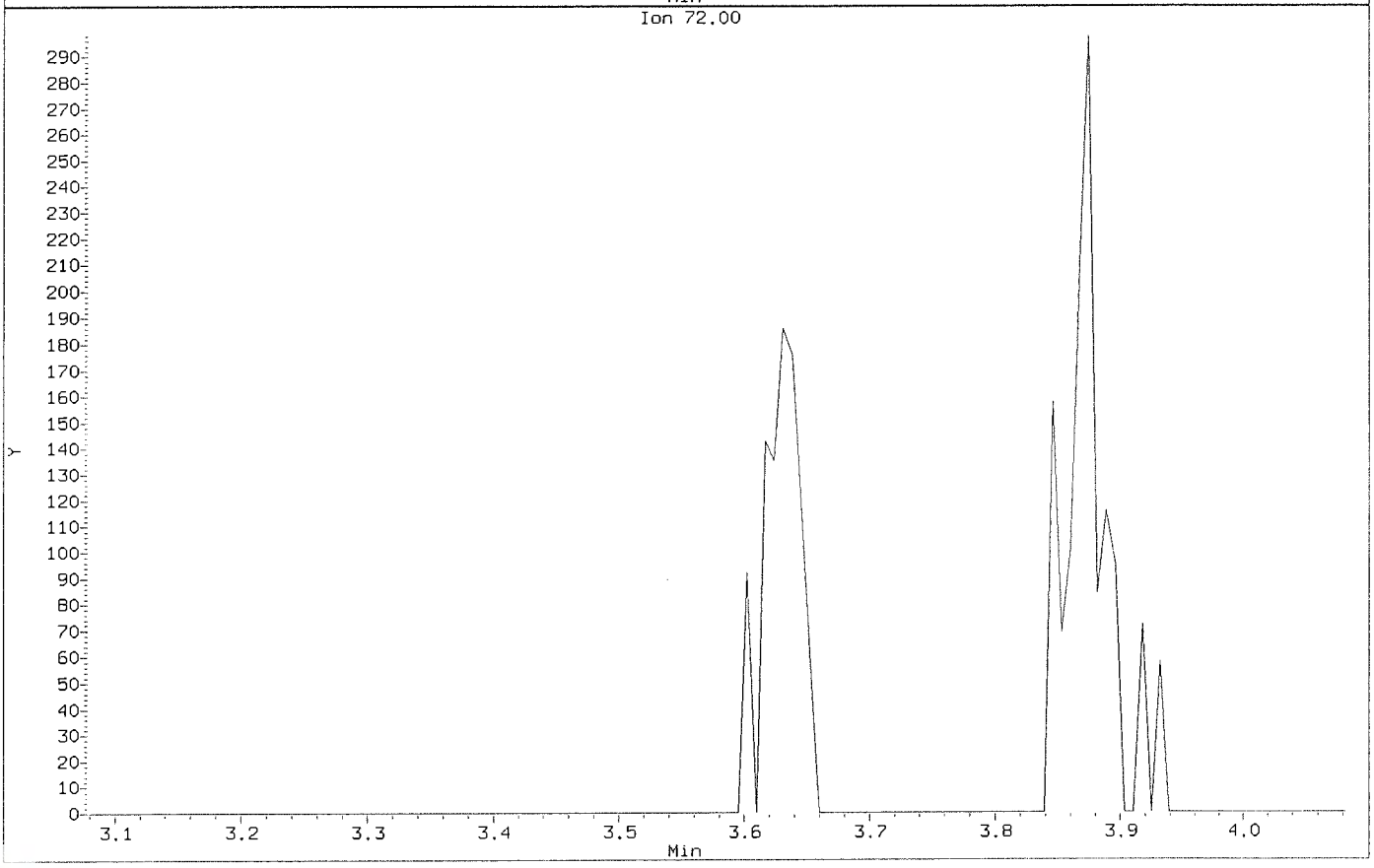




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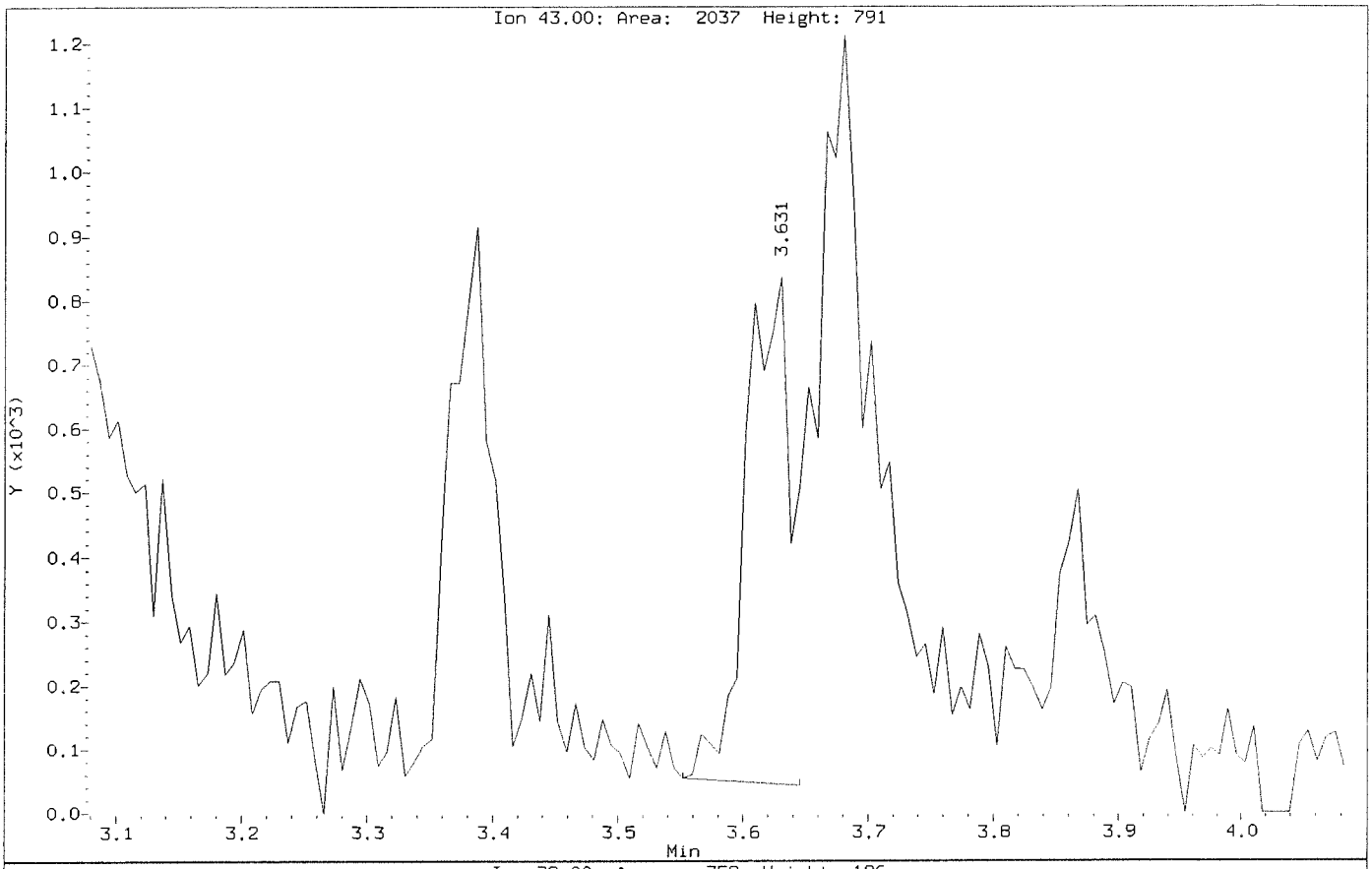
Compound: 2-Butanone
CAS Number: 78-93-3

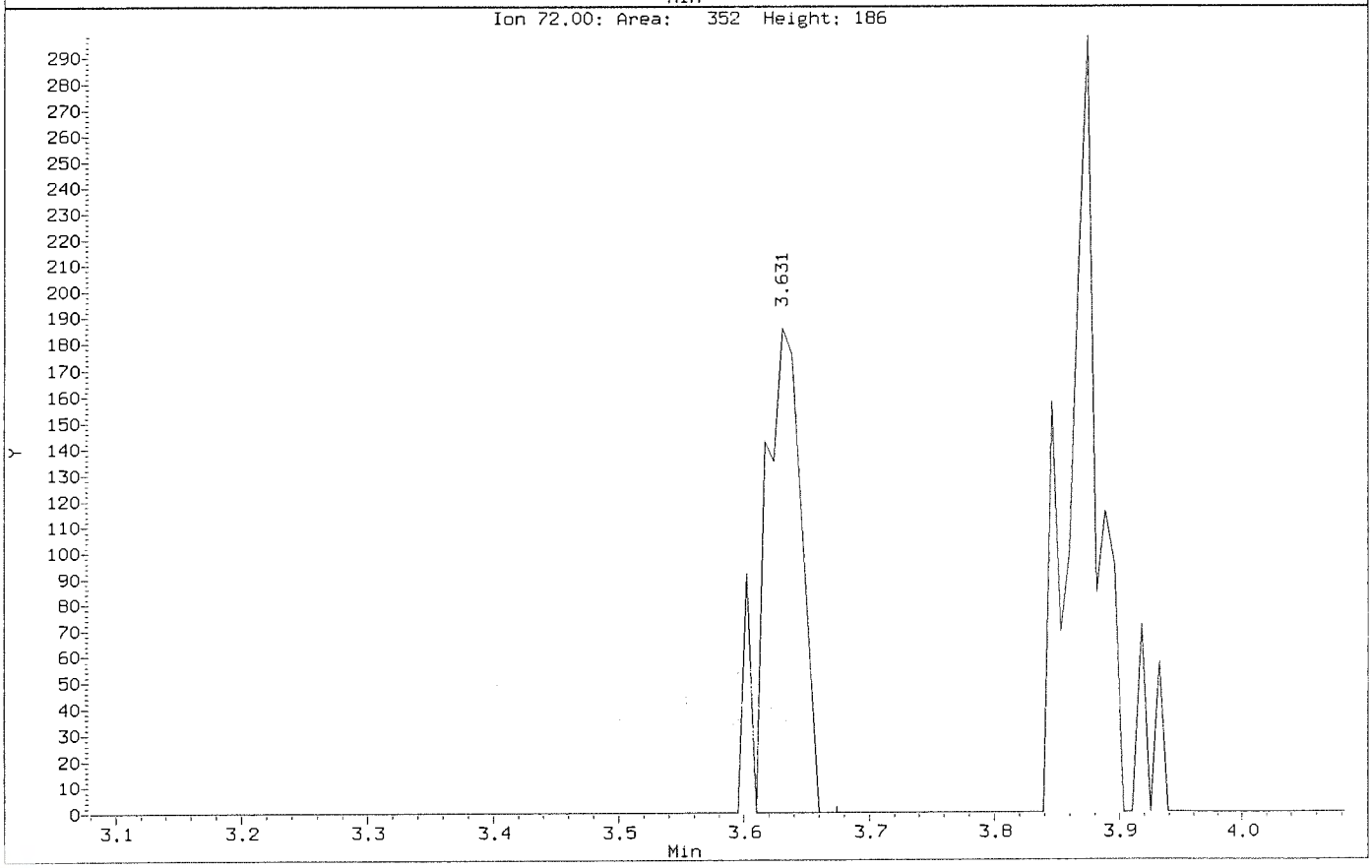




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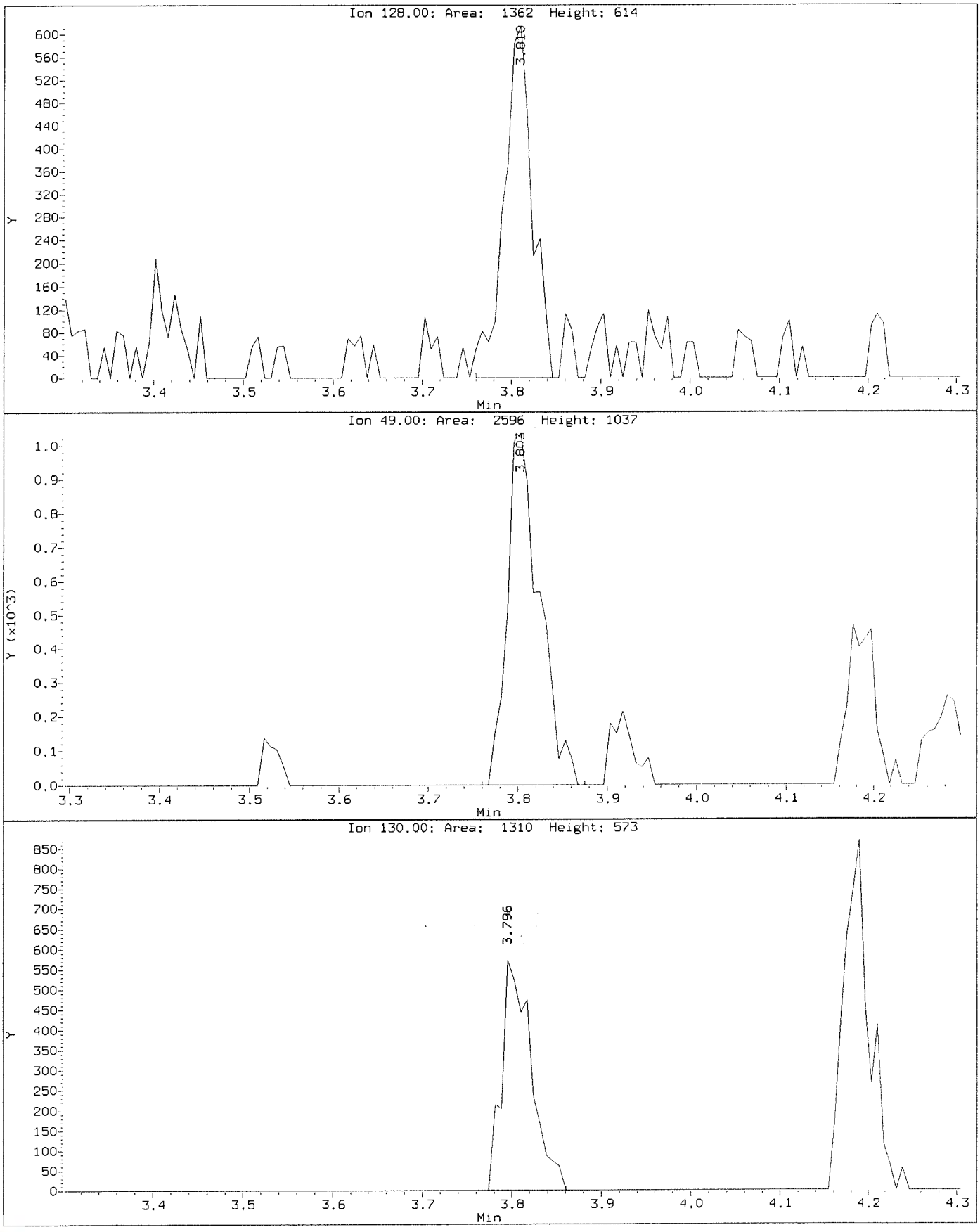
Compound: 2-Butanone
CAS Number: 78-93-3





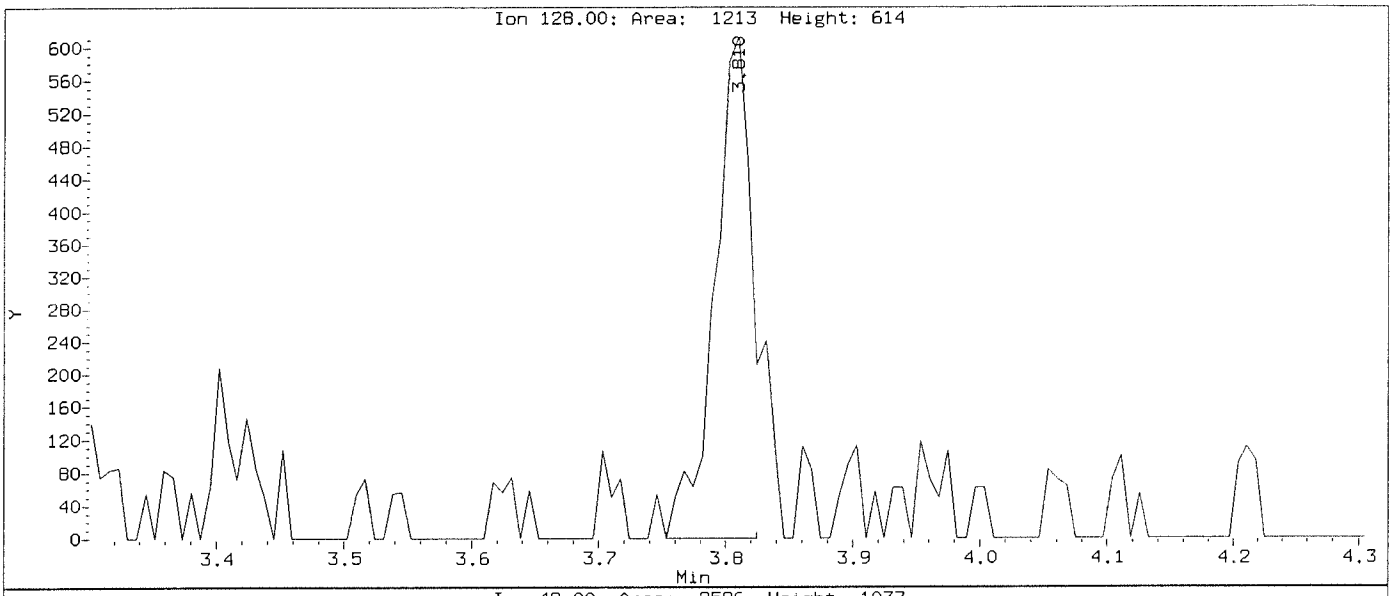
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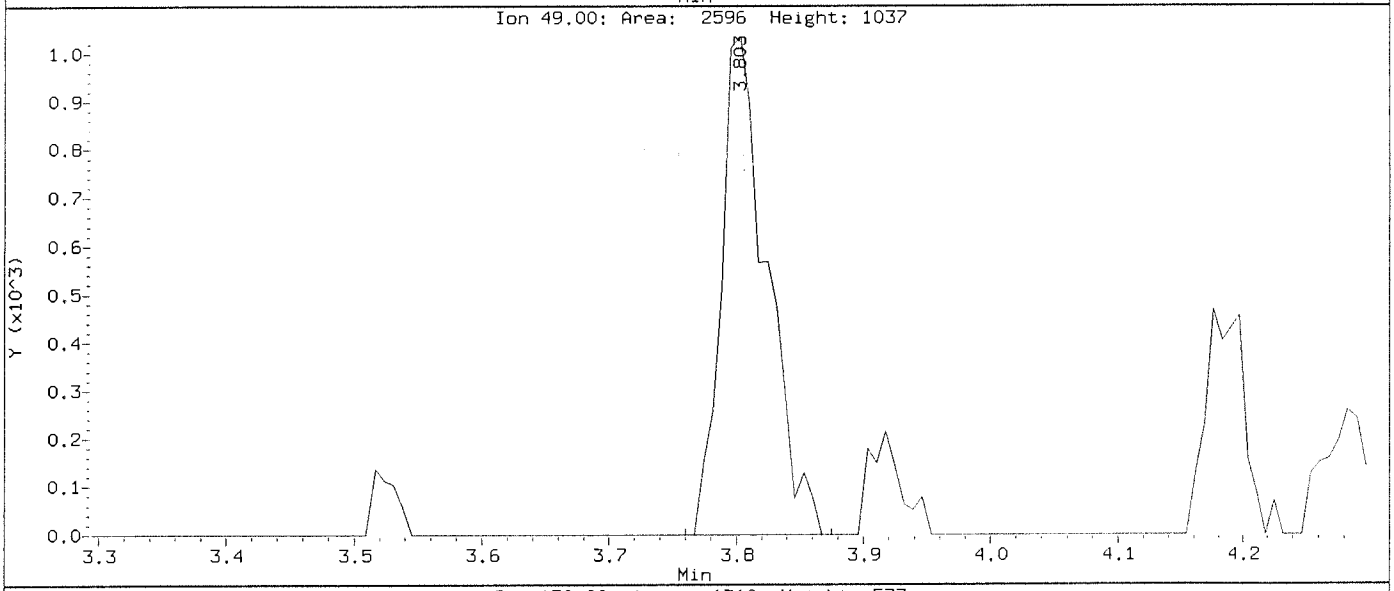
Compound: Bromochloromethane
CAS Number: 74-97-5

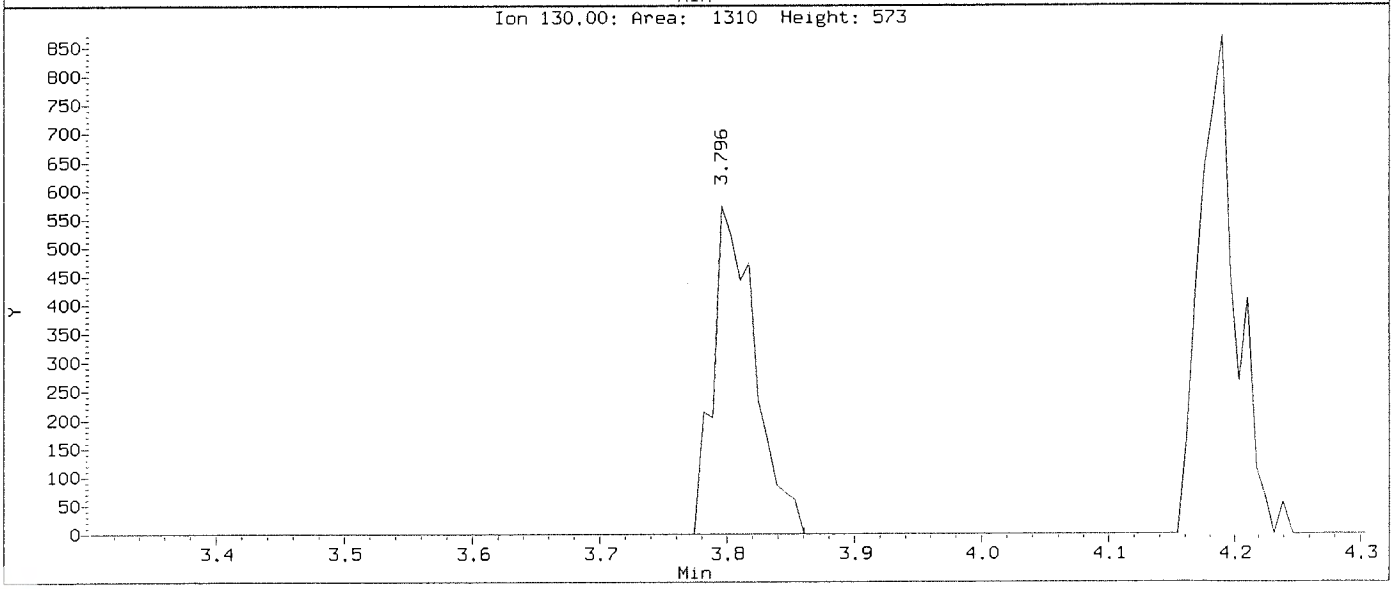


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Instrument: voa6.i
Client Sample ID: VSTD000.5

Compound: Bromochloromethane
CAS Number: 74-97-5

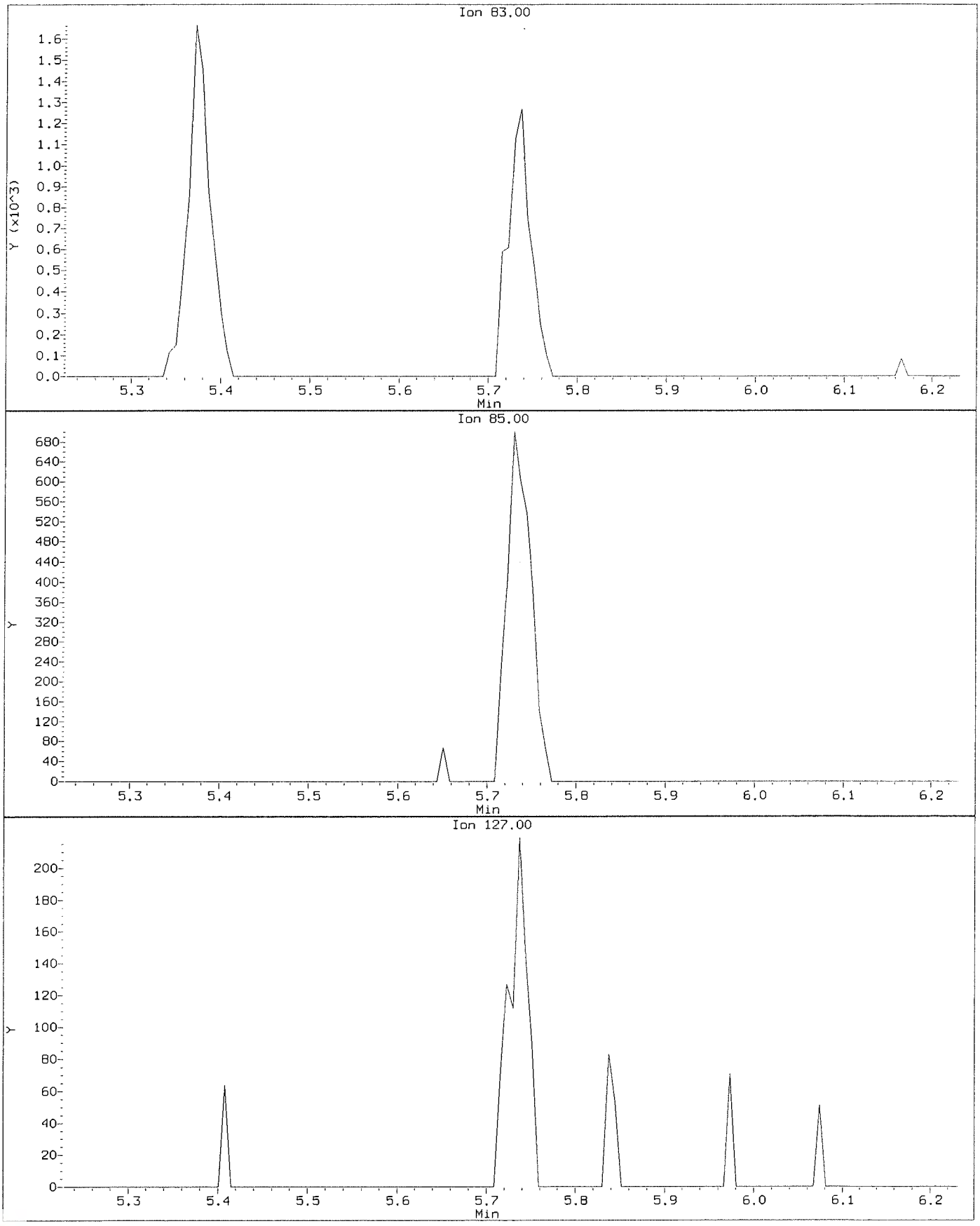






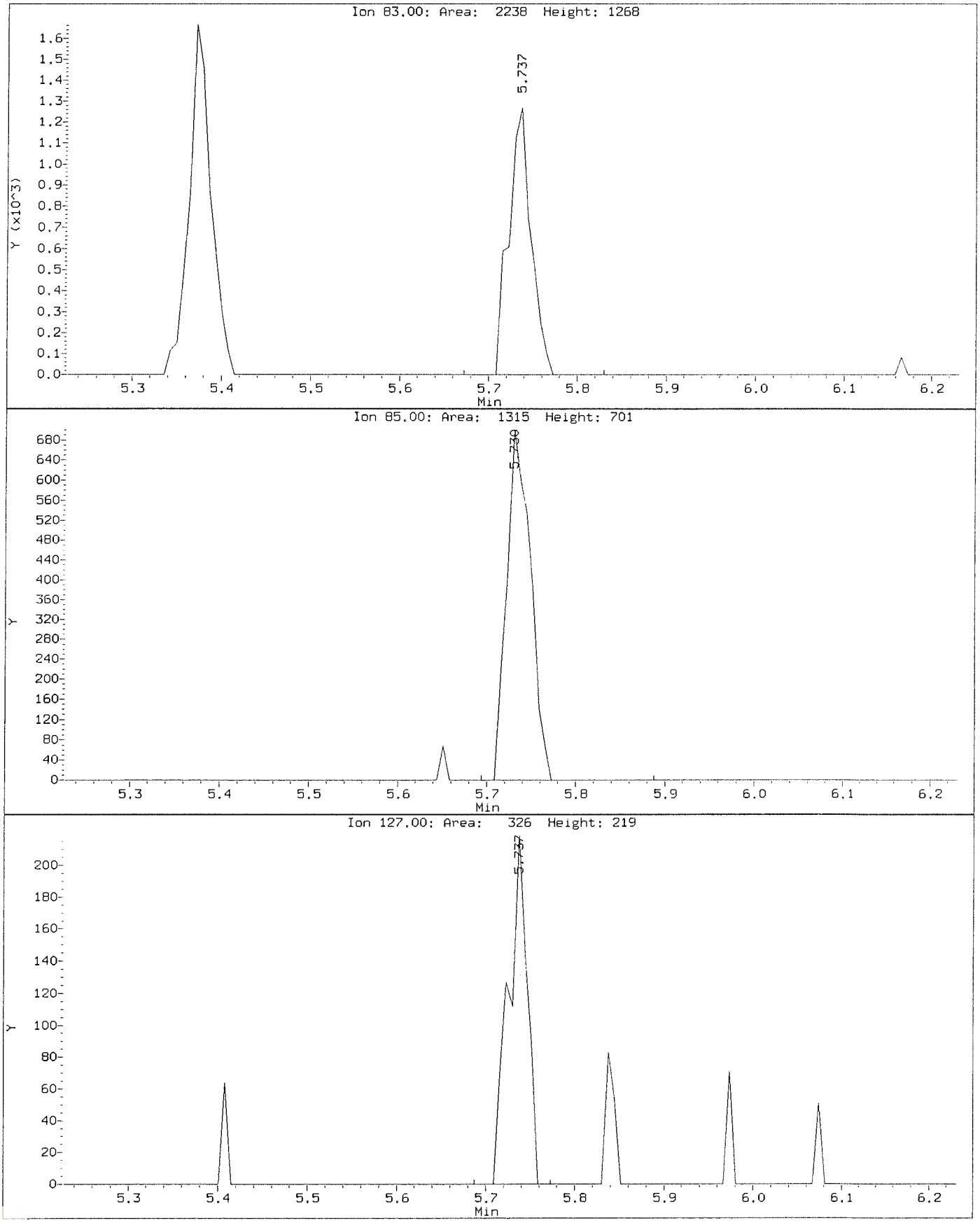
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Instrument: voa6.i
Client Sample ID: VSTD000.5

Compound: Bromodichloromethane
CAS Number: 75-27-4



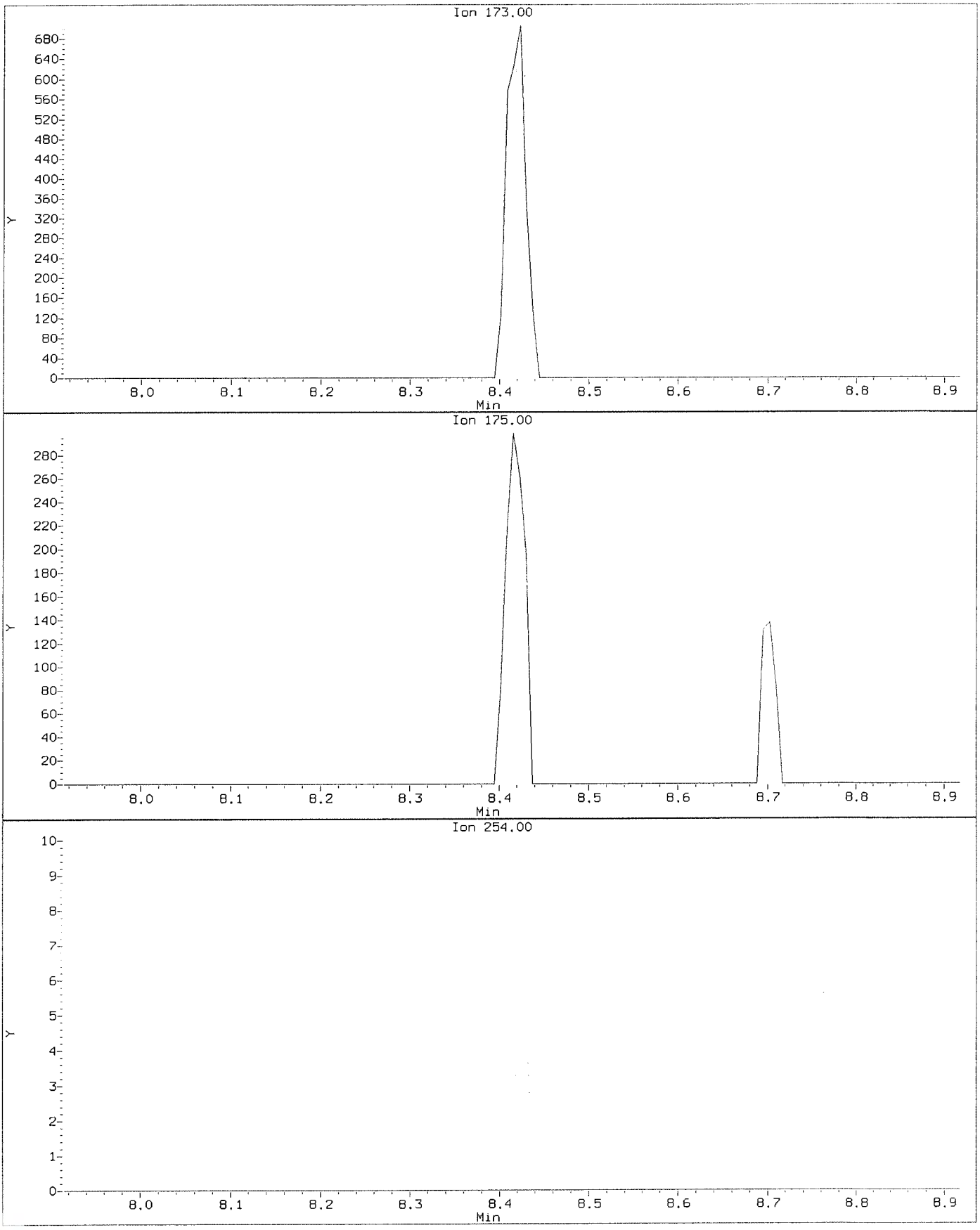
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Instrument: voa6.i
Client Sample ID: VSTD000.5

Compound: Bromodichloromethane
CAS Number: 75-27-4



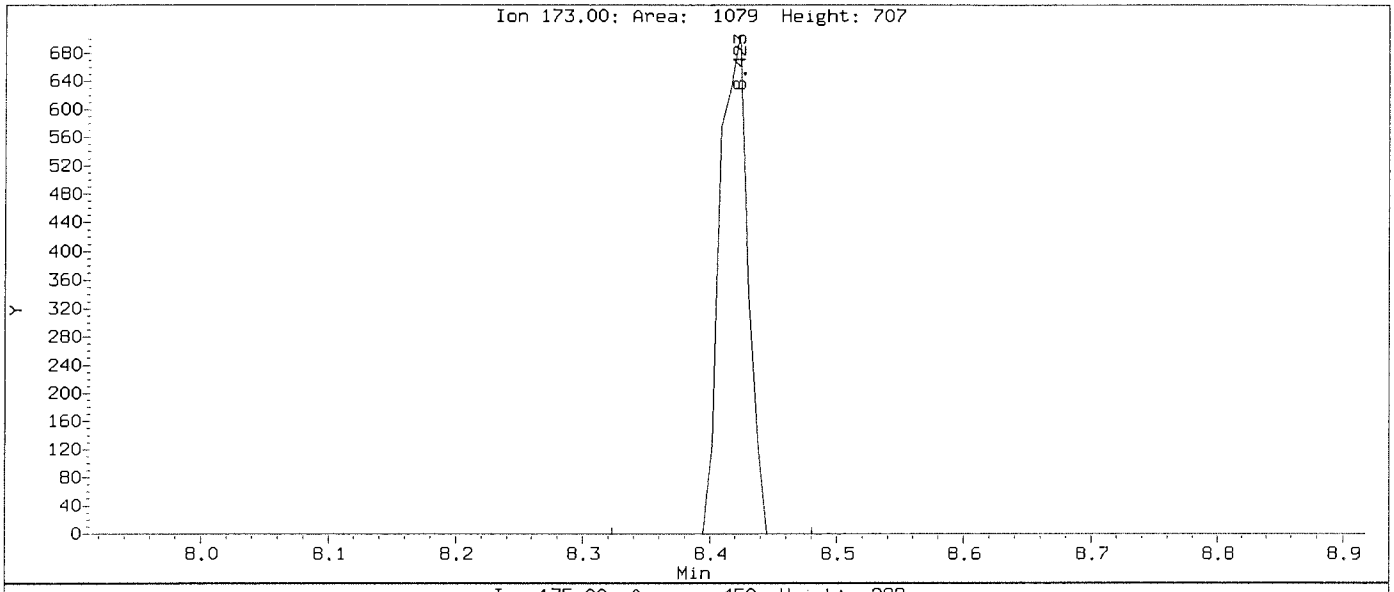
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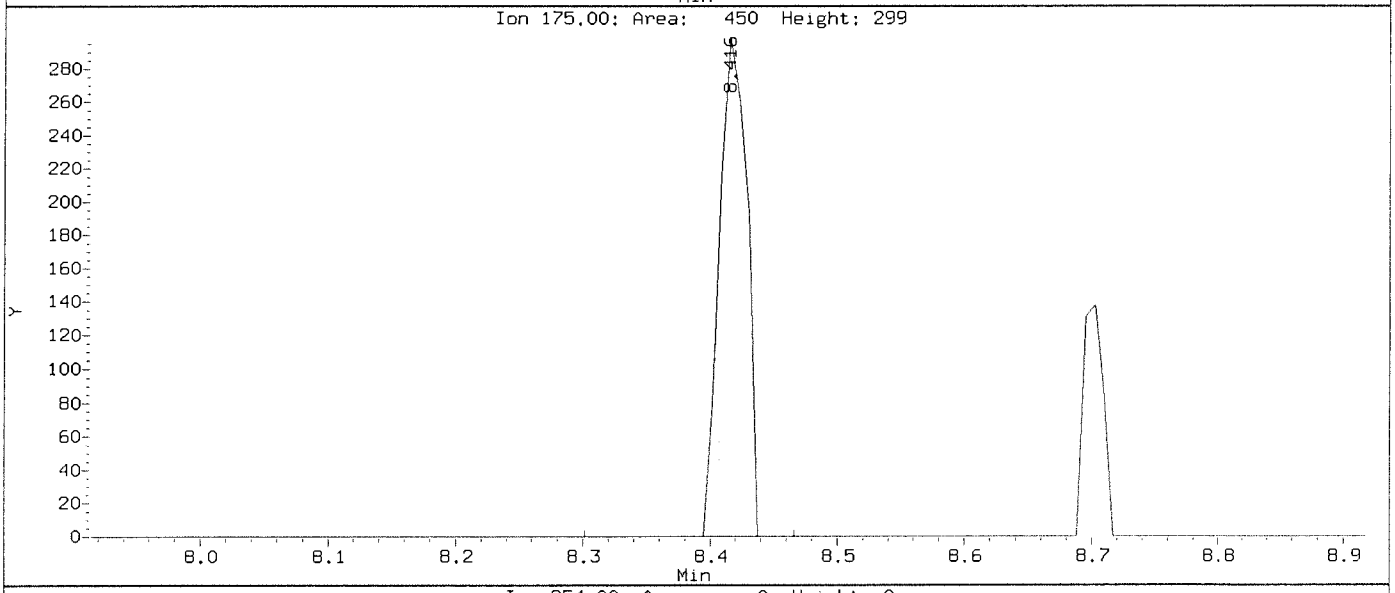
Compound: Bromoform
CAS Number: 75-25-2

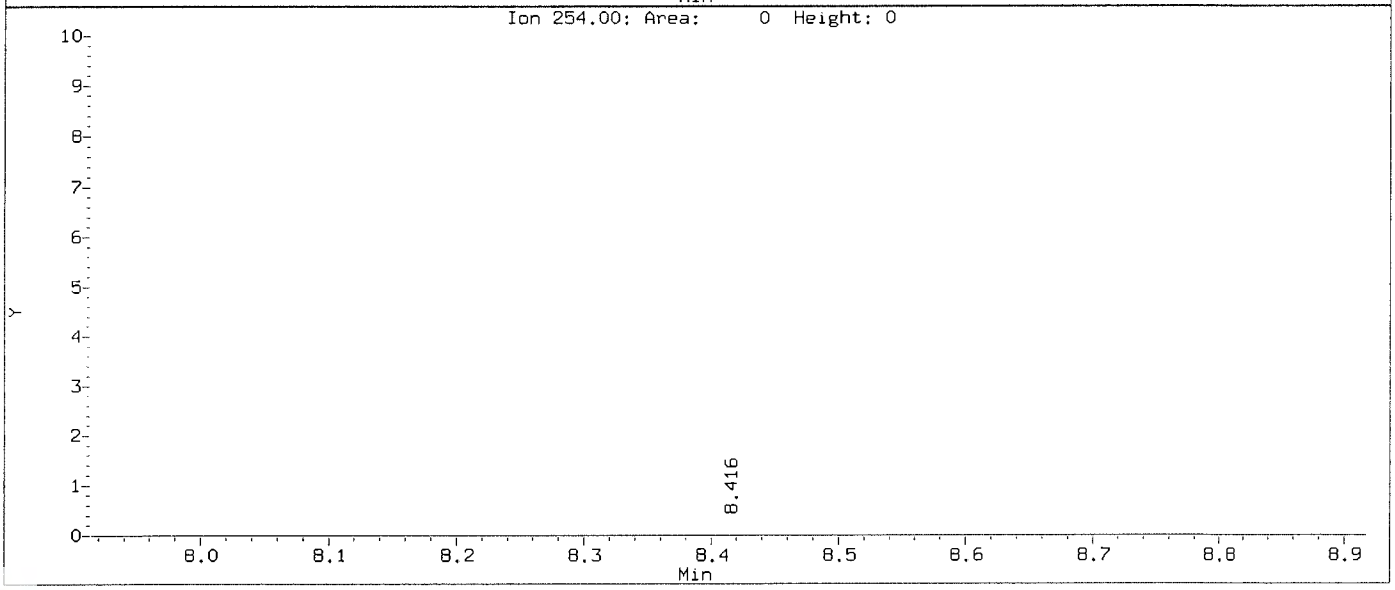


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Instrument: voa6.i
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Compound: Bromoform
CAS Number: 75-25-2

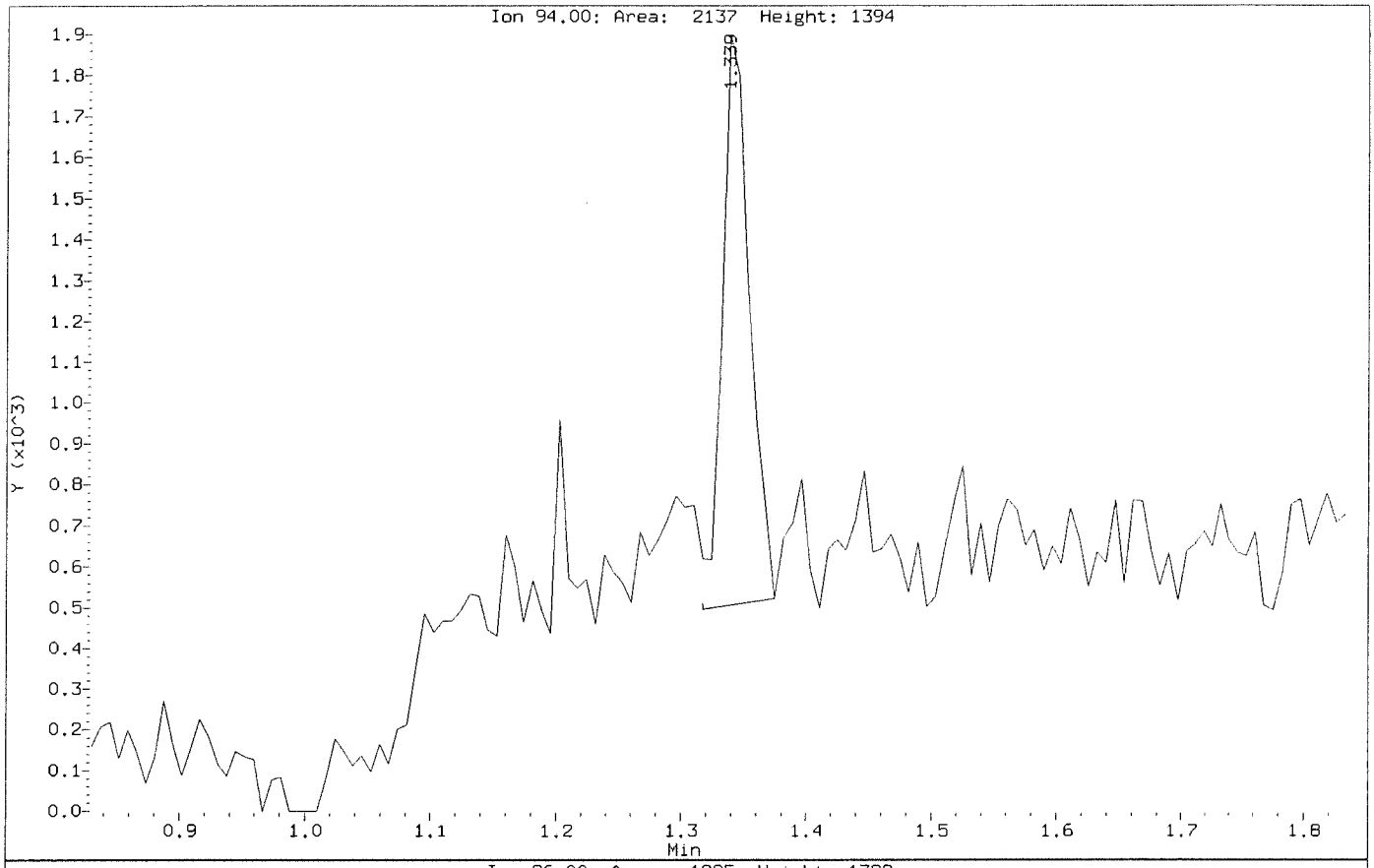


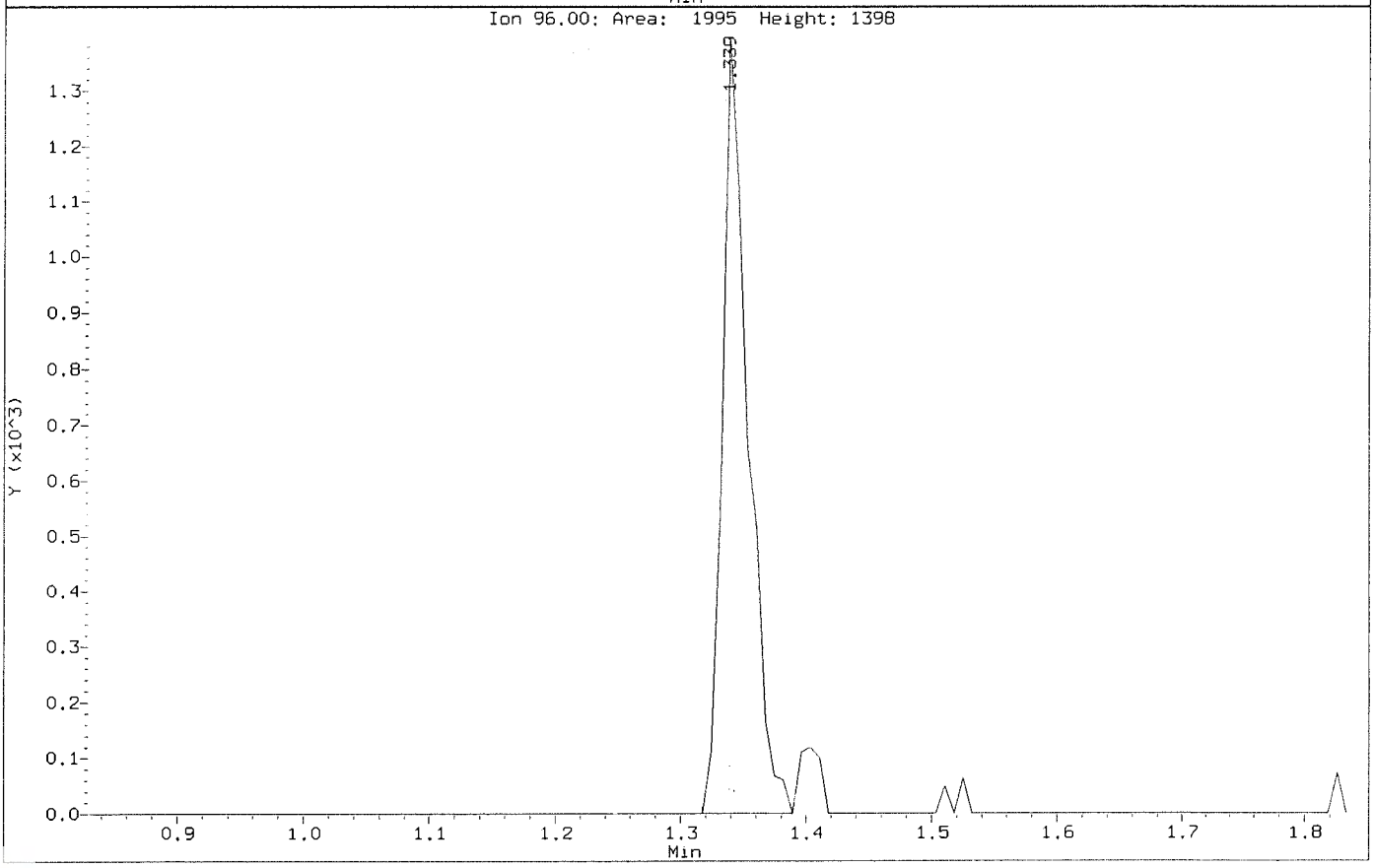




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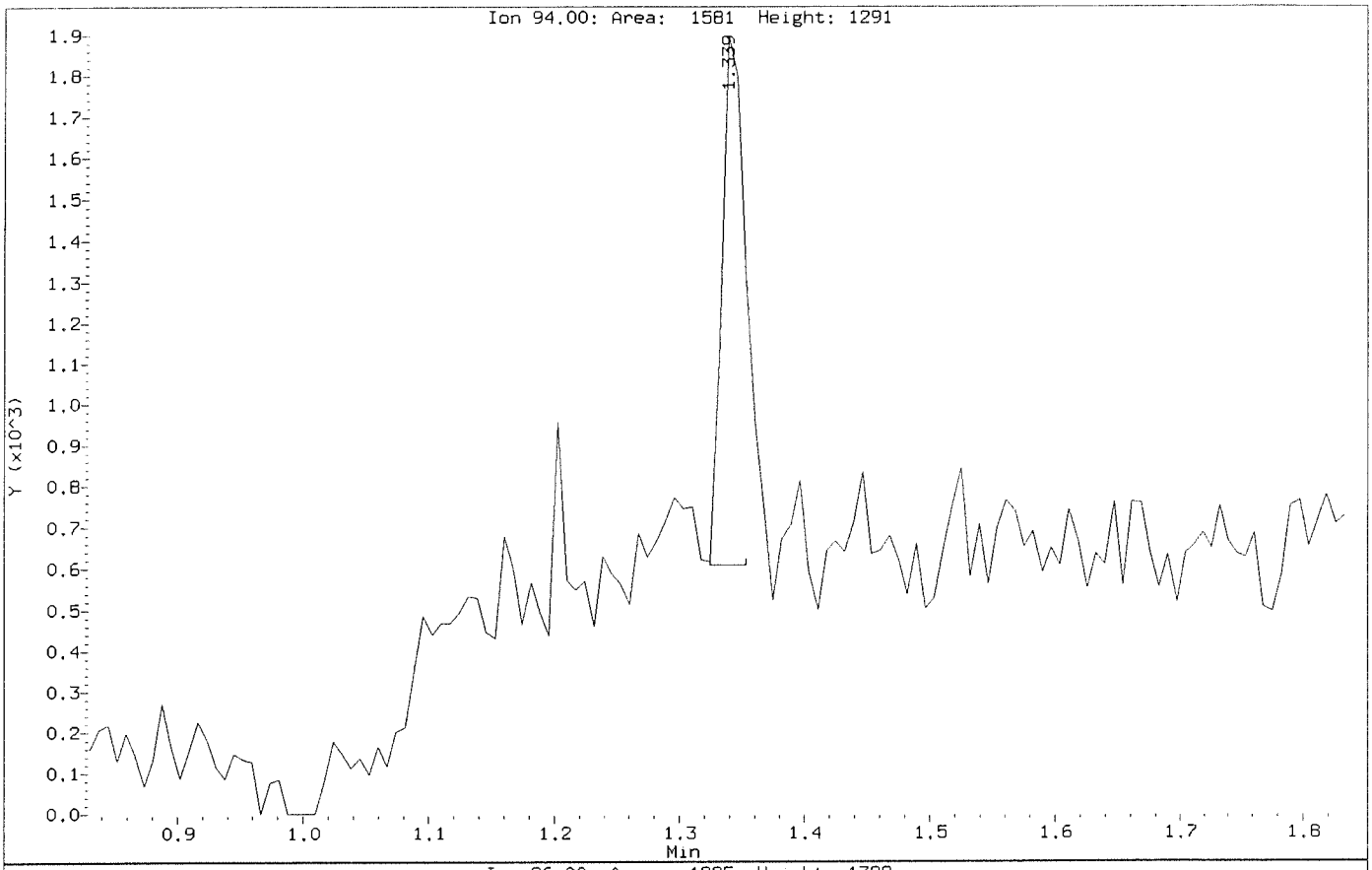
Compound: Bromomethane
CAS Number: 74-83-9

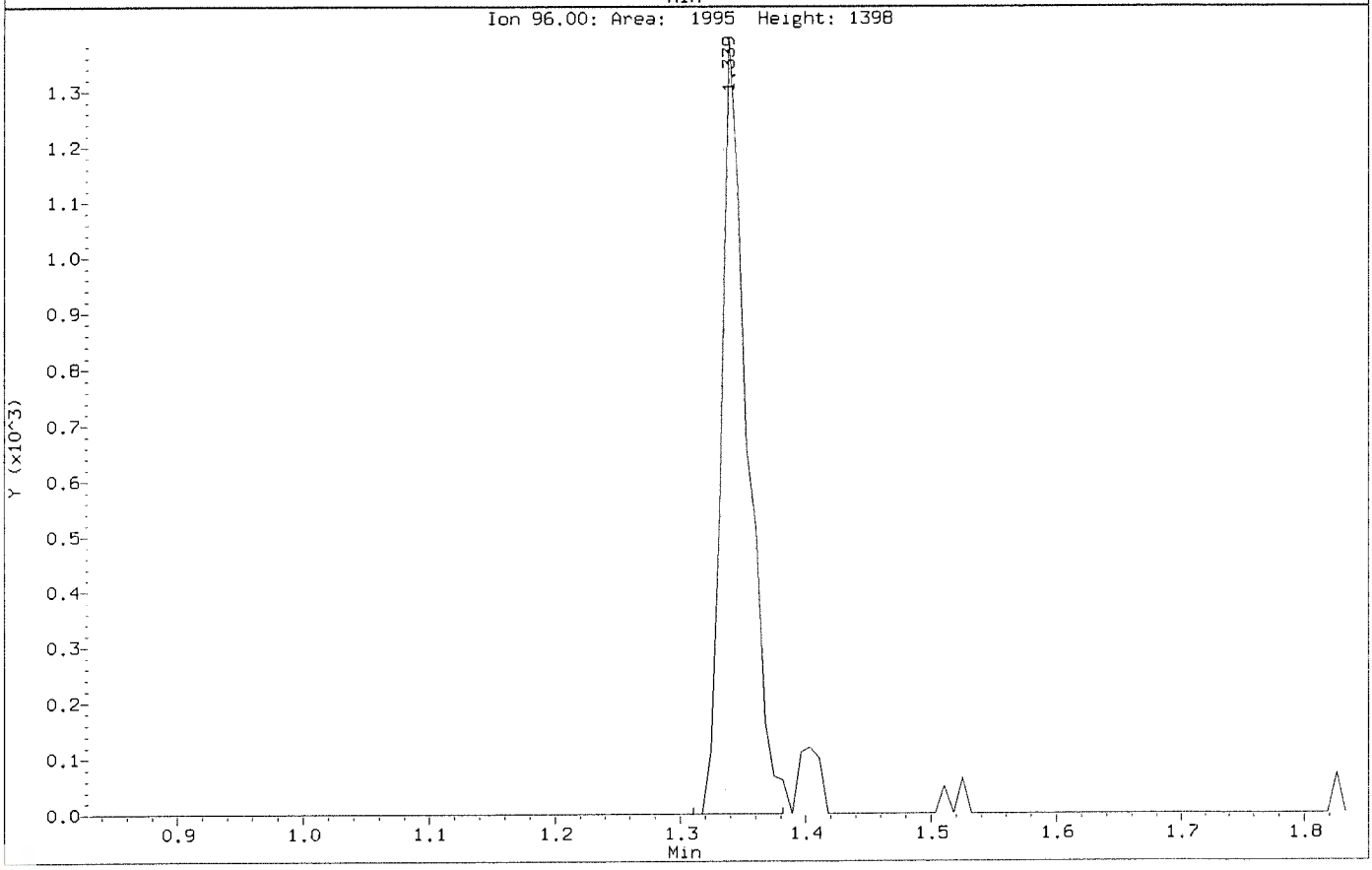




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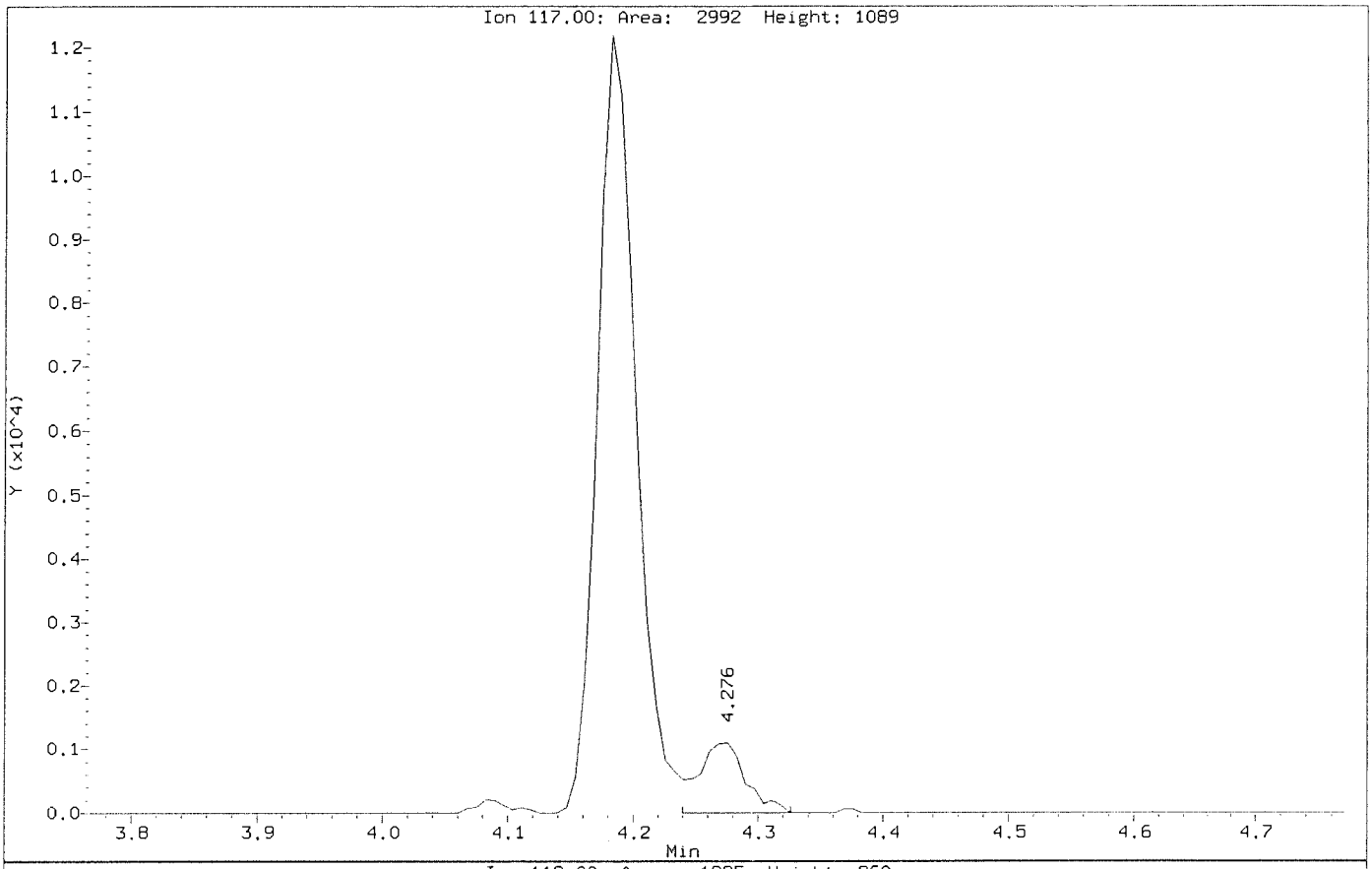
Compound: Bromomethane
CAS Number: 74-83-9

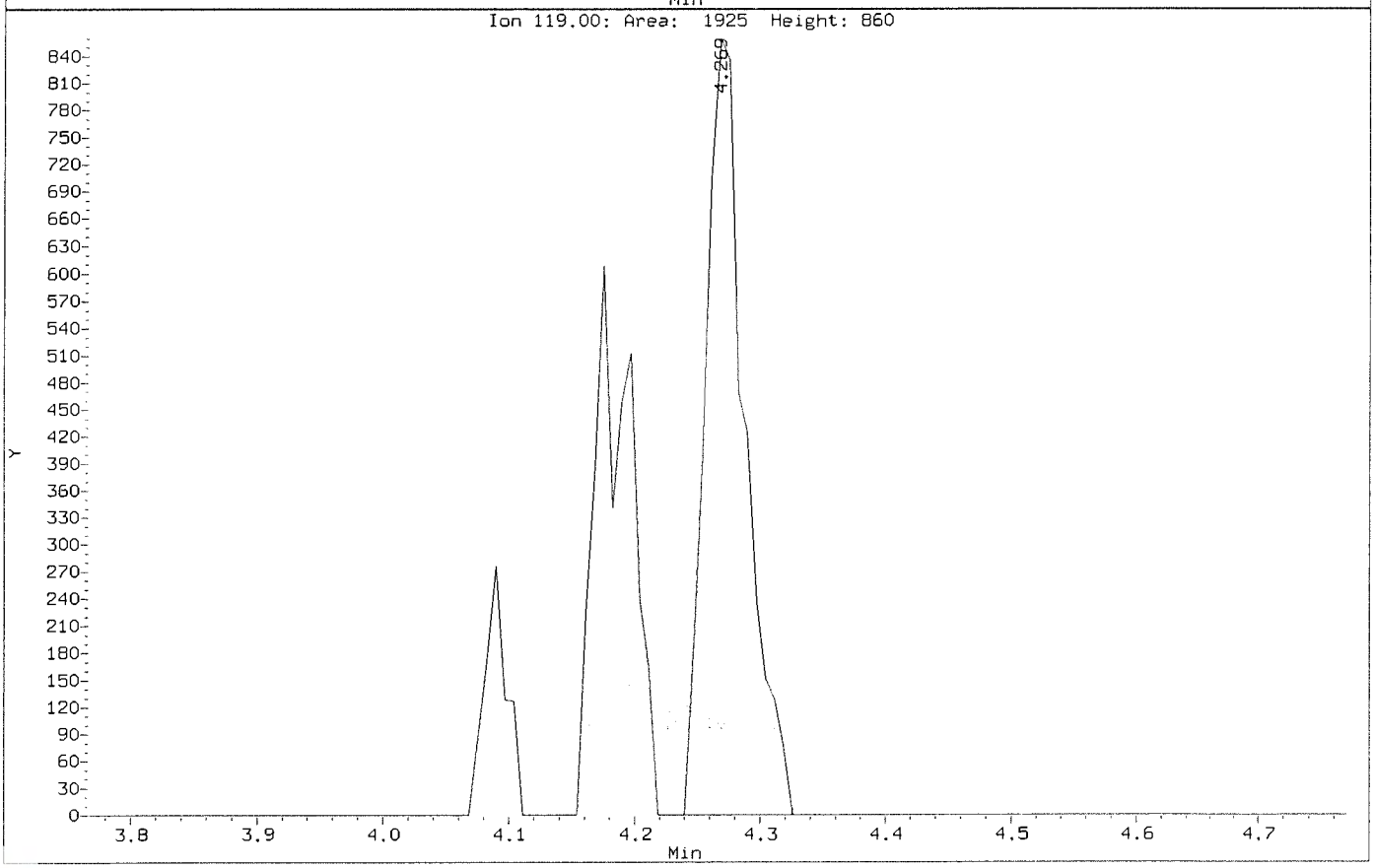




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Instrument: voa6.i
Client Sample ID: VSTD000.5

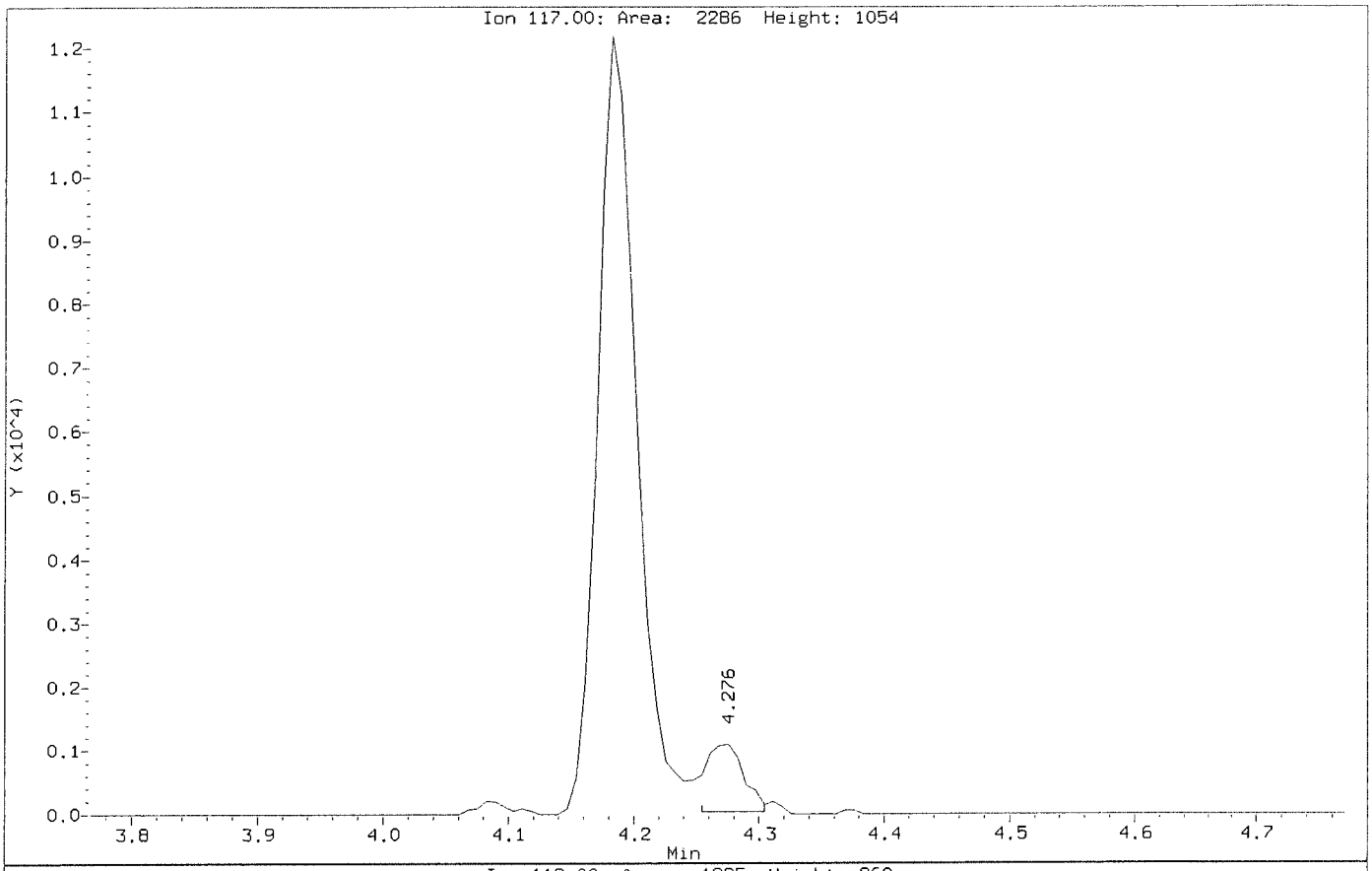
Compound: Carbon Tetrachloride
CAS Number: 56-23-5

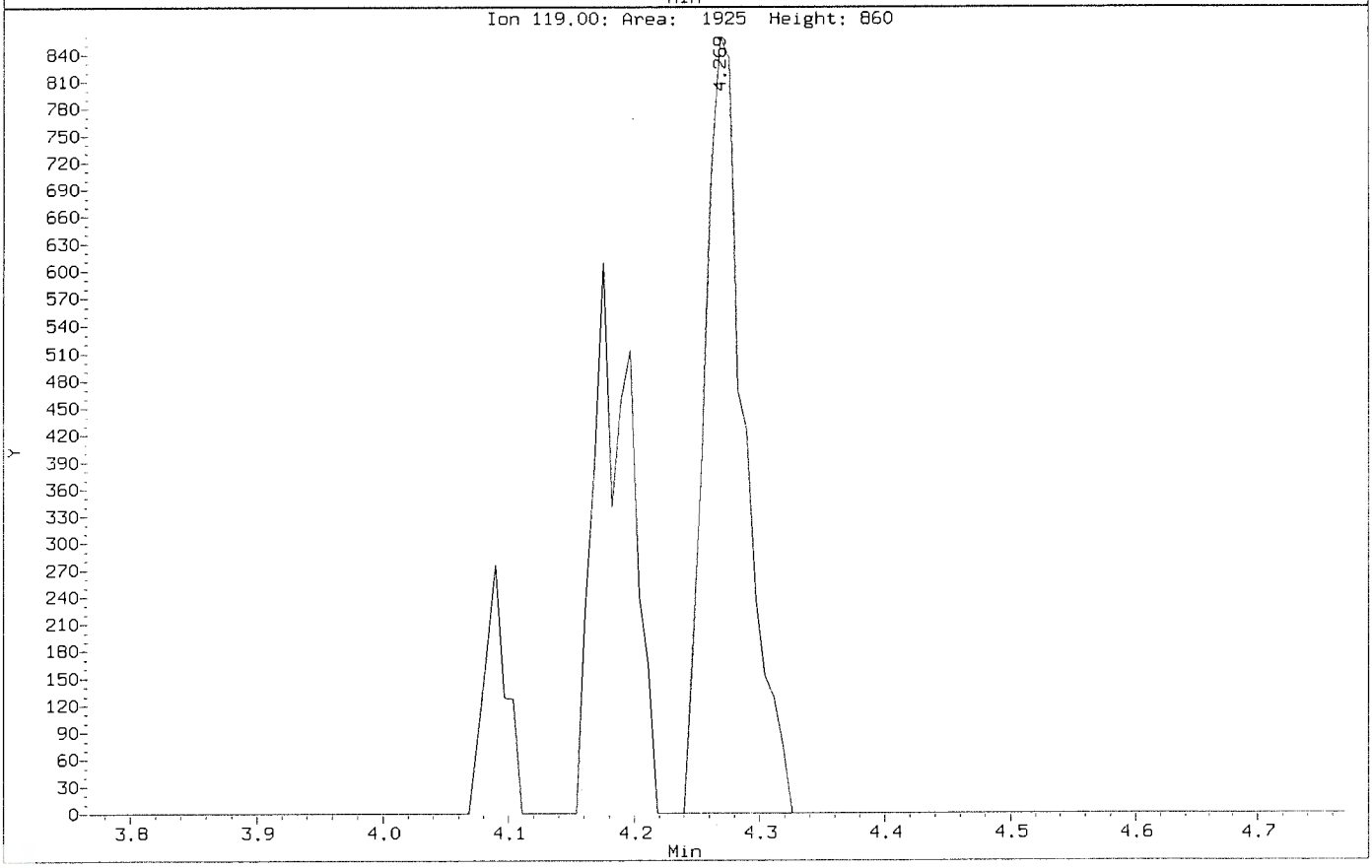




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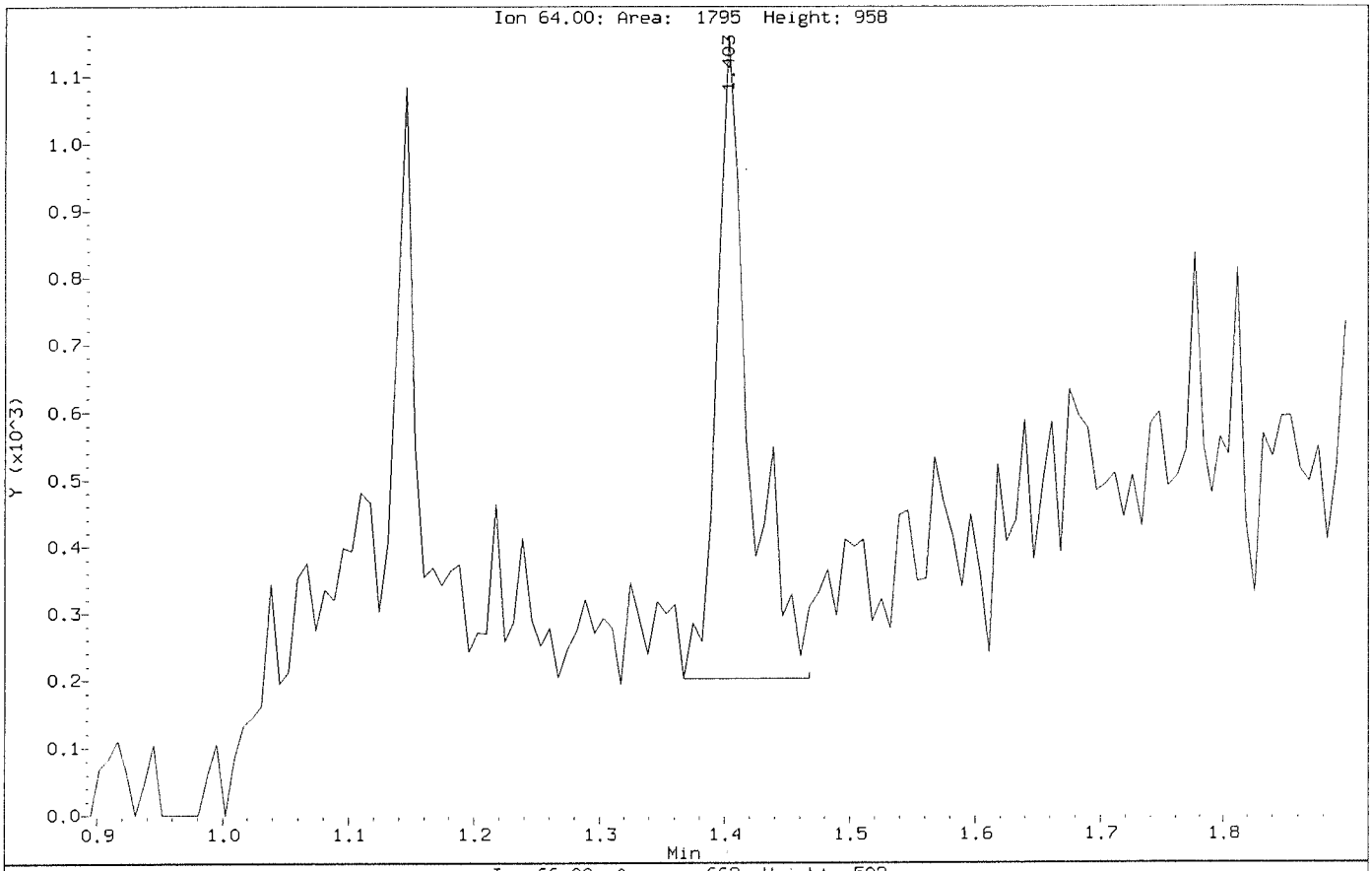
Compound: Carbon Tetrachloride
CAS Number: 56-23-5

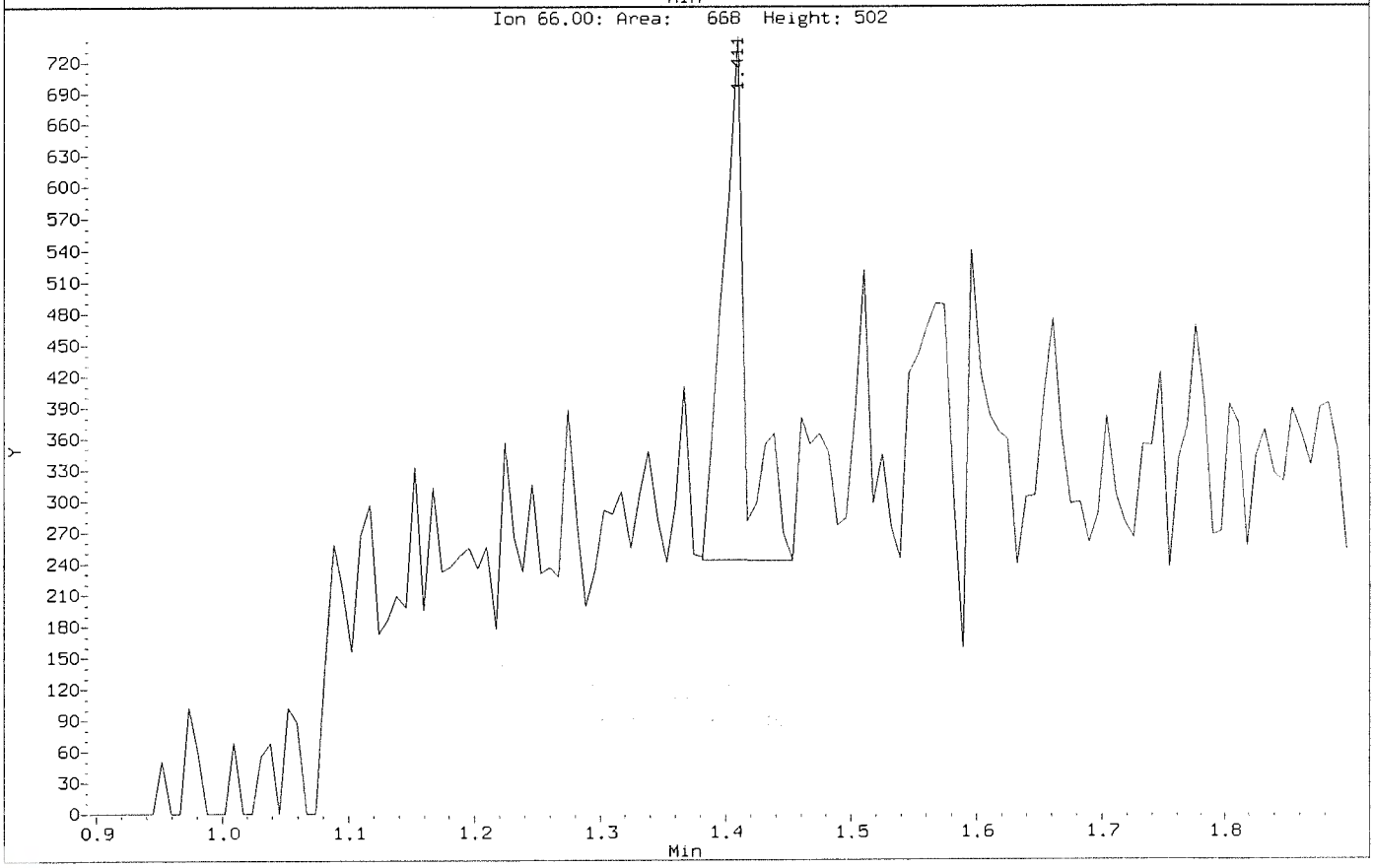




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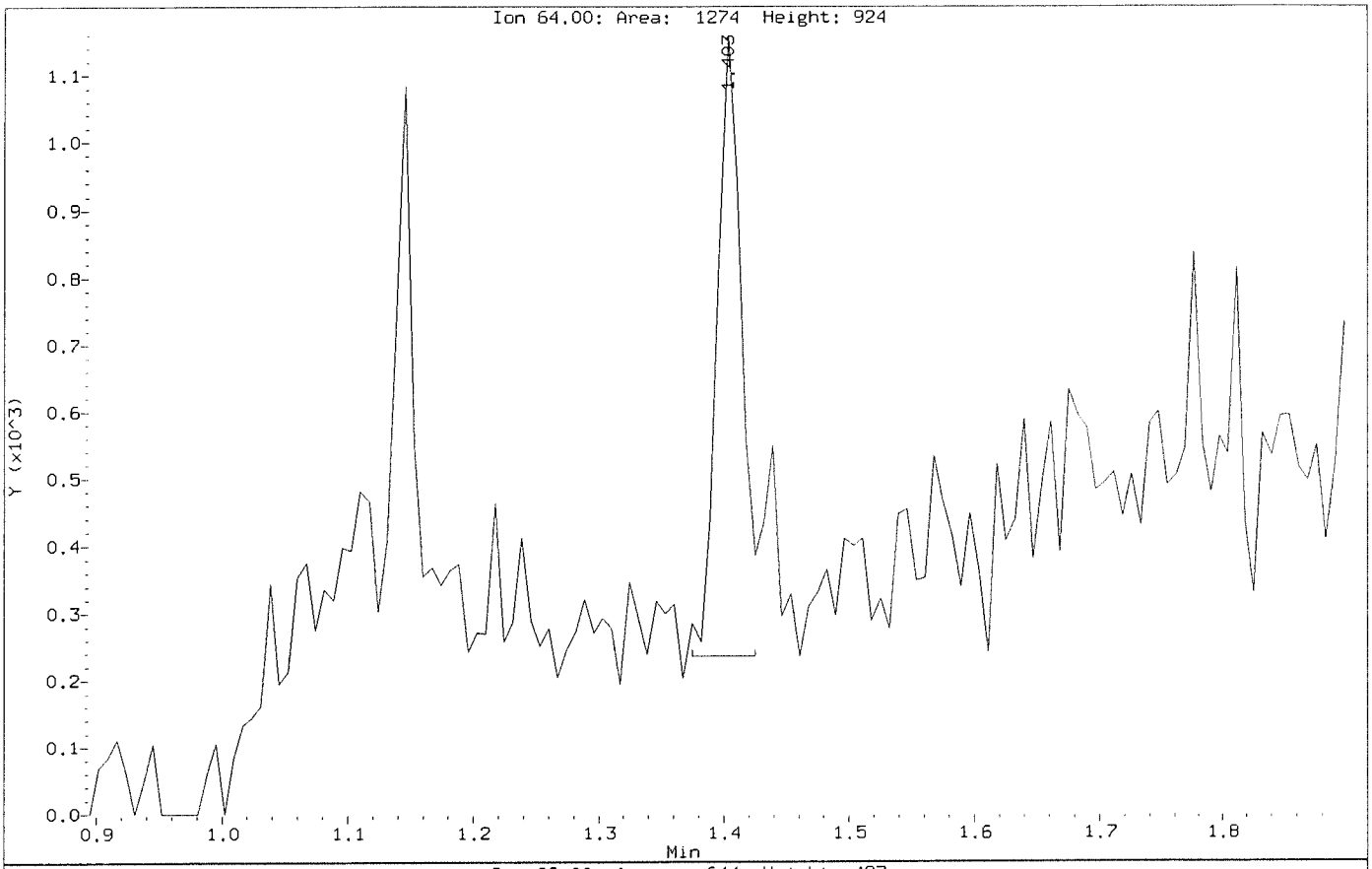
Compound: Chloroethane
CAS Number: 75-00-3

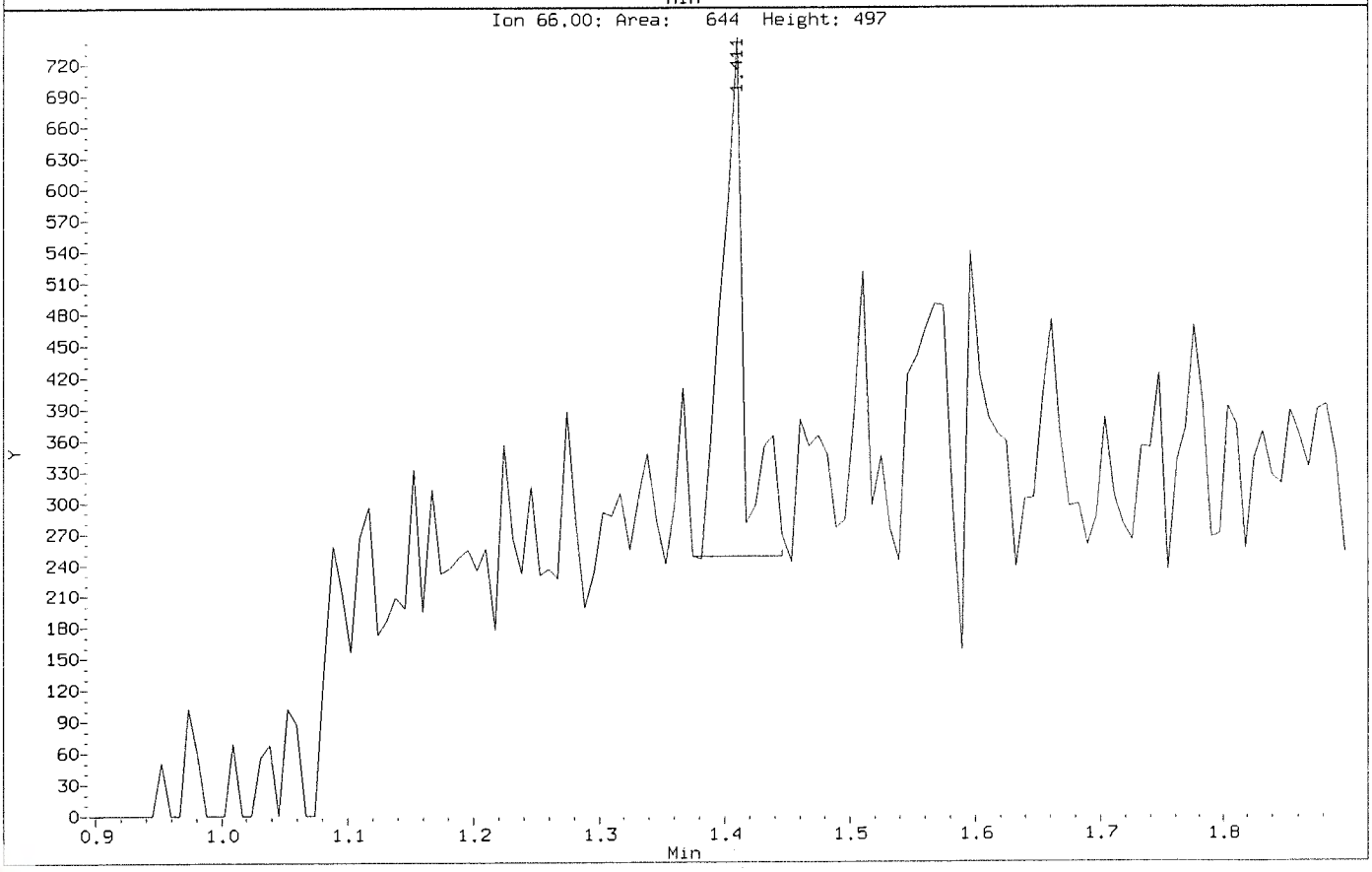




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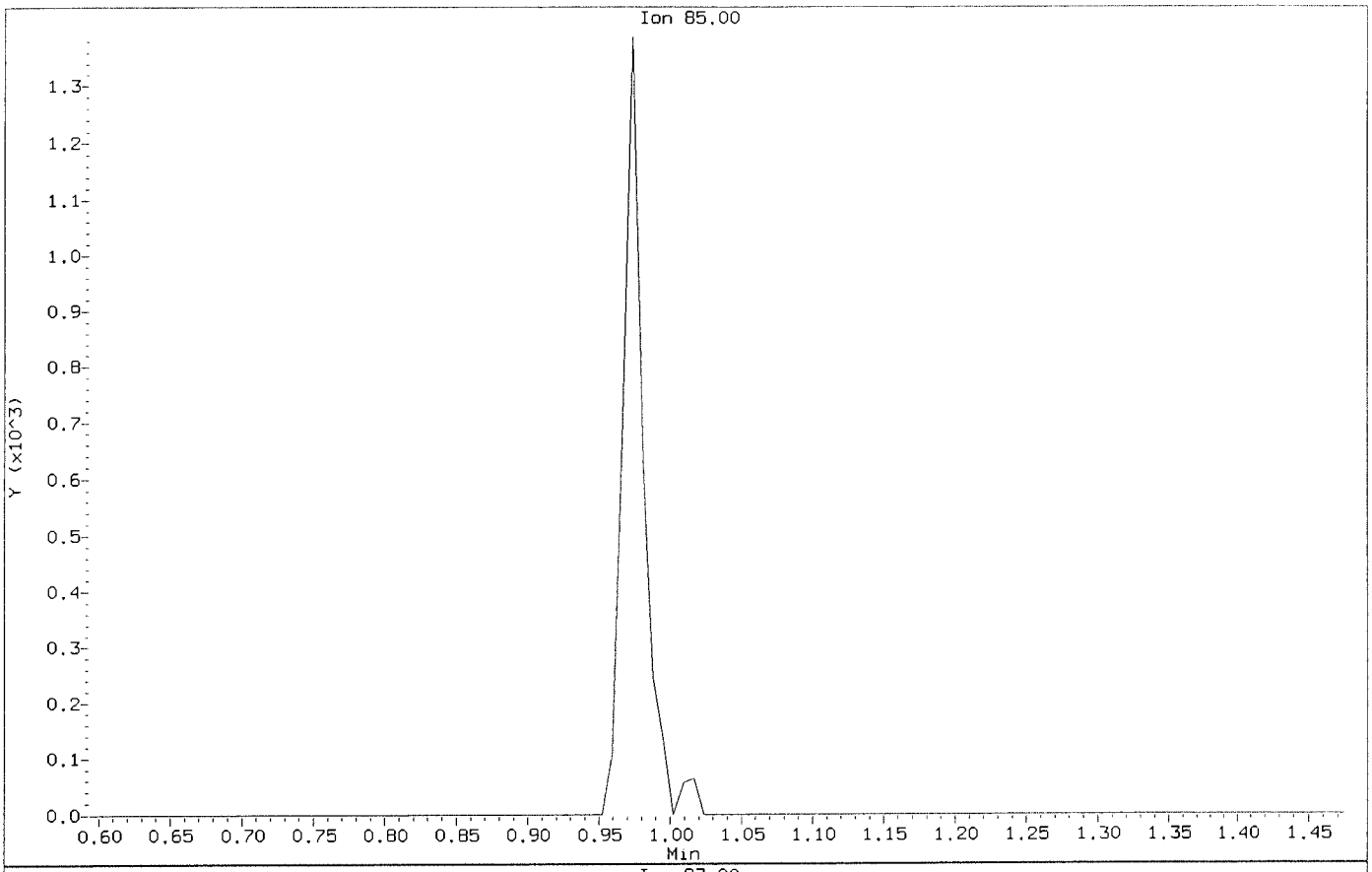
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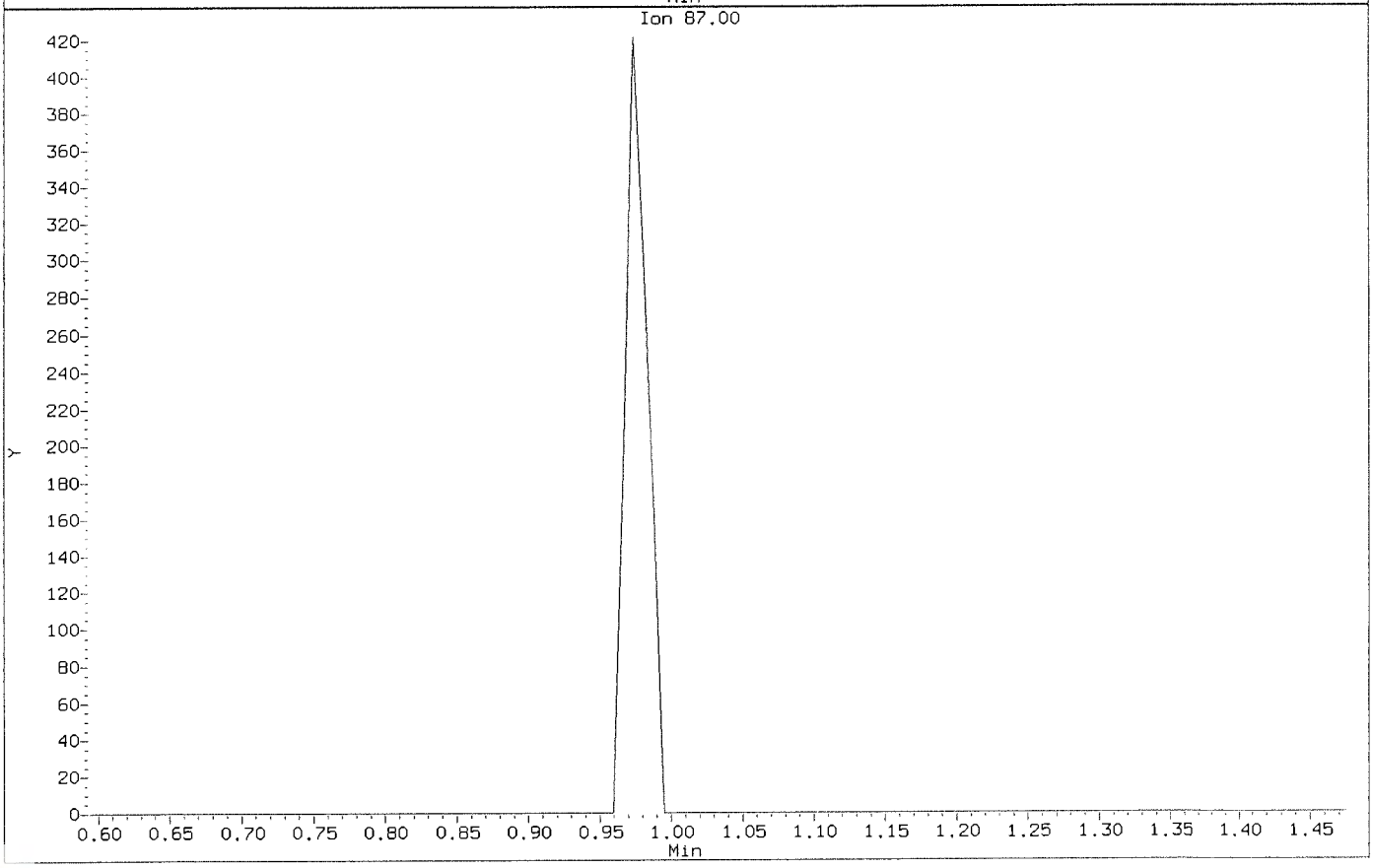




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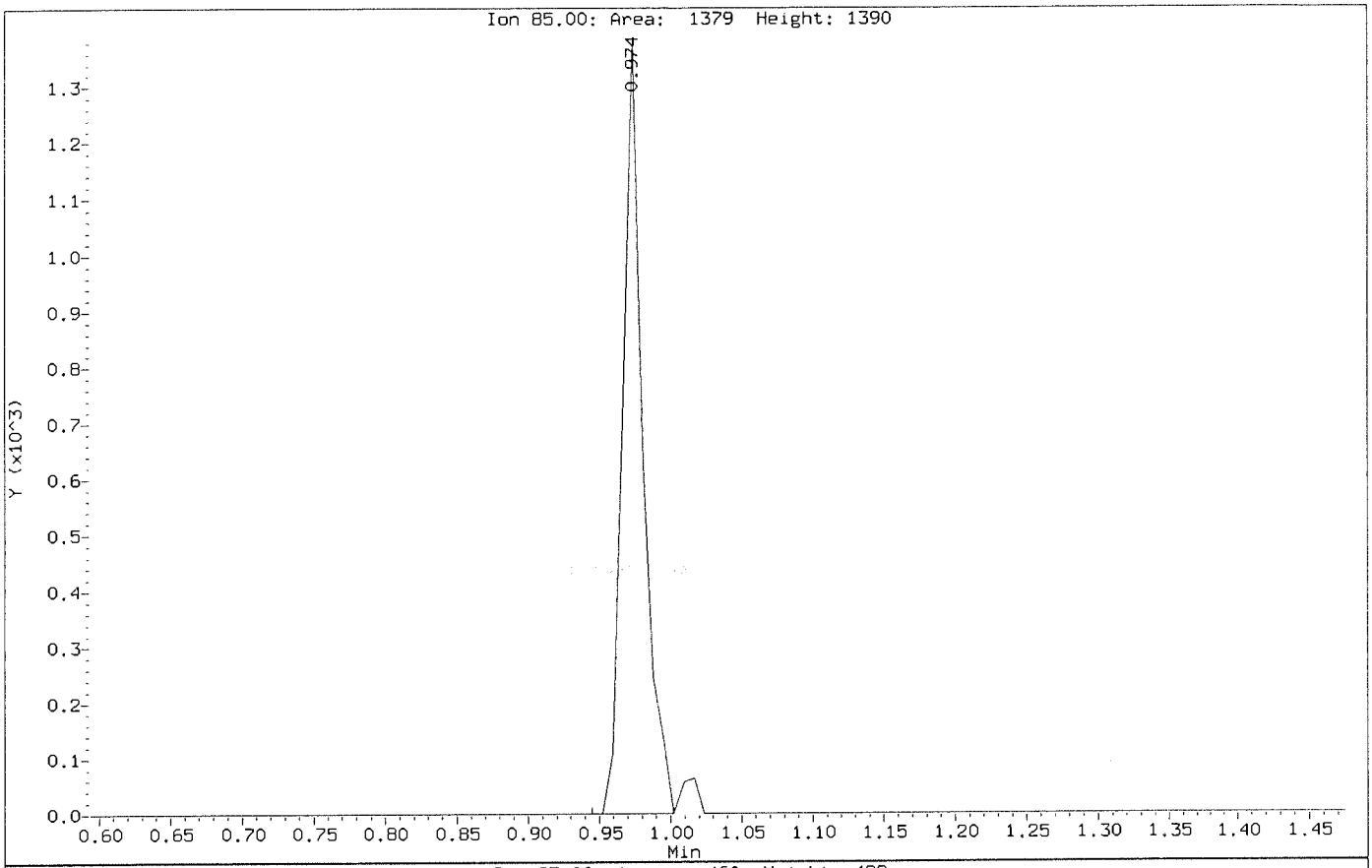
Compound: Dichlorodifluoromethane
CAS Number: 75-71-8

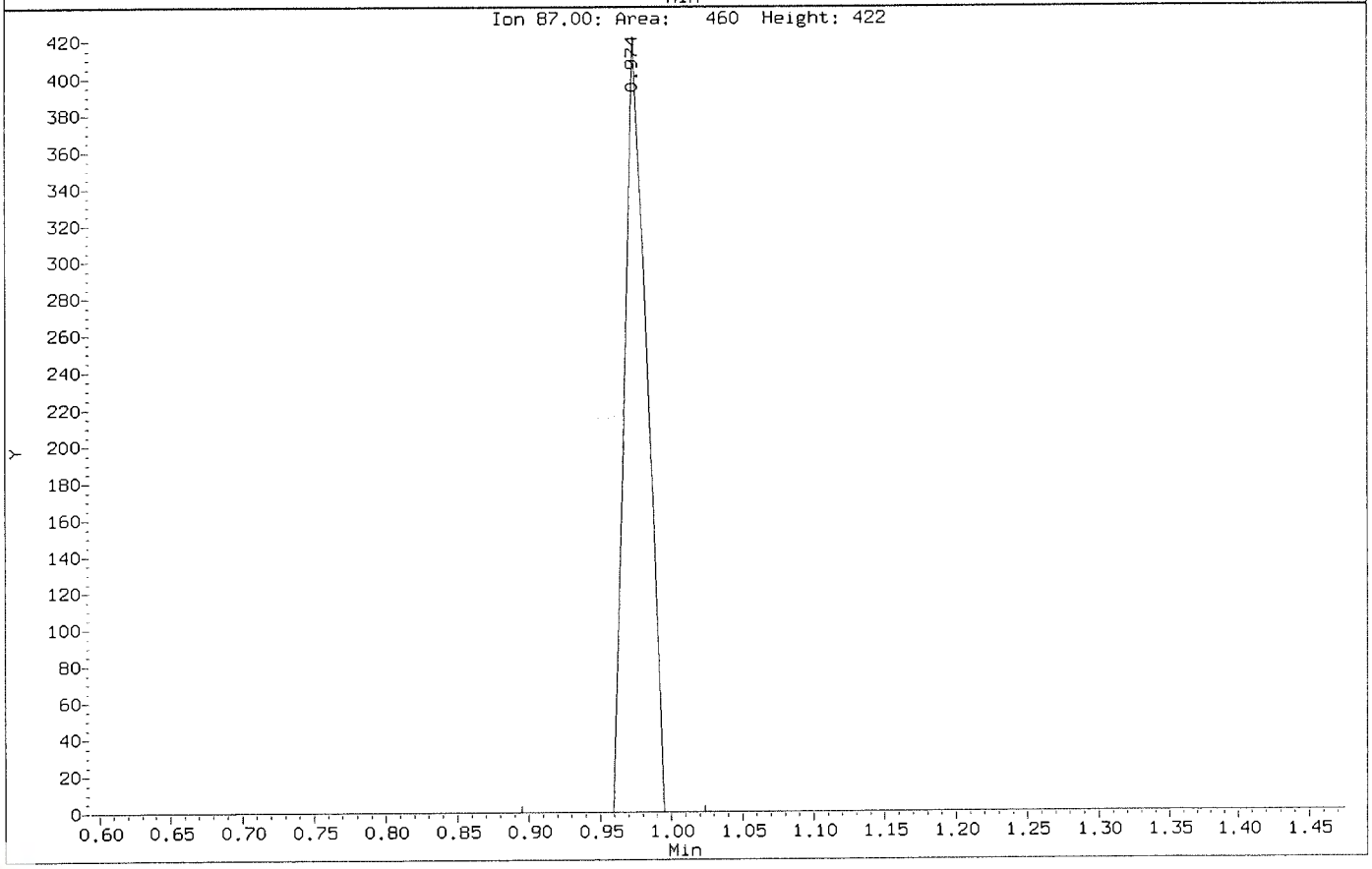




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Client Sample ID: VSTD000.5

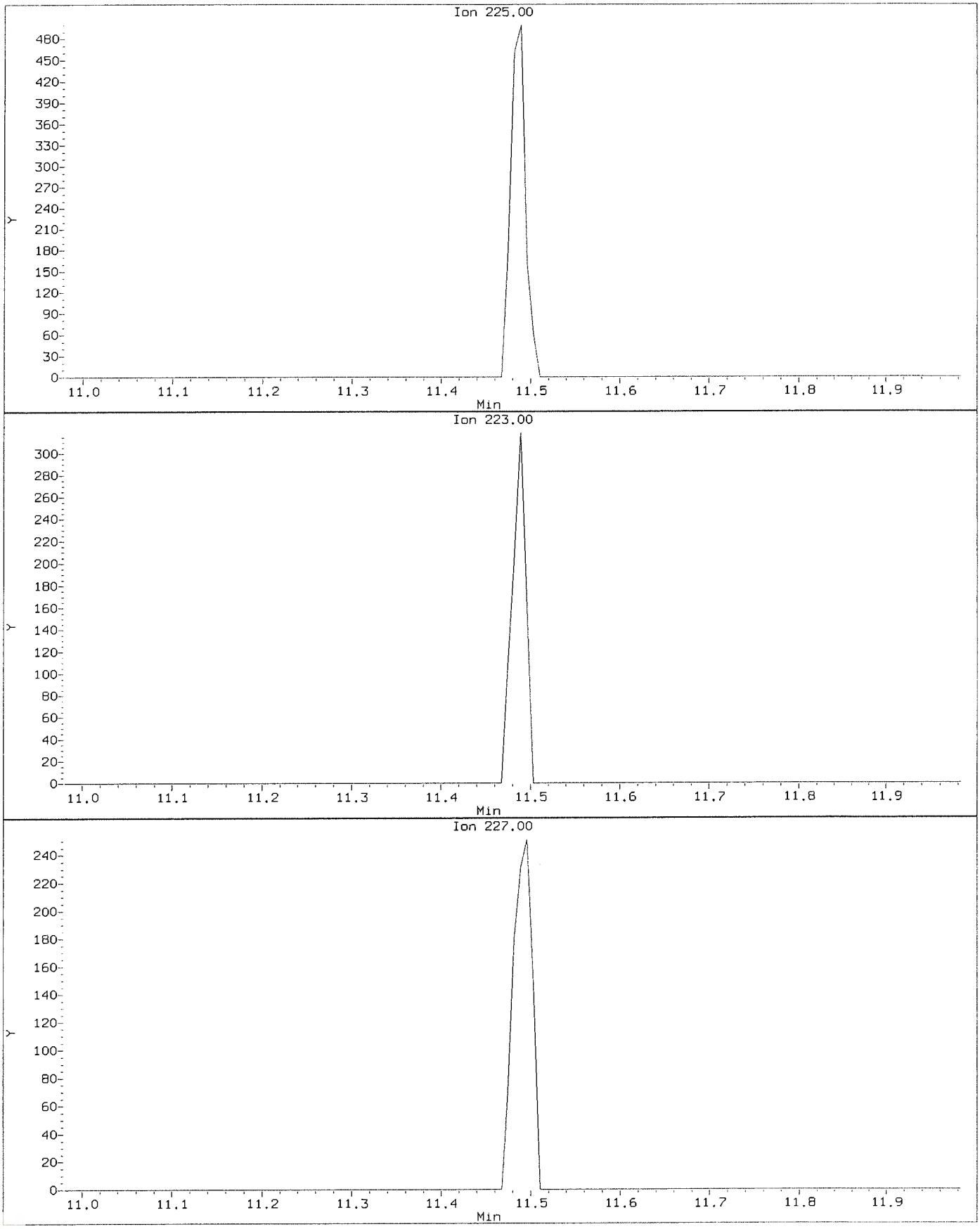
Compound: Dichlorodifluoromethane
CAS Number: 75-71-8





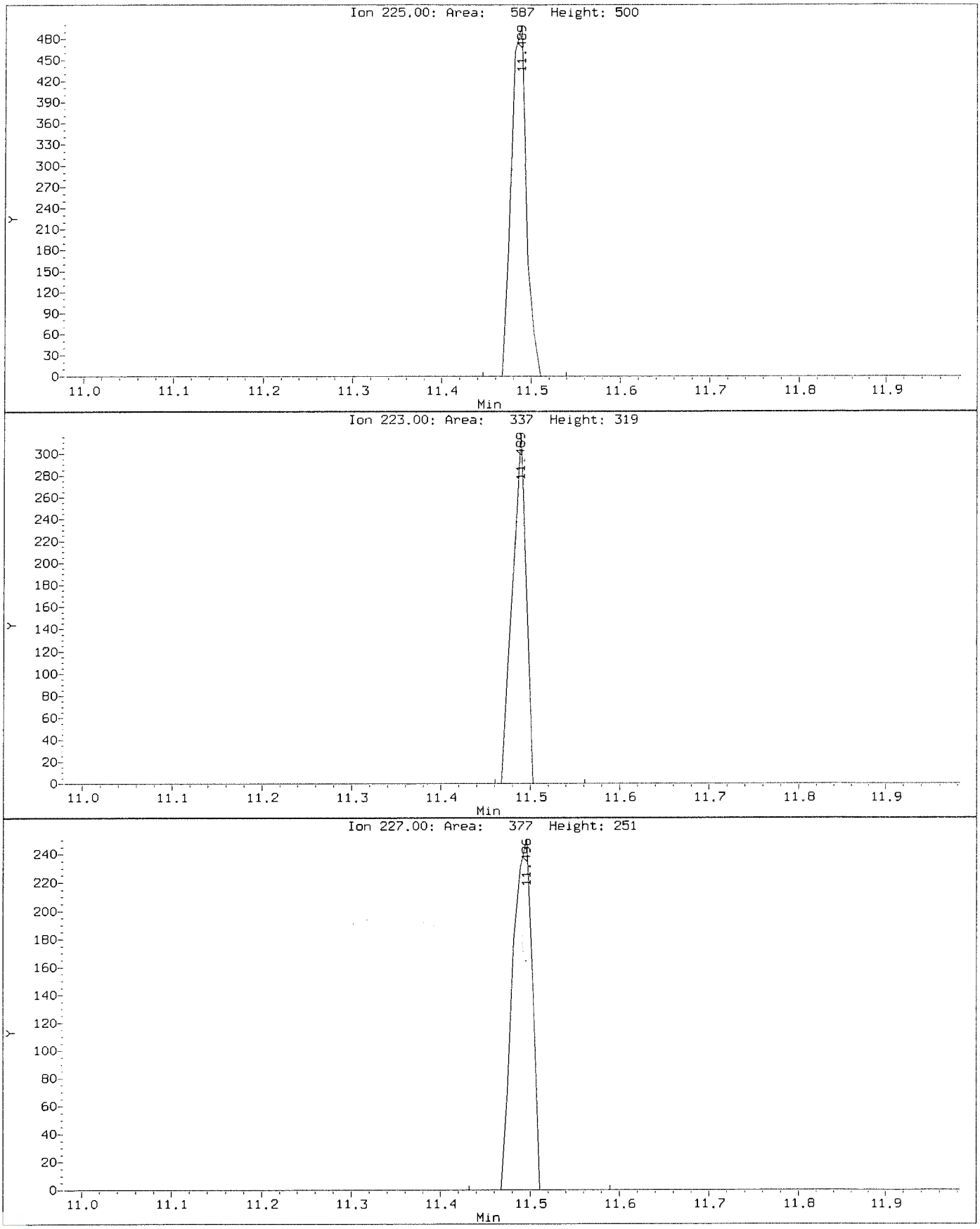
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Instrument: voa6.i
Client Sample ID: VSTD000.5

Compound: Hexachlorobutadiene
CAS Number: 87-68-3



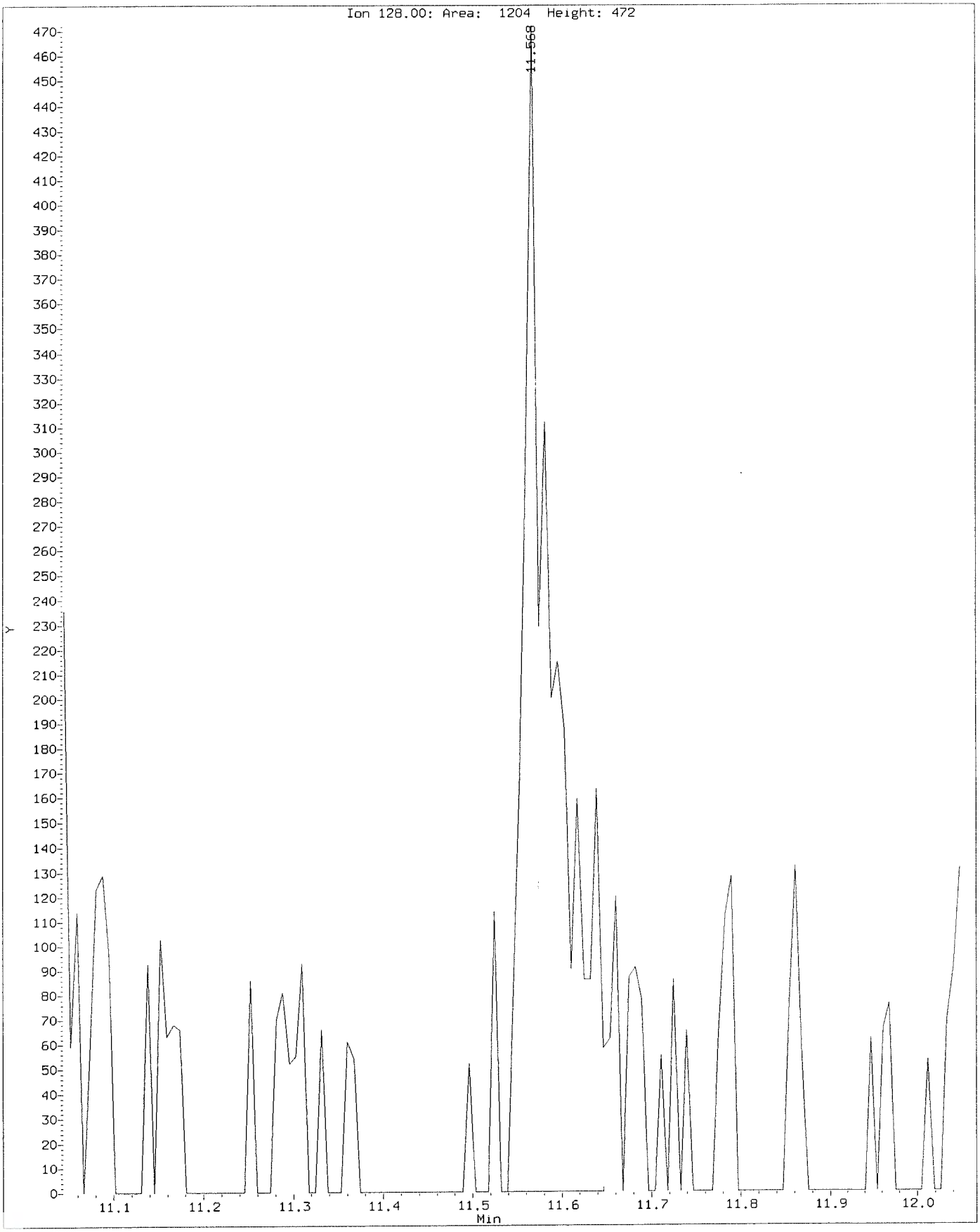
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Client Sample ID: VSTD000.5

Compound: Hexachlorobutadiene
CAS Number: 87-68-3



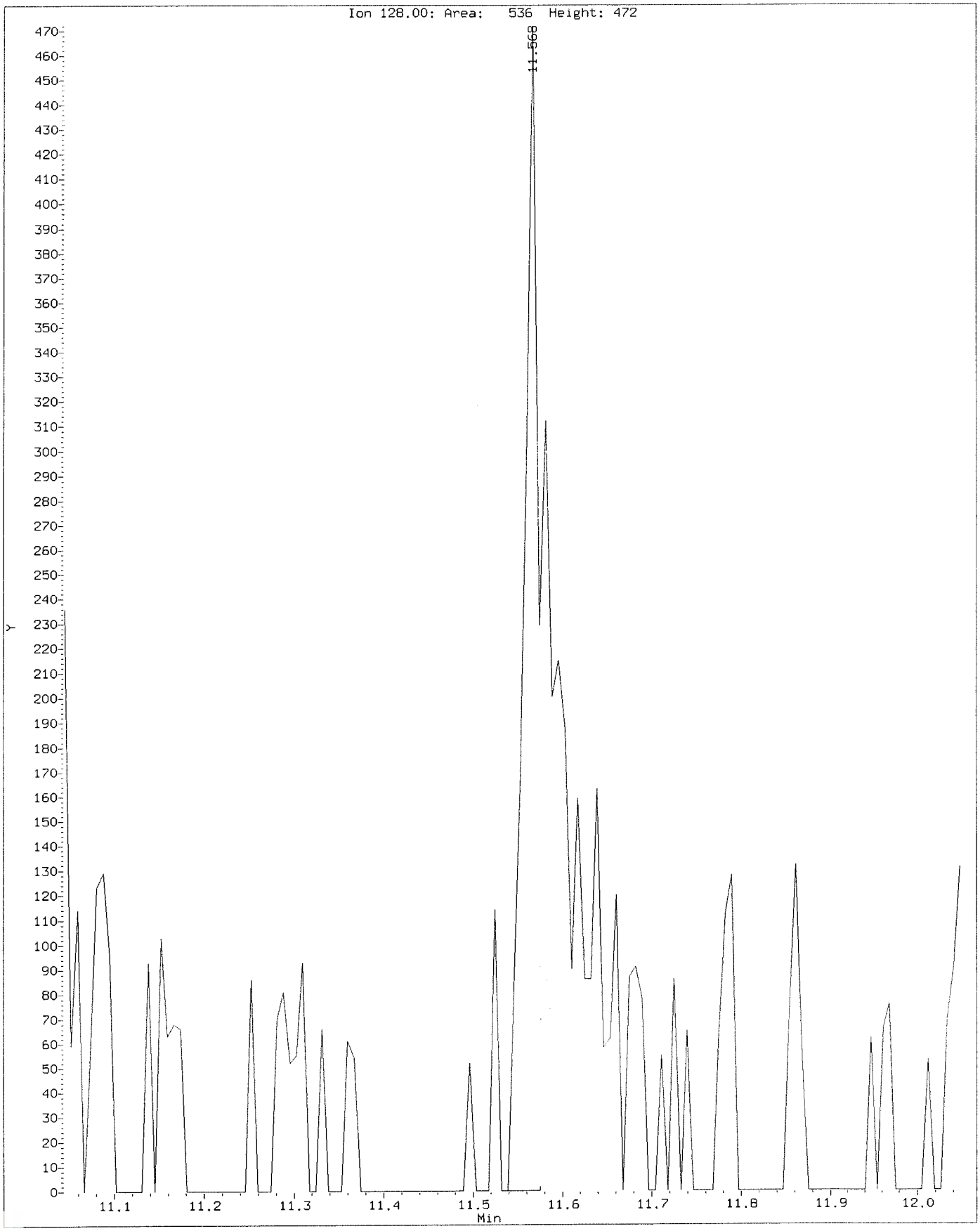
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Injection Date: 13-JUL-2020 10:55
Instrument: voa6.i
Client Sample ID: VSTD000.5

Compound: Naphthalene
CAS Number: 91-20-3



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Injection Date: 13-JUL-2020 10:55
Instrument: voa6.i
Client Sample ID: VSTD000.5

Compound: Naphthalene
CAS Number: 91-20-3



Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\X071304.D Page 1
Report Date: 13-Aug-2020 14:50

ALS Laboratory Group

Data file : \\nahstws005\Target\chem\voa6.i\X200713.b\X071304.D
Lab Smp Id: VSTD001 Client Smp ID: VSTD001
Inj Date : 13-JUL-2020 11:42
Operator : PC Inst ID: voa6.i
Smp Info : VSTD001;VSTD001;1;3;
Misc Info : HS18090001;WATER;0;1;
Comment :
Method : \\nahstws005\Target\chem\voa6.i\X200713.b\8260W.m
Meth Date : 13-Aug-2020 14:50 voa6.i Quant Type: ISTD
Cal Date : 13-JUL-2020 10:55 Cal File: X071303.D
Als bottle: 5 Calibration Sample, Level: 3
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: bhate.sub
Target Version: 4.14
Processing Host: NAHSTW7056

Concentration Formula: Amt * DF * (Uf/Vo)*1 * CpndVariable

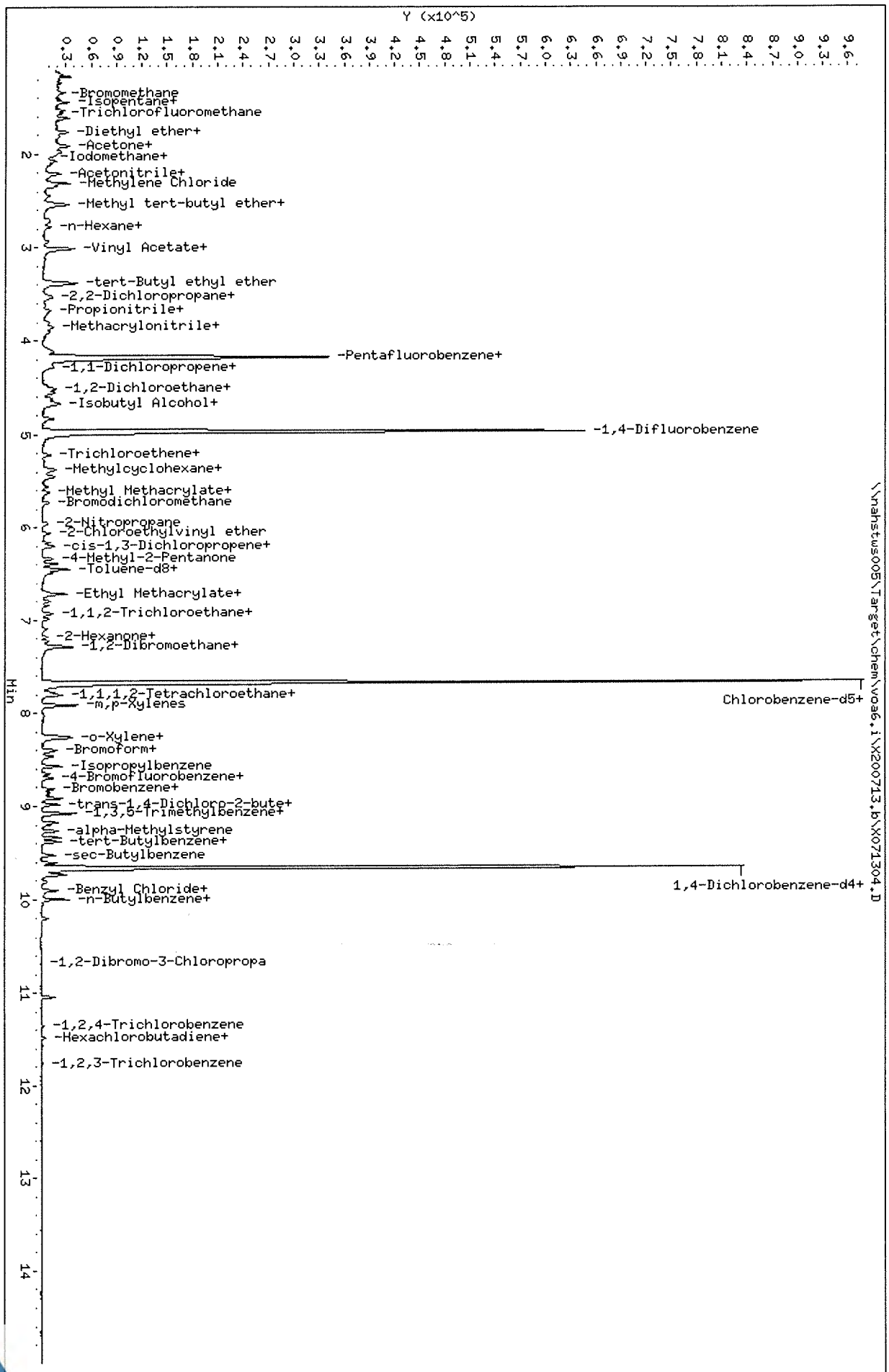
Name	Value	Description
DF	1.000	Dilution Factor
Uf	5.000	ng unit correction factor
Vo	5.000	sample purged
Cpnd Variable		Local Compound Variable

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/l)	ON-COL (ug/l)
* 1 Pentafluorobenzene	168	4.189	4.189	(1.000)	272342	50.0000	
* 36 1,4-Difluorobenzene	114	4.970	4.970	(1.000)	461217	50.0000	
* 47 Chlorobenzene-d5	117	7.671	7.671	(1.000)	414030	50.0000	
* 70 1,4-Dichlorobenzene-d4	152	9.669	9.669	(1.000)	193083	50.0000	
$ 30 Dibromofluoromethane	113	4.111	4.111	(0.981)	3129	1.00000	0.95(a)
$ 35 1,2-Dichloroethane-d4	65	4.490	4.490	(1.072)	4323	1.00000	1.38(a)
$ 48 Toluene-d8	98	6.396	6.396	(0.834)	10651	1.00000	0.98(a)
$ 69 4-Bromofluorobenzene	95	8.695	8.695	(1.134)	4513	1.00000	0.60(a)
60 1,1,1,2-Tetrachloroethane	131	7.785	7.785	(1.015)	2950	1.00000	0.92(a)
31 1,1,1-Trichloroethane	97	4.096	4.096	(0.978)	4871	1.00000	0.98(a)
68 1,1,2,2-Tetrachloroethane	83	8.845	8.845	(0.915)	3605	1.00000	1.01(aM)
53 1,1,2-Trichloroethane	83	6.847	6.847	(0.893)	1966	1.00000	0.77(a)
22 1,1-Dichloroethane	63	2.929	2.929	(0.699)	7972	1.00000	1.04(a)
11 1,1-Dichloroethene	96	1.919	1.919	(0.458)	2381	1.00000	0.99(a)
32 1,1-Dichloropropene	75	4.290	4.290	(0.863)	4580	1.00000	1.05(a)
93 1,2,3-Trichlorobenzene	180	11.761	11.761	(1.216)	659	1.00000	1.00(aM)
71 1,2,3-Trichloropropane	75	8.867	8.867	(0.917)	3080	1.00000	0.98(aM)
90 1,2,4-Trichlorobenzene	180	11.352	11.352	(1.174)	1289	1.00000	1.04(aM)
79 1,2,4-Trimethylbenzene	105	9.383	9.383	(0.970)	10402	1.00000	0.97(a)
89 1,2-Dibromo-3-Chloropropane	155	10.665	10.665	(1.103)	276	1.00000	2.14(aM)
57 1,2-Dibromoethane	107	7.269	7.269	(0.948)	3092	1.00000	1.01(a)
88 1,2-Dichlorobenzene	146	9.999	9.999	(1.034)	5305	1.00000	0.98(a)

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/l)	AMOUNTS ON-COL (ug/l)
33	1,2-Dichloroethane	62	4.569	4.569	(0.919)	5434	1.00000	0.99(a)
42	1,2-Dichloropropane	63	5.443	5.443	(1.095)	3968	1.00000	0.93(aM)
75	1,3,5-Trimethylbenzene	105	9.075	9.075	(0.939)	10886	1.00000	1.03(a)
83	1,3-Dichlorobenzene	146	9.612	9.612	(0.994)	6135	1.00000	1.03(a)
54	1,3-Dichloropropane	76	6.983	6.983	(0.910)	4626	1.00000	0.85(a)
84	1,4-Dichlorobenzene	146	9.683	9.683	(1.001)	6203	1.00000	1.02(a)
26	2,2-Dichloropropane	77	3.516	3.516	(0.839)	5385	1.00000	1.11(a)
24	2-Butanone	43	3.609	3.609	(0.862)	3969	2.00000	1.67(a)
76	2-Chlorotoluene	91	8.981	8.981	(0.929)	10382	1.00000	1.12(a)
52	2-Hexanone	43	7.098	7.098	(0.925)	6255	2.00000	1.59(a)
77	4-Chlorotoluene	91	9.075	9.075	(0.939)	11485	1.00000	1.06(a)
82	p-Isopropyltoluene	119	9.655	9.655	(0.999)	9989	1.00000	0.97(a)
45	4-Methyl-2-Pentanone	43	6.338	6.338	(0.826)	10373	2.00000	1.83(a)
10	Acetone	43	1.976	1.976	(0.472)	7883	2.00000	0.66(a)
37	Benzene	78	4.519	4.519	(0.909)	12999	1.00000	1.03(a)
74	Bromobenzene	156	8.817	8.817	(0.912)	3540	1.00000	1.00(a)
29	Bromochloromethane	128	3.803	3.803	(0.908)	2212	1.00000	1.14(a)
39	Bromodichloromethane	83	5.729	5.729	(1.153)	4925	1.00000	1.06(aM)
66	Bromoform	173	8.416	8.416	(1.097)	2238	1.00000	0.97(Ta)
6	Bromomethane	94	1.346	1.346	(0.321)	2906	1.00000	0.51(aM)
19	Carbon Disulfide	76	2.069	2.069	(0.494)	14675	2.00000	1.95(a)
34	Carbon Tetrachloride	117	4.261	4.261	(0.857)	4883	1.00000	1.12(aH)
59	Chlorobenzene	112	7.699	7.699	(1.004)	8617	1.00000	1.04(a)
7	Chloroethane	64	1.403	1.403	(0.335)	2838	1.00000	1.18(aM)
28	Chloroform	83	3.910	3.910	(0.933)	6234	1.00000	1.04(a)
3	Chloromethane	50	1.081	1.081	(0.258)	6654	1.00000	2.84(aM)
27	cis-1,2-Dichloroethene	96	3.537	3.537	(0.844)	3447	1.00000	0.98(a)
46	cis-1,3-Dichloropropene	75	6.166	6.166	(1.241)	5228	1.00000	0.97(a)
55	Dibromochloromethane	129	7.183	7.183	(0.937)	3068	1.00000	0.91(a)
44	Dibromomethane	93	5.557	5.557	(1.118)	2406	1.00000	1.05(a)
2	Dichlorodifluoromethane	85	0.973	0.973	(0.232)	2630	1.00000	0.91(a)
61	Ethylbenzene	106	7.807	7.807	(1.018)	4211	1.00000	0.97(a)
91	Hexachlorobutadiene	225	11.488	11.488	(1.188)	975	1.00000	1.01(aM)
67	Isopropylbenzene	105	8.566	8.566	(1.117)	13018	1.00000	1.01(a)
62	m,p-Xylenes	106	7.914	7.914	(1.032)	10367	2.00000	2.01(a)
17	Methylene Chloride	84	2.313	2.313	(0.552)	5799	1.00000	0.47(a)
87	n-Butylbenzene	91	9.999	9.999	(1.034)	8716	1.00000	0.96(a)
73	n-Propylbenzene	91	8.917	8.917	(0.922)	15225	1.00000	1.03(a)
92	Naphthalene	128	11.560	11.560	(1.196)	1603	1.00000	2.03(aM)
63	o-Xylene	106	8.244	8.244	(1.075)	5298	1.00000	1.01(a)
81	sec-Butylbenzene	105	9.526	9.526	(0.985)	10394	1.00000	0.86(a)
64	Styrene	104	8.265	8.265	(1.078)	8953	1.00000	0.99(a)
78	tert-Butylbenzene	119	9.340	9.340	(0.966)	8260	1.00000	0.98(a)
56	Tetrachloroethene	164	6.933	6.933	(0.904)	2432	1.00000	0.95(a)
50	Toluene	91	6.453	6.453	(0.841)	12551	1.00000	0.96(a)
20	trans-1,2-Dichloroethene	96	2.542	2.542	(0.607)	3055	1.00000	1.04(a)
51	trans-1,3-Dichloropropene	75	6.696	6.696	(1.347)	3805	1.00000	0.76(a)
38	Trichloroethene	130	5.214	5.214	(1.049)	3283	1.00000	0.98(a)
8	Trichlorofluoromethane	101	1.560	1.560	(0.373)	4203	1.00000	0.93(a)
5	Vinyl Chloride	62	1.138	1.138	(0.272)	4654	1.00000	1.03(a)

QC Flag Legend

T - Target compound detected outside RT window.
a - Target compound detected but, quantitated amount
Below Limit Of Quantitation(BLOQ).
M - Compound response manually integrated.
H - Operator selected an alternate compound hit.

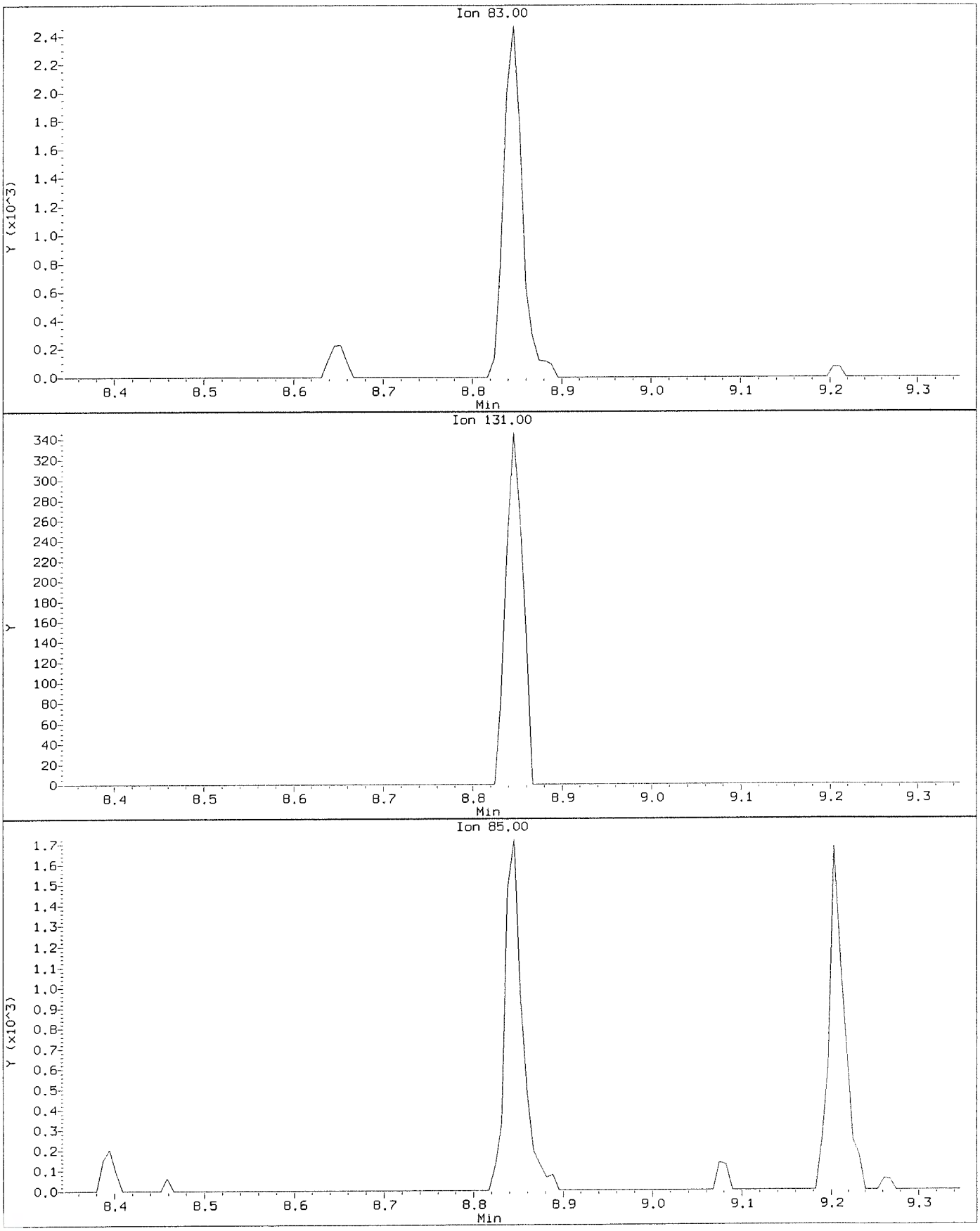


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Date : 13-JUL-2020 11:42
Client ID: VSTD001
Sample Info: VSTD001;VSTD001;1;3;
Purge Volume: 5.0
Column phase: DB624

Instrument: voa6.i
Operator: PC
Column diameter: 0.18

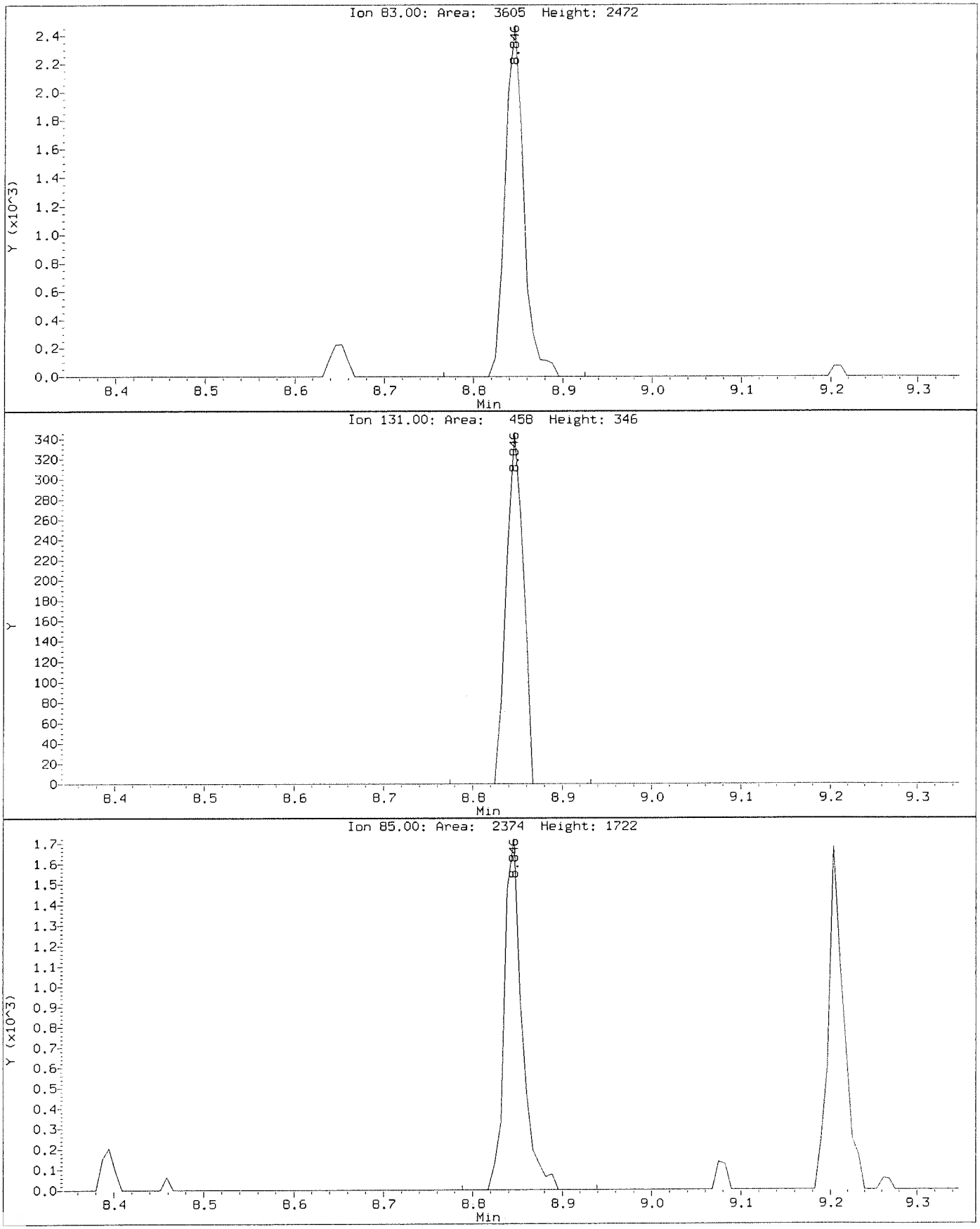
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Injection Date: 13-JUL-2020 11:42
Instrument: voa6.i
Client Sample ID: VSTD001

Compound: 1,1,2,2-Tetrachloroethane
CAS Number: 79-34-5



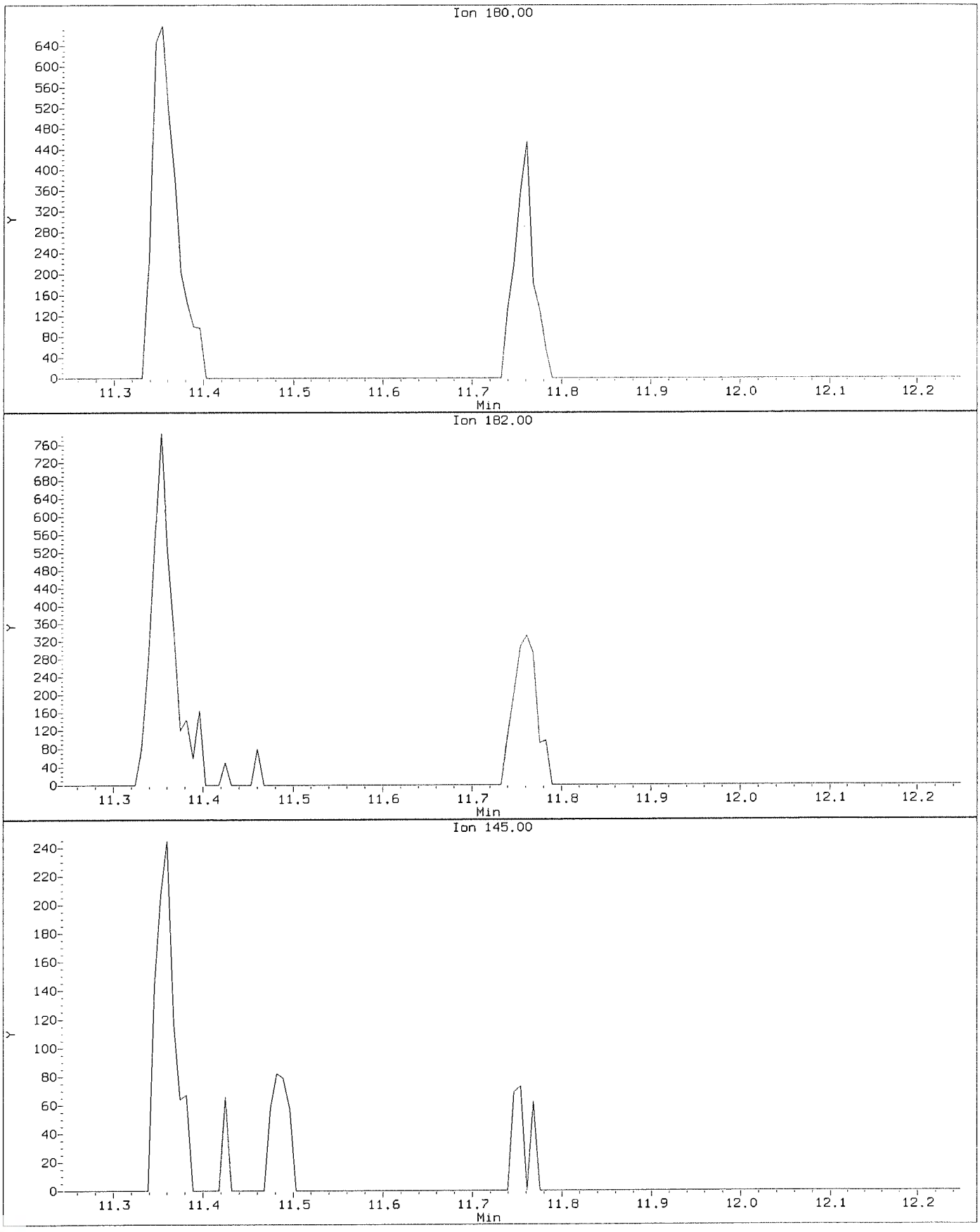
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Compound: 1,1,2,2-Tetrachloroethane
CAS Number: 79-34-5



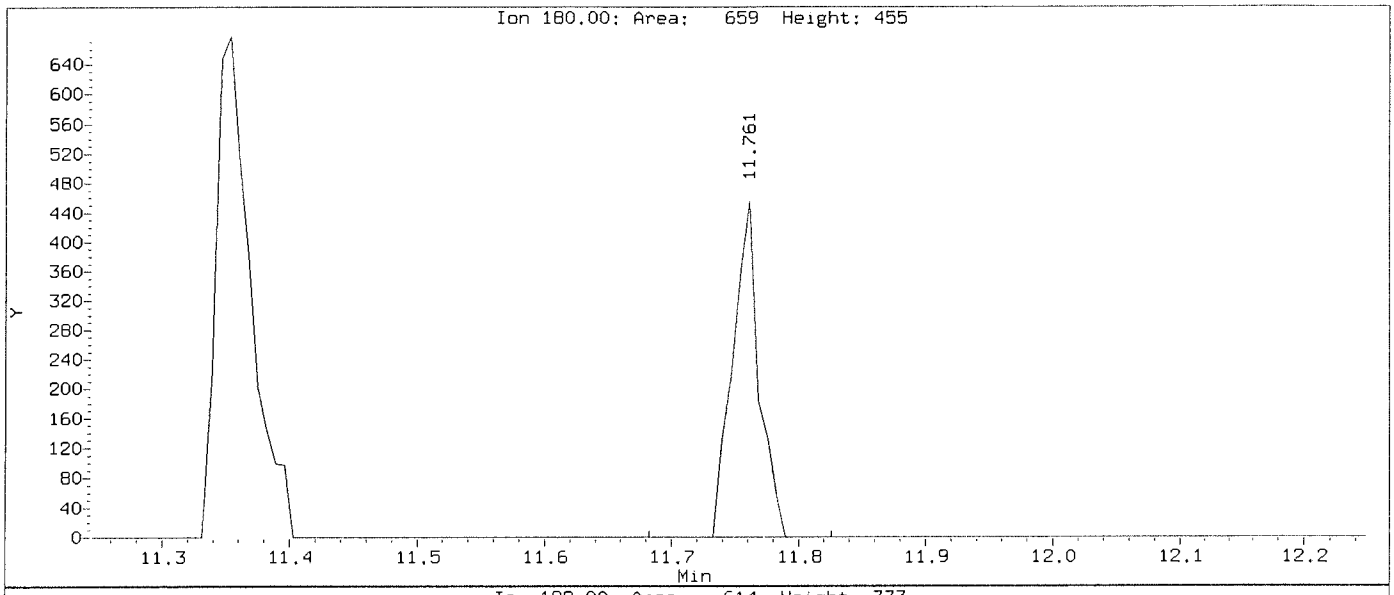
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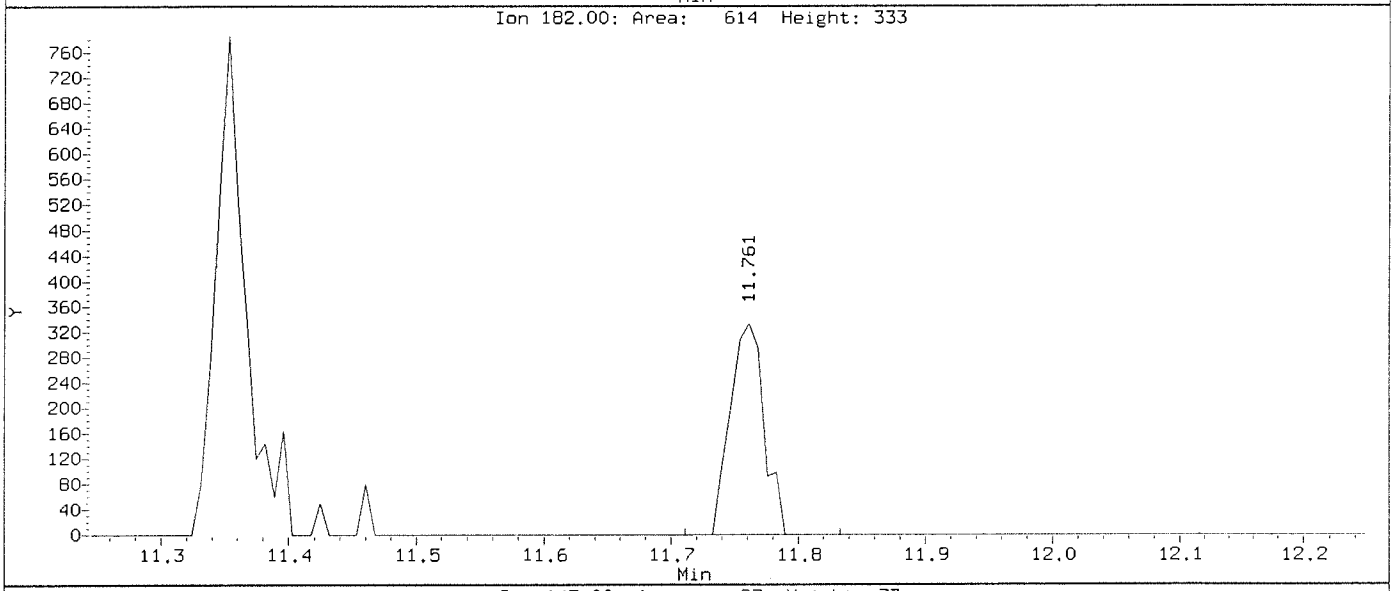
Compound: 1,2,3-Trichlorobenzene
CAS Number: 87-61-6

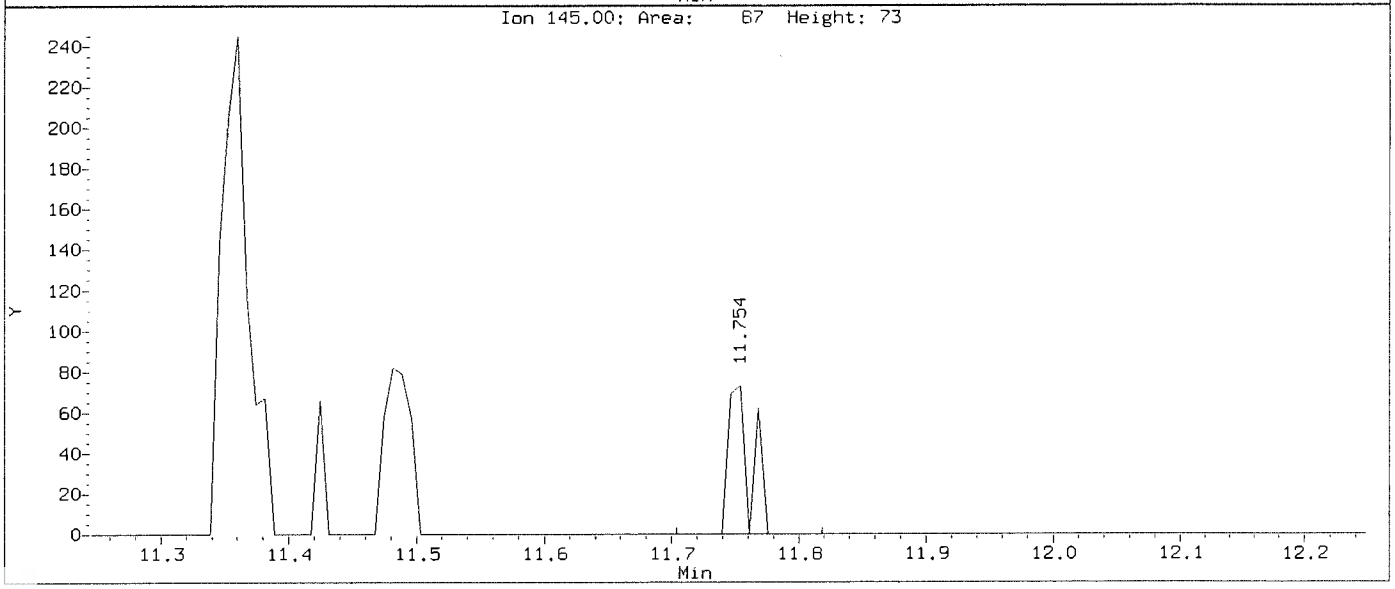


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Injection Date: 13-JUL-2020 11:42
Instrument: voa6.i
Client Sample ID: VSTD001

Compound: 1,2,3-Trichlorobenzene
CAS Number: 87-61-6

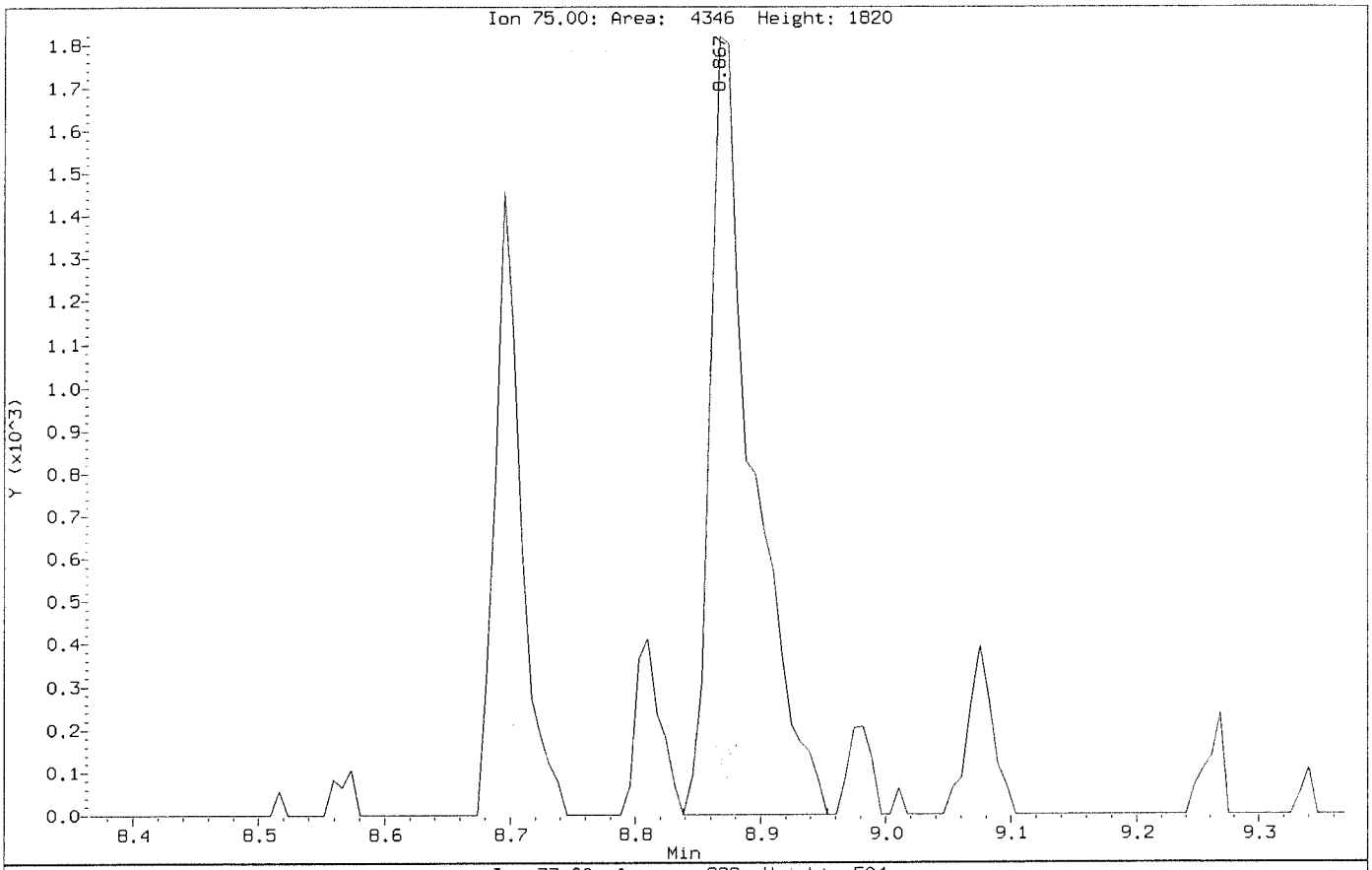


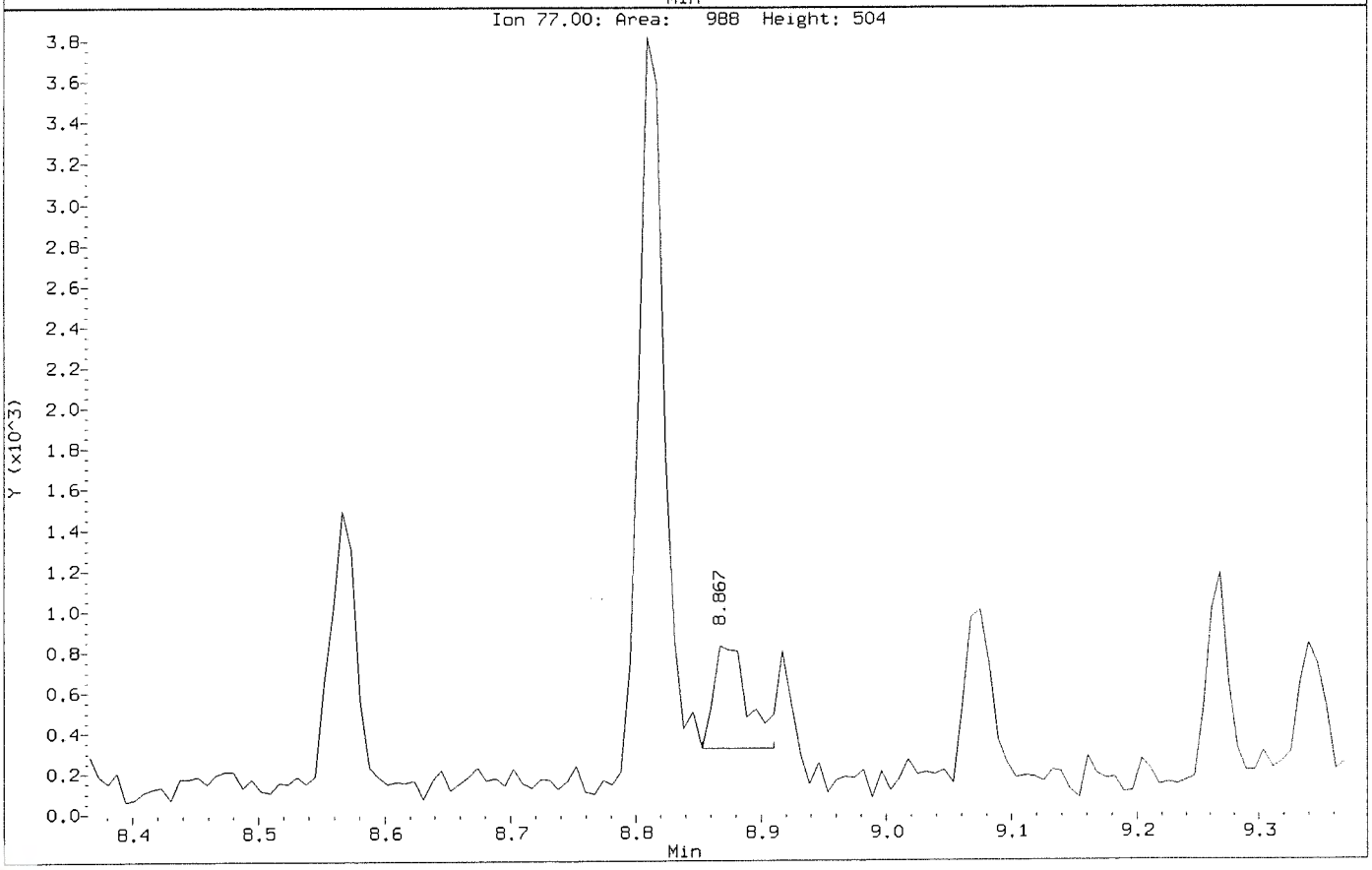




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Instrument: voa6.i
Client Sample ID: VSTD001

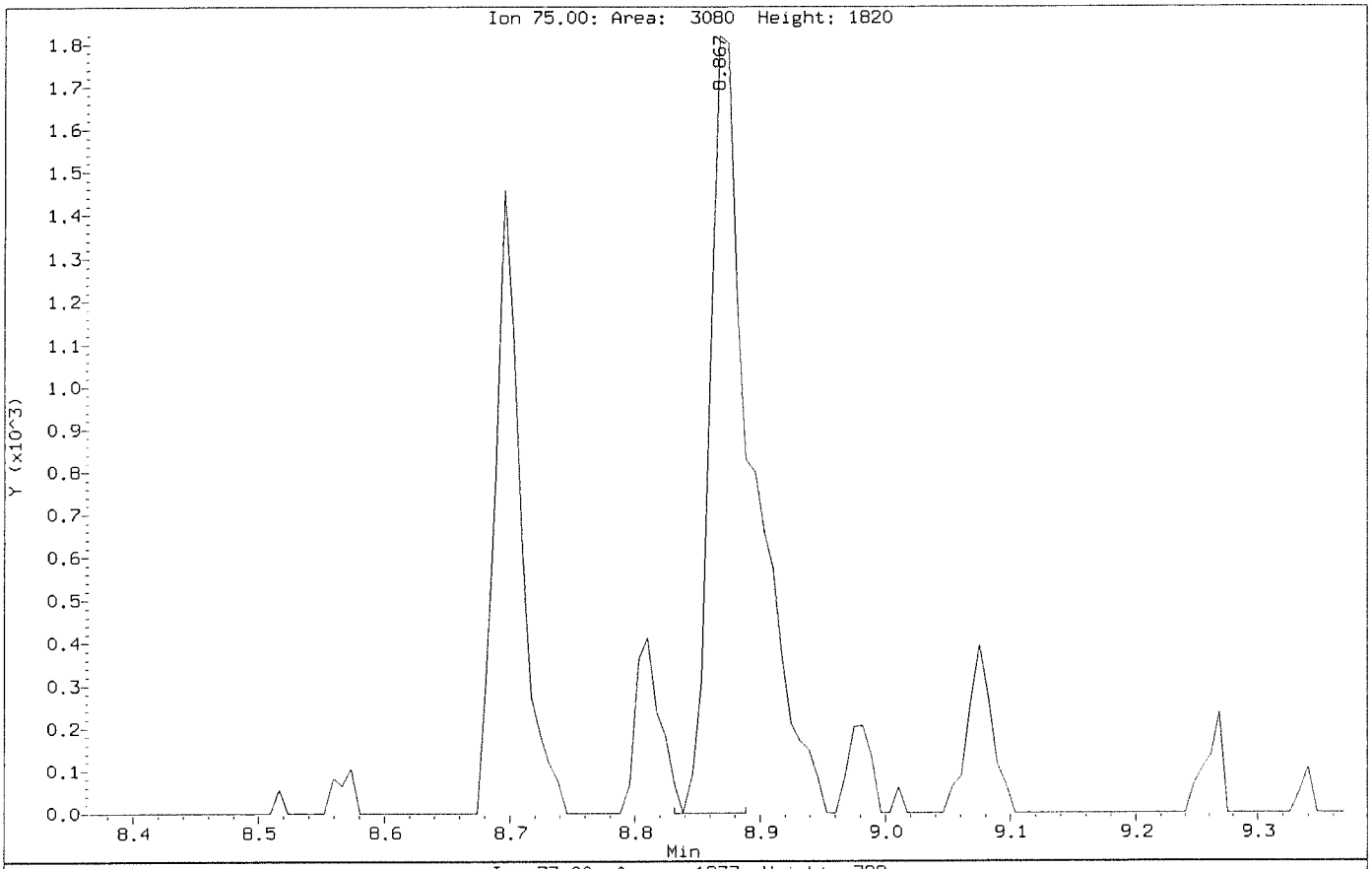
Compound: 1,2,3-Trichloropropane
CAS Number: 96-18-4

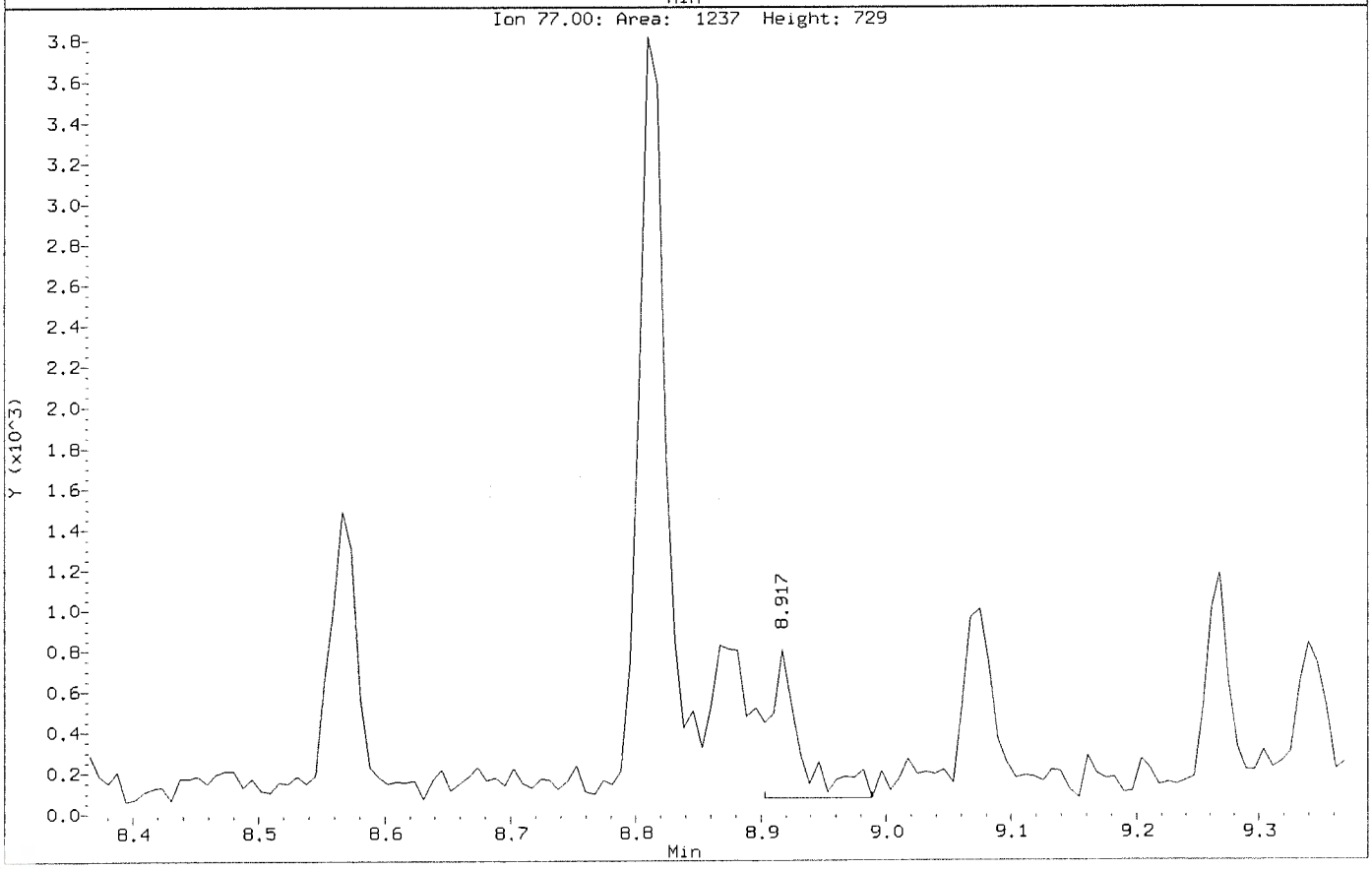




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Injection Date: 13-JUL-2020 11:42
Instrument: voa6.i
Client Sample ID: VSTD001

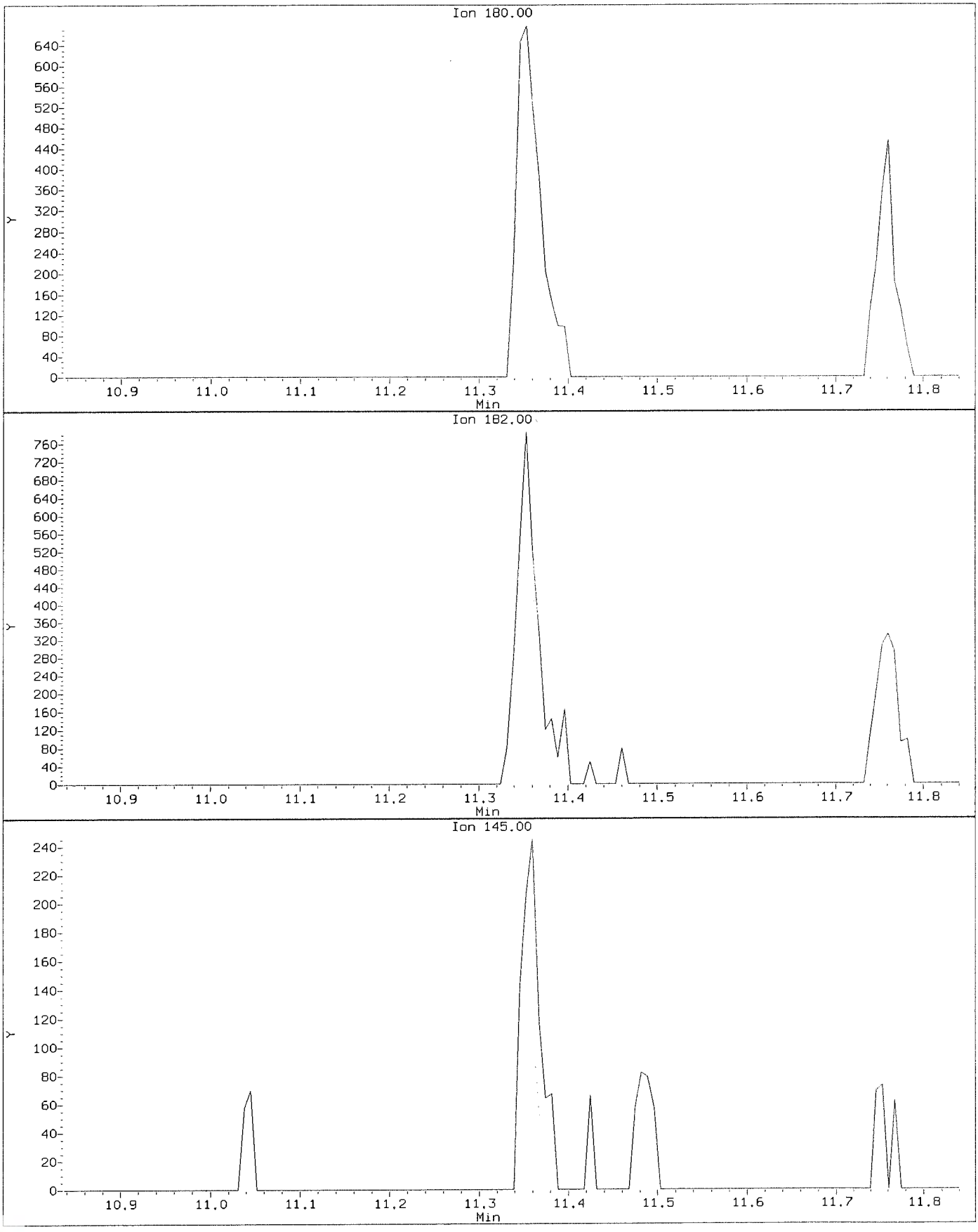
Compound: 1,2,3-Trichloropropane
CAS Number: 96-18-4





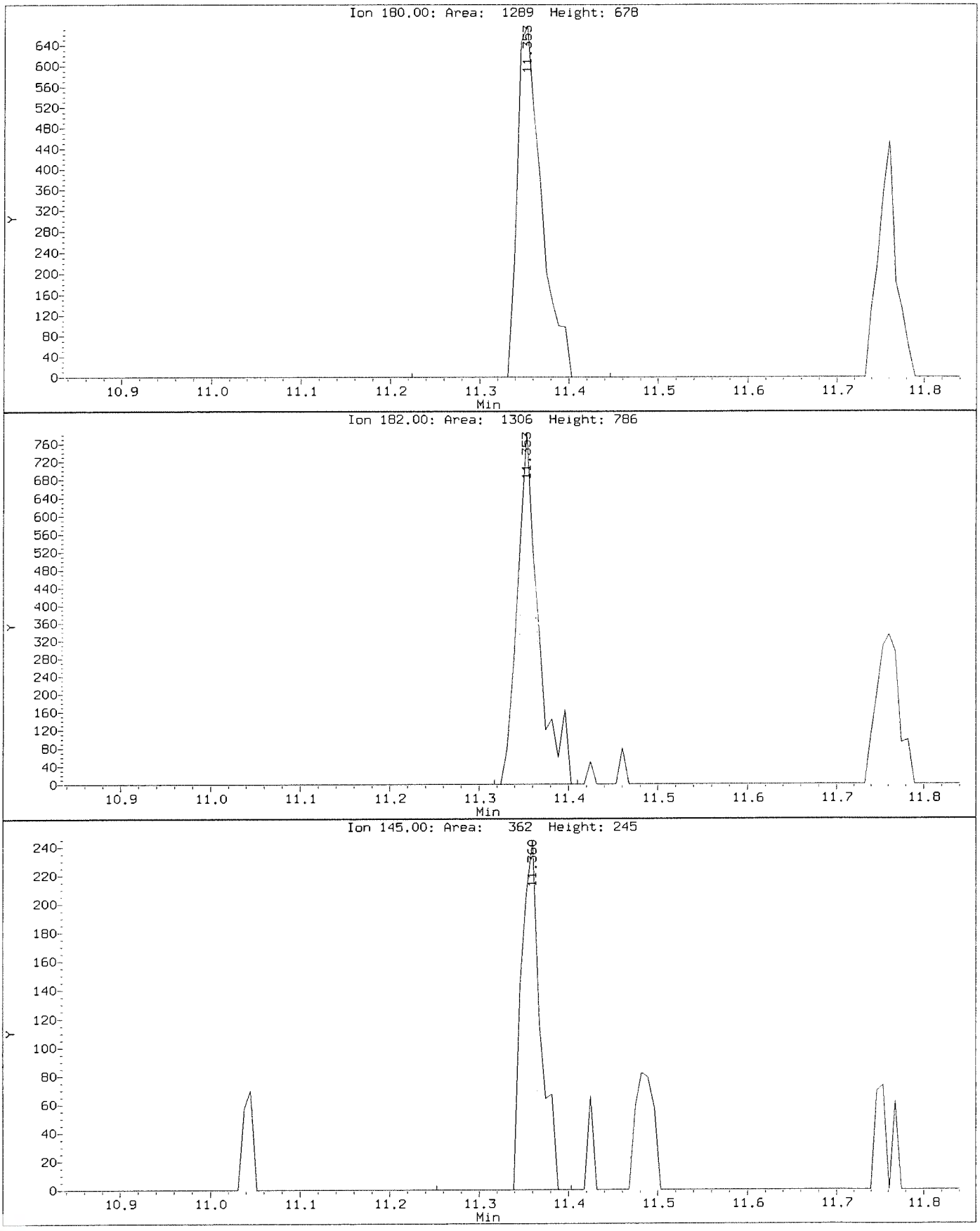
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Instrument: voa6.i
Client Sample ID: VSTD001

Compound: 1,2,4-Trichlorobenzene
CAS Number: 120-82-1



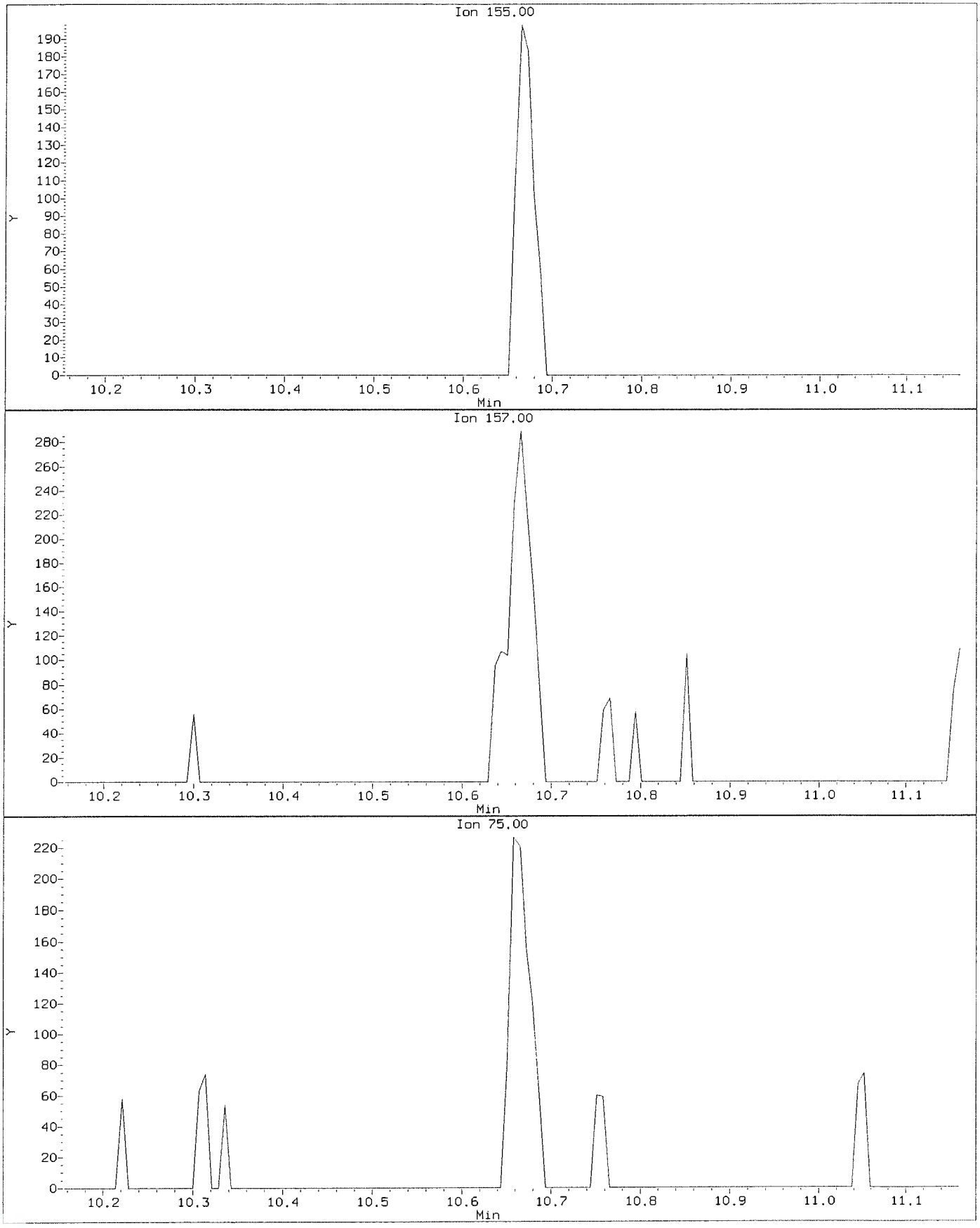
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Instrument: voa6.i
Client Sample ID: VSTD001

Compound: 1,2,4-Trichlorobenzene
CAS Number: 120-82-1



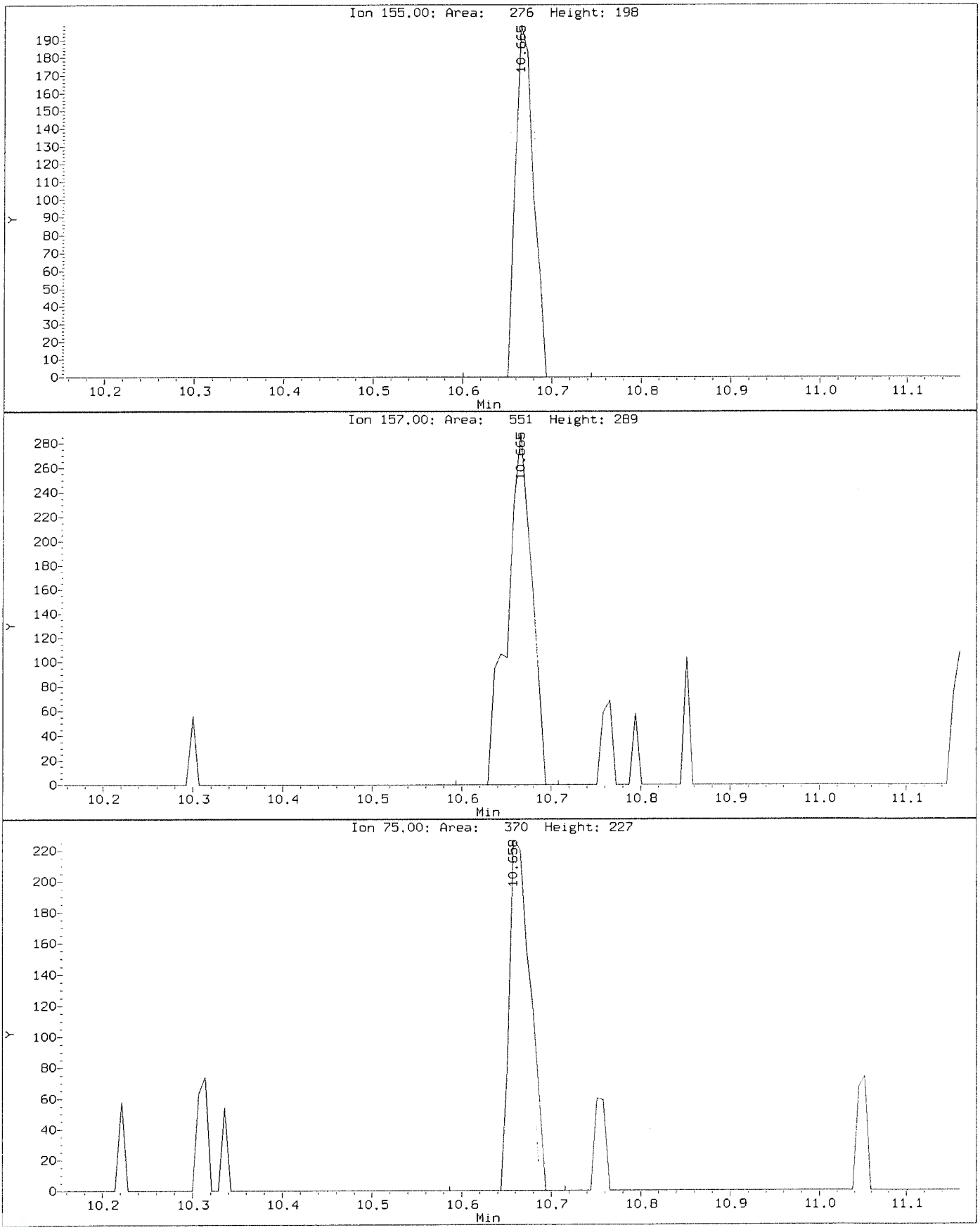
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Injection Date: 13-JUL-2020 11:42
Instrument: voa6.i
Client Sample ID: VSTD001

Compound: 1,2-Dibromo-3-Chloropropane
CAS Number: 96-12-8



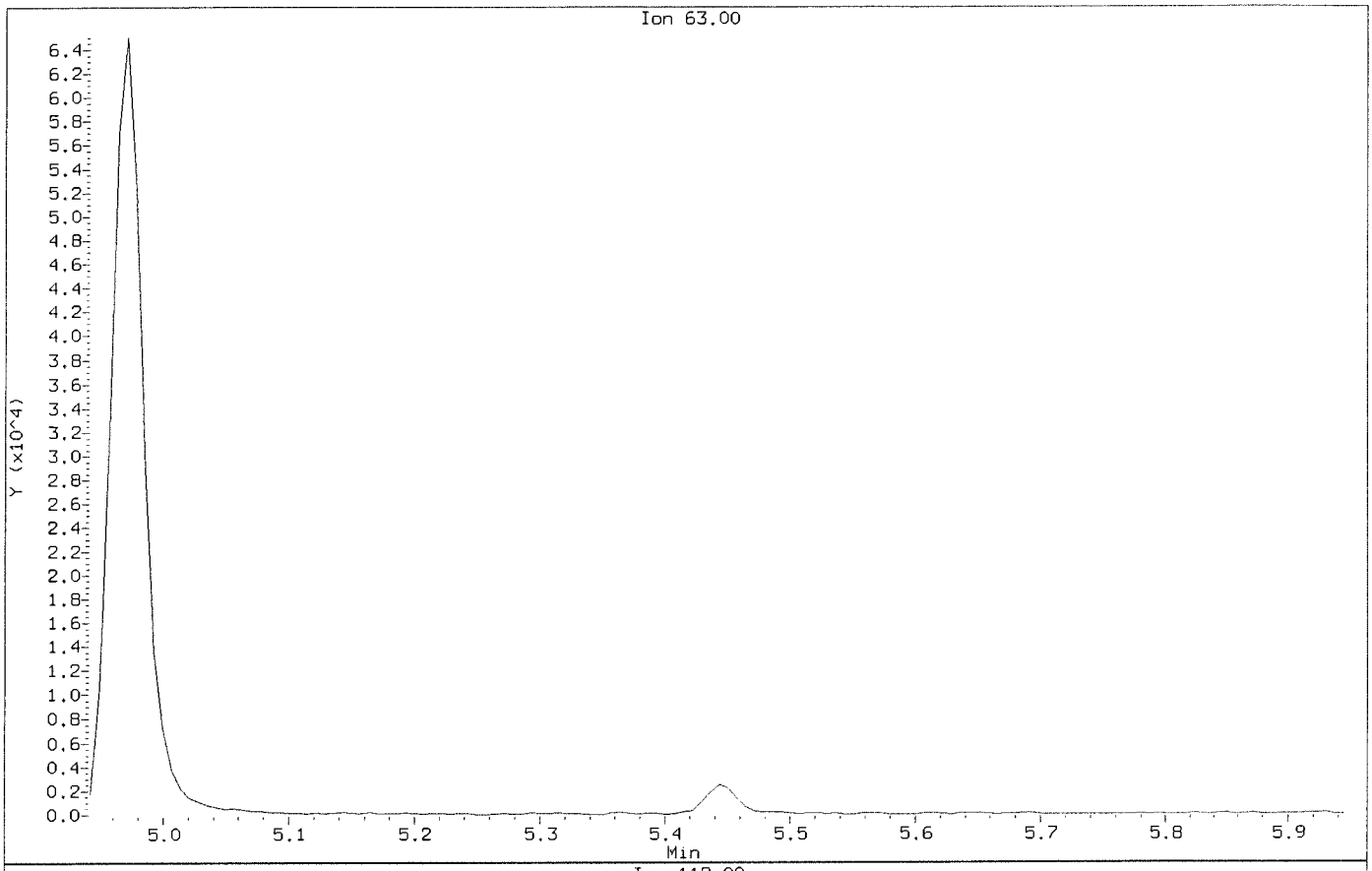
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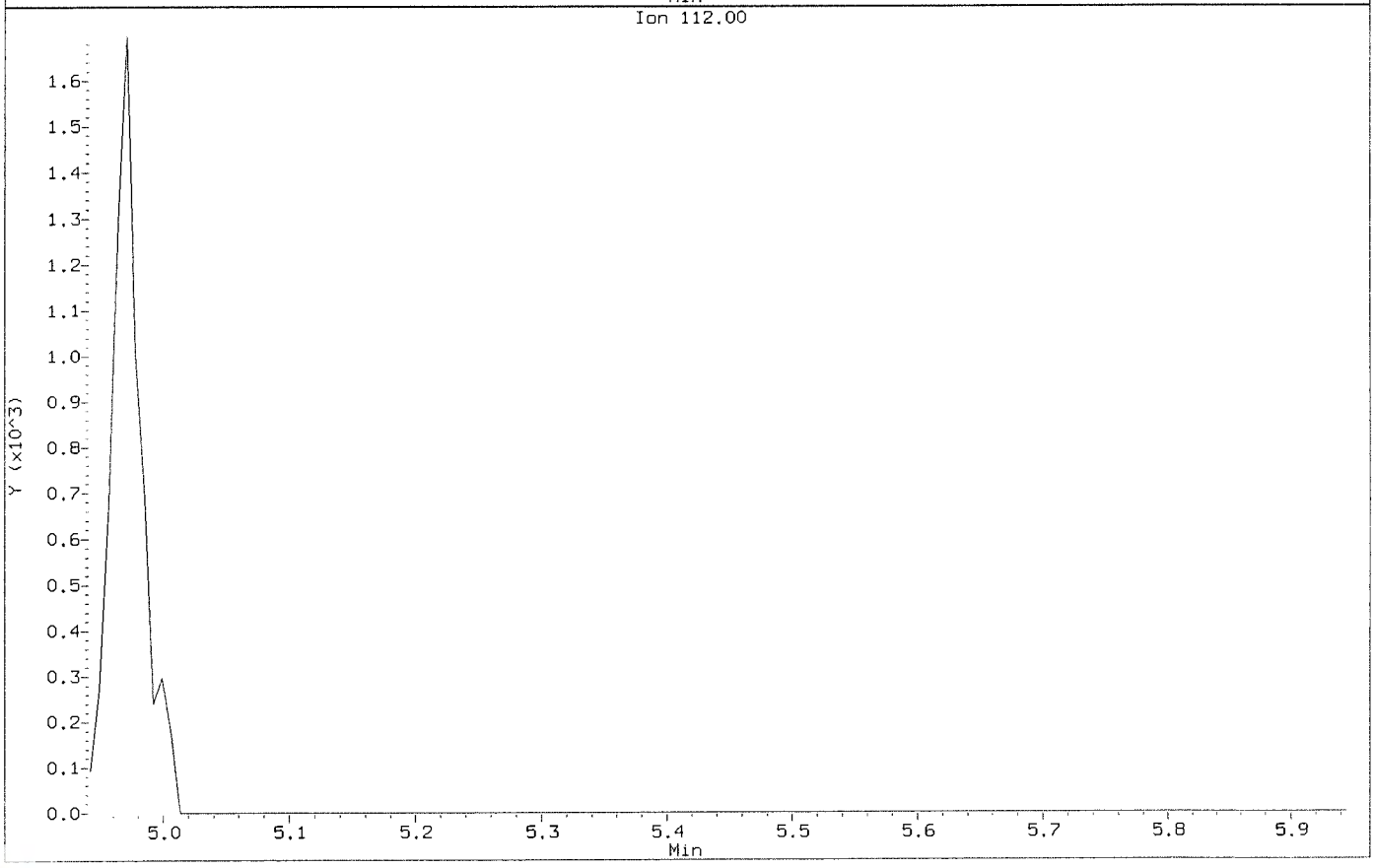
Compound: 1,2-Dibromo-3-Chloropropane
CAS Number: 96-12-8



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Client Sample ID: VSTD001

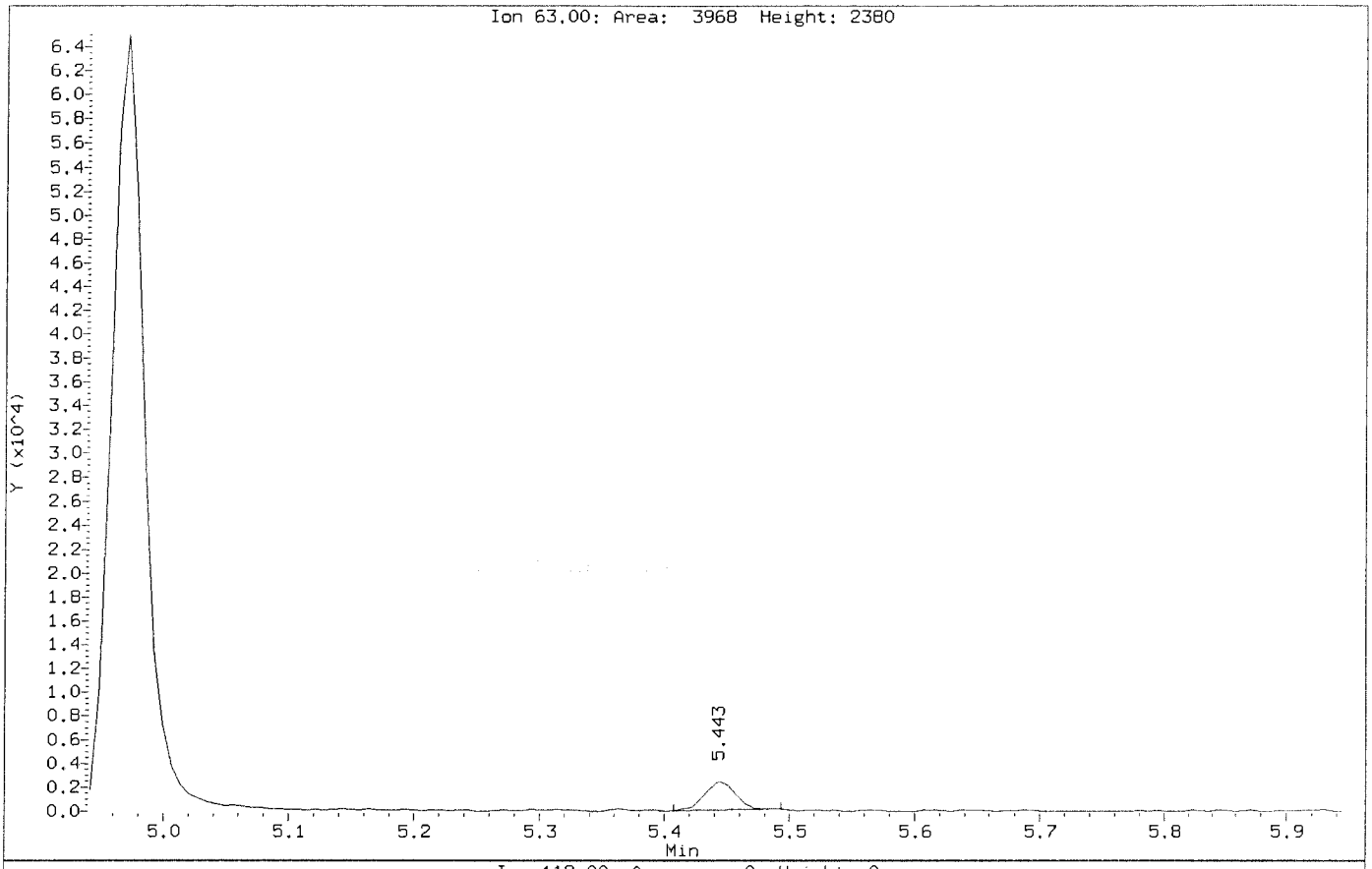
Compound: 1,2-Dichloropropane
CAS Number: 78-87-5

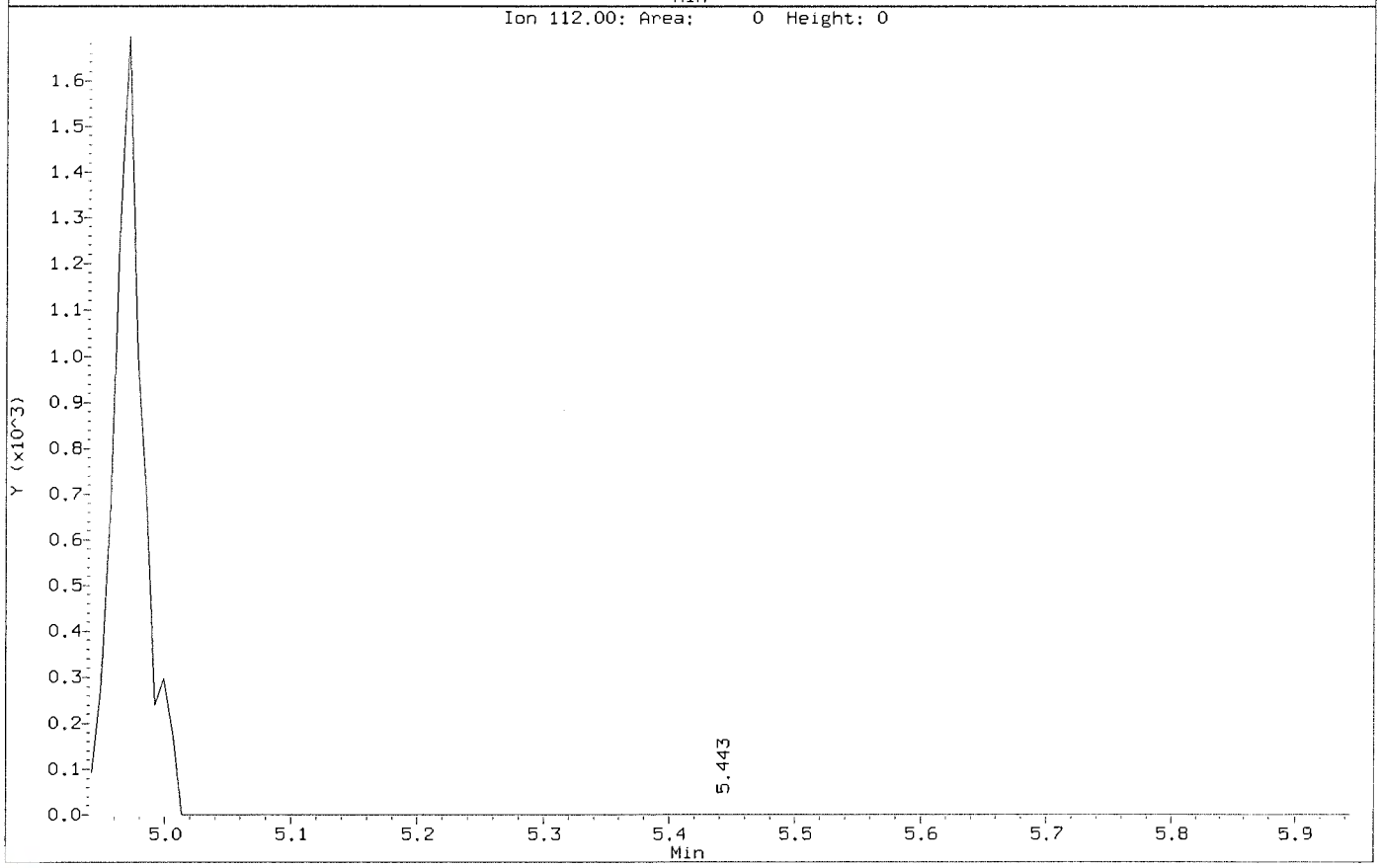




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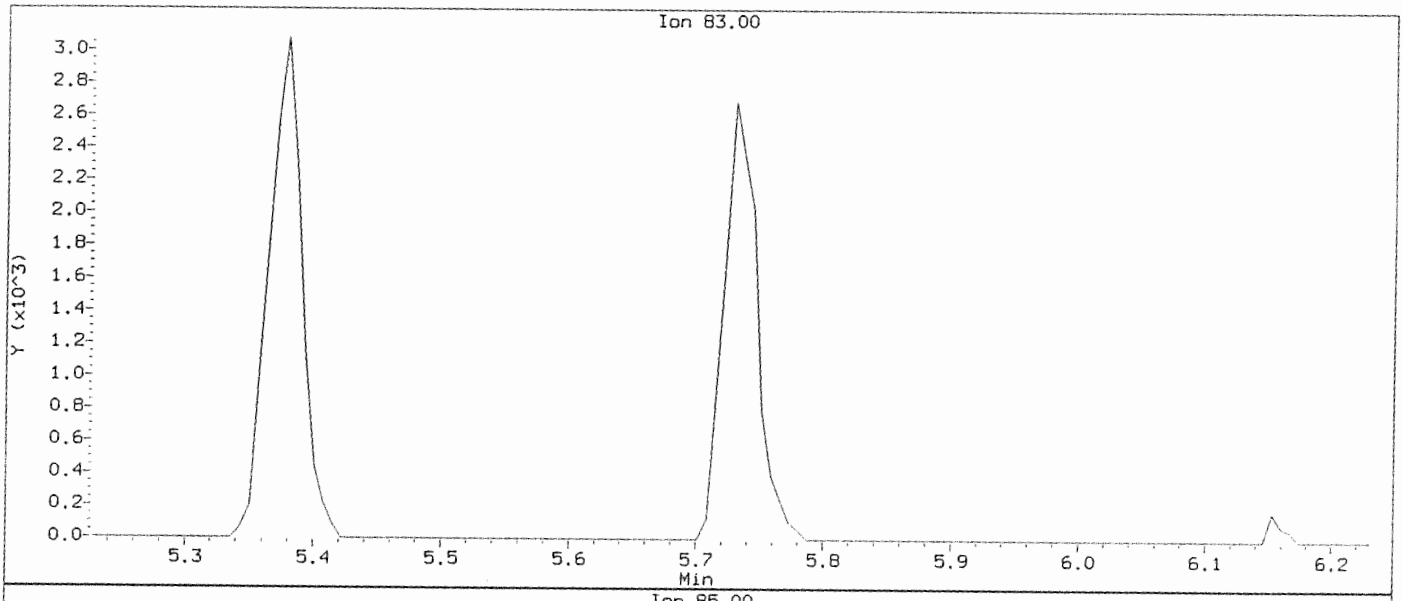
Compound: 1,2-Dichloropropane
CAS Number: 78-87-5

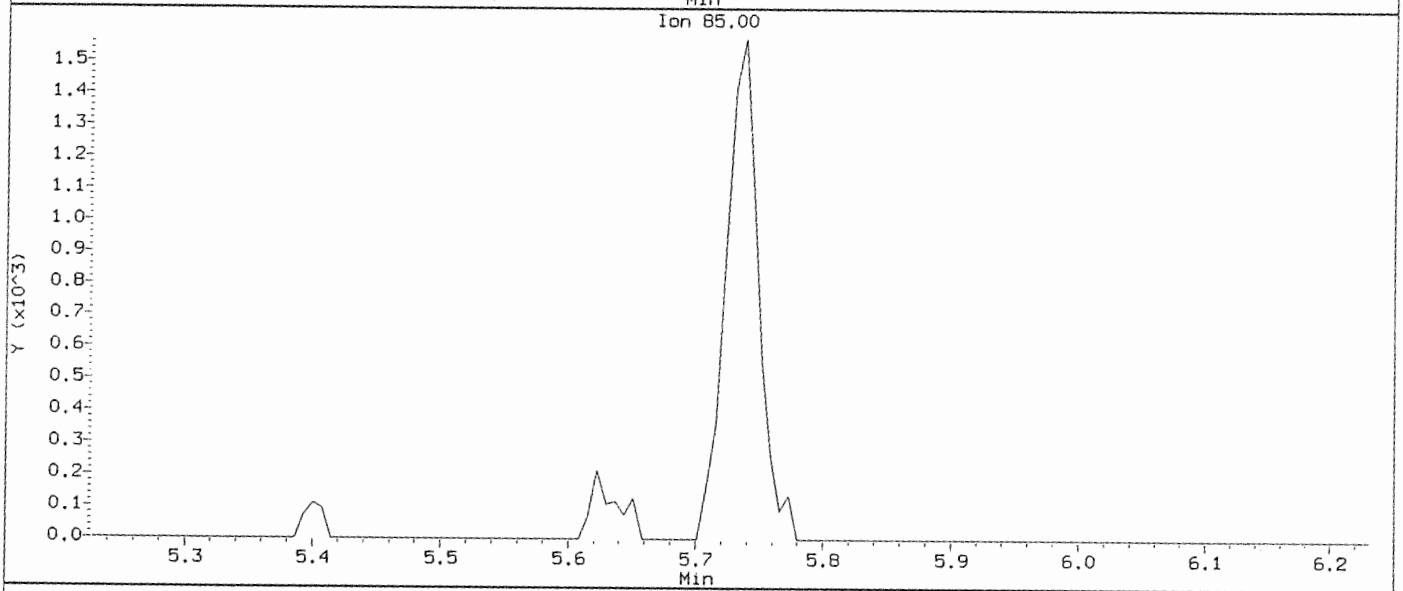


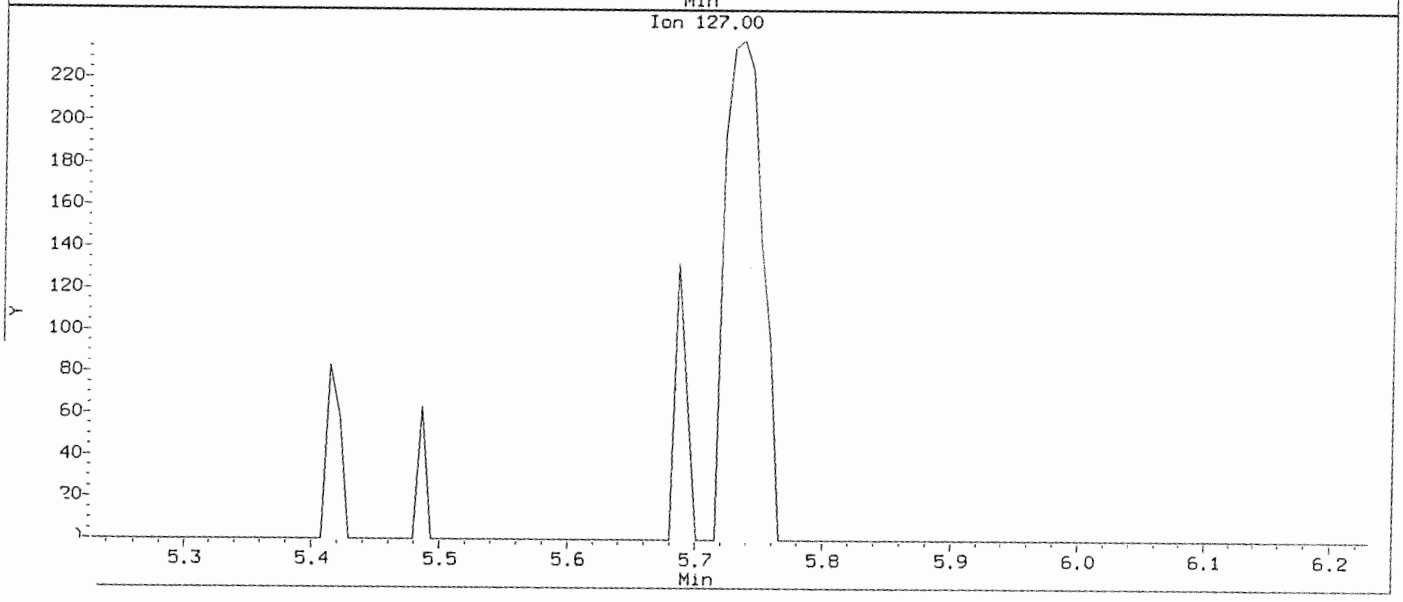


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nstrument: voa6.i
lient Sample ID: VSTD001

Compound: Bromodichloromethane
CAS Number: 75-27-4

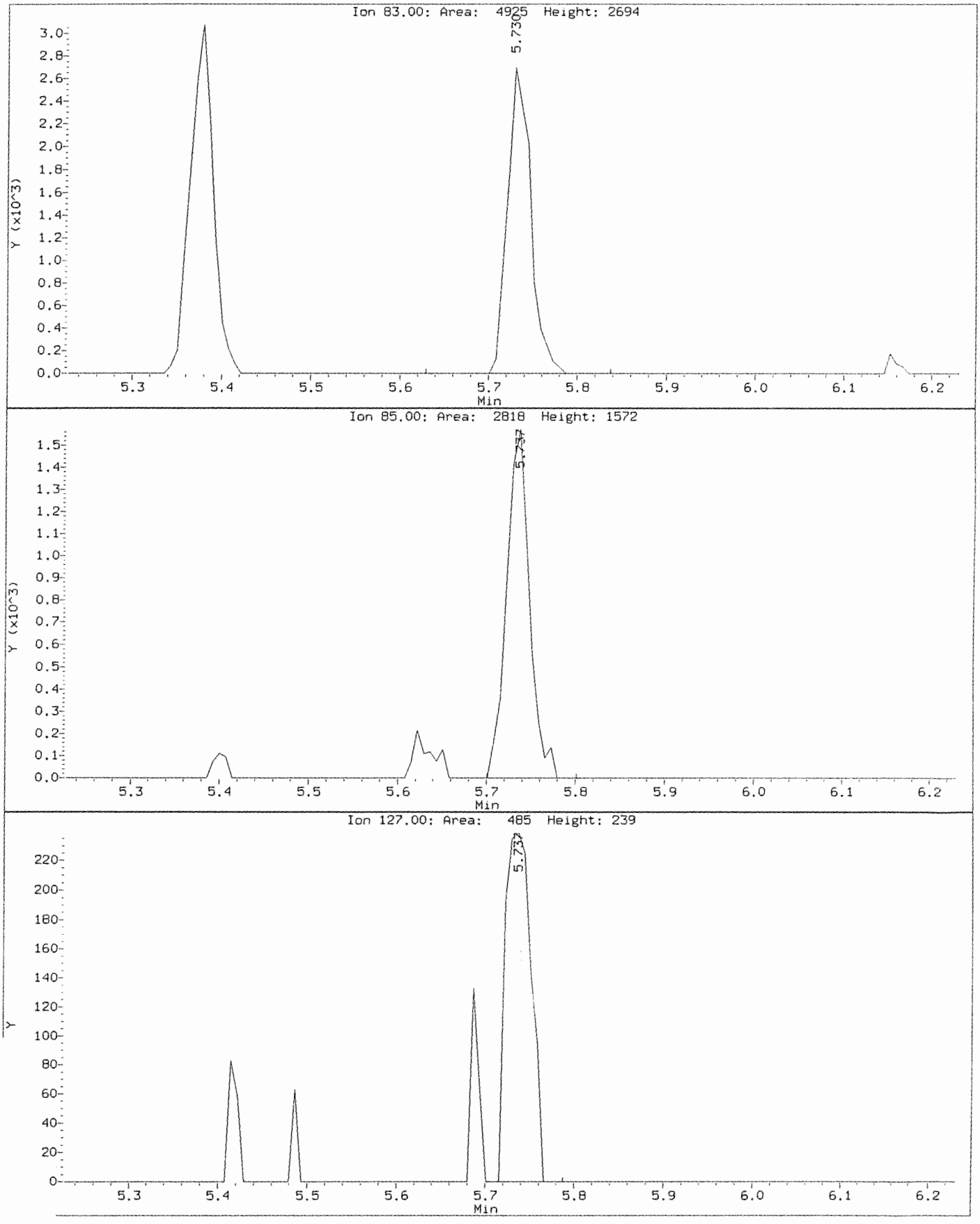






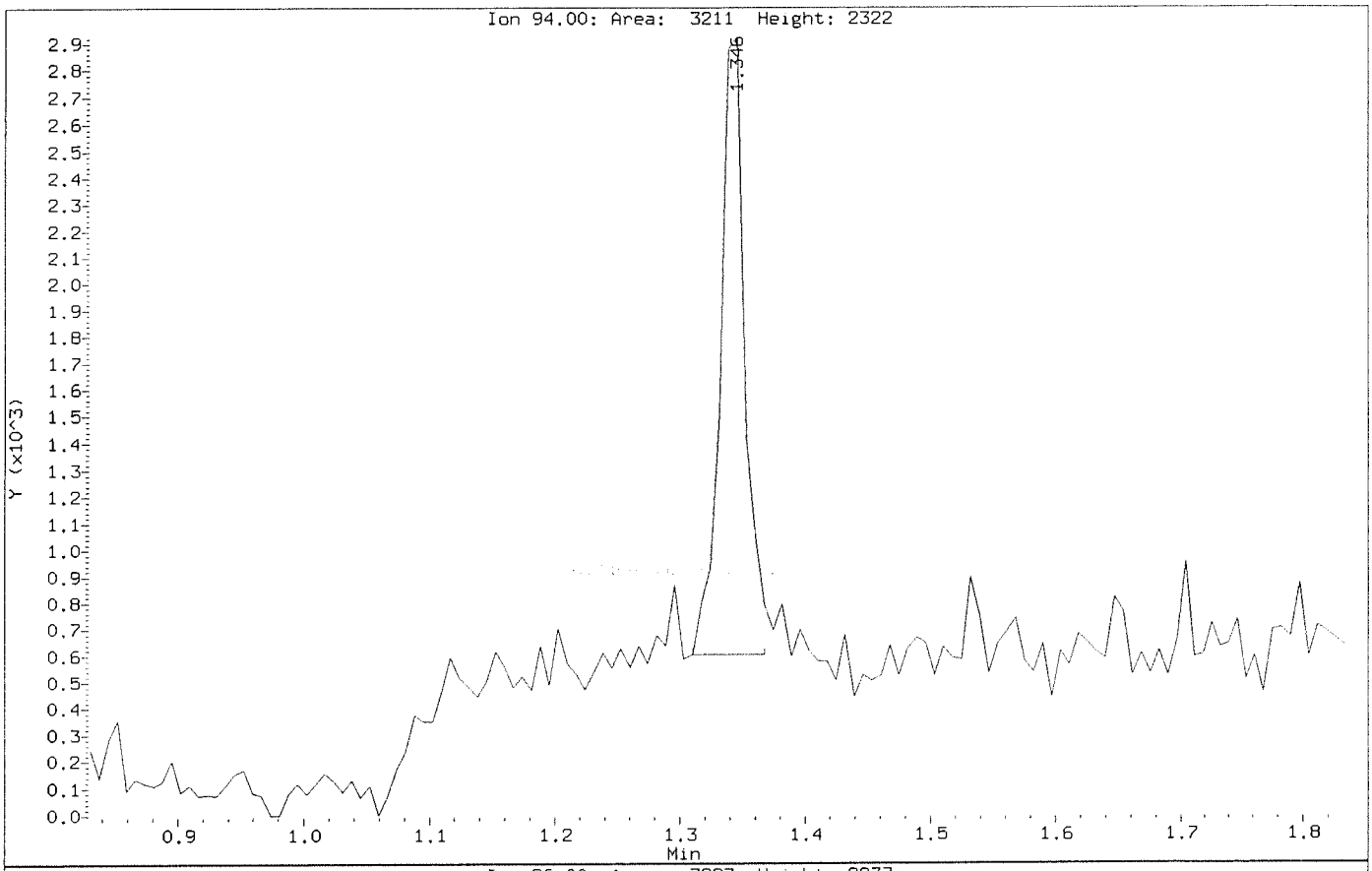
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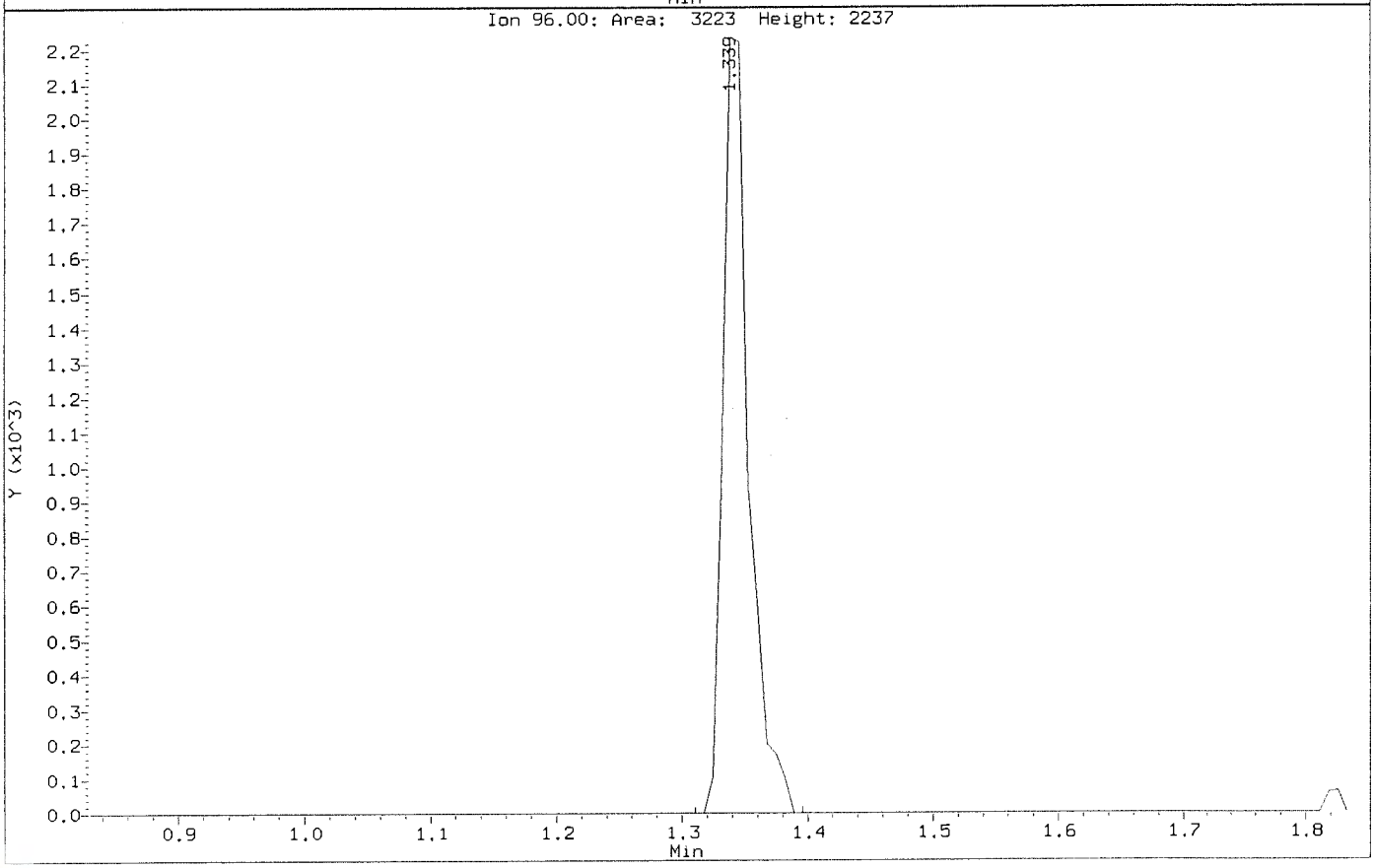
Compound: Bromodichloromethane
CAS Number: 75-27-4



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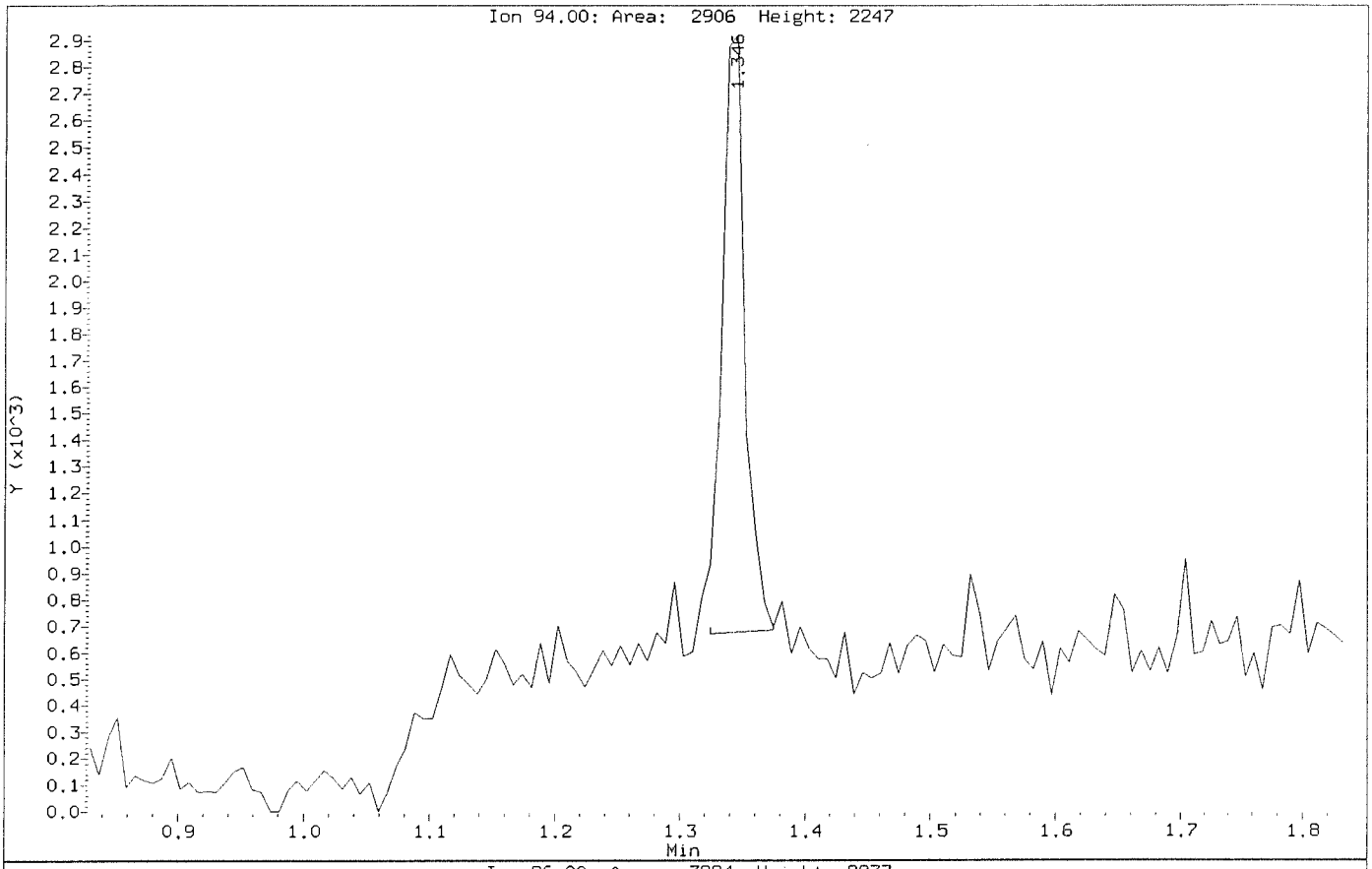
Compound: Bromomethane
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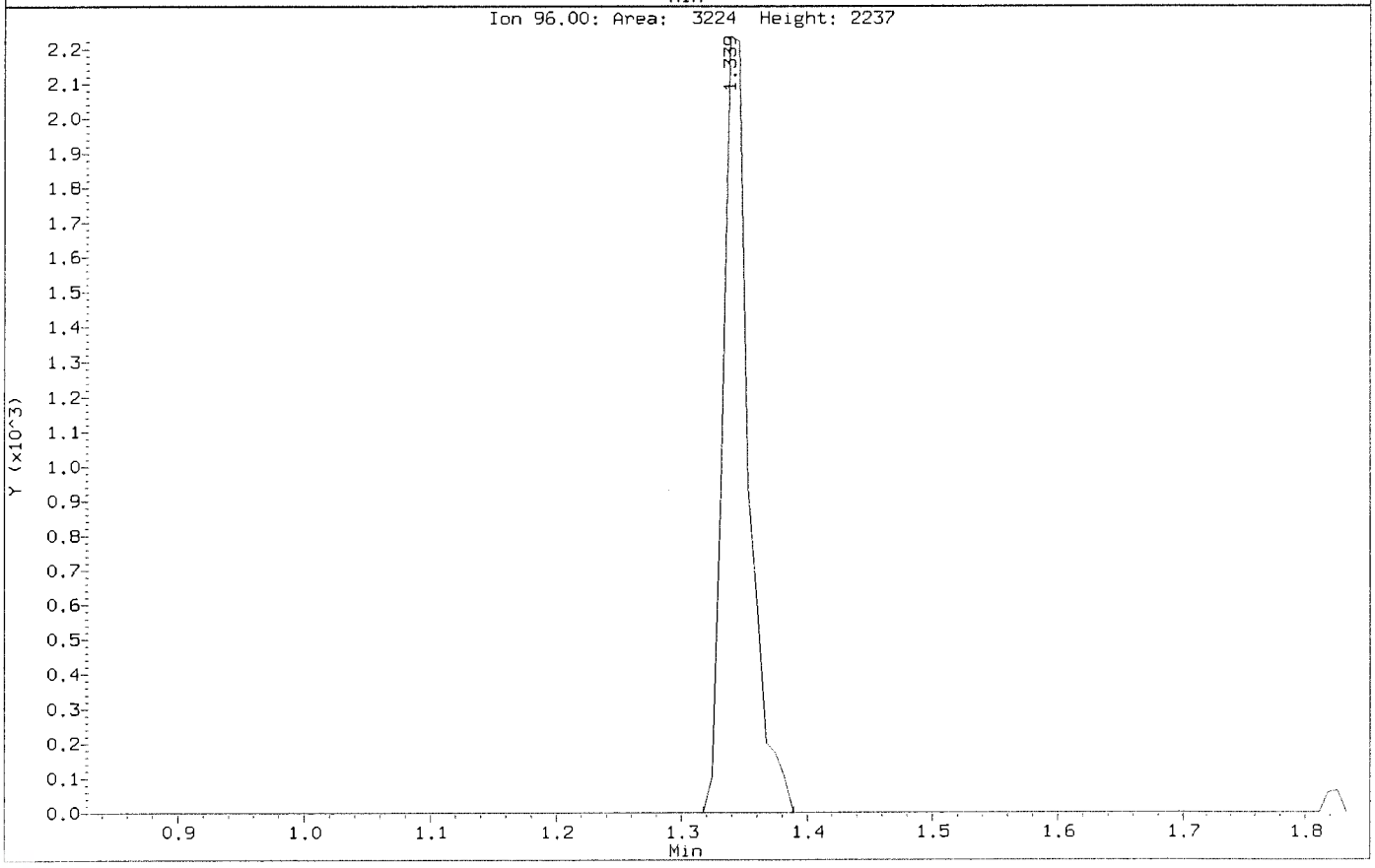




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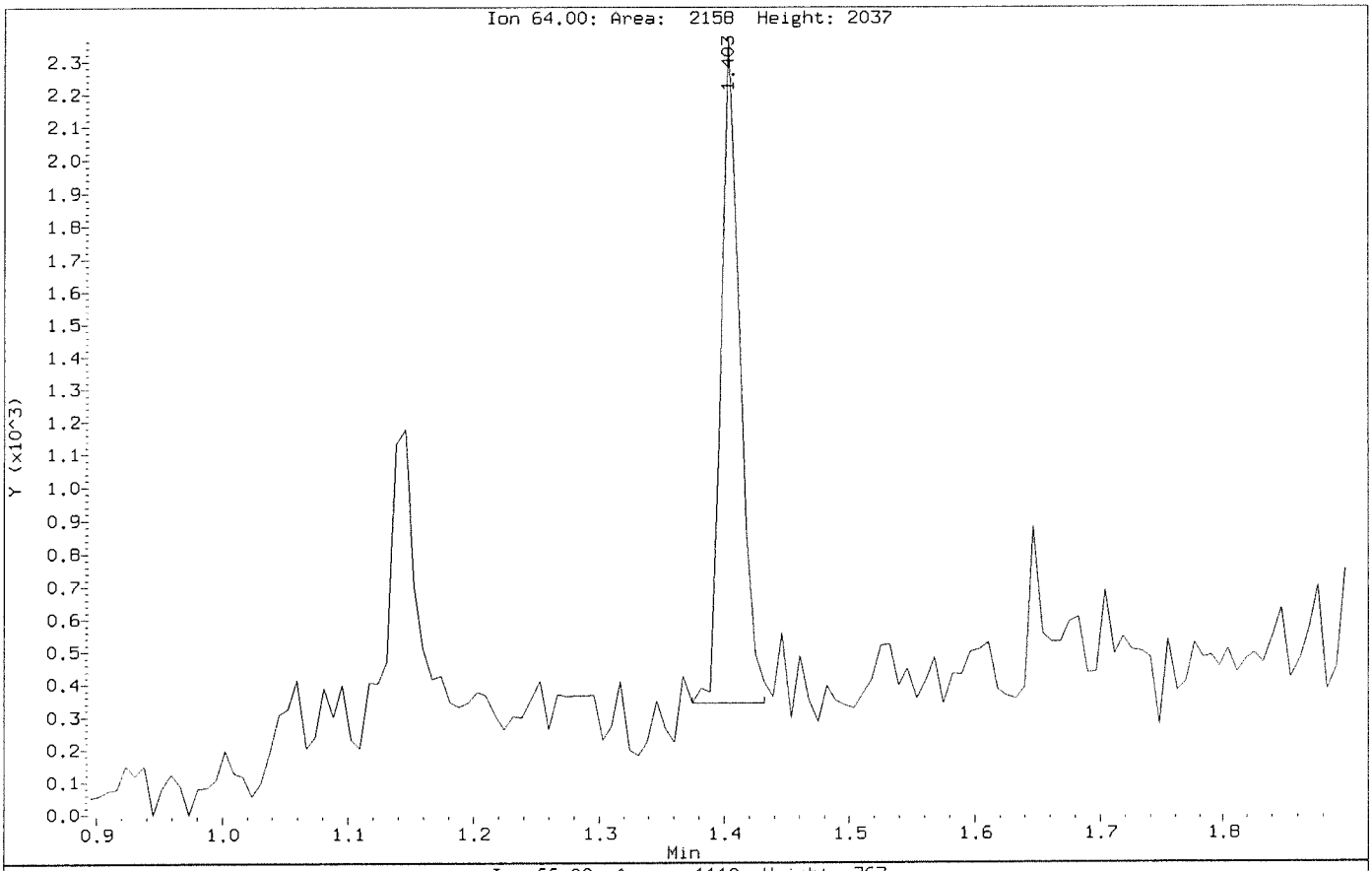
Compound: Bromomethane
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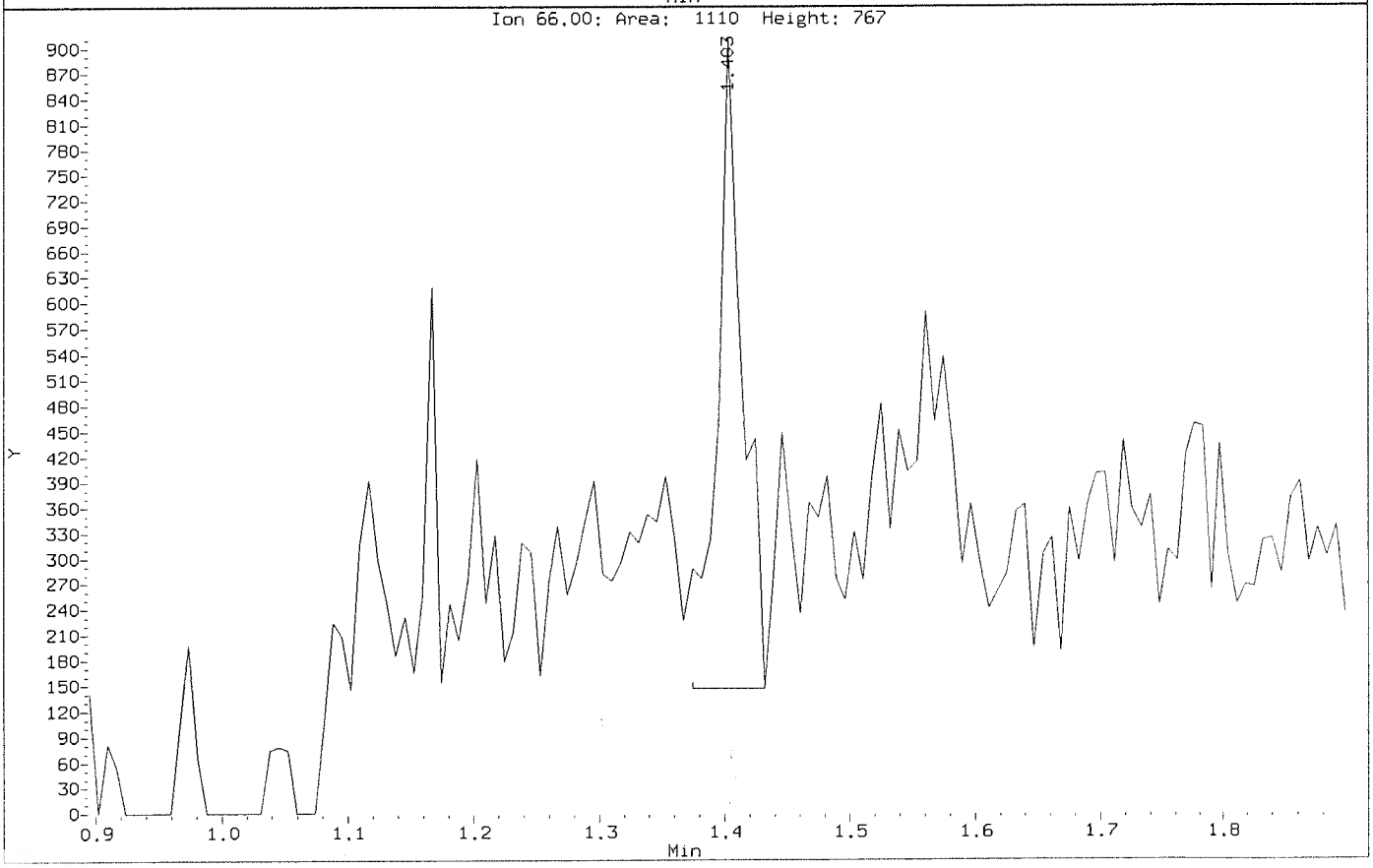




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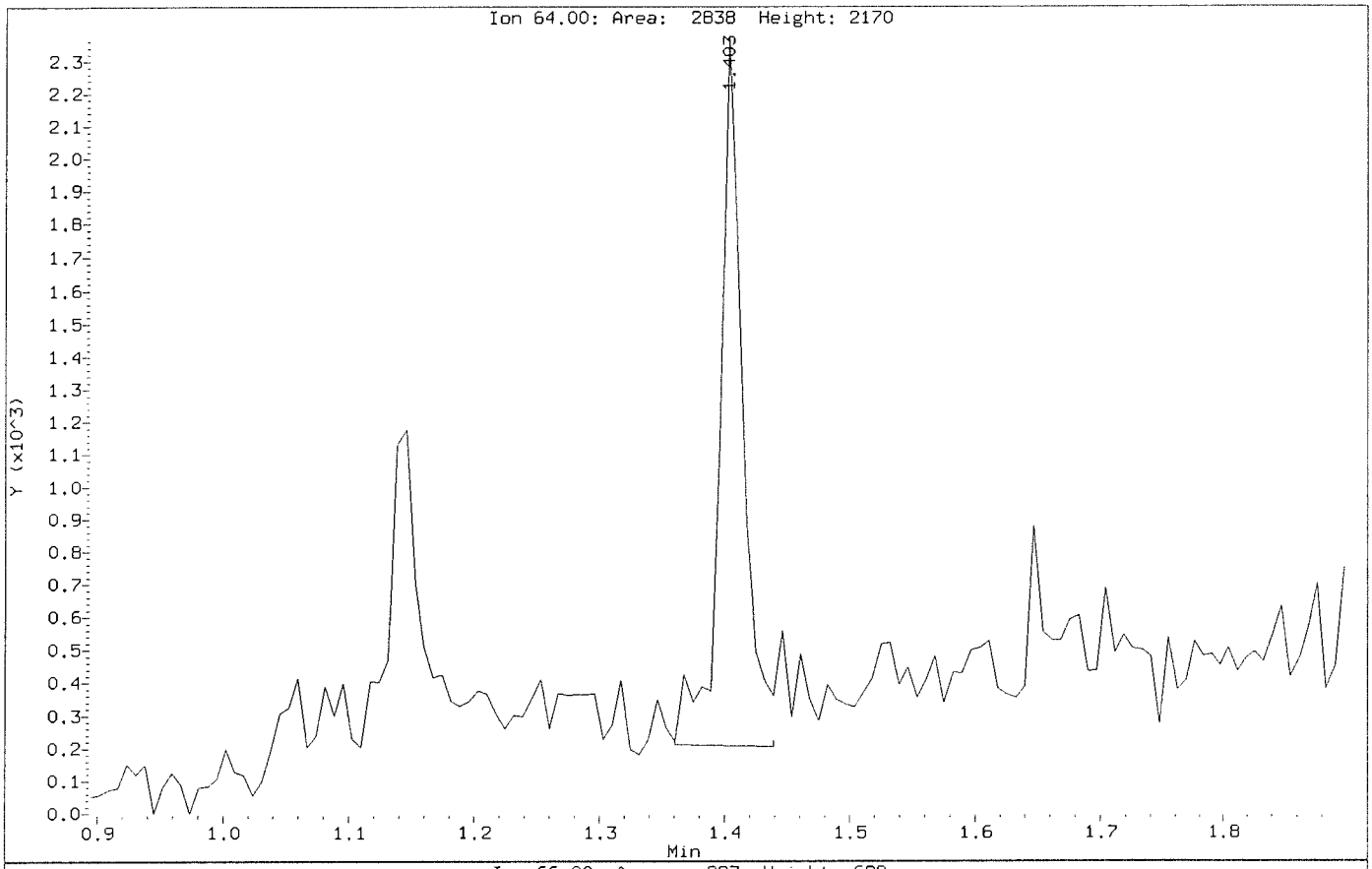
Compound: Chloroethane
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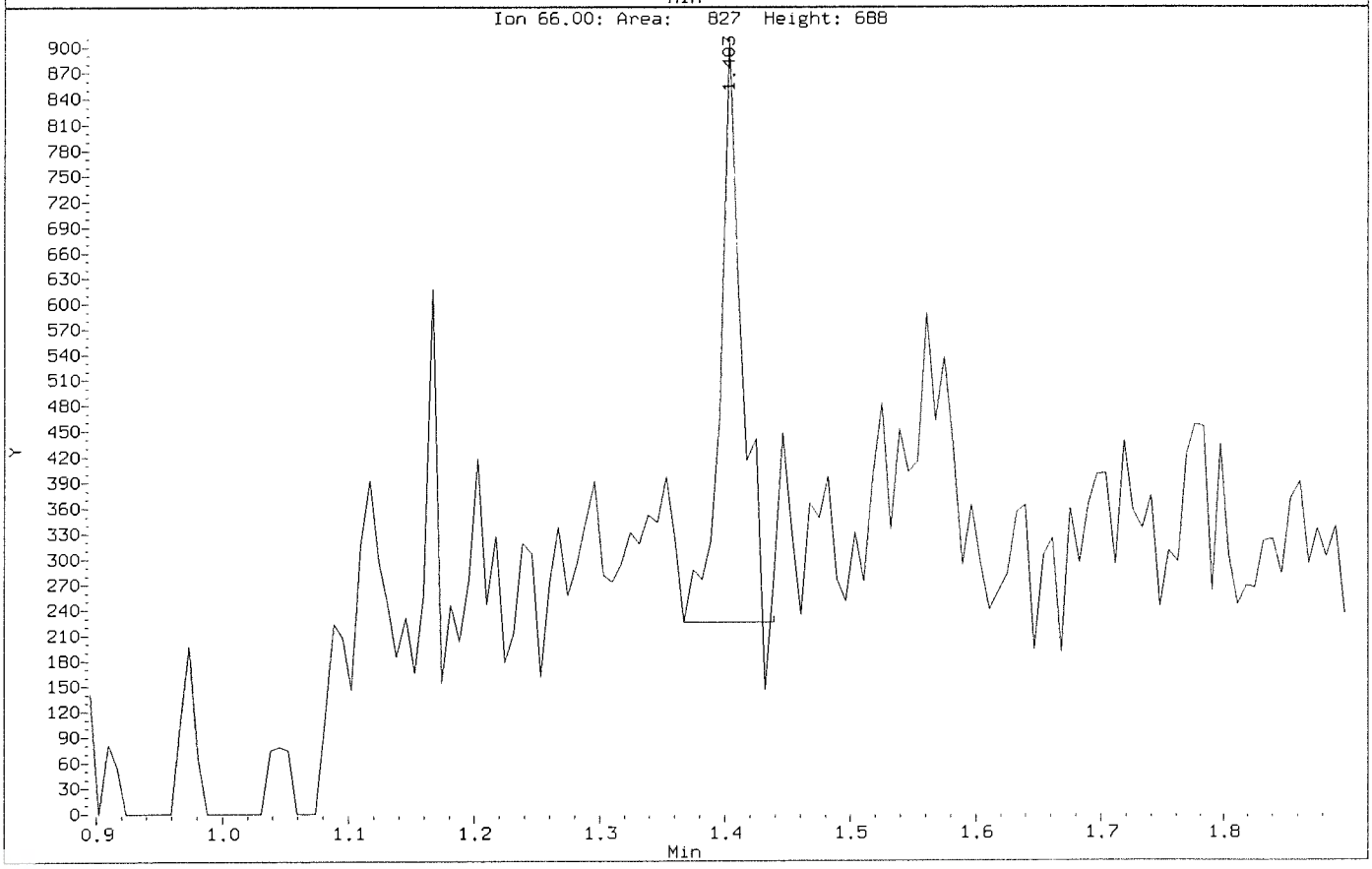




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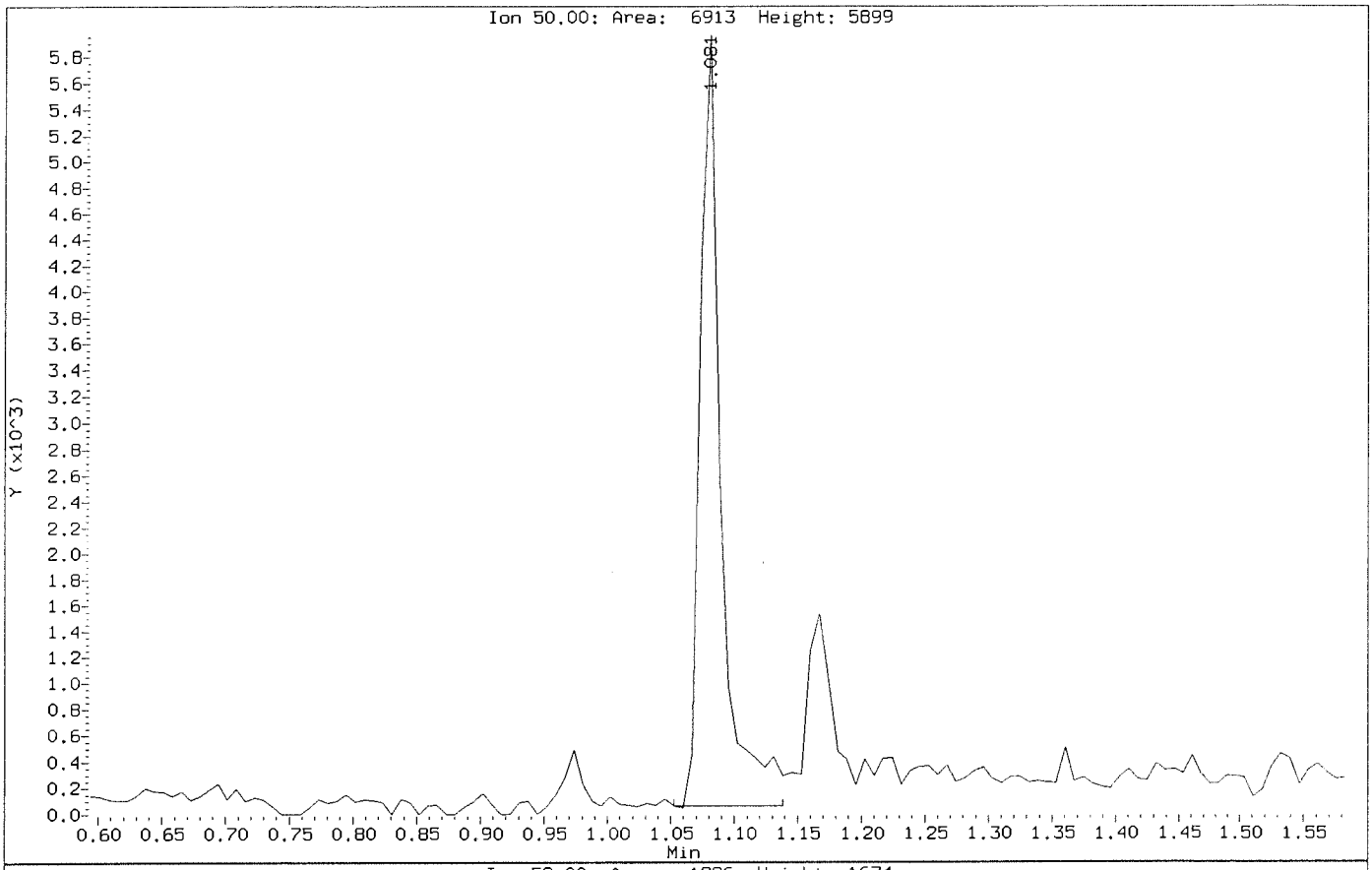
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CAS Number: 75-00-3

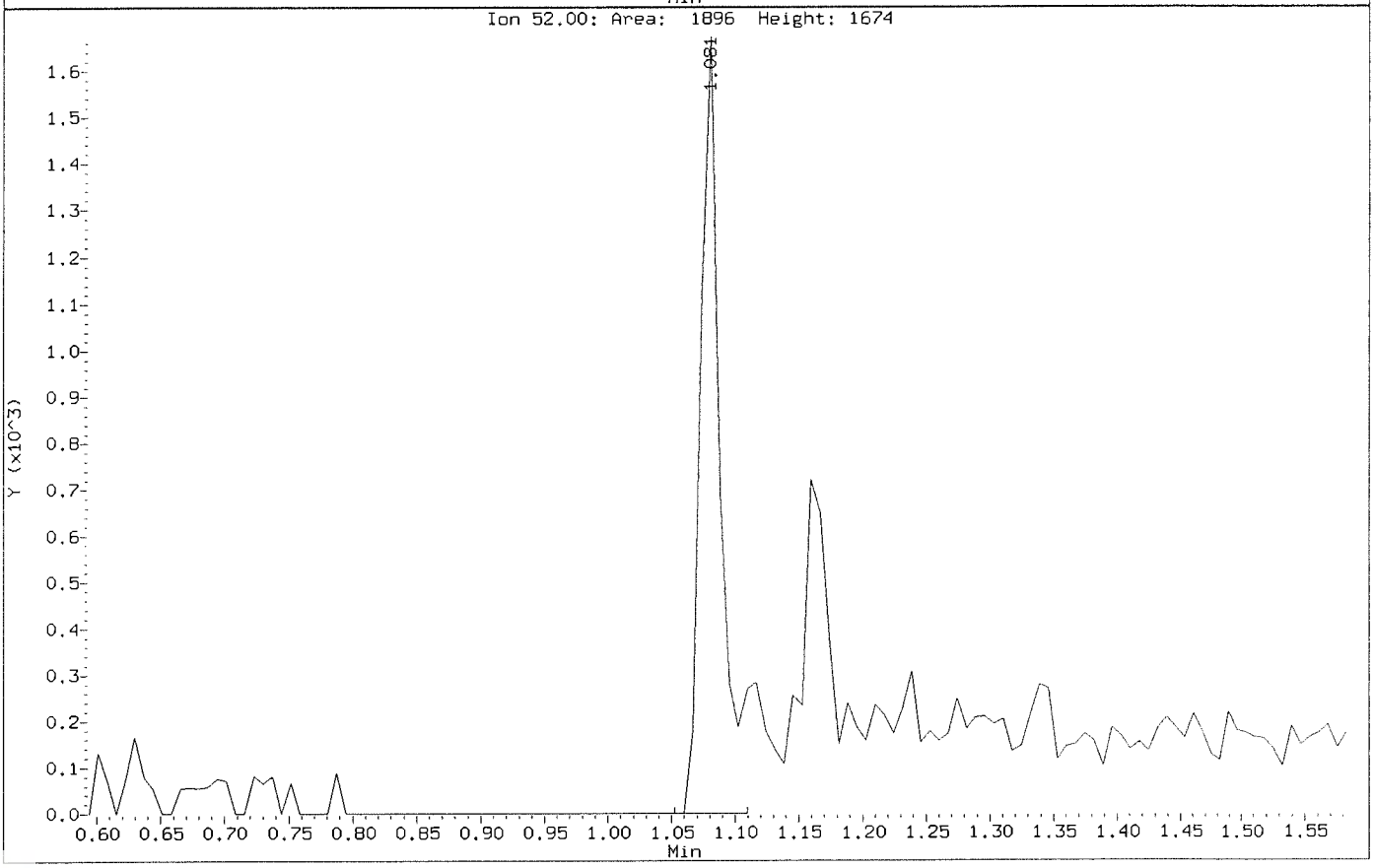




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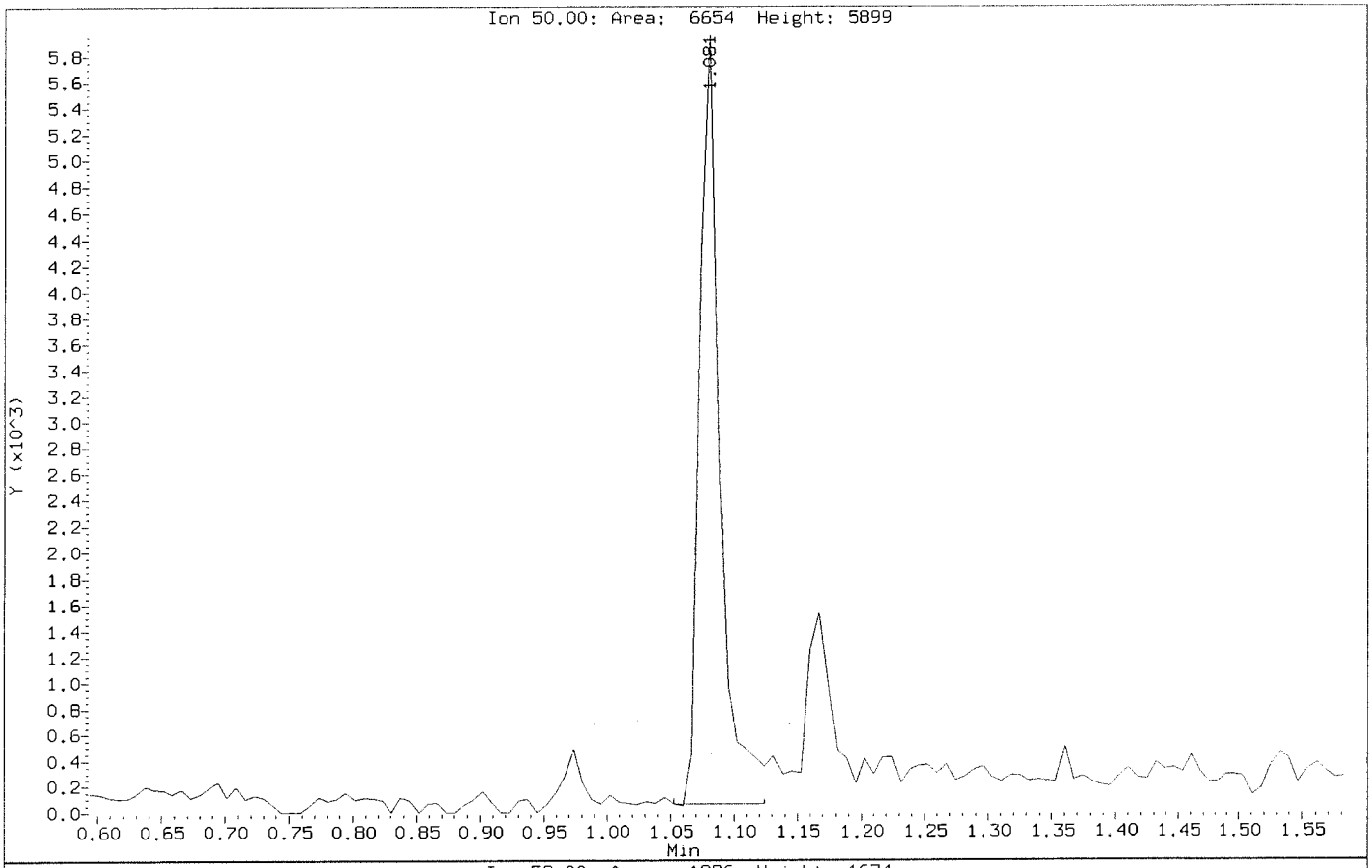
Compound: Chloromethane
CAS Number: 74-87-3

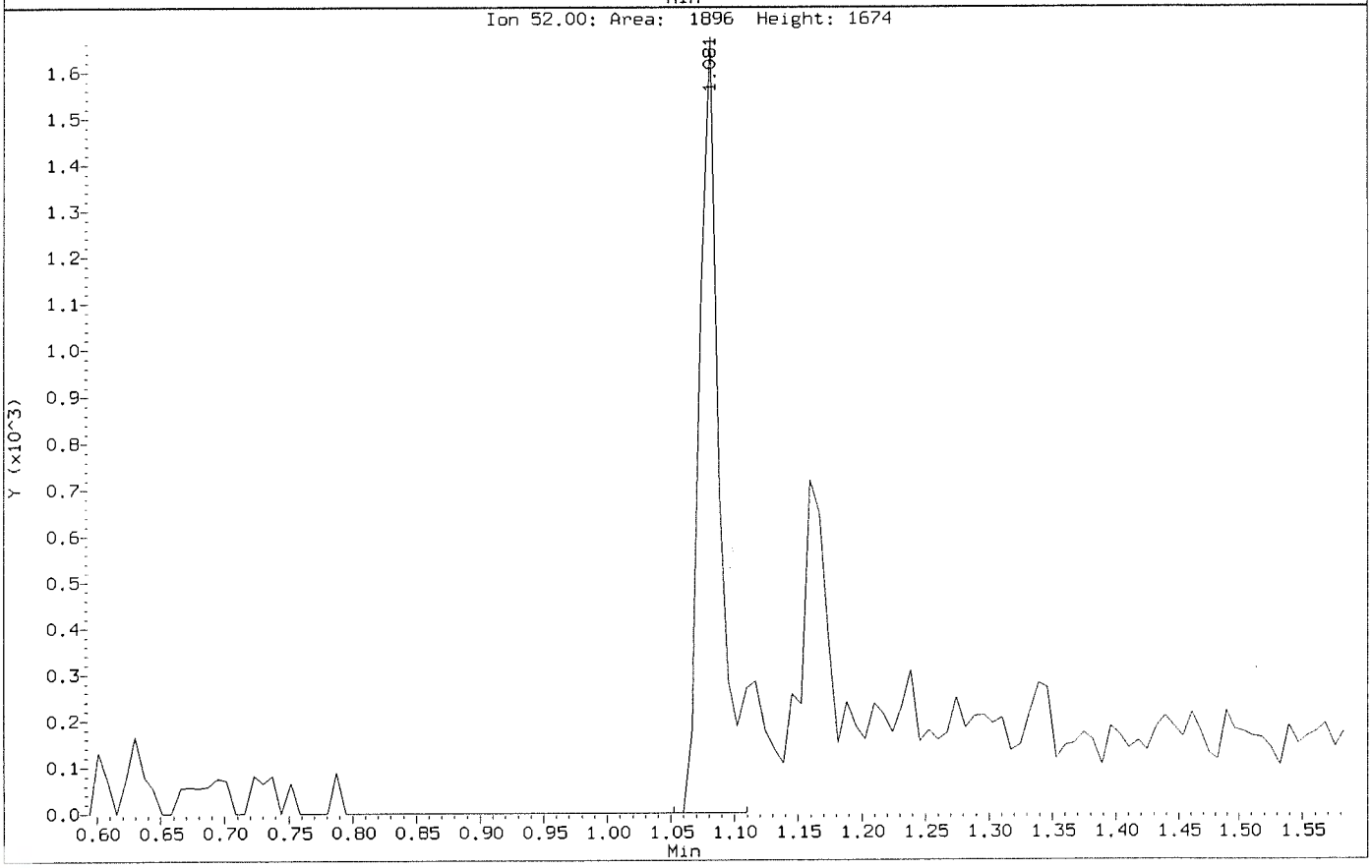




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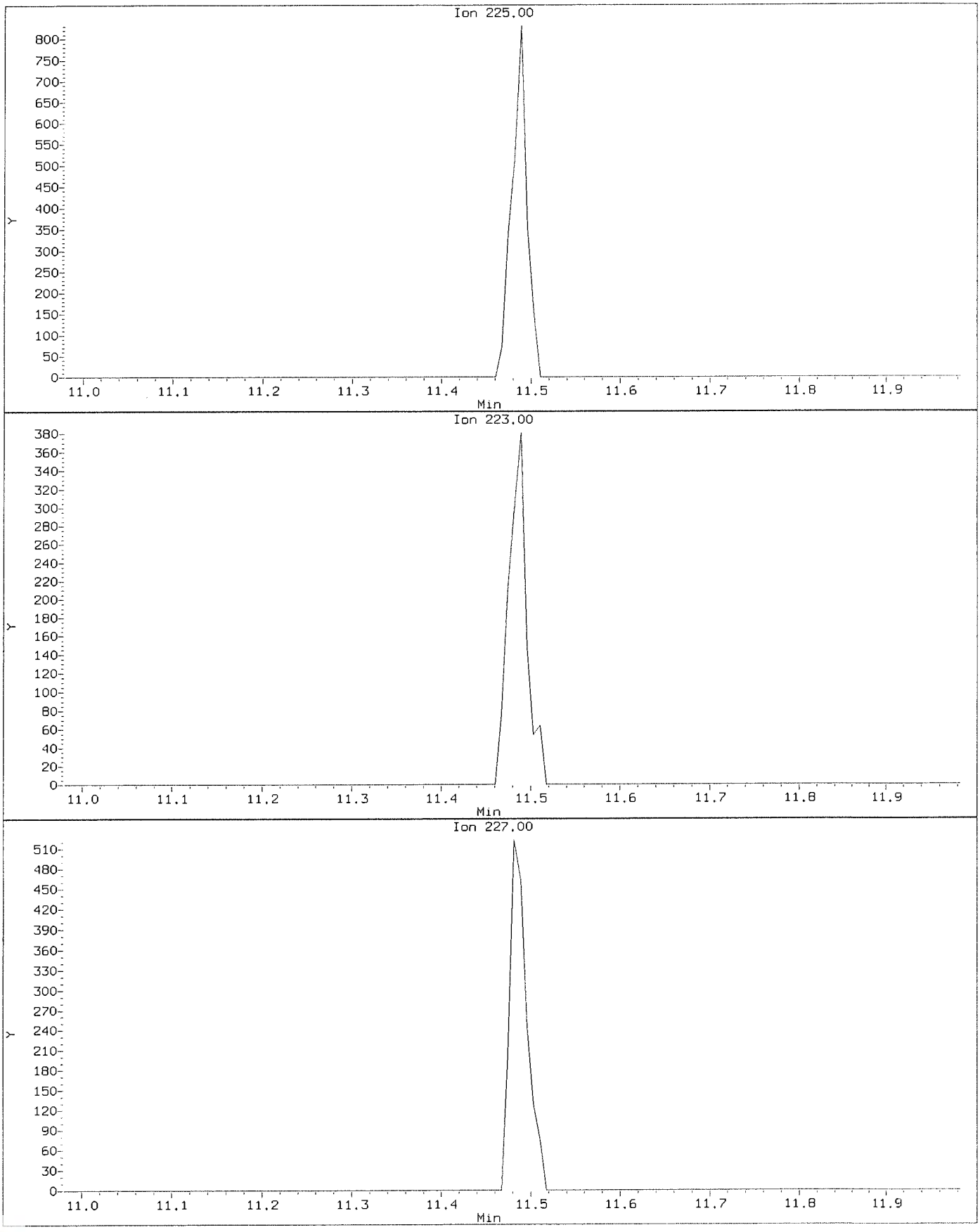
Compound: Chloromethane
CAS Number: 74-87-3





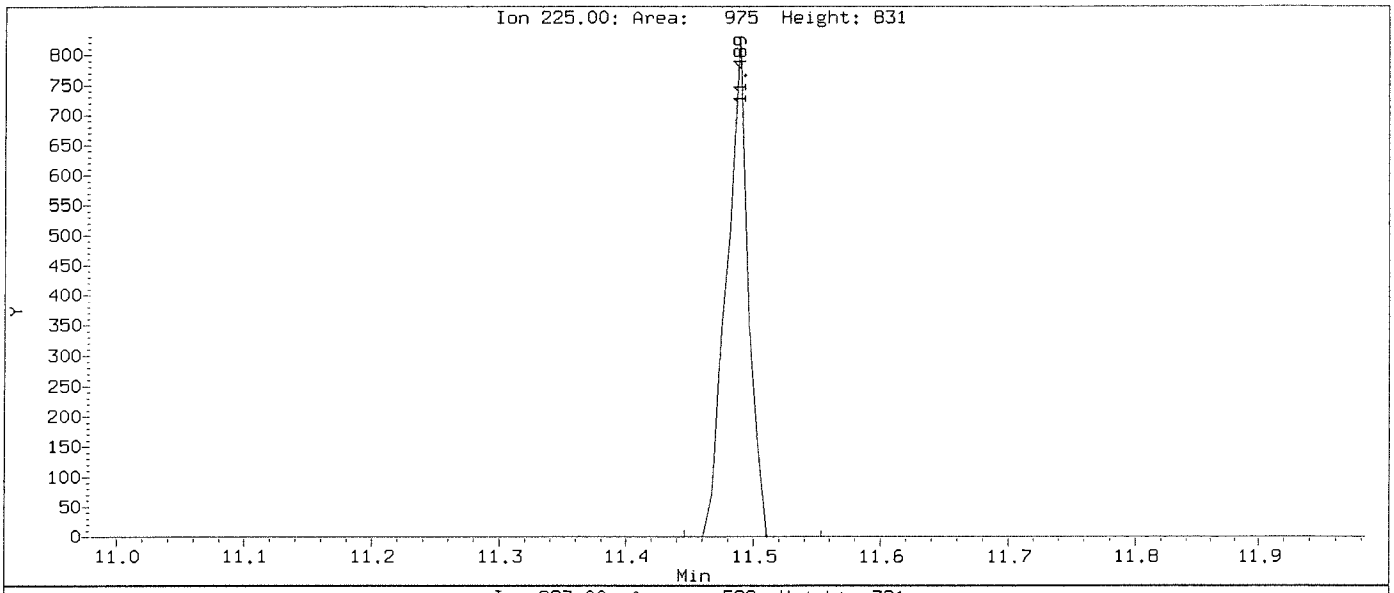
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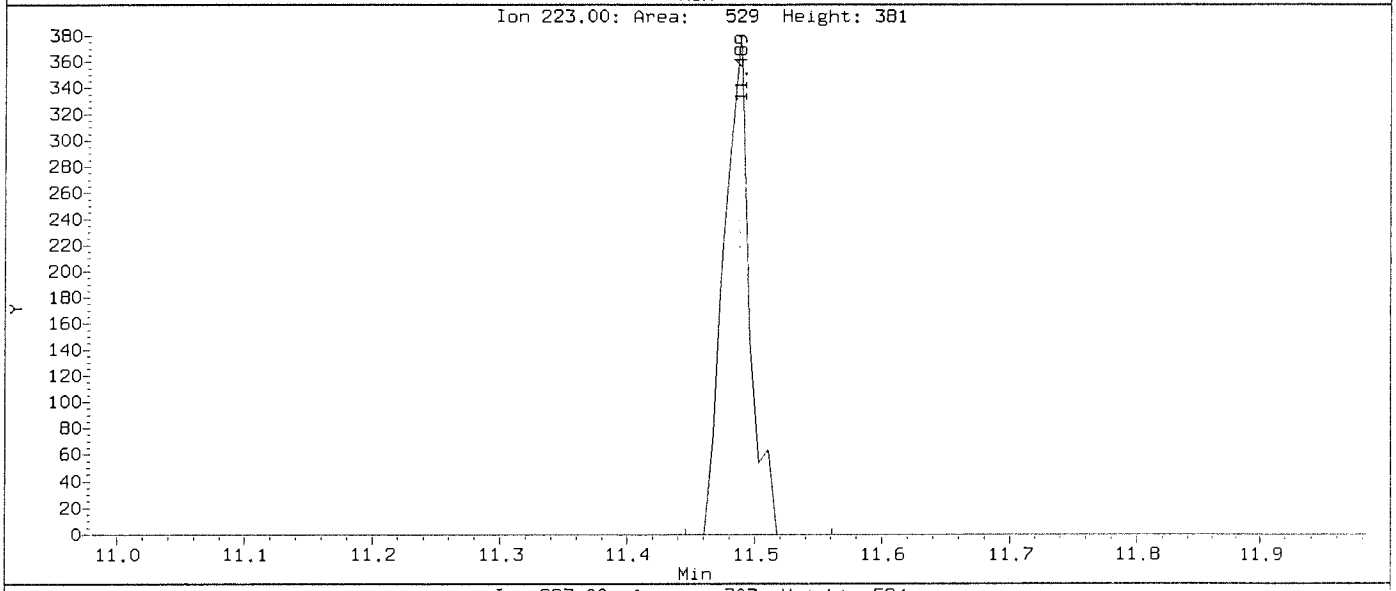
Compound: Hexachlorobutadiene
CAS Number: 87-68-3

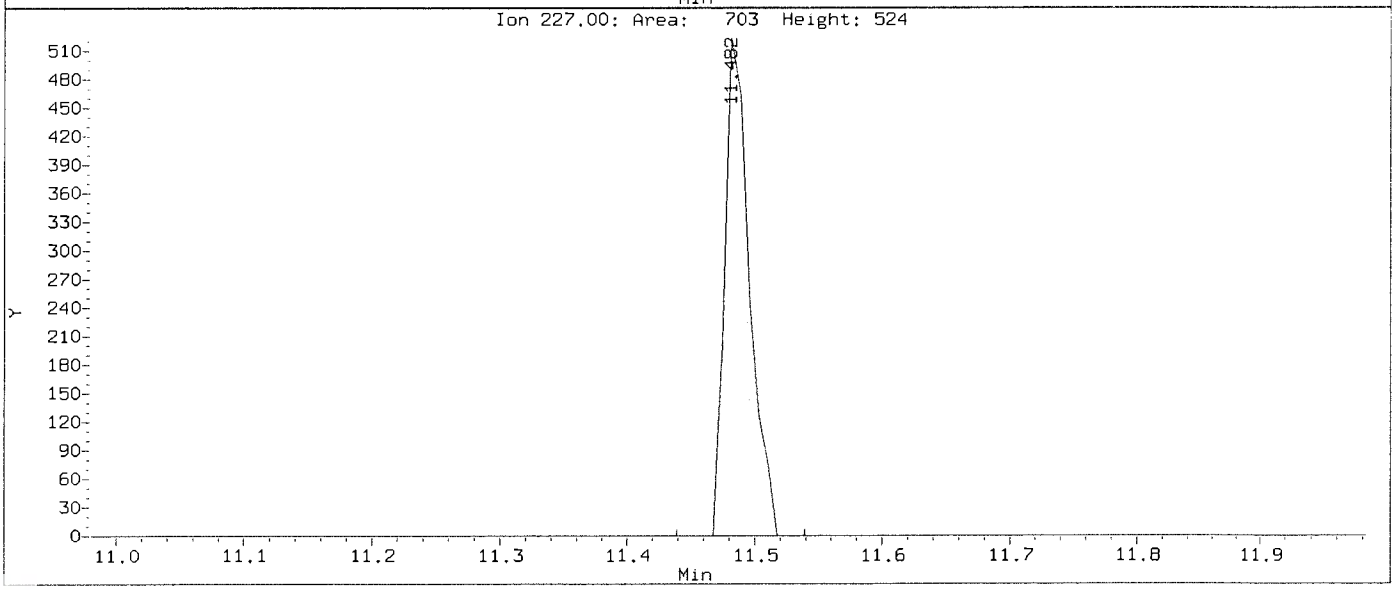


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Compound: Hexachlorobutadiene
CAS Number: 87-68-3

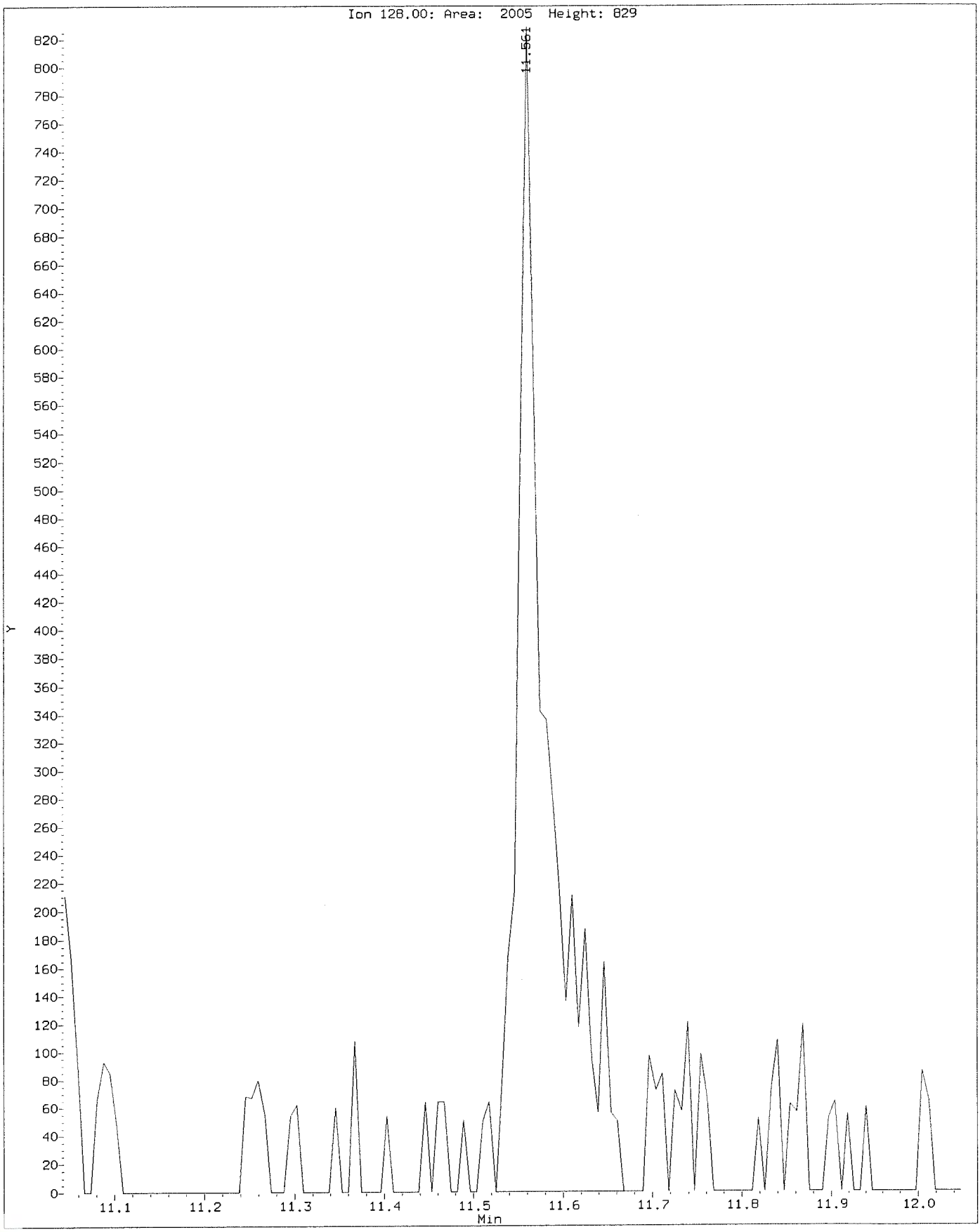






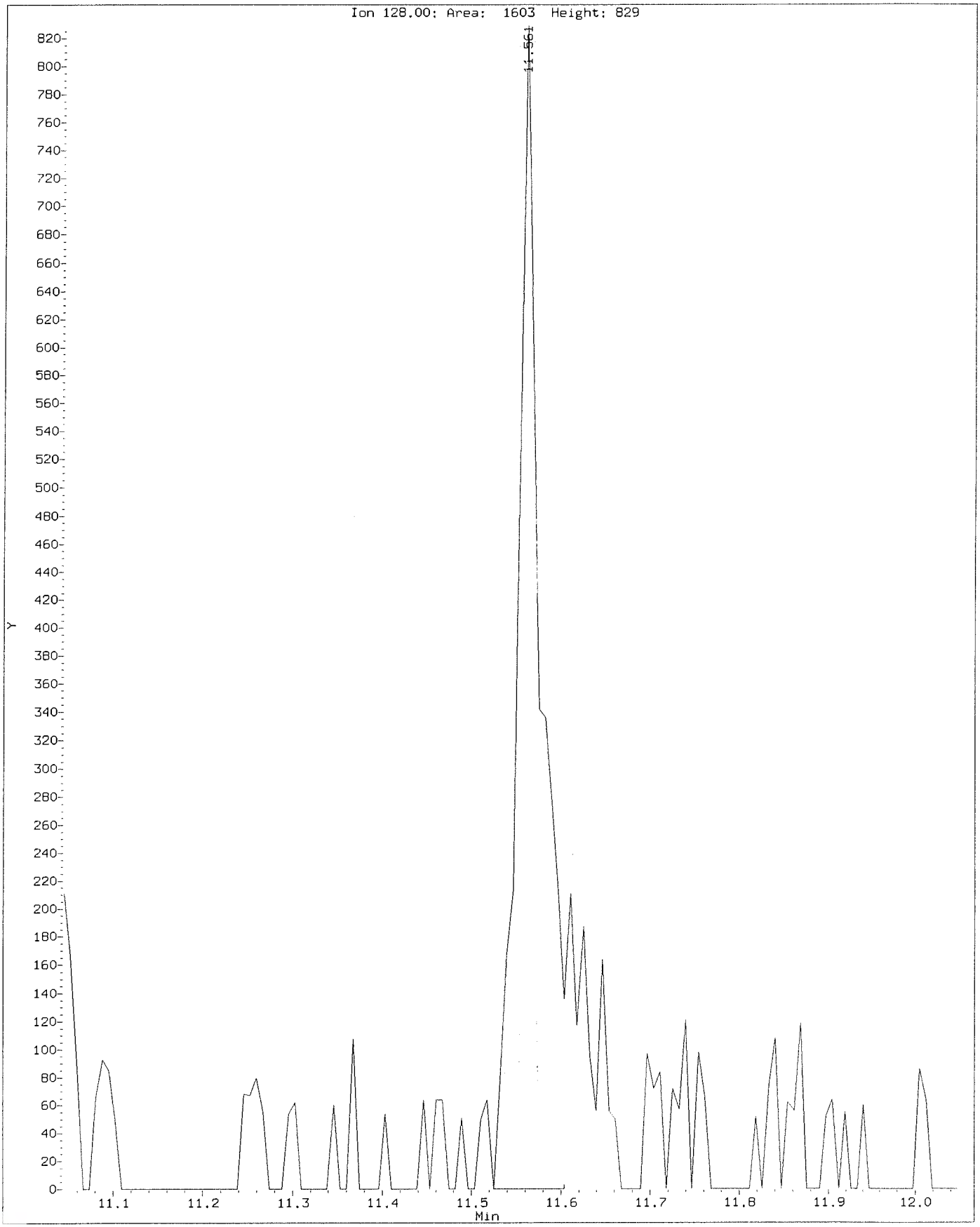
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Injection Date: 13-JUL-2020 11:42
Instrument: voa6.i
Client Sample ID: VSTD001

Compound: Naphthalene
CAS Number: 91-20-3



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Injection Date: 13-JUL-2020 11:42
Instrument: voa6.i
Client Sample ID: VSTD001

Compound: Naphthalene
CAS Number: 91-20-3



Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\X071305.D Page 1
Report Date: 13-Aug-2020 14:50

ALS Laboratory Group

Data file : \\nahstws005\Target\chem\voa6.i\X200713.b\X071305.D
Lab Smp Id: VSTD002 Client Smp ID: VSTD002
Inj Date : 13-JUL-2020 12:06
Operator : PC Inst ID: voa6.i
Smp Info : VSTD002;VSTD002;1;4;
Misc Info : HS18090001;WATER;0;1;
Comment   :
Method   : \\nahstws005\Target\chem\voa6.i\X200713.b\8260W.m
Meth Date : 13-Aug-2020 14:50 voa6.i Quant Type: ISTD
Cal Date : 13-JUL-2020 11:42 Cal File: X071304.D
Als bottle: 6 Calibration Sample, Level: 4
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: bhate.sub
Target Version: 4.14
Processing Host: NAHSTW7056

Concentration Formula: Amt * DF * (Uf/Vo)*1 * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Uf	5.000	ng unit correction factor
Vo	5.000	sample purged
Cpnd Variable		Local Compound Variable

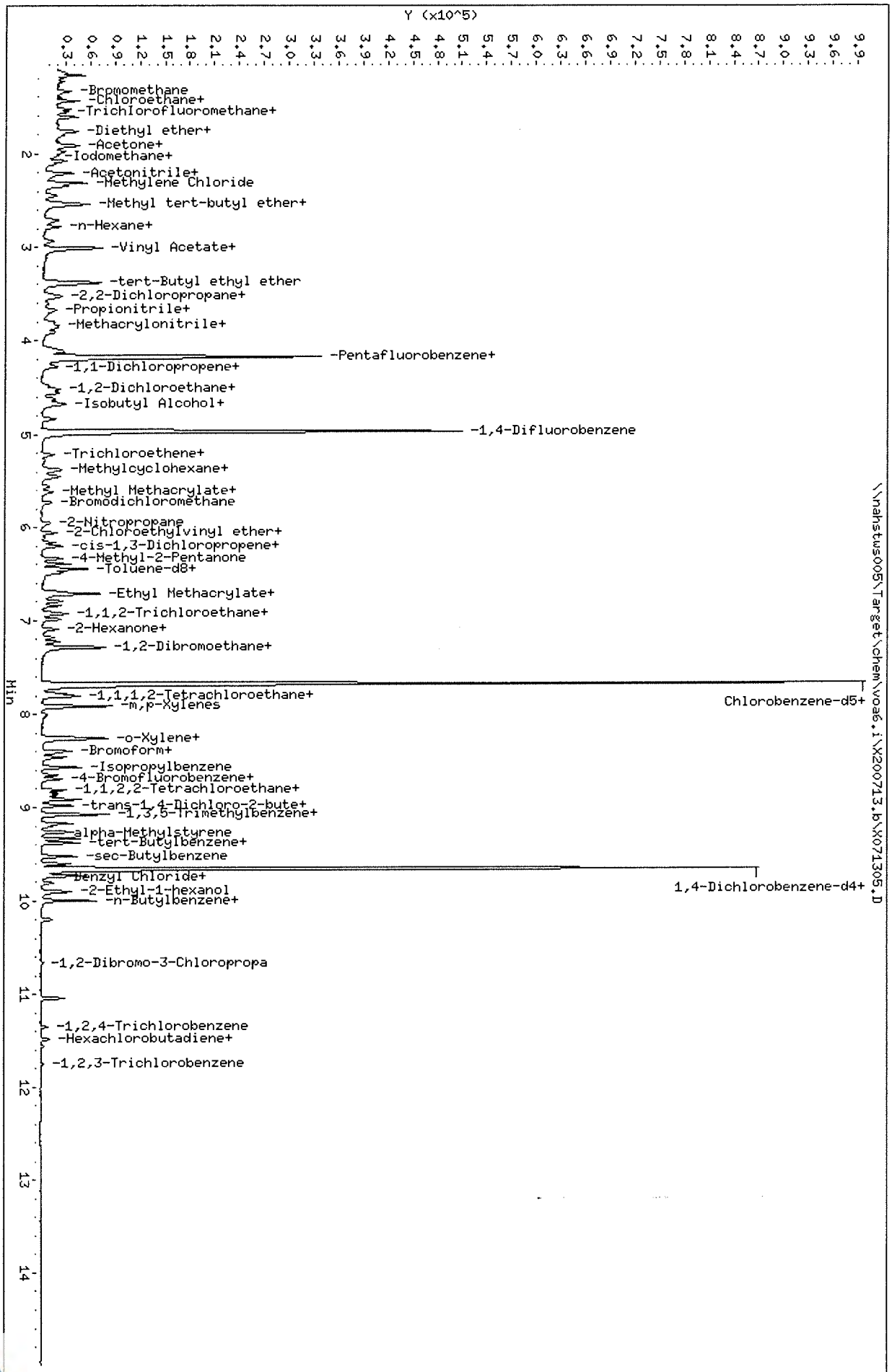
Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/l)	AMOUNTS ON-COL (ug/l)
* 1 Pentafluorobenzene	168	4.182	4.182	(1.000)	241171	50.0000	
* 36 1,4-Difluorobenzene	114	4.970	4.970	(1.000)	361641	50.0000	
* 47 Chlorobenzene-d5	117	7.671	7.671	(1.000)	414402	50.0000	
* 70 1,4-Dichlorobenzene-d4	152	9.669	9.669	(1.000)	191002	50.0000	
$ 30 Dibromofluoromethane	113	4.103	4.103	(0.981)	5716	2.00000	2.04(a)
$ 35 1,2-Dichloroethane-d4	65	4.483	4.483	(1.072)	6078	2.00000	1.99(a)
$ 48 Toluene-d8	98	6.396	6.396	(0.834)	20027	2.00000	1.84(a)
$ 69 4-Bromofluorobenzene	95	8.695	8.695	(1.134)	7984	2.00000	1.47(a)
60 1,1,1,2-Tetrachloroethane	131	7.778	7.778	(1.014)	6232	2.00000	1.94(a)
31 1,1,1-Trichloroethane	97	4.096	4.096	(0.979)	8965	2.00000	2.04(a)
68 1,1,2,2-Tetrachloroethane	83	8.845	8.845	(0.915)	7313	2.00000	2.07(a)
53 1,1,2-Trichloroethane	83	6.847	6.847	(0.893)	4901	2.00000	1.93(a)
22 1,1-Dichloroethane	63	2.929	2.929	(0.700)	14670	2.00000	2.17(a)
11 1,1-Dichloroethene	96	1.919	1.919	(0.459)	4557	2.00000	2.15(a)
32 1,1-Dichloropropene	75	4.290	4.290	(0.863)	5660	2.00000	1.67(a)
93 1,2,3-Trichlorobenzene	180	11.746	11.746	(1.215)	1388	2.00000	2.14(a)
71 1,2,3-Trichloropropane	75	8.867	8.867	(0.917)	6285	2.00000	2.02(aM)
90 1,2,4-Trichlorobenzene	180	11.352	11.352	(1.174)	2468	2.00000	2.01(a)
79 1,2,4-Trimethylbenzene	105	9.383	9.383	(0.970)	21231	2.00000	2.02(a)
89 1,2-Dibromo-3-Chloropropane	155	10.665	10.665	(1.103)	578	2.00000	3.06(aM)
57 1,2-Dibromoethane	107	7.270	7.270	(0.948)	6087	2.00000	1.99(a)
88 1,2-Dichlorobenzene	146	9.999	9.999	(1.034)	10896	2.00000	2.04(a)

Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\X071305.D Page 2
Report Date: 13-Aug-2020 14:50

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/l)	ON-COL (ug/l)
33	1,2-Dichloroethane	62	4.569	4.569	(0.919)	8907	2.00000	2.06(a)
42	1,2-Dichloropropane	63	5.443	5.443	(1.095)	5959	2.00000	1.78(aM)
75	1,3,5-Trimethylbenzene	105	9.075	9.075	(0.939)	21148	2.00000	2.03(a)
83	1,3-Dichlorobenzene	146	9.612	9.612	(0.994)	11839	2.00000	2.02(a)
54	1,3-Dichloropropane	76	6.990	6.990	(0.911)	10164	2.00000	1.87(a)
84	1,4-Dichlorobenzene	146	9.683	9.683	(1.001)	11847	2.00000	1.98(a)
26	2,2-Dichloropropane	77	3.516	3.516	(0.841)	9767	2.00000	2.28(a)
24	2-Butanone	43	3.602	3.602	(0.861)	7754	4.00000	3.70(a)
76	2-Chlorotoluene	91	8.981	8.981	(0.929)	17797	2.00000	1.95(a)
52	2-Hexanone	43	7.098	7.098	(0.925)	14575	4.00000	3.71(a)
77	4-Chlorotoluene	91	9.075	9.075	(0.939)	21879	2.00000	2.05(a)
82	p-Isopropyltoluene	119	9.655	9.655	(0.999)	18754	2.00000	1.84(a)
45	4-Methyl-2-Pentanone	43	6.331	6.331	(0.825)	19710	4.00000	3.48(a)
10	Acetone	43	1.976	1.976	(0.473)	11772	4.00000	3.88(a)
37	Benzene	78	4.519	4.519	(0.909)	18885	2.00000	1.92(a)
74	Bromobenzene	156	8.810	8.810	(0.911)	7409	2.00000	2.11(a)
29	Bromochloromethane	128	3.803	3.803	(0.909)	3937	2.00000	2.30(a)
39	Bromodichloromethane	83	5.729	5.729	(1.153)	7307	2.00000	2.00(a)
66	Bromoform	173	8.416	8.416	(1.097)	3980	2.00000	1.73(Ta)
6	Bromomethane	94	1.339	1.339	(0.320)	6118	2.00000	2.66(aM)
19	Carbon Disulfide	76	2.069	2.069	(0.495)	29553	4.00000	4.44(a)
34	Carbon Tetrachloride	117	4.268	4.268	(0.859)	5940	2.00000	1.74(aH)
59	Chlorobenzene	112	7.699	7.699	(1.004)	16780	2.00000	2.03(a)
7	Chloroethane	64	1.403	1.403	(0.336)	4911	2.00000	2.31(a)
28	Chloroform	83	3.917	3.917	(0.937)	11075	2.00000	2.09(a)
3	Chloromethane	50	1.081	1.081	(0.258)	11467	2.00000	3.91(aM)
27	cis-1,2-Dichloroethene	96	3.538	3.538	(0.846)	6846	2.00000	2.21(a)
46	cis-1,3-Dichloropropene	75	6.166	6.166	(1.241)	8453	2.00000	2.00(a)
55	Dibromochloromethane	129	7.184	7.184	(0.937)	6412	2.00000	1.90(a)
44	Dibromomethane	93	5.558	5.558	(1.118)	3694	2.00000	2.07(a)
2	Dichlorodifluoromethane	85	0.973	0.973	(0.233)	5070	2.00000	1.99(a)
61	Ethylbenzene	106	7.807	7.807	(1.018)	8722	2.00000	2.02(a)
91	Hexachlorobutadiene	225	11.489	11.489	(1.188)	1878	2.00000	1.98(a)
67	Isopropylbenzene	105	8.566	8.566	(1.117)	24840	2.00000	1.92(a)
62	m,p-Xylenes	106	7.907	7.907	(1.031)	20300	4.00000	3.93(a)
17	Methylene Chloride	84	2.306	2.306	(0.551)	8593	2.00000	1.73(a)
87	n-Butylbenzene	91	9.999	9.999	(1.034)	17558	2.00000	1.96(a)
73	n-Propylbenzene	91	8.917	8.917	(0.922)	28485	2.00000	1.95(a)
92	Naphthalene	128	11.560	11.560	(1.196)	3601	2.00000	3.04(aM)
63	o-Xylene	106	8.244	8.244	(1.075)	9756	2.00000	1.87(a)
81	sec-Butylbenzene	105	9.526	9.526	(0.985)	23695	2.00000	2.00(a)
64	Styrene	104	8.265	8.265	(1.078)	16920	2.00000	1.87(a)
78	tert-Butylbenzene	119	9.340	9.340	(0.966)	17097	2.00000	2.06(a)
56	Tetrachloroethene	164	6.933	6.933	(0.904)	4994	2.00000	1.96(a)
50	Toluene	91	6.453	6.453	(0.841)	24432	2.00000	1.88(a)
20	trans-1,2-Dichloroethene	96	2.535	2.535	(0.606)	5911	2.00000	2.27(a)
51	trans-1,3-Dichloropropene	75	6.689	6.689	(1.346)	8684	2.00000	2.23(a)
38	Trichloroethene	130	5.214	5.214	(1.049)	5153	2.00000	1.97(a)
8	Trichlorofluoromethane	101	1.561	1.561	(0.373)	8722	2.00000	2.18(a)
5	Vinyl Chloride	62	1.145	1.145	(0.274)	8298	2.00000	2.09(a)

QC Flag Legend

T - Target compound detected outside RT window.
a - Target compound detected but, quantitated amount
Below Limit Of Quantitation(BLOQ).
M - Compound response manually integrated.
H - Operator selected an alternate compound hit.

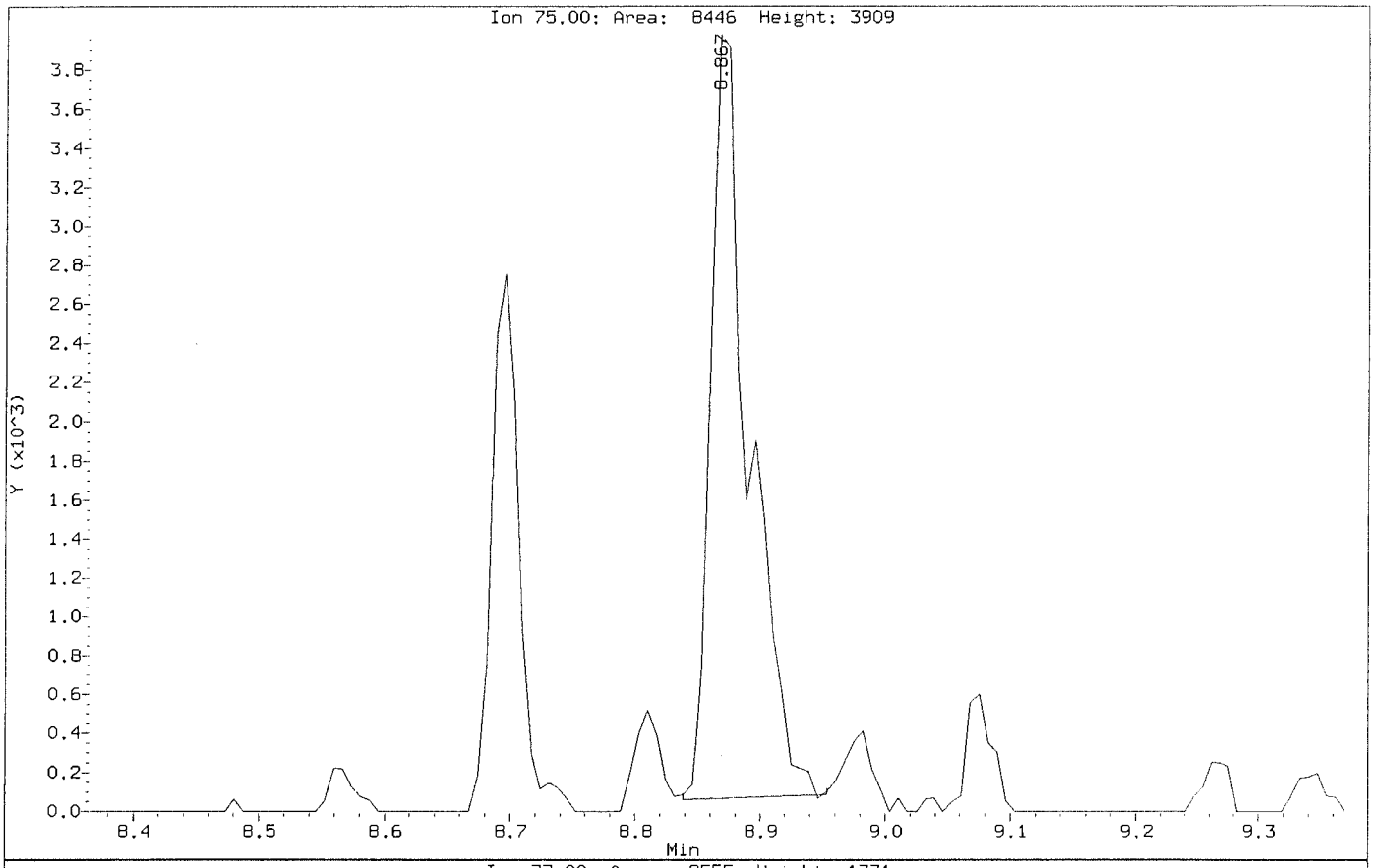


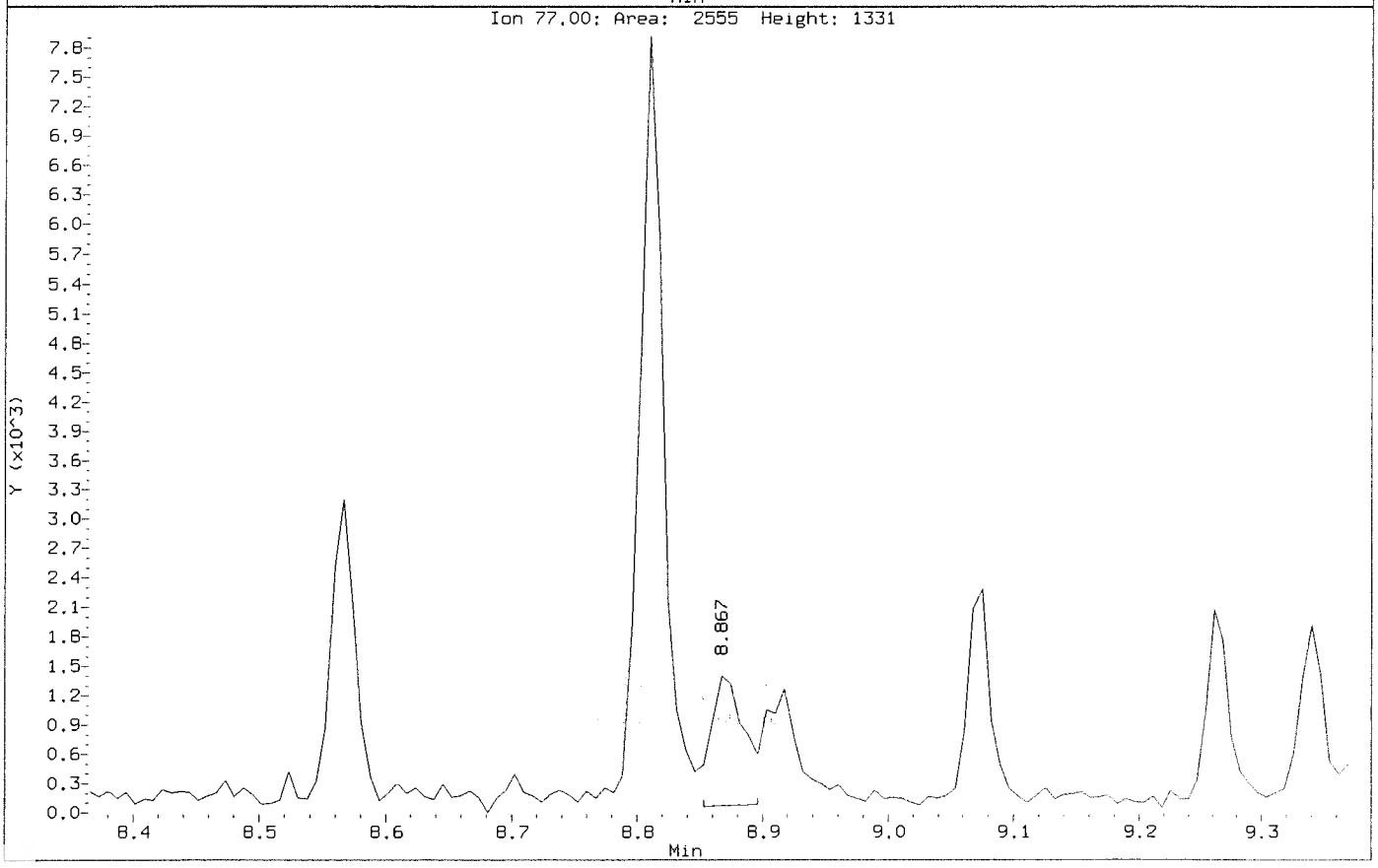
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Purge Volume: 5.0
Column phase: DB624

Instrument: voa6.i
Operator: PC
Column diameter: 0.18

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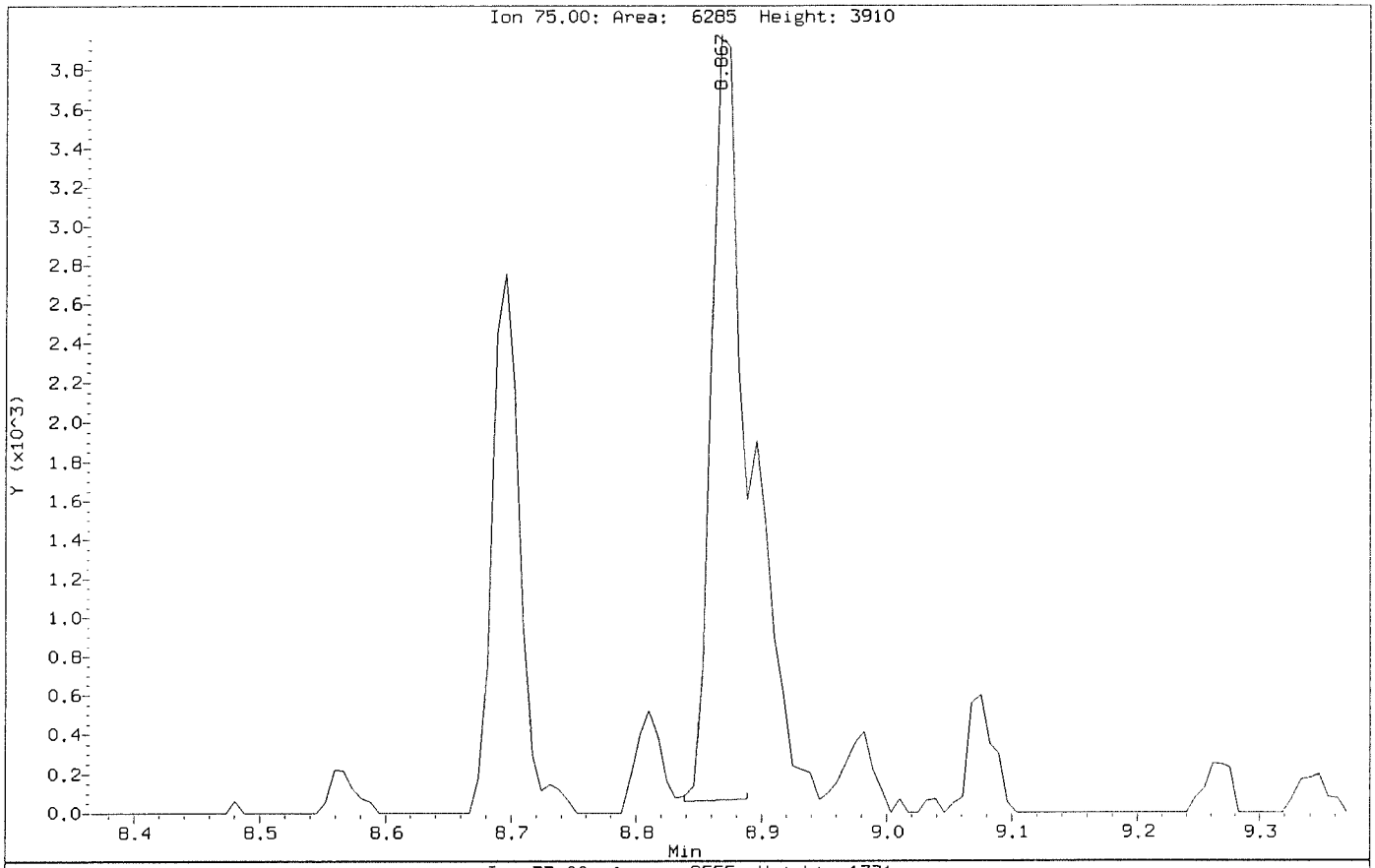
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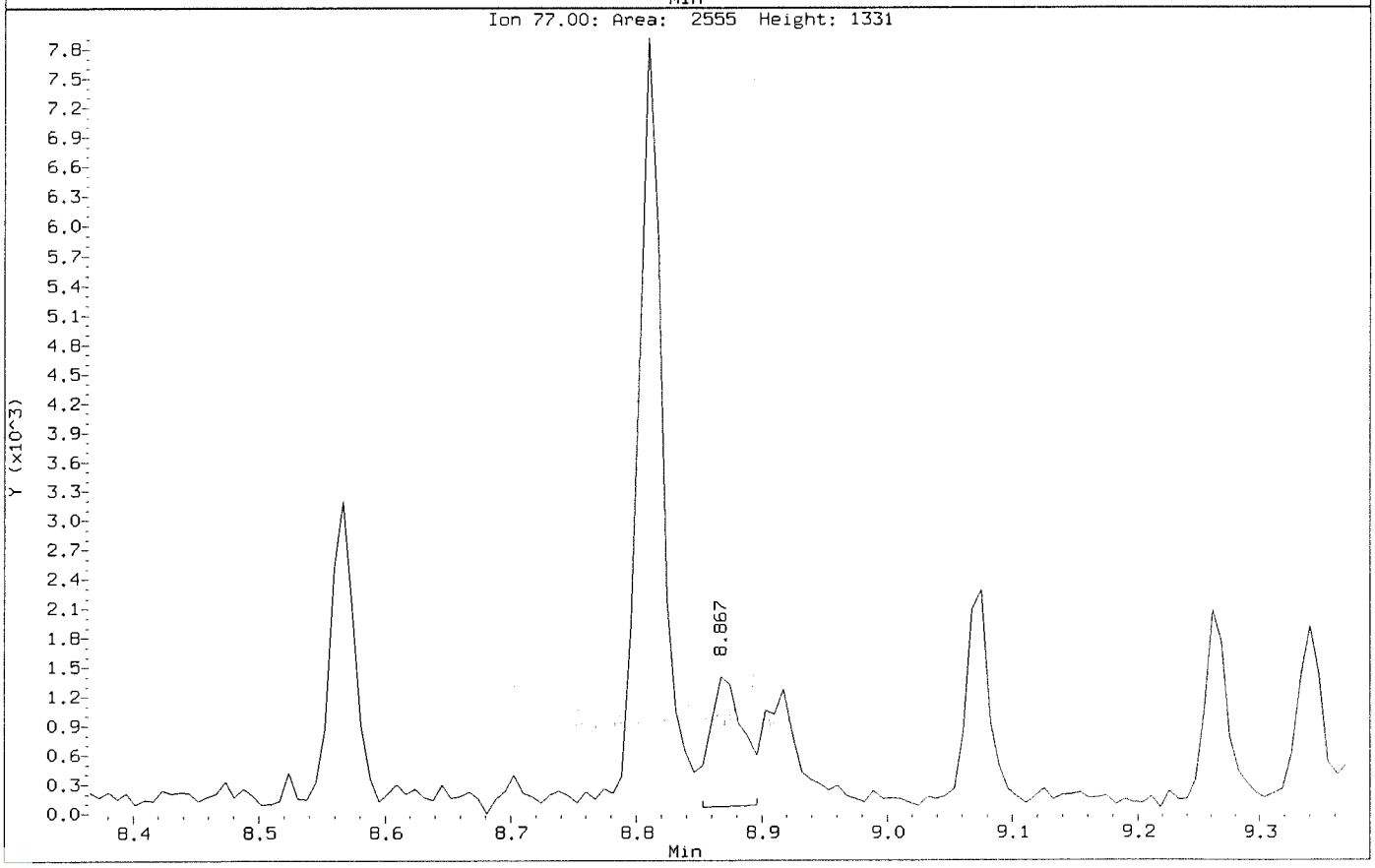




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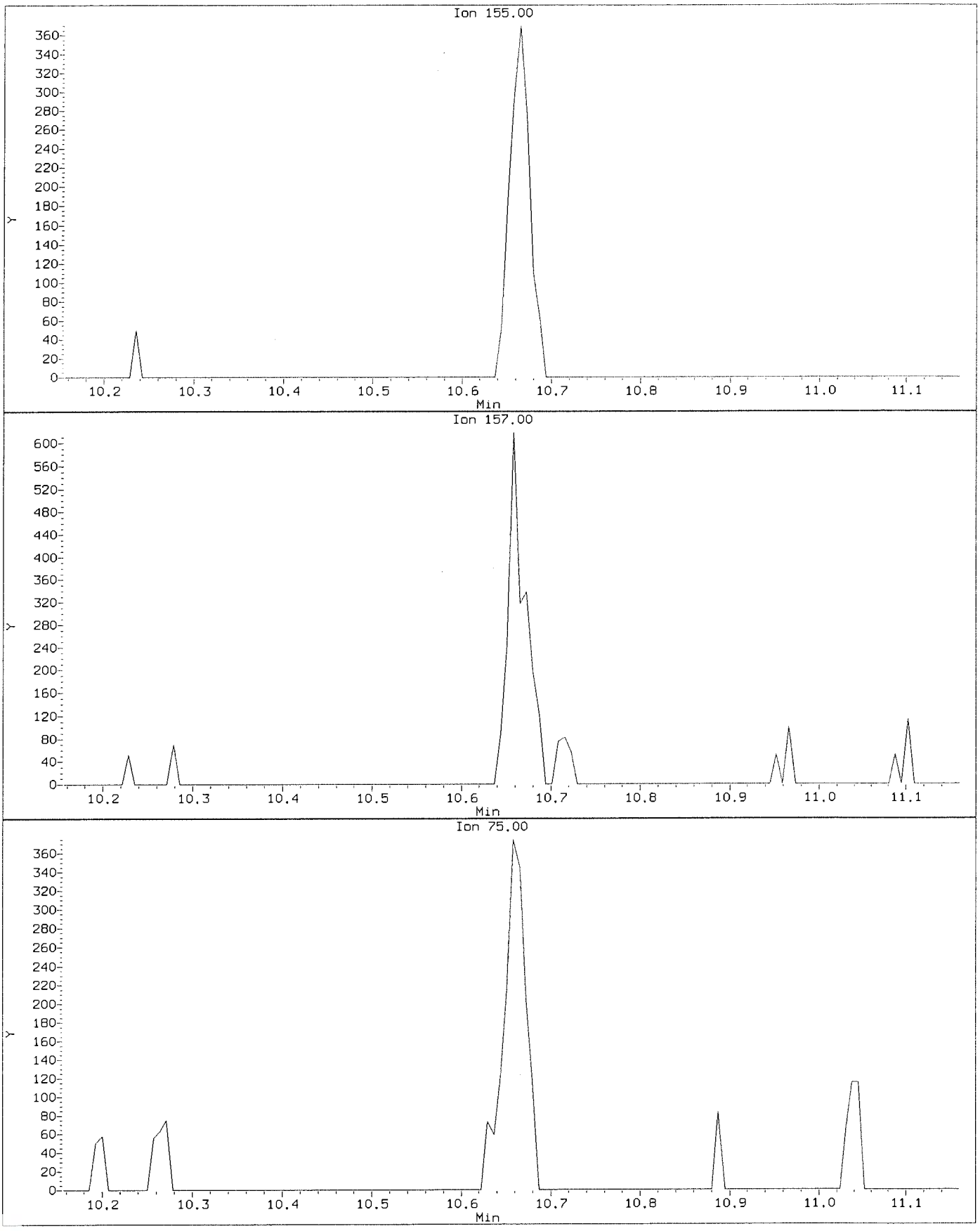
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CAS Number: 96-18-4





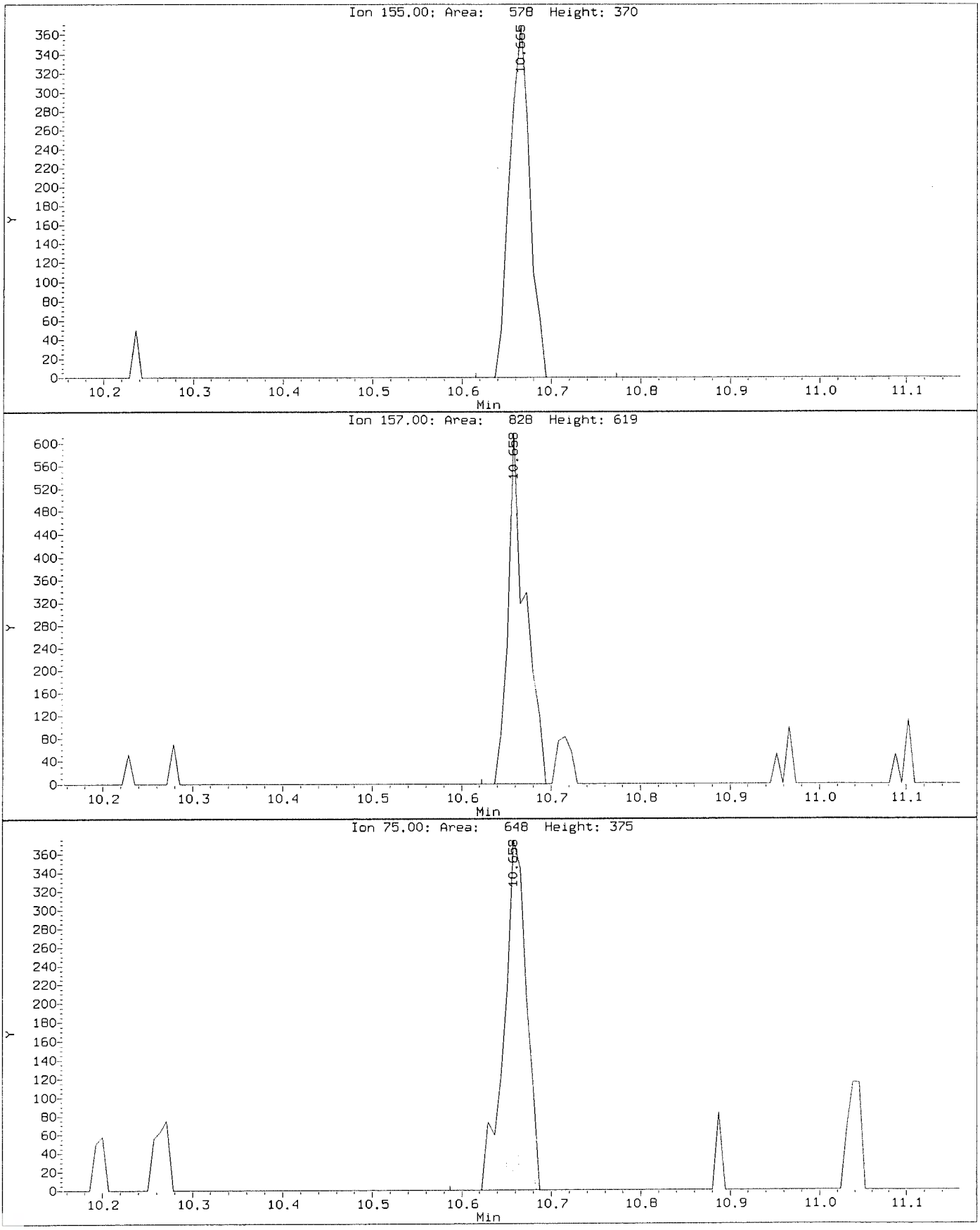
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Client Sample ID: VSTD002

Compound: 1,2-Dibromo-3-Chloropropane
CAS Number: 96-12-8



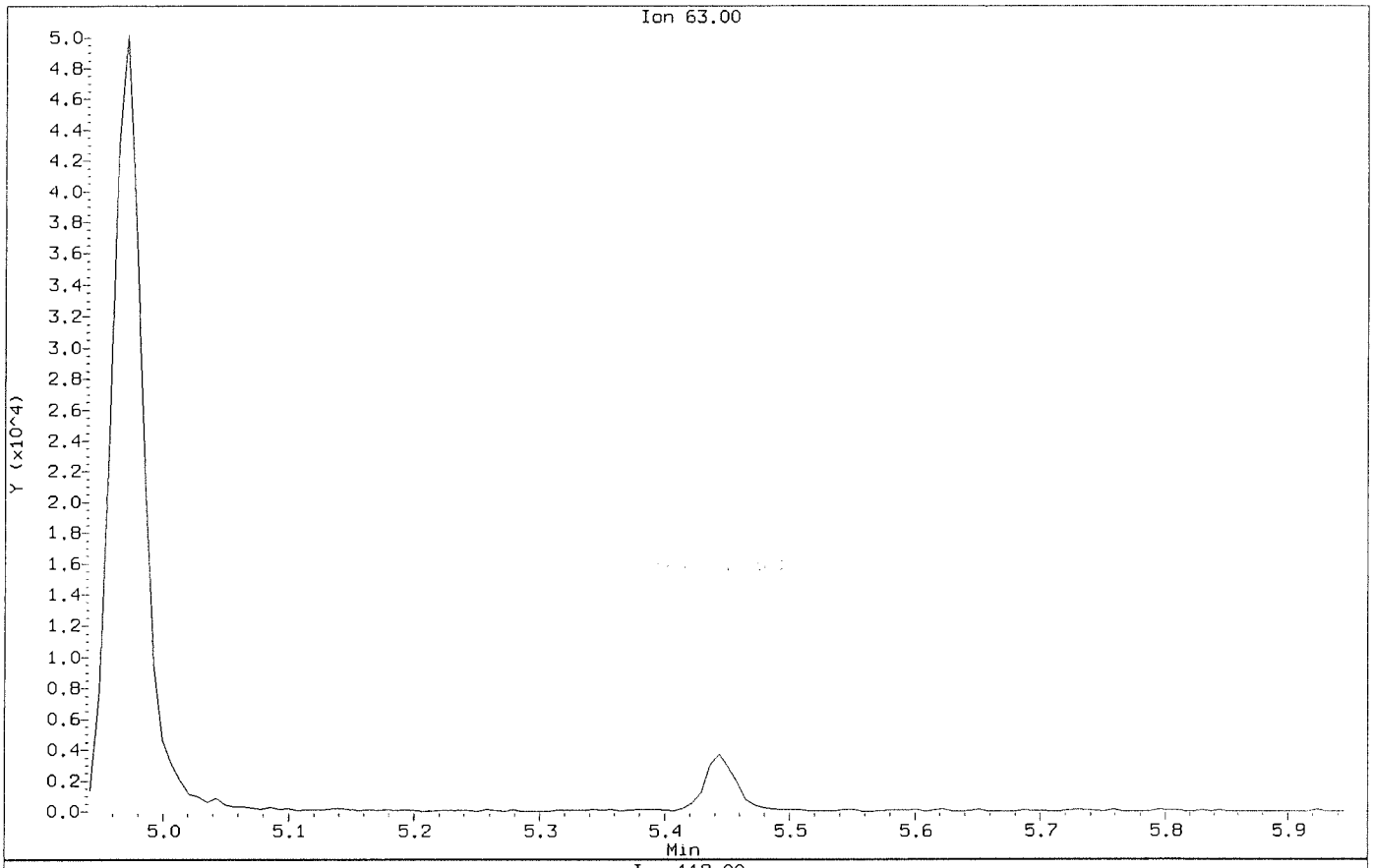
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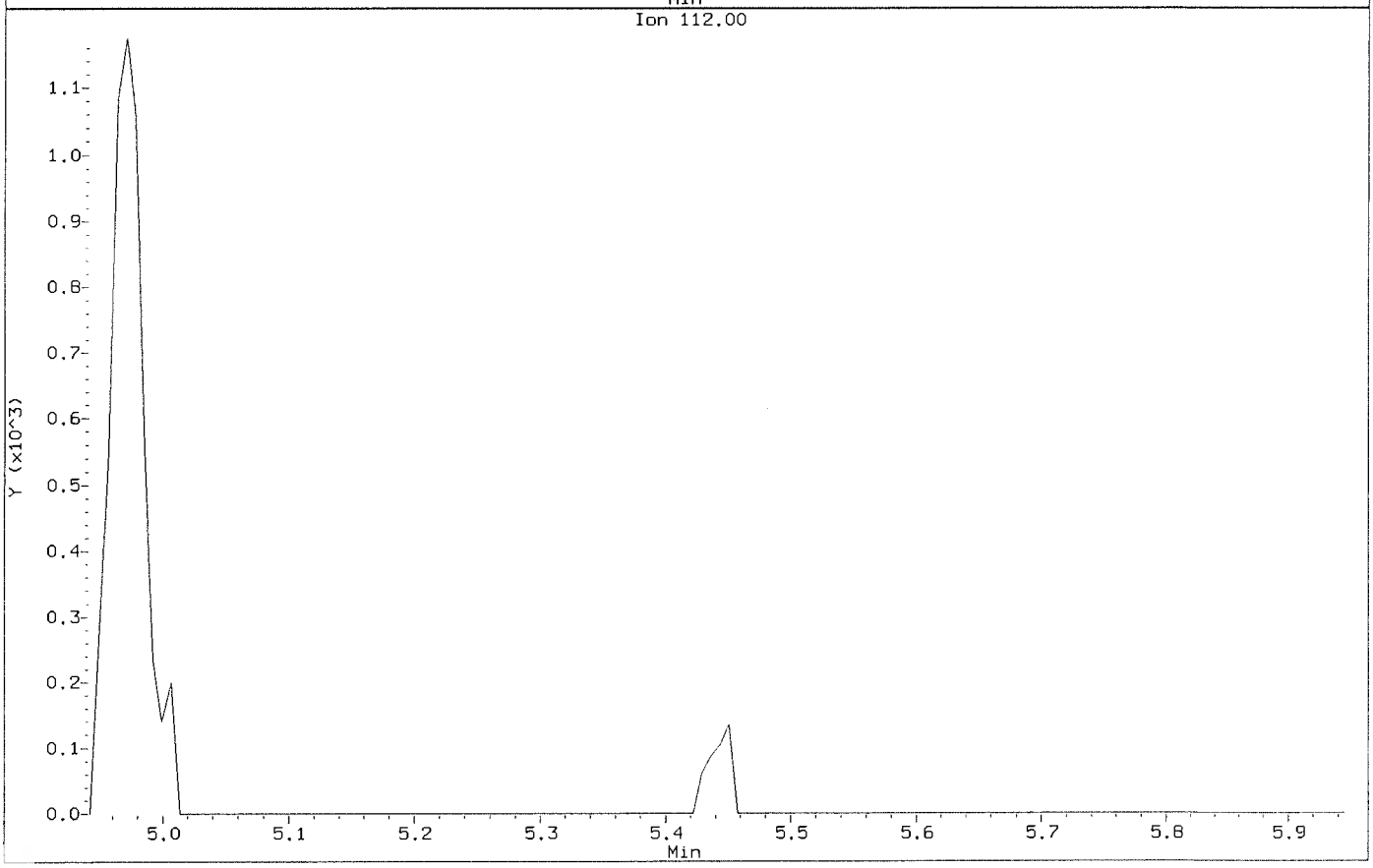
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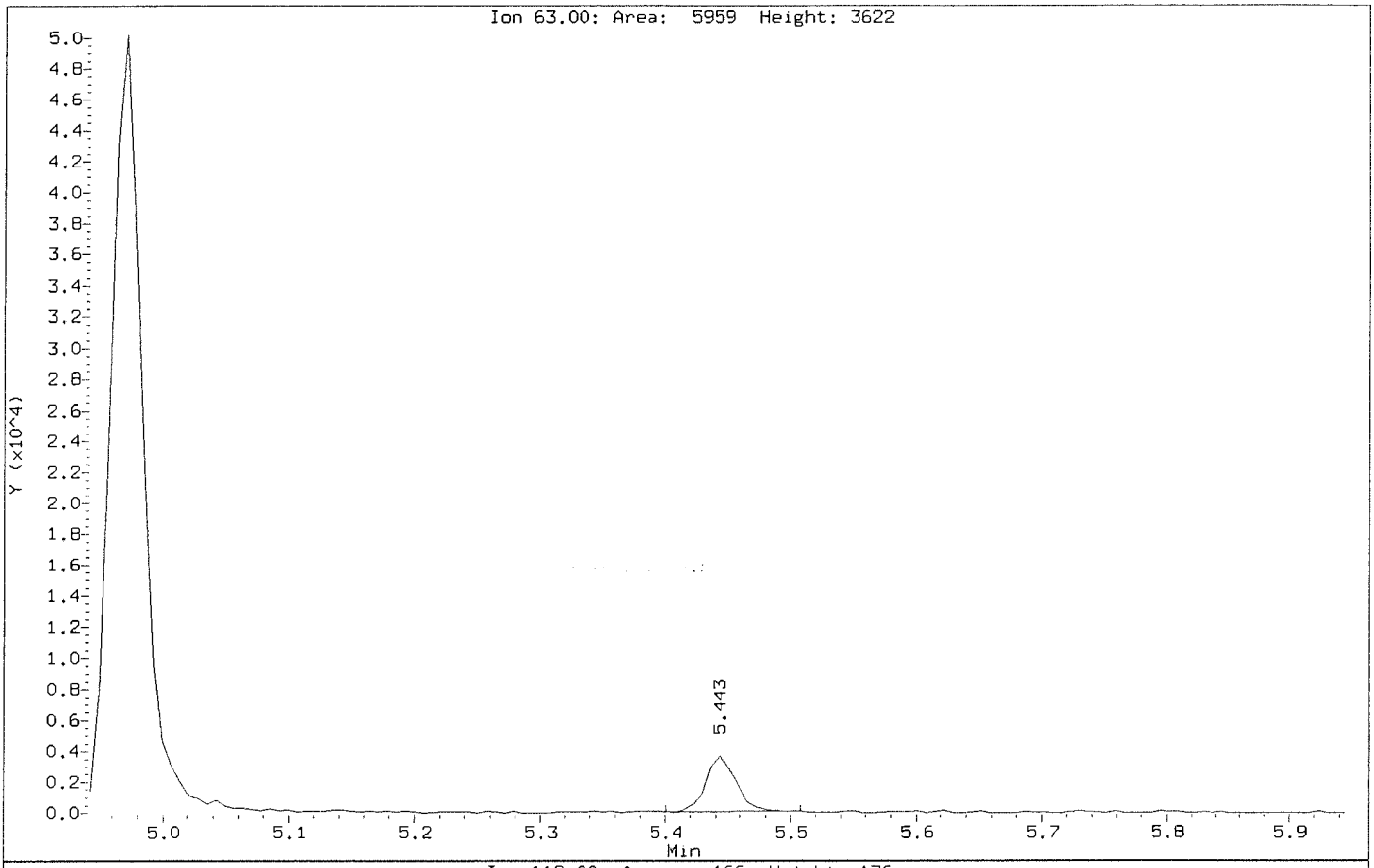
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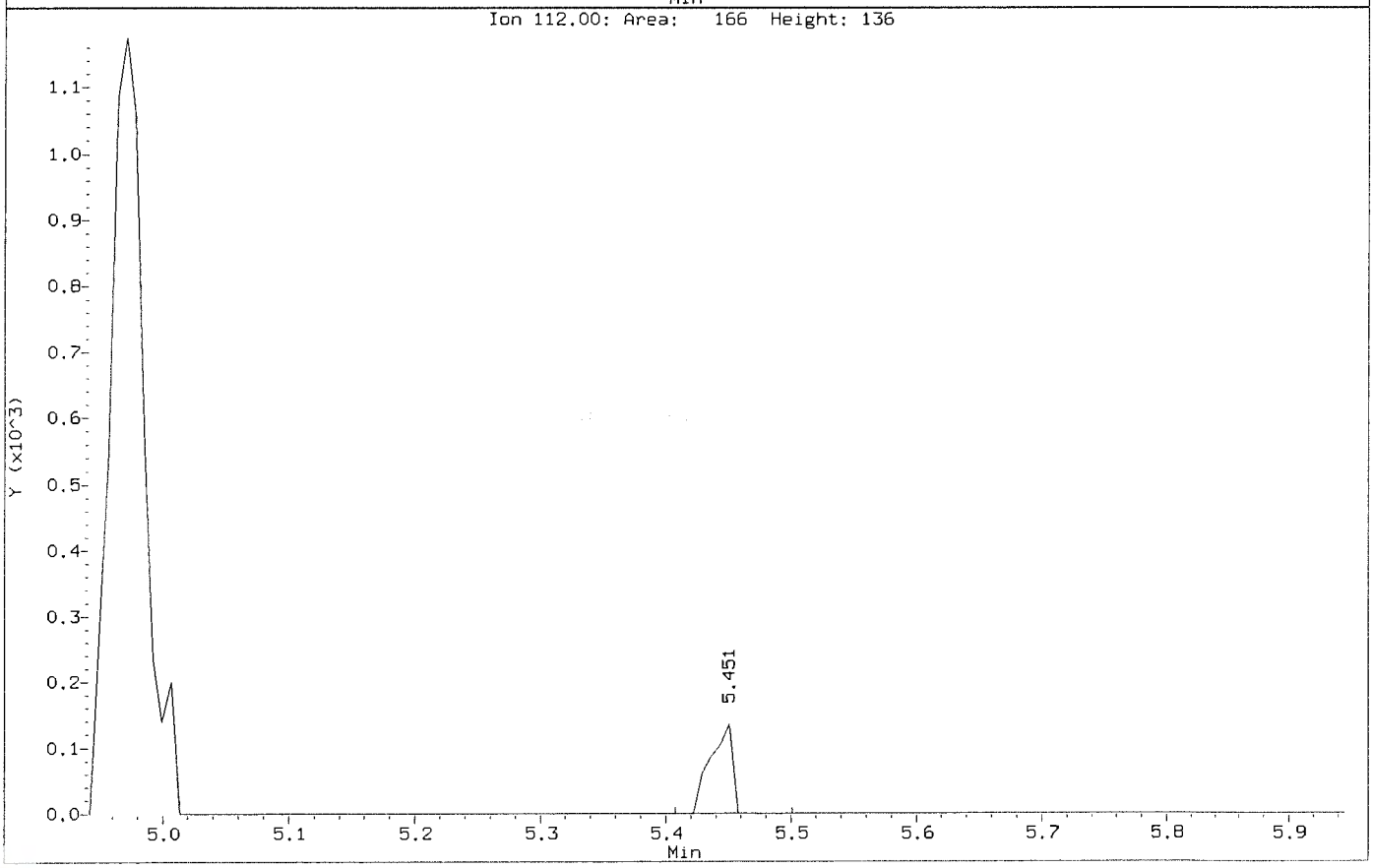




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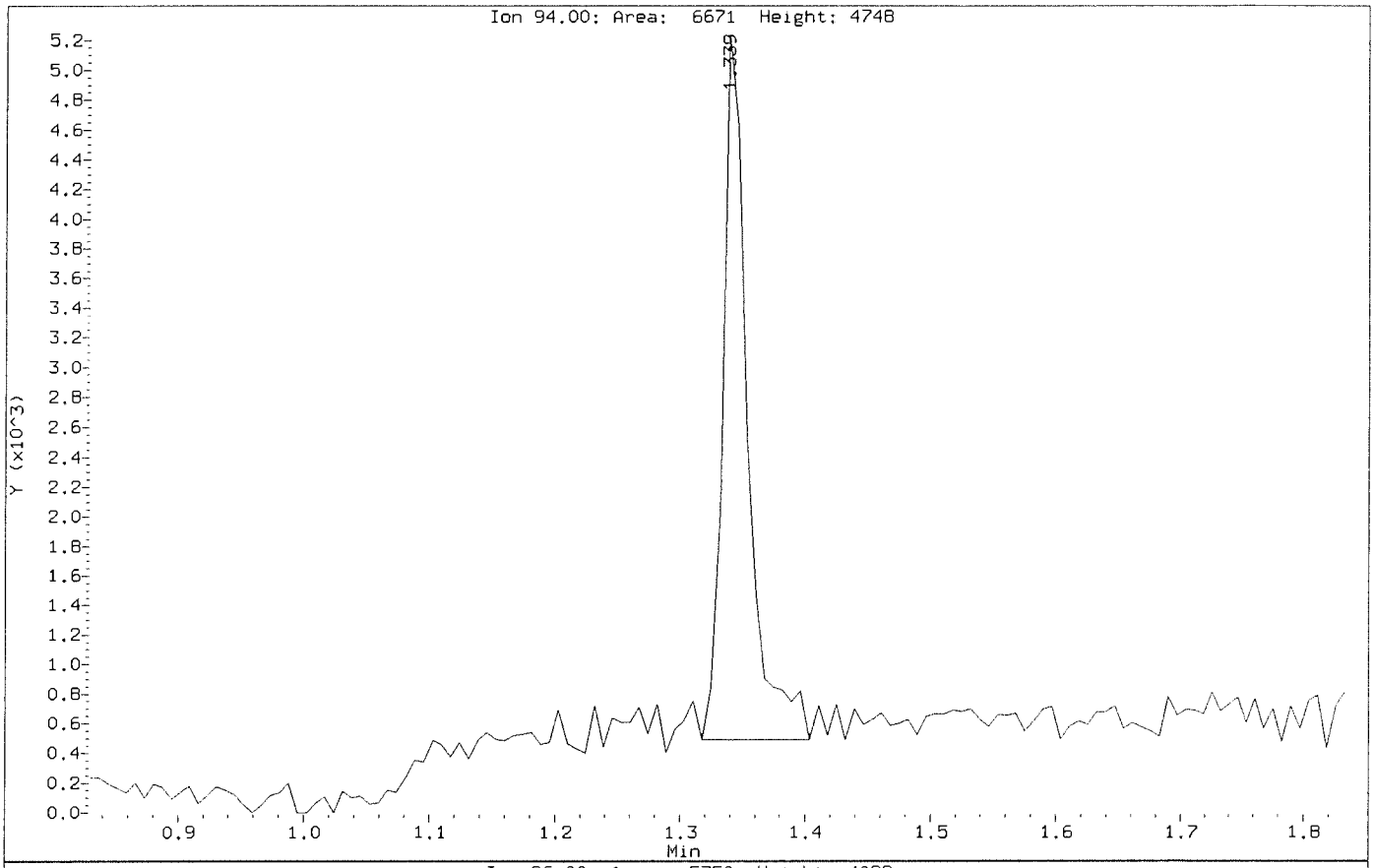
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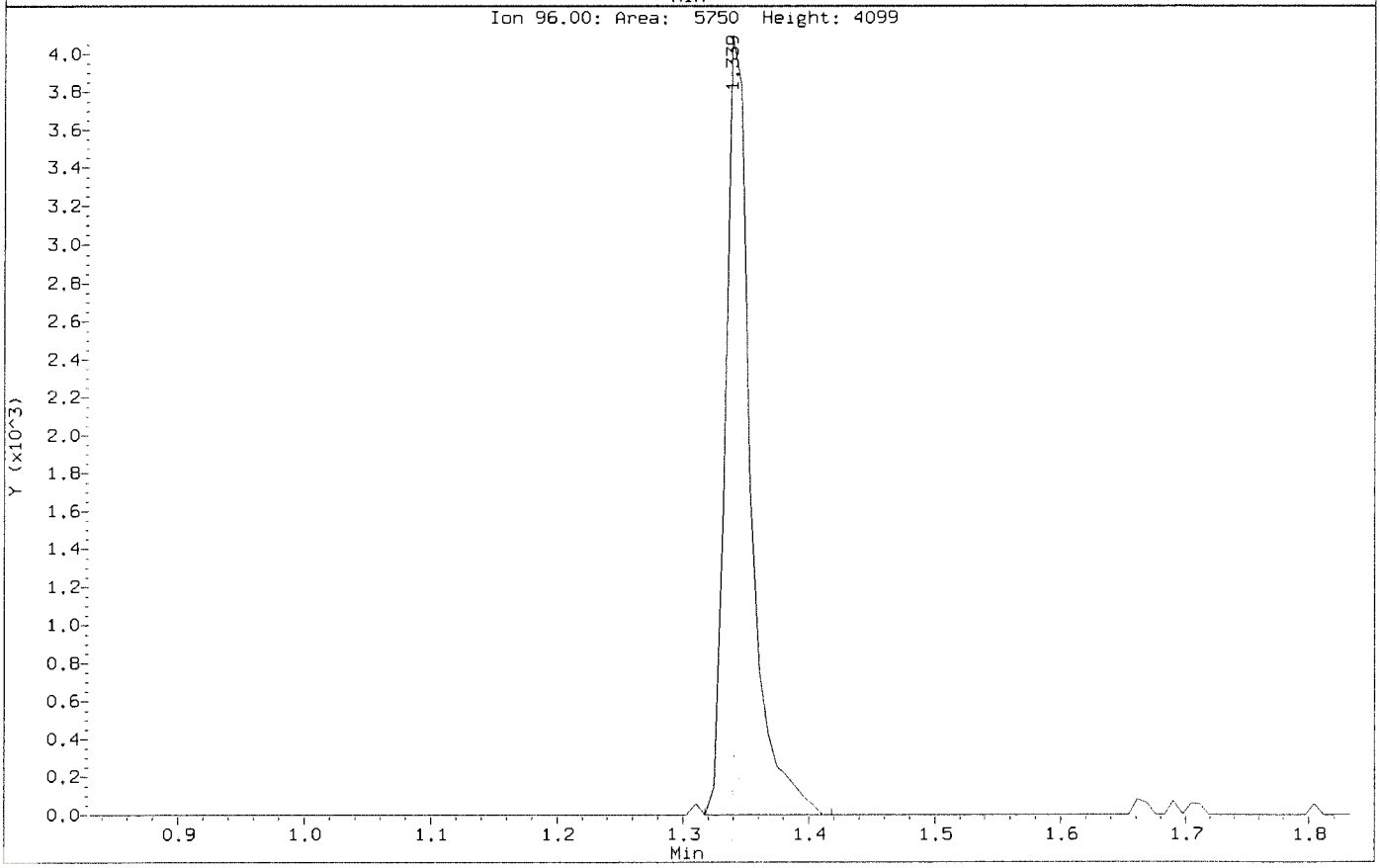




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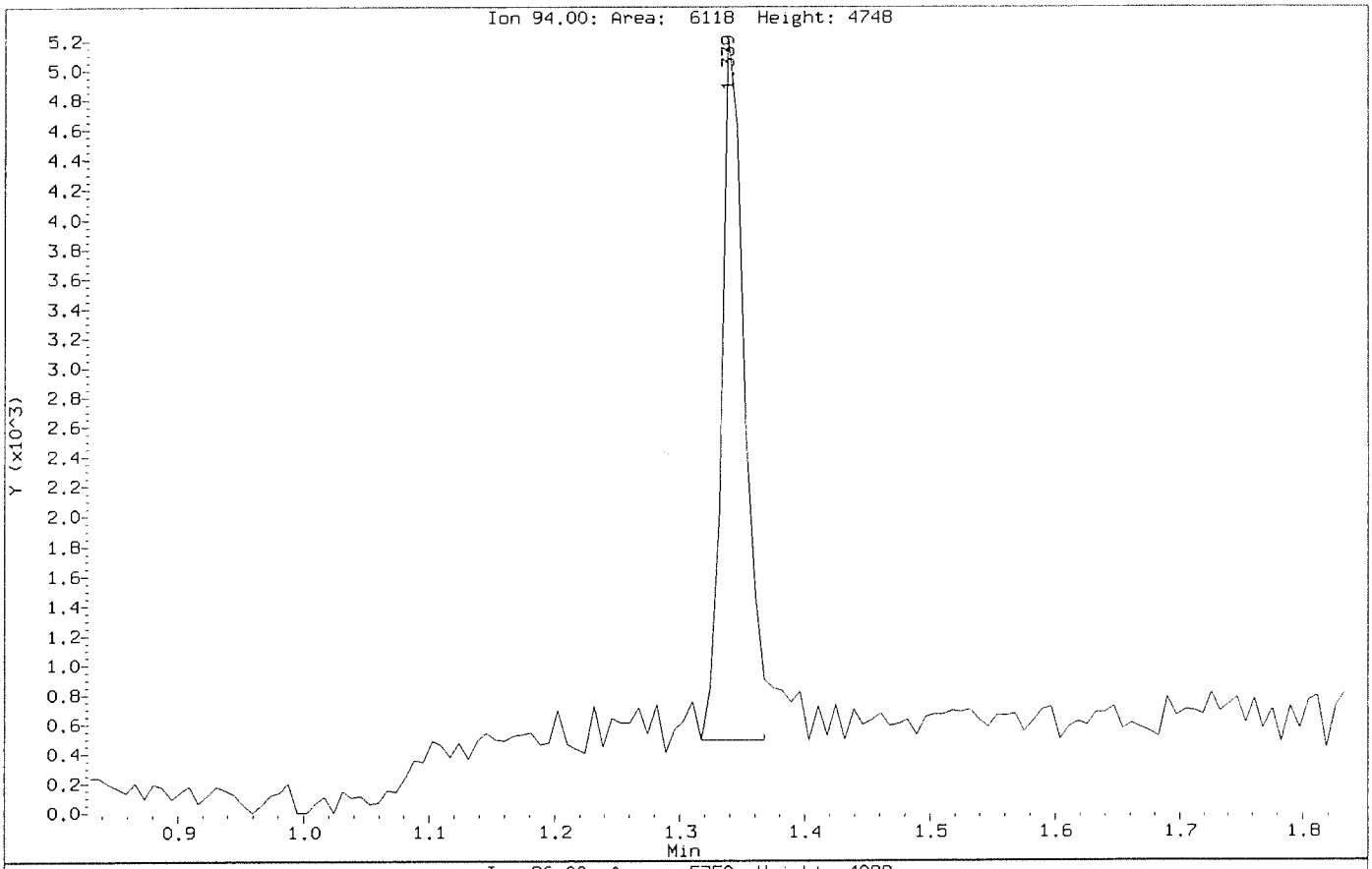
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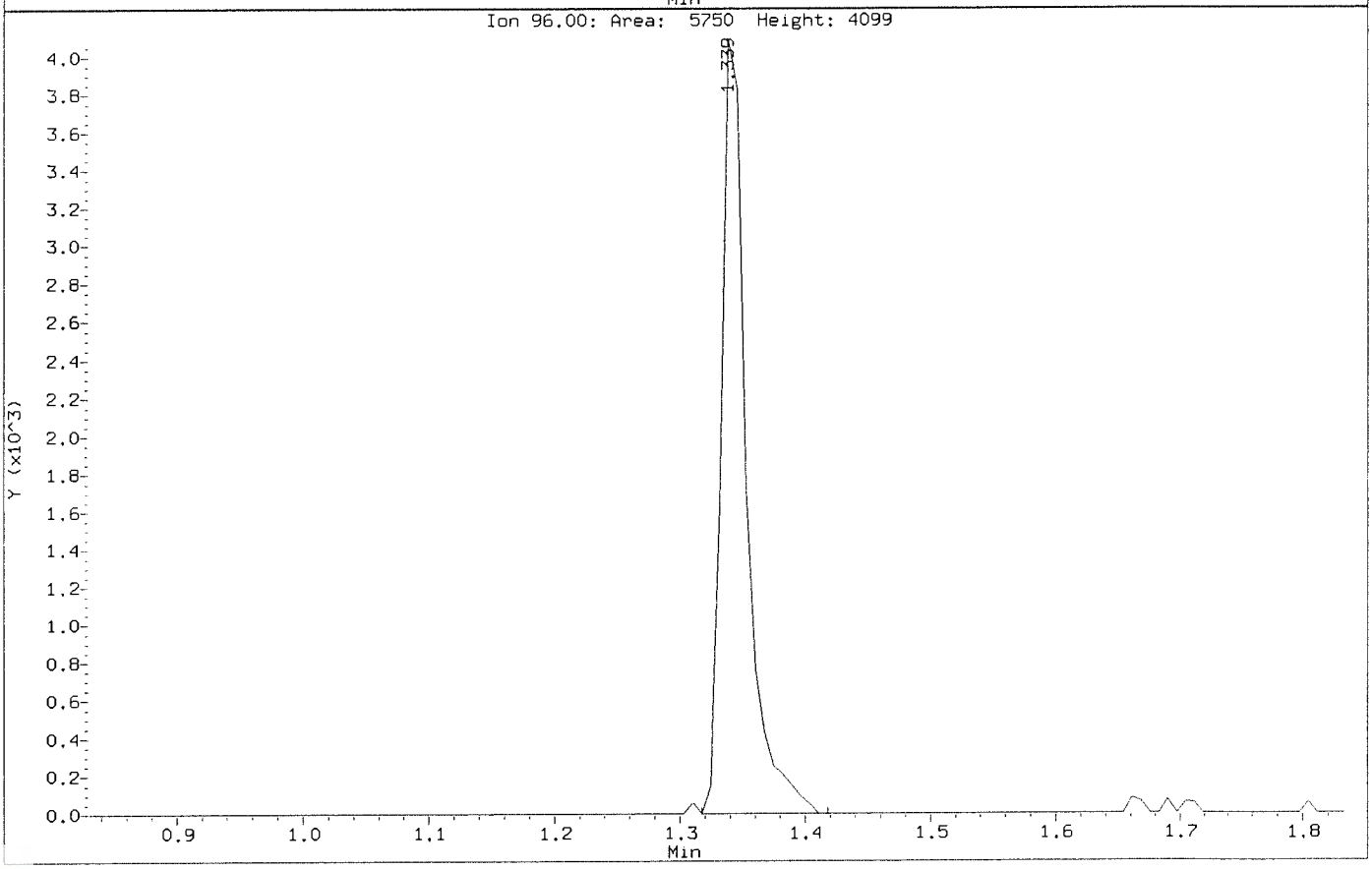




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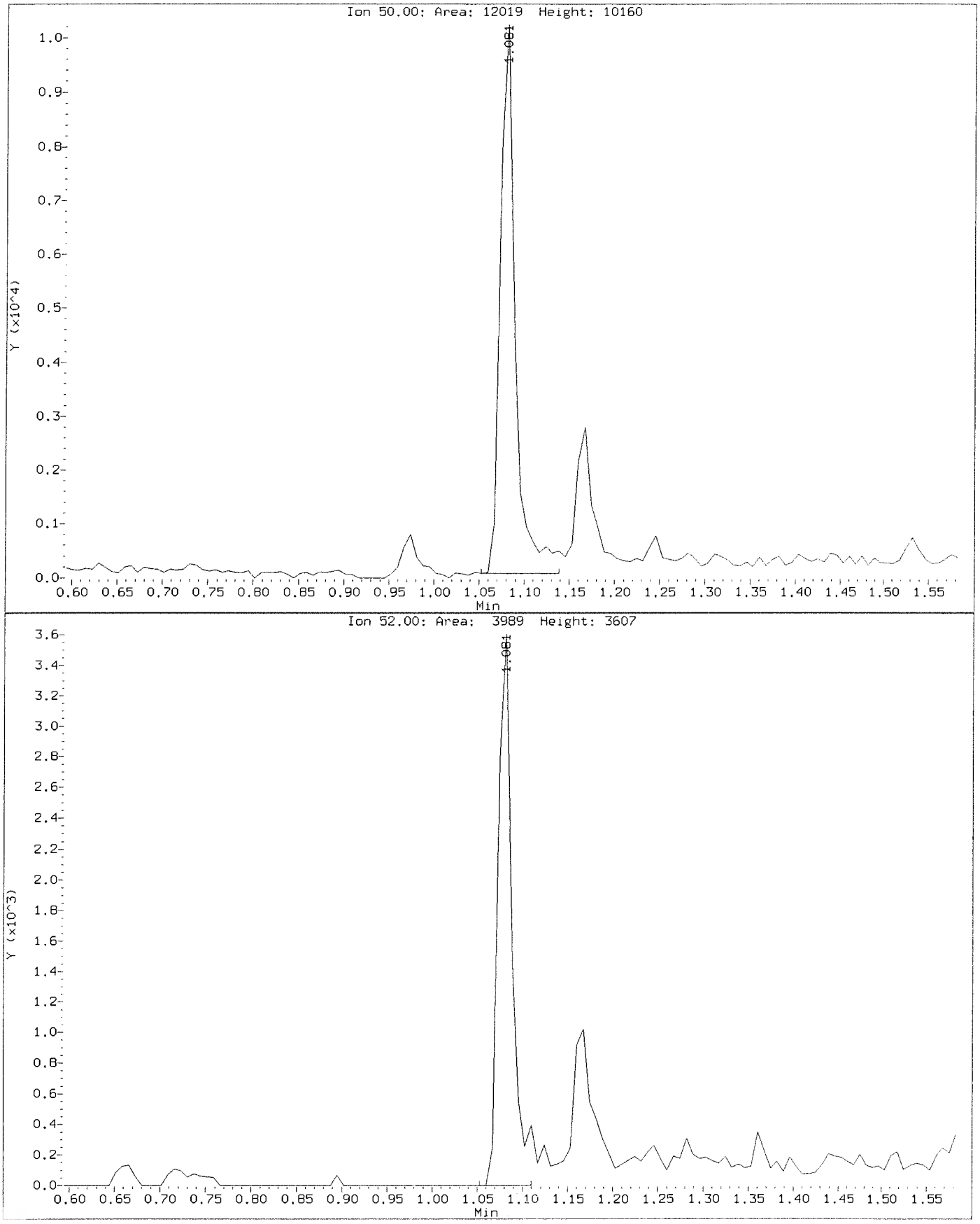
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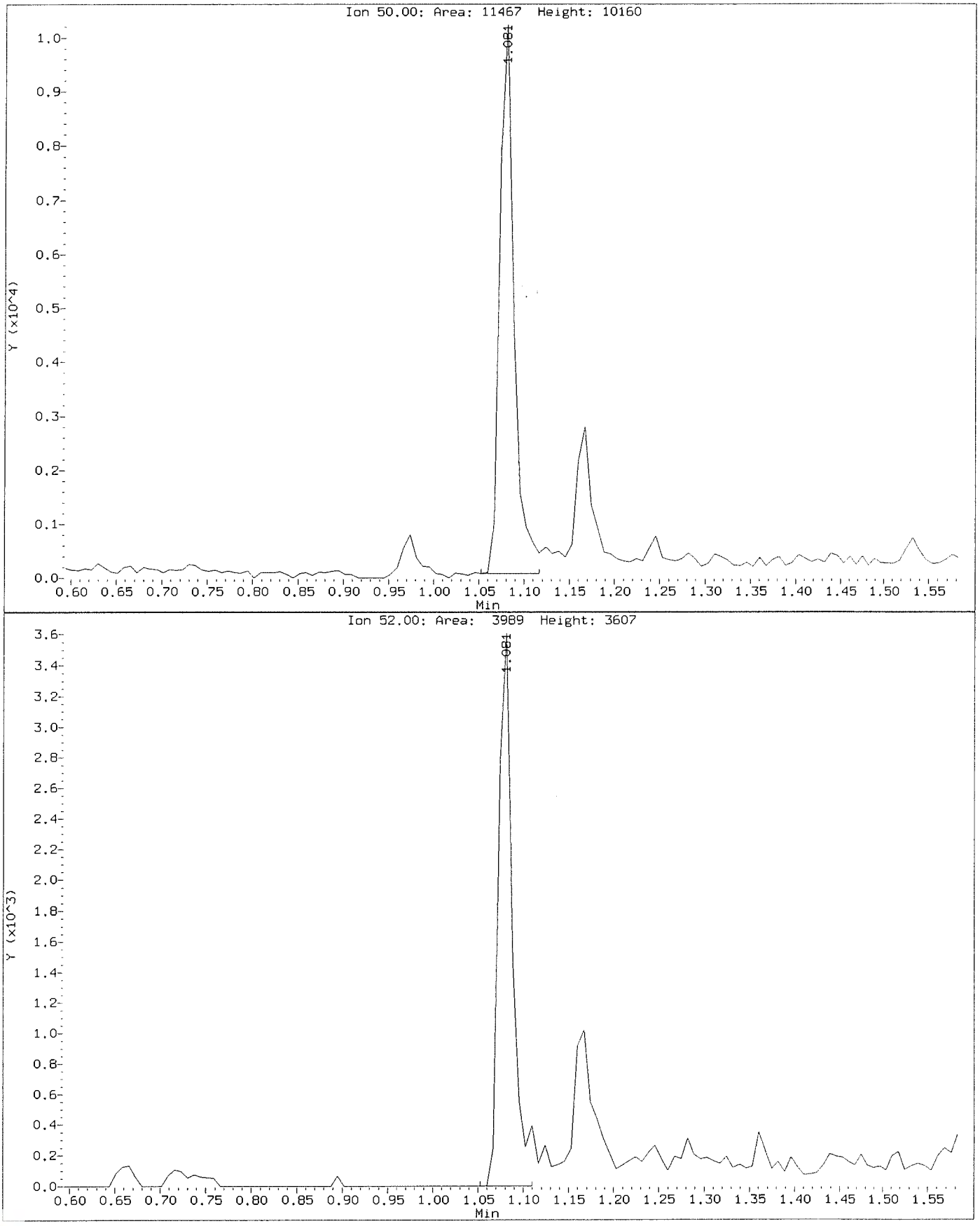
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Compound: Chloromethane
CAS Number: 74-87-3



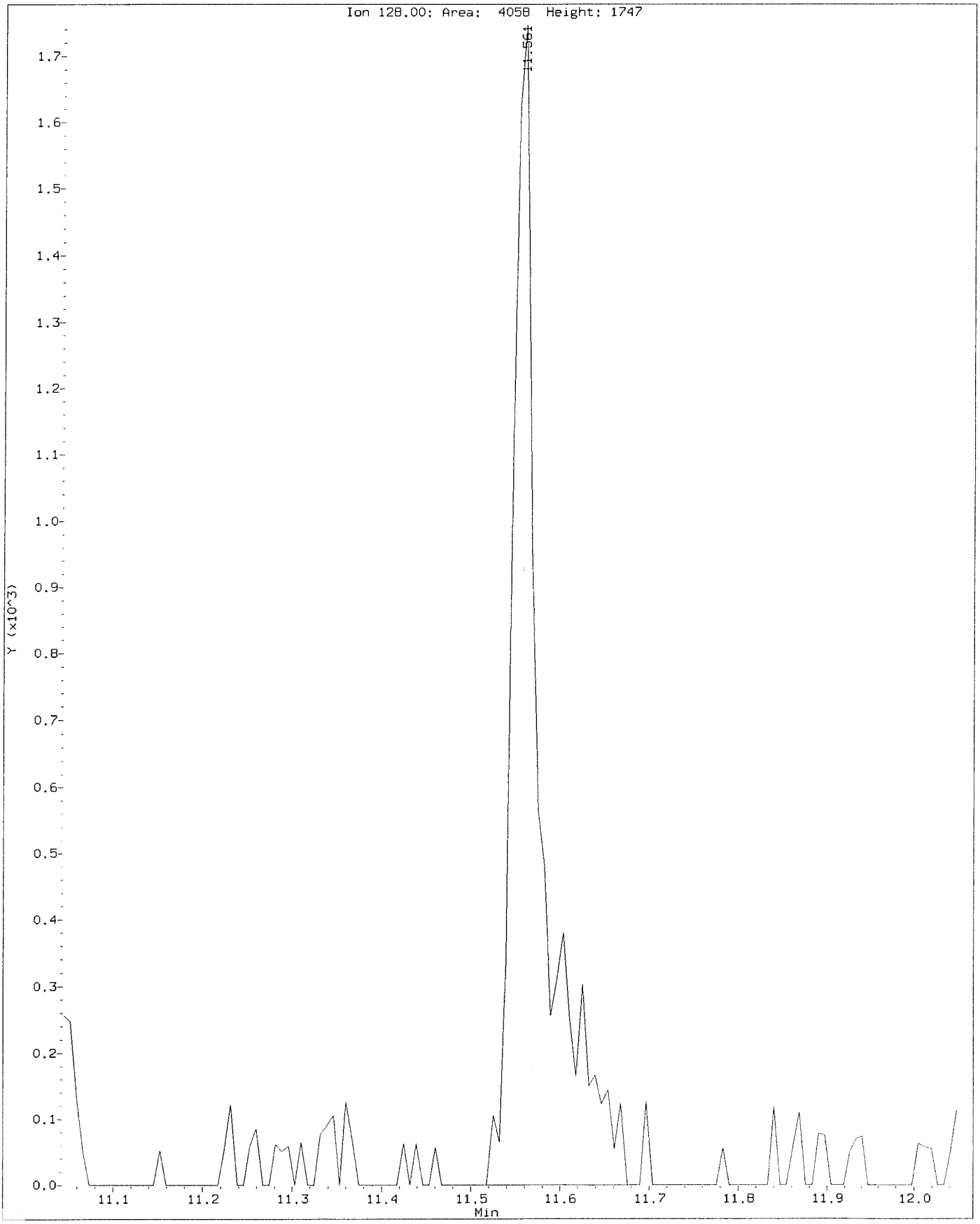
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Client Sample ID: VSTD002

Compound: Chloromethane
CAS Number: 74-87-3



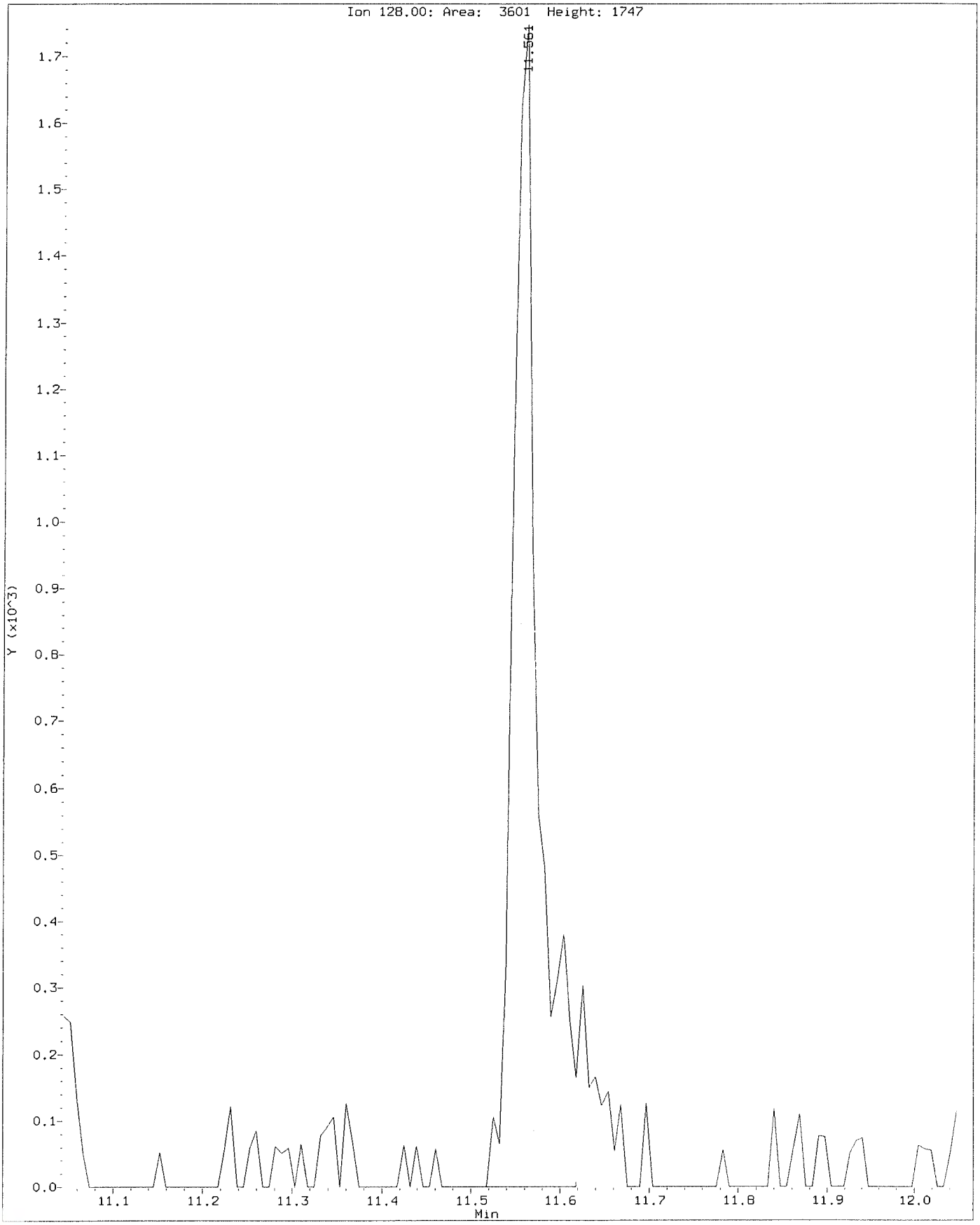
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Instrument: voa6.i
Client Sample ID: VSTD002

Compound: Naphthalene
CAS Number: 91-20-3



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Injection Date: 13-JUL-2020 12:06
Instrument: voa6.i
Client Sample ID: VSTD002

Compound: Naphthalene
CAS Number: 91-20-3



Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\X071306.D Page 1
Report Date: 13-Aug-2020 14:51

ALS Laboratory Group

Data file : \\nahstws005\Target\chem\voa6.i\X200713.b\X071306.D
Lab Smp Id: VSTD005 Client Smp ID: VSTD005
Inj Date : 13-JUL-2020 12:30
Operator : PC Inst ID: voa6.i
Smp Info : VSTD005;VSTD005;1;5;
Misc Info : HS18090001;WATER;0;1;
Comment :
Method : \\nahstws005\Target\chem\voa6.i\X200713.b\8260W.m
Meth Date : 13-Aug-2020 14:51 voa6.i Quant Type: ISTD
Cal Date : 13-JUL-2020 12:06 Cal File: X071305.D
Als bottle: 7 Calibration Sample, Level: 5
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: bhate.sub
Target Version: 4.14
Processing Host: NAHSTW7056

Concentration Formula: Amt * DF * (Uf/Vo)*1 * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Uf	5.000	ng unit correction factor
Vo	5.000	sample purged
Cpnd Variable		Local Compound Variable

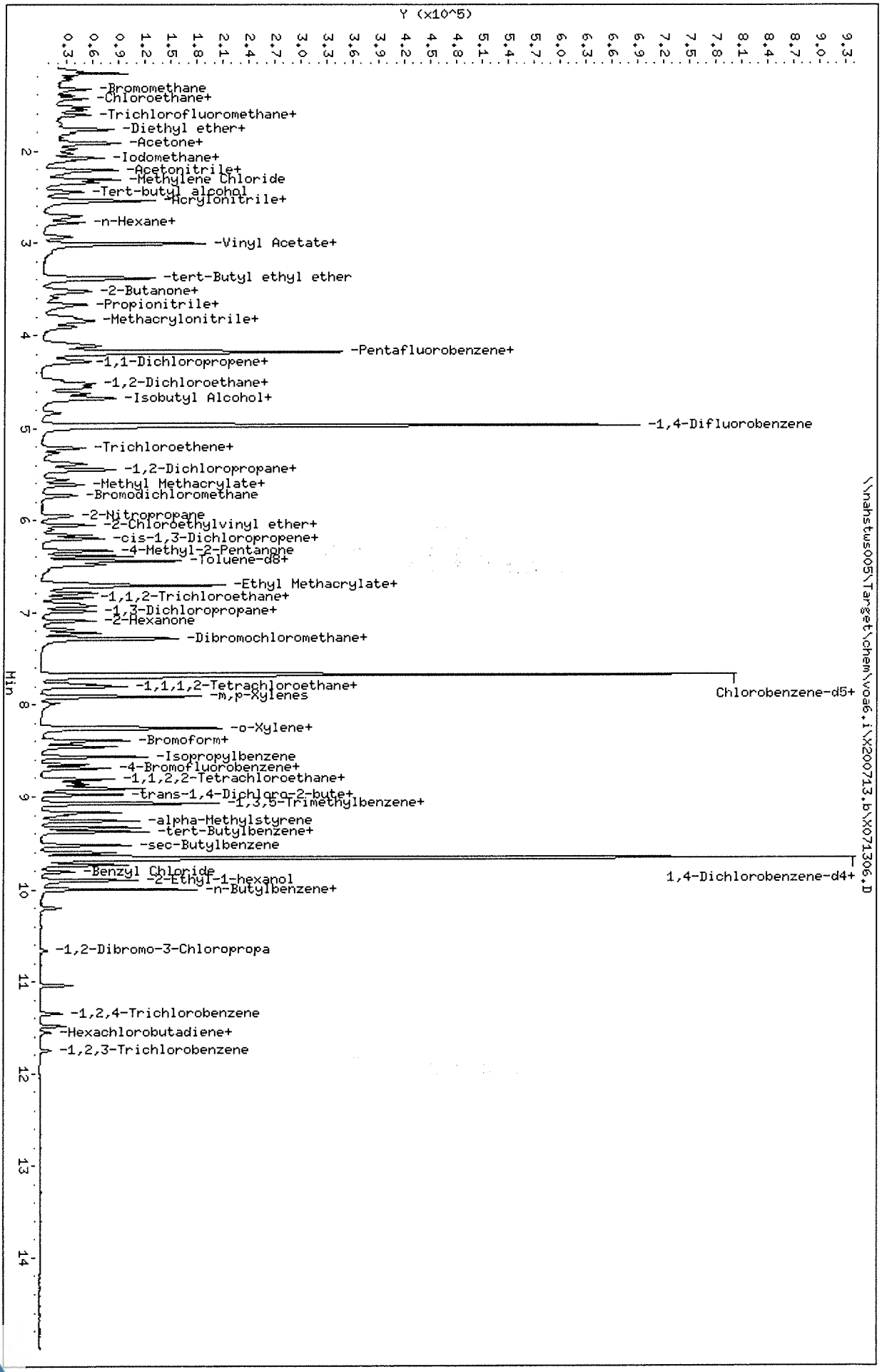
Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/l)	AMOUNTS ON-COL (ug/l)
* 1 Pentafluorobenzene	168	4.189	4.189	(1.000)	273643	50.0000	
* 36 1,4-Difluorobenzene	114	4.970	4.970	(1.000)	442506	50.0000	
* 47 Chlorobenzene-d5	117	7.671	7.671	(1.000)	340884	50.0000	
* 70 1,4-Dichlorobenzene-d4	152	9.669	9.669	(1.000)	193290	50.0000	
$ 30 Dibromofluoromethane	113	4.111	4.111	(0.981)	15802	5.00000	5.10
$ 35 1,2-Dichloroethane-d4	65	4.483	4.483	(1.070)	19086	5.00000	4.92(a)
$ 48 Toluene-d8	98	6.388	6.388	(0.833)	55374	5.00000	6.20
$ 69 4-Bromofluorobenzene	95	8.695	8.695	(1.134)	21438	5.00000	6.03
60 1,1,1,2-Tetrachloroethane	131	7.778	7.778	(1.014)	13279	5.00000	5.04
31 1,1,1-Trichloroethane	97	4.089	4.089	(0.976)	23973	5.00000	4.80(a)
68 1,1,2,2-Tetrachloroethane	83	8.845	8.845	(0.915)	19151	5.00000	5.36
53 1,1,2-Trichloroethane	83	6.840	6.840	(0.892)	13282	5.00000	6.36
22 1,1-Dichloroethane	63	2.929	2.929	(0.699)	36806	5.00000	4.80(a)
11 1,1-Dichloroethene	96	1.919	1.919	(0.458)	11848	5.00000	4.94(a)
32 1,1-Dichloropropene	75	4.290	4.290	(0.863)	19974	5.00000	4.81(a)
93 1,2,3-Trichlorobenzene	180	11.746	11.746	(1.215)	3665	5.00000	5.60(M)
71 1,2,3-Trichloropropane	75	8.867	8.867	(0.917)	16006	5.00000	5.09(M)
90 1,2,4-Trichlorobenzene	180	11.345	11.345	(1.173)	7130	5.00000	5.75
79 1,2,4-Trimethylbenzene	105	9.383	9.383	(0.970)	53238	5.00000	5.00
89 1,2-Dibromo-3-Chloropropane	155	10.665	10.665	(1.103)	1652	5.00000	6.24
57 1,2-Dibromoethane	107	7.262	7.262	(0.947)	13057	5.00000	5.20
88 1,2-Dichlorobenzene	146	9.999	9.999	(1.034)	27071	5.00000	5.02

Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\X071306.D Page 2
Report Date: 13-Aug-2020 14:51

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/l)	AMOUNTS ON-COL (ug/l)
33	1,2-Dichloroethane	62	4.562	4.562	(0.918)	22279	5.00000	4.23(a)
42	1,2-Dichloropropane	63	5.443	5.443	(1.095)	20237	5.00000	4.95(a)
75	1,3,5-Trimethylbenzene	105	9.067	9.067	(0.938)	50432	5.00000	4.80(a)
83	1,3-Dichlorobenzene	146	9.612	9.612	(0.994)	29277	5.00000	4.94(a)
54	1,3-Dichloropropane	76	6.990	6.990	(0.911)	27428	5.00000	6.14
84	1,4-Dichlorobenzene	146	9.683	9.683	(1.001)	30204	5.00000	5.00
26	2,2-Dichloropropane	77	3.516	3.516	(0.839)	22857	5.00000	4.72(a)
24	2-Butanone	43	3.588	3.588	(0.856)	23110	10.0000	9.72
76	2-Chlorotoluene	91	8.981	8.981	(0.929)	45170	5.00000	4.90(a)
52	2-Hexanone	43	7.090	7.090	(0.924)	40421	10.0000	12.51
77	4-Chlorotoluene	91	9.075	9.075	(0.939)	52254	5.00000	4.85(a)
82	p-Isopropyltoluene	119	9.655	9.655	(0.999)	47285	5.00000	4.59(a)
45	4-Methyl-2-Pentanone	43	6.331	6.331	(0.825)	57676	10.0000	12.39
10	Acetone	43	1.976	1.976	(0.472)	23758	10.0000	10.05
37	Benzene	78	4.519	4.519	(0.909)	51209	5.00000	4.26(a)
74	Bromobenzene	156	8.810	8.810	(0.911)	17798	5.00000	5.02
29	Bromochloromethane	128	3.803	3.803	(0.908)	9718	5.00000	5.02
39	Bromodichloromethane	83	5.729	5.729	(1.153)	22114	5.00000	4.96(a)
66	Bromoform	173	8.416	8.416	(1.097)	11138	5.00000	5.90
6	Bromomethane	94	1.338	1.338	(0.320)	12533	5.00000	5.64
19	Carbon Disulfide	76	2.069	2.069	(0.494)	75503	10.0000	10.01
34	Carbon Tetrachloride	117	4.268	4.268	(0.859)	20691	5.00000	4.97(aH)
59	Chlorobenzene	112	7.699	7.699	(1.004)	33889	5.00000	4.99(a)
7	Chloroethane	64	1.403	1.403	(0.335)	11173	5.00000	4.64(a)
28	Chloroform	83	3.917	3.917	(0.935)	30449	5.00000	5.06
3	Chloromethane	50	1.081	1.081	(0.258)	28703	5.00000	6.56
27	cis-1,2-Dichloroethene	96	3.530	3.530	(0.843)	16456	5.00000	4.68(a)
46	cis-1,3-Dichloropropene	75	6.159	6.159	(1.239)	26646	5.00000	5.16
55	Dibromochloromethane	129	7.184	7.184	(0.937)	15706	5.00000	5.66
44	Dibromomethane	93	5.558	5.558	(1.118)	11029	5.00000	5.05
2	Dichlorodifluoromethane	85	0.973	0.973	(0.232)	13524	5.00000	4.68(a)
61	Ethylbenzene	106	7.807	7.807	(1.018)	17551	5.00000	4.95(a)
91	Hexachlorobutadiene	225	11.481	11.481	(1.187)	4496	5.00000	4.69(a)
67	Isopropylbenzene	105	8.566	8.566	(1.117)	62070	5.00000	5.85
62	m,p-Xylenes	106	7.907	7.907	(1.031)	41186	10.0000	9.71
17	Methylene Chloride	84	2.305	2.305	(0.550)	18680	5.00000	4.58(a)
87	n-Butylbenzene	91	9.999	9.999	(1.034)	41319	5.00000	4.57(a)
73	n-Propylbenzene	91	8.917	8.917	(0.922)	71185	5.00000	4.83(a)
92	Naphthalene	128	11.553	11.553	(1.195)	9070	5.00000	5.71(M)
63	o-Xylene	106	8.244	8.244	(1.075)	24863	5.00000	5.80
81	sec-Butylbenzene	105	9.526	9.526	(0.985)	57543	5.00000	4.80(a)
64	Styrene	104	8.265	8.265	(1.078)	42901	5.00000	5.78
78	tert-Butylbenzene	119	9.340	9.340	(0.966)	41611	5.00000	4.96(a)
56	Tetrachloroethene	164	6.933	6.933	(0.904)	11030	5.00000	5.28
50	Toluene	91	6.453	6.453	(0.841)	65015	5.00000	6.08
20	trans-1,2-Dichloroethene	96	2.535	2.535	(0.605)	14734	5.00000	4.99(a)
51	trans-1,3-Dichloropropene	75	6.689	6.689	(1.346)	24385	5.00000	5.12
38	Trichloroethene	130	5.214	5.214	(1.049)	15147	5.00000	4.75(a)
8	Trichlorofluoromethane	101	1.561	1.561	(0.373)	20912	5.00000	4.62(a)
5	Vinyl Chloride	62	1.138	1.138	(0.272)	21041	5.00000	4.67(a)

QC Flag Legend

a - Target compound detected but, quantitated amount
    Below Limit Of Quantitation(BLOQ).
M - Compound response manually integrated.
H - Operator selected an alternate compound hit.

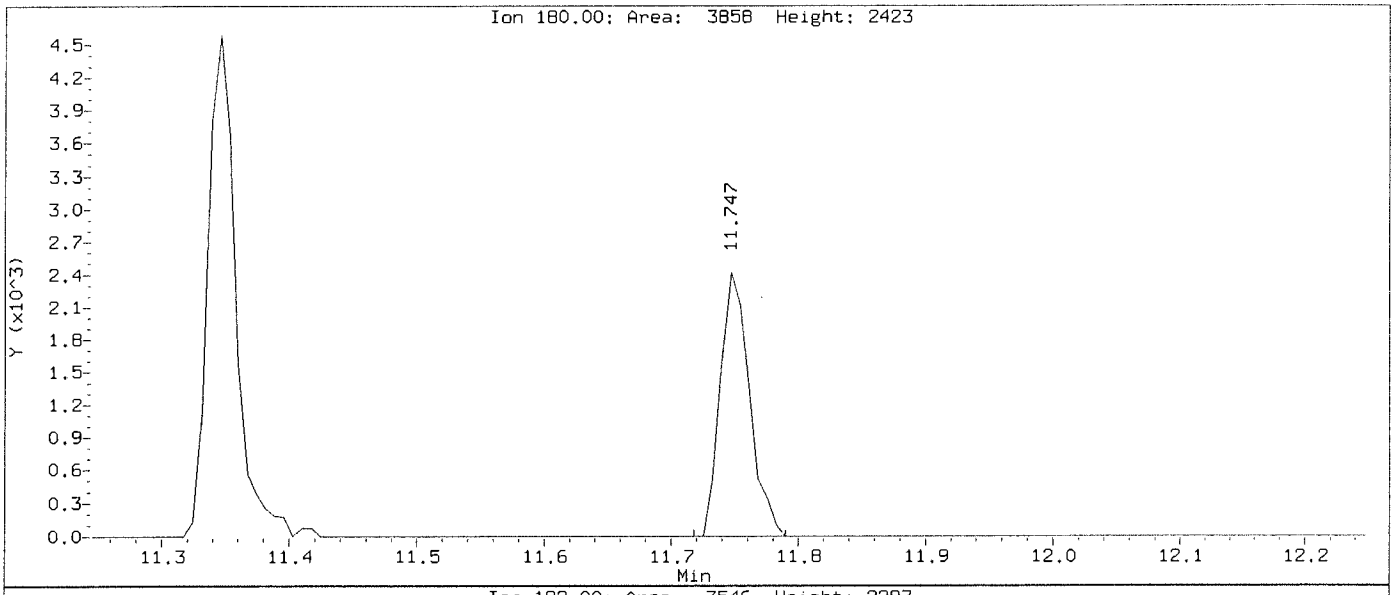


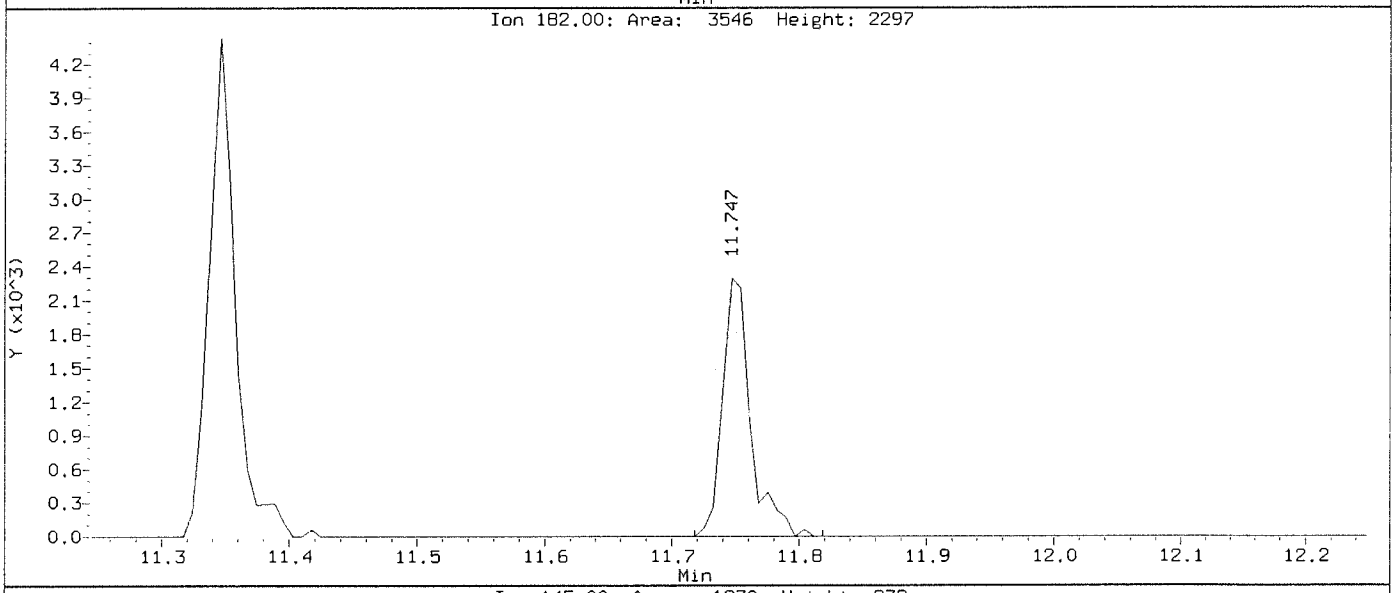
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Date : 13-JUL-2020 12:30
Client ID: VSTD005
Sample Info: VSTD005;VSTD005;1;5;
Purge Volume: 5.0
Column phase: DB624

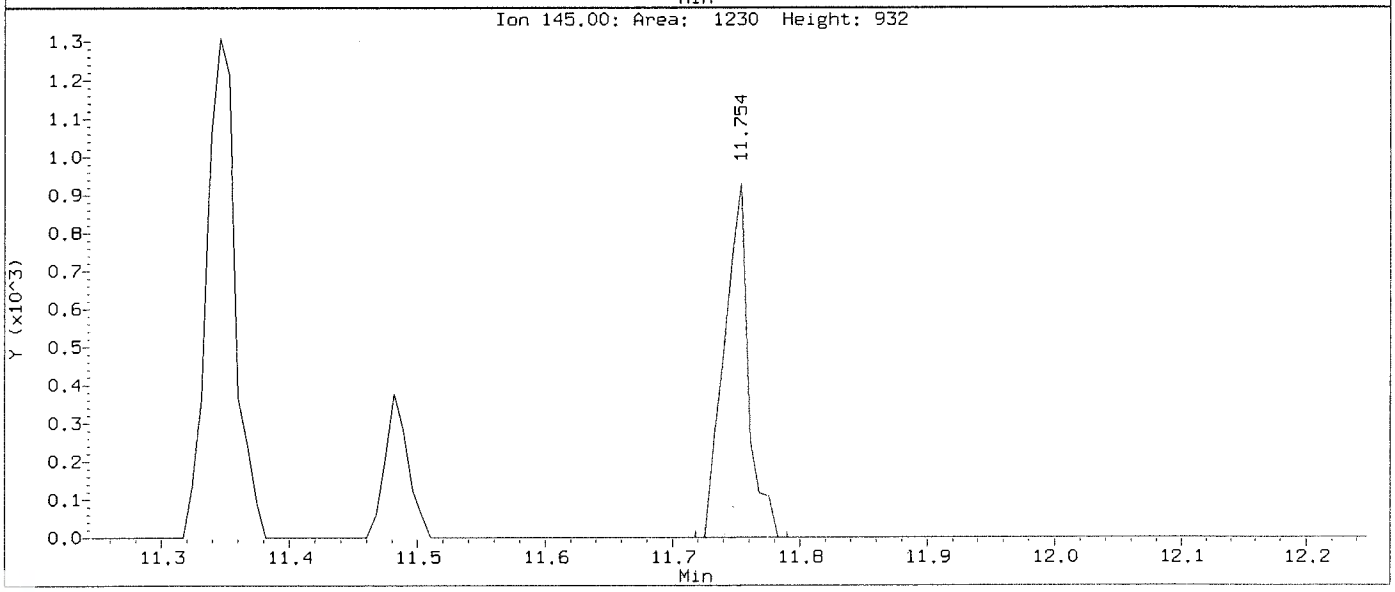
Instrument: voa6.i
Operator: PC
Column diameter: 0.18

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Injection Date: 13-JUL-2020 12:30
Instrument: voa6.i
Client Sample ID: VSTD005

Compound: 1,2,3-Trichlorobenzene
CAS Number: 87-61-6

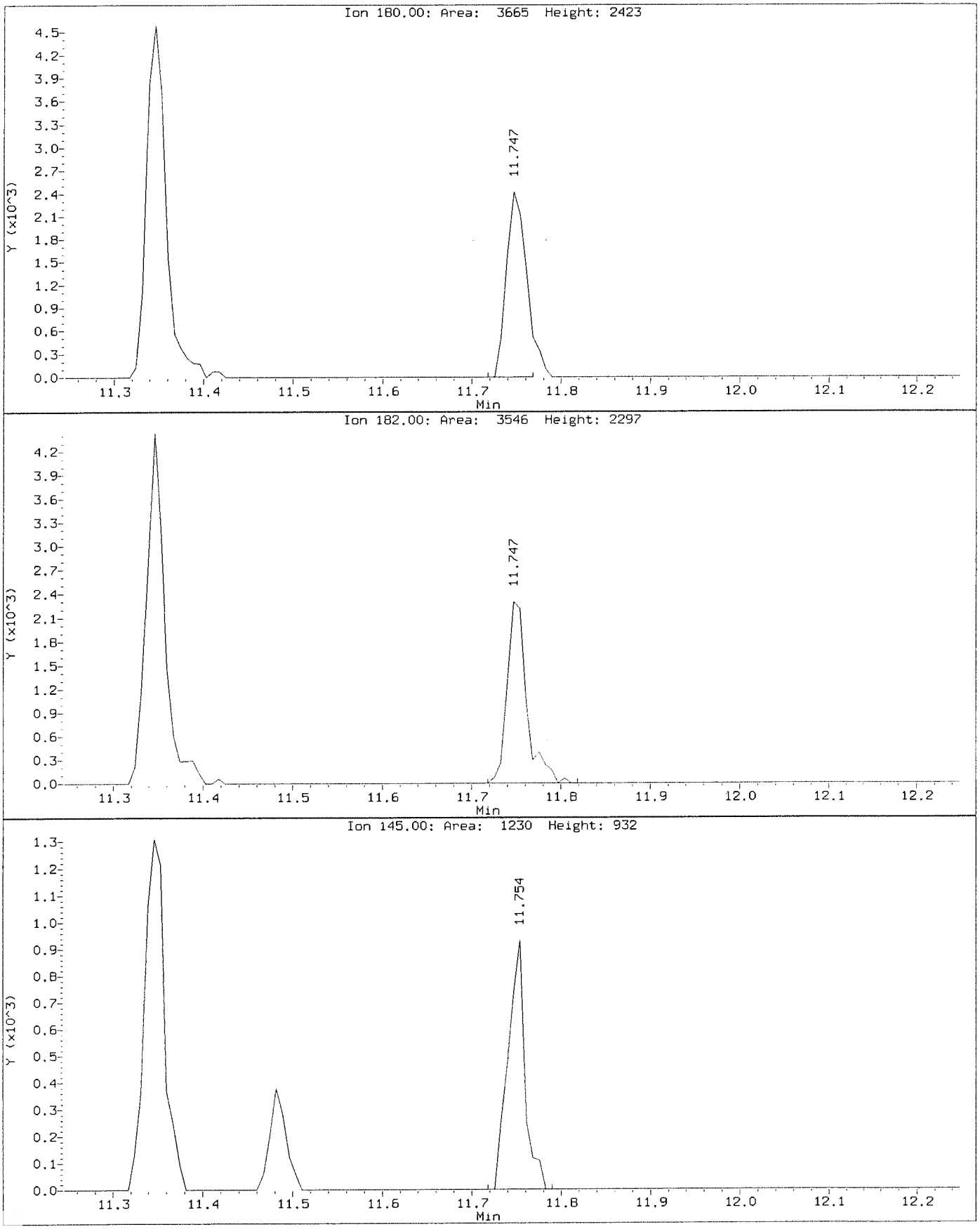






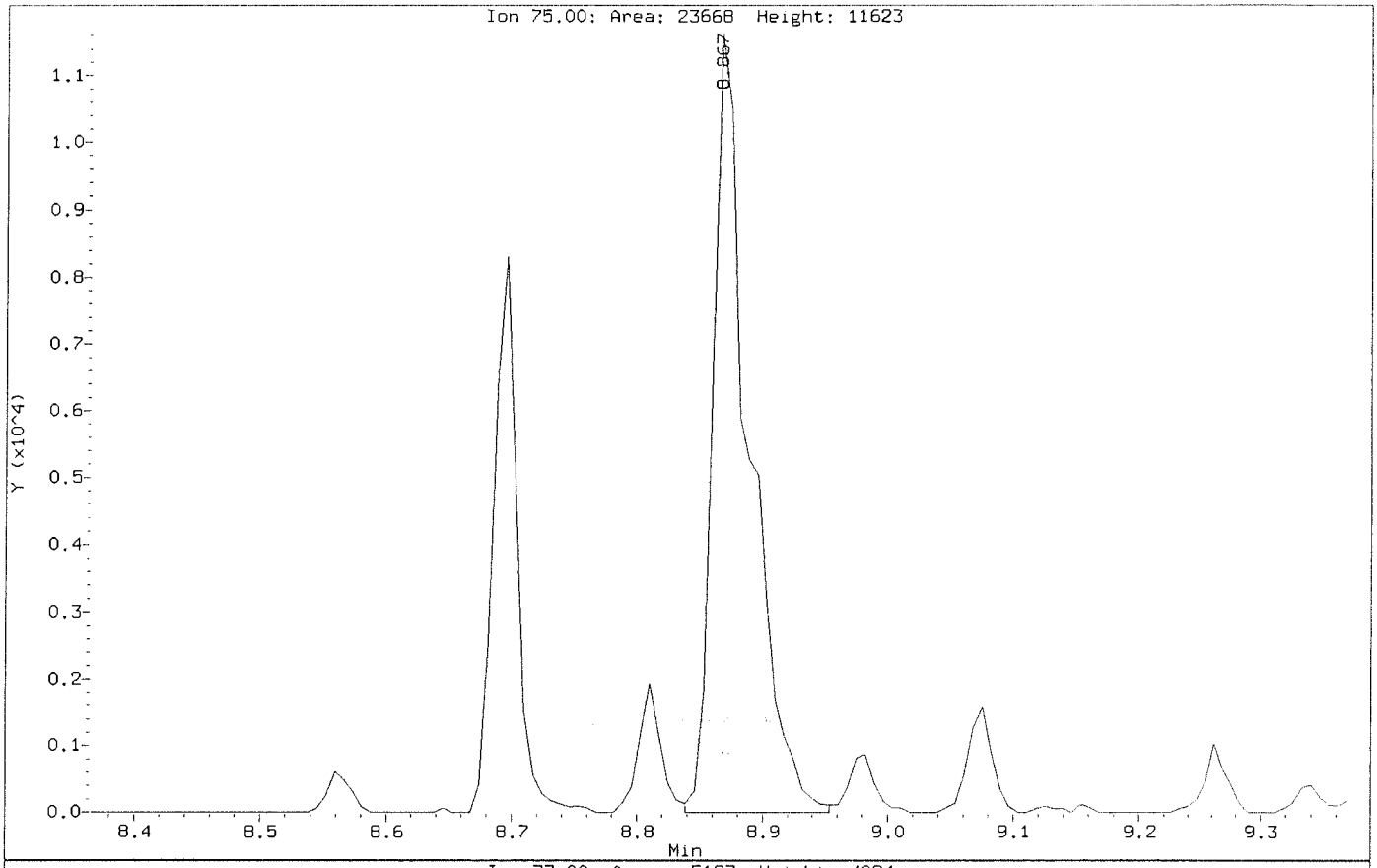
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Instrument: voa6.i
Client Sample ID: VSTD005

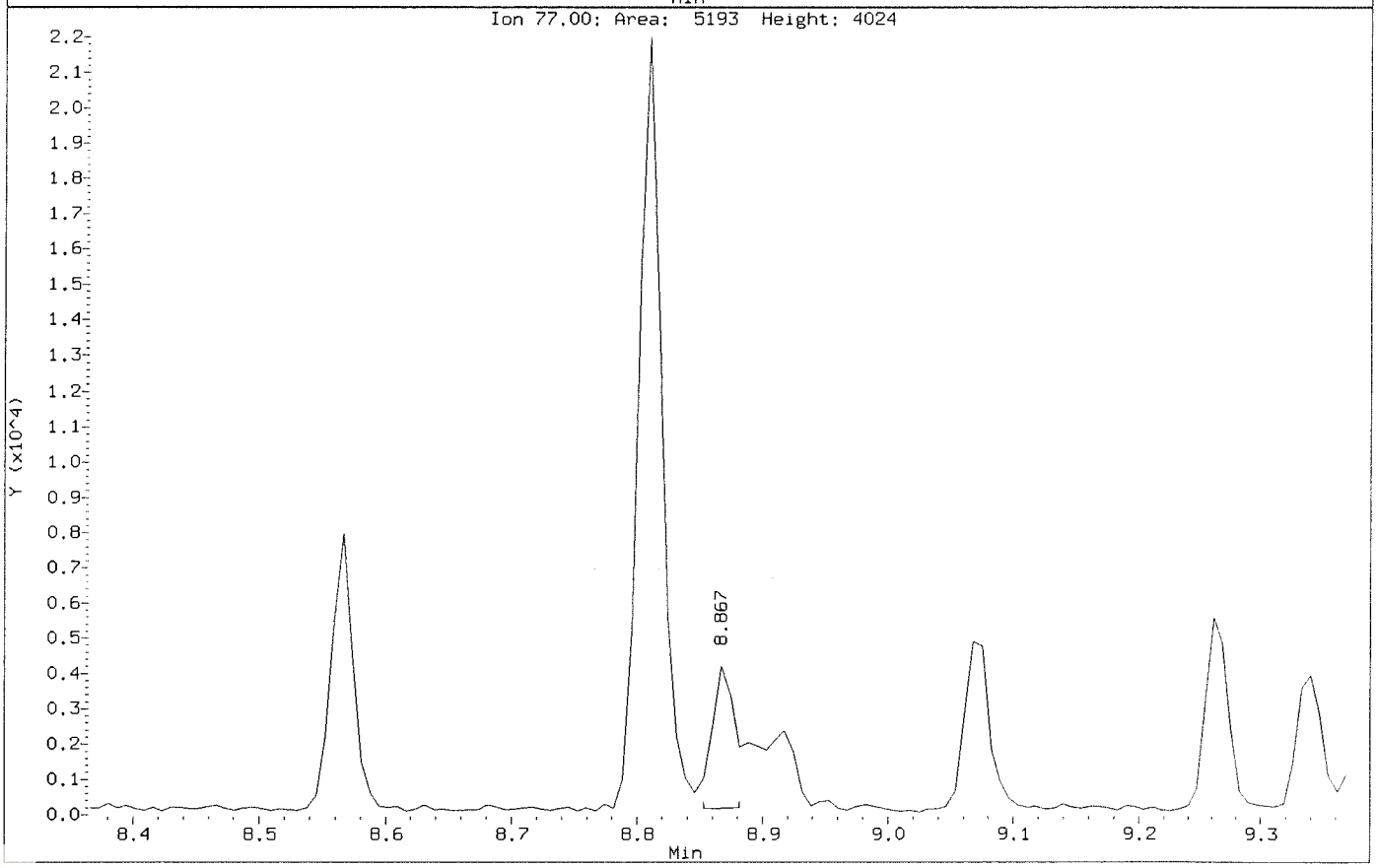
Compound: 1,2,3-Trichlorobenzene
CAS Number: 87-61-6



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Injection Date: 13-JUL-2020 12:30
Instrument: voa6.i
Client Sample ID: VSTD005

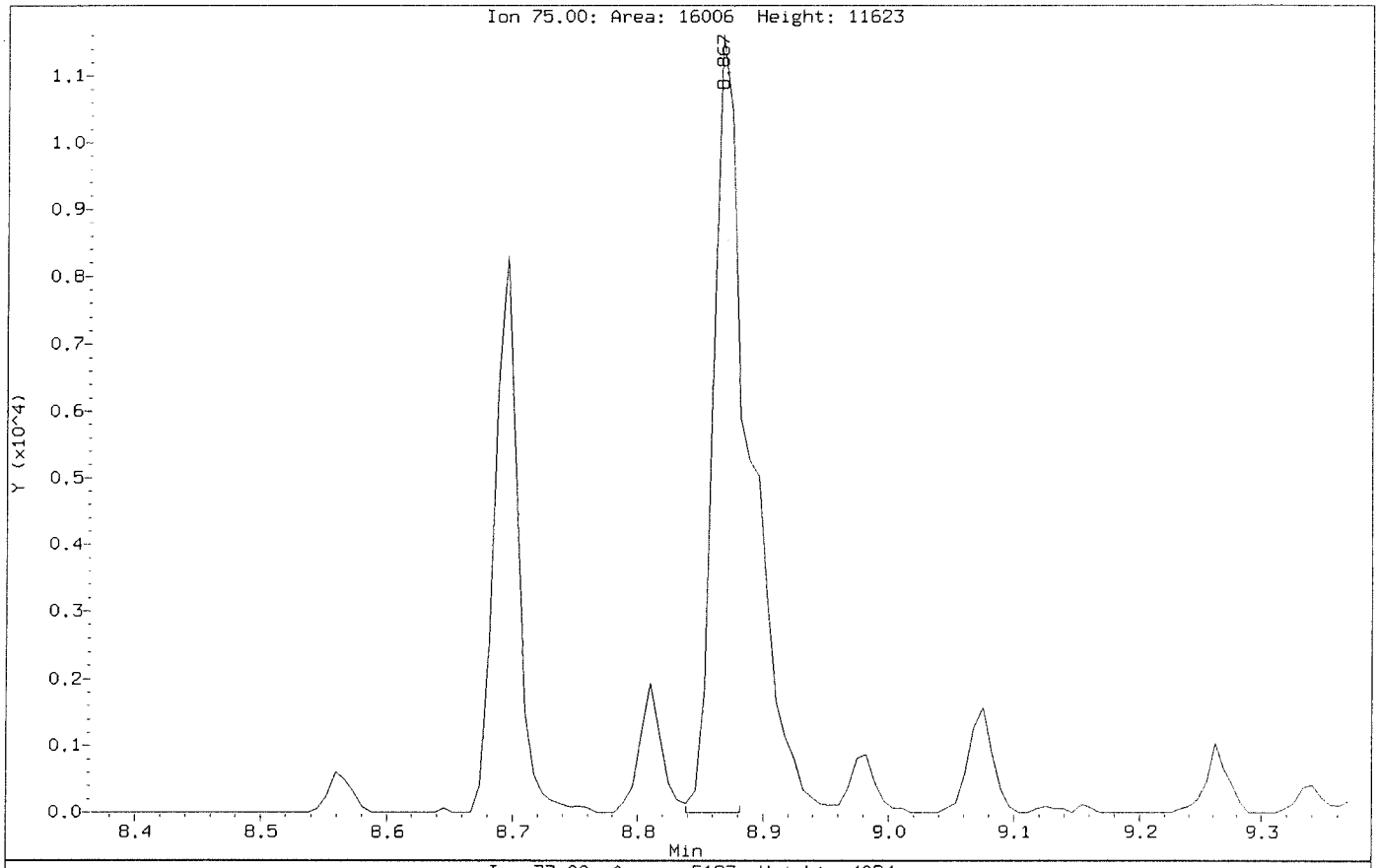
Compound: 1,2,3-Trichloropropane
CAS Number: 96-18-4

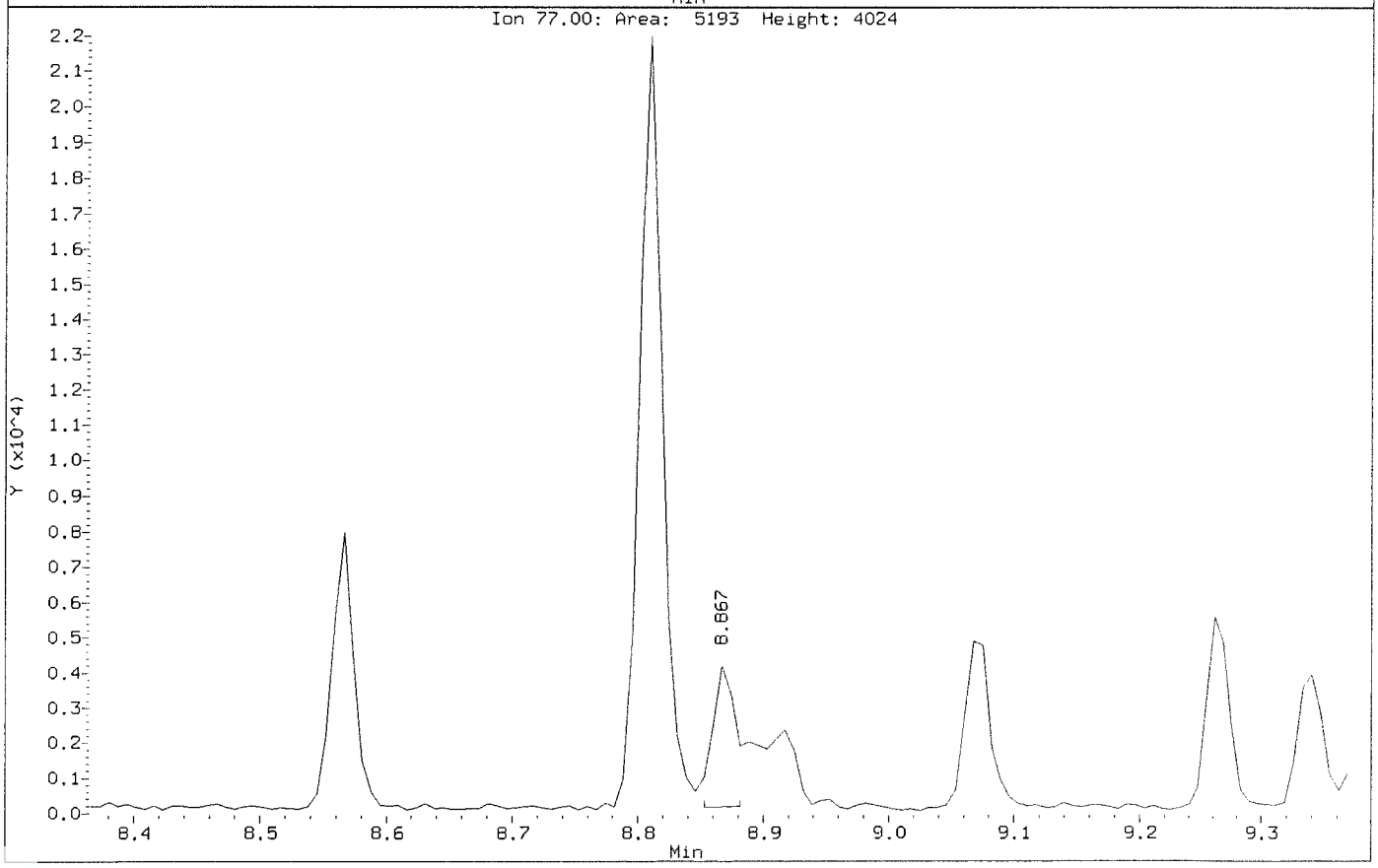




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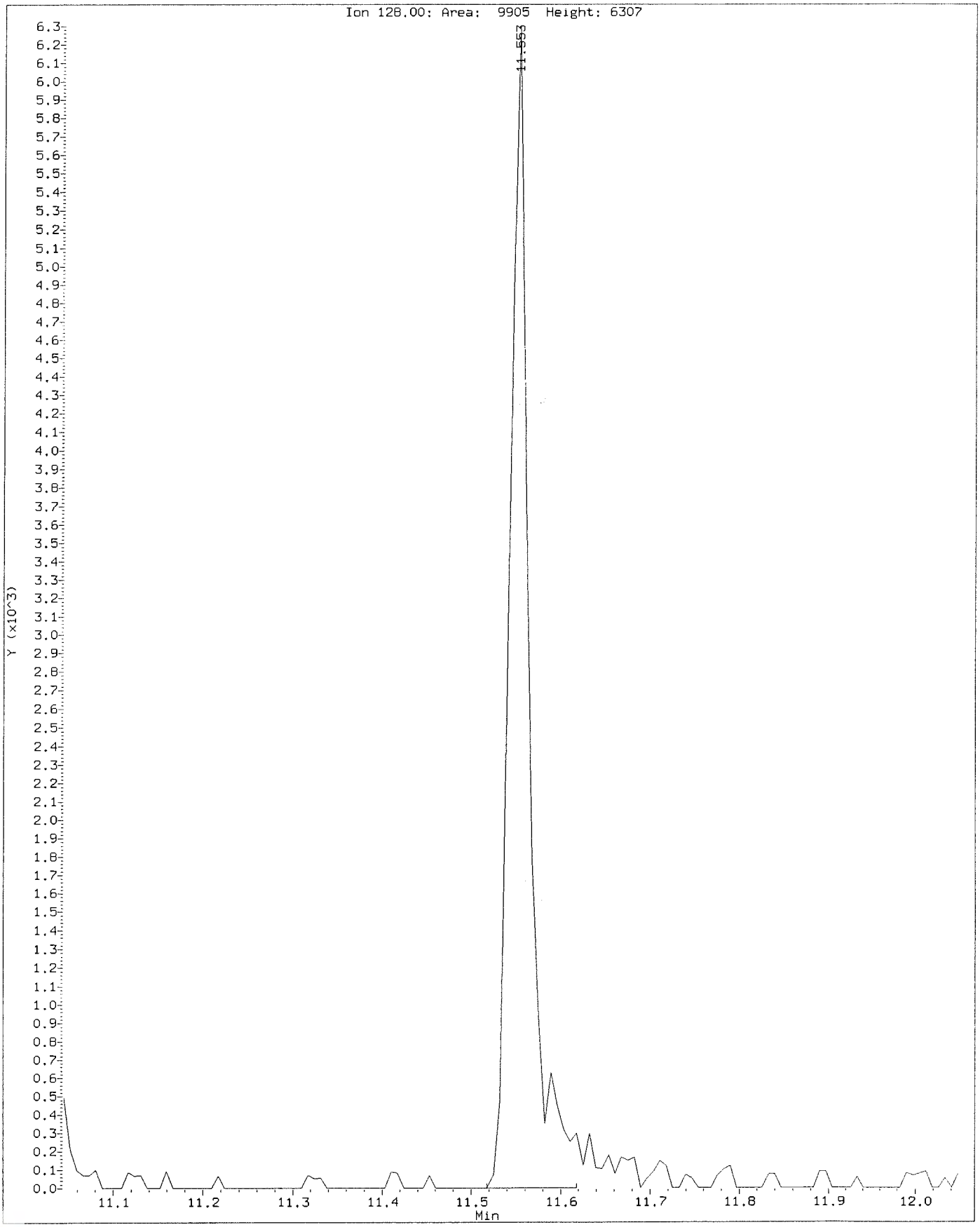
Compound: 1,2,3-Trichloropropane
CAS Number: 96-18-4





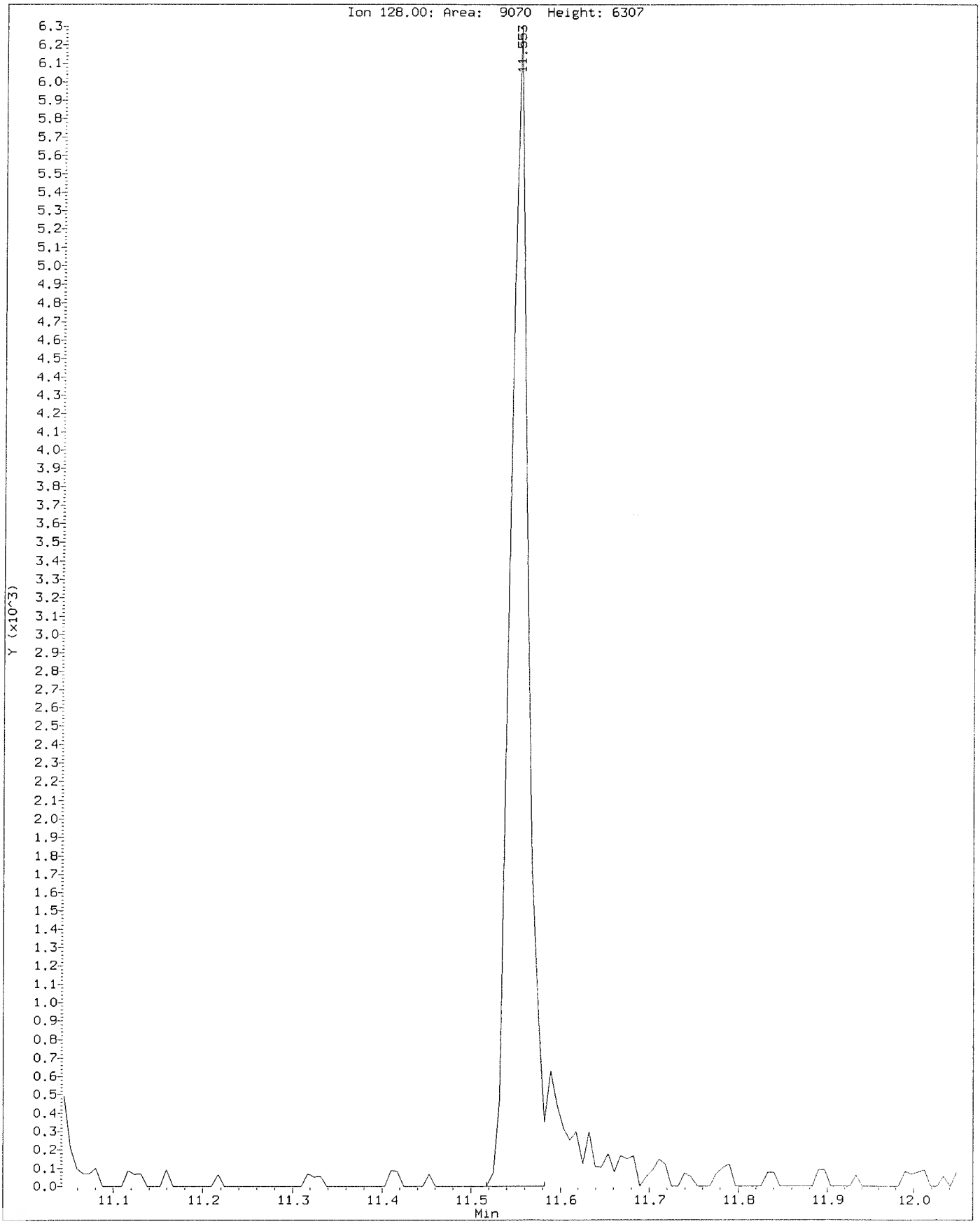
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Injection Date: 13-JUL-2020 12:30
Instrument: voa6.i
Client Sample ID: VSTD005

Compound: Naphthalene
CAS Number: 91-20-3



Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\X071306.D
Injection Date: 13-JUL-2020 12:30
Instrument: voa6.i
Client Sample ID: VSTD005

Compound: Naphthalene
CAS Number: 91-20-3



Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\X071307.D Page 1
Report Date: 13-Aug-2020 14:51

ALS Laboratory Group

Data file : \\nahstws005\Target\chem\voa6.i\X200713.b\X071307.D
Lab Smp Id: VSTD020 Client Smp ID: VSTD020
Inj Date : 13-JUL-2020 12:54
Operator : PC Inst ID: voa6.i
Smp Info : VSTD020;VSTD020;1;6;
Misc Info : HS18090001;WATER;0;1;
Comment :
Method : \\nahstws005\Target\chem\voa6.i\X200713.b\8260W.m
Meth Date : 13-Aug-2020 14:51 voa6.i Quant Type: ISTD
Cal Date : 13-JUL-2020 12:30 Cal File: X071306.D
Als bottle: 8 Calibration Sample, Level: 6
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: bhate.sub
Target Version: 4.14
Processing Host: NAHSTW7056

Concentration Formula: Amt * DF * (Uf/Vo)*1 * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Uf	5.000	ng unit correction factor
Vo	5.000	sample purged
Cpnd Variable		Local Compound Variable

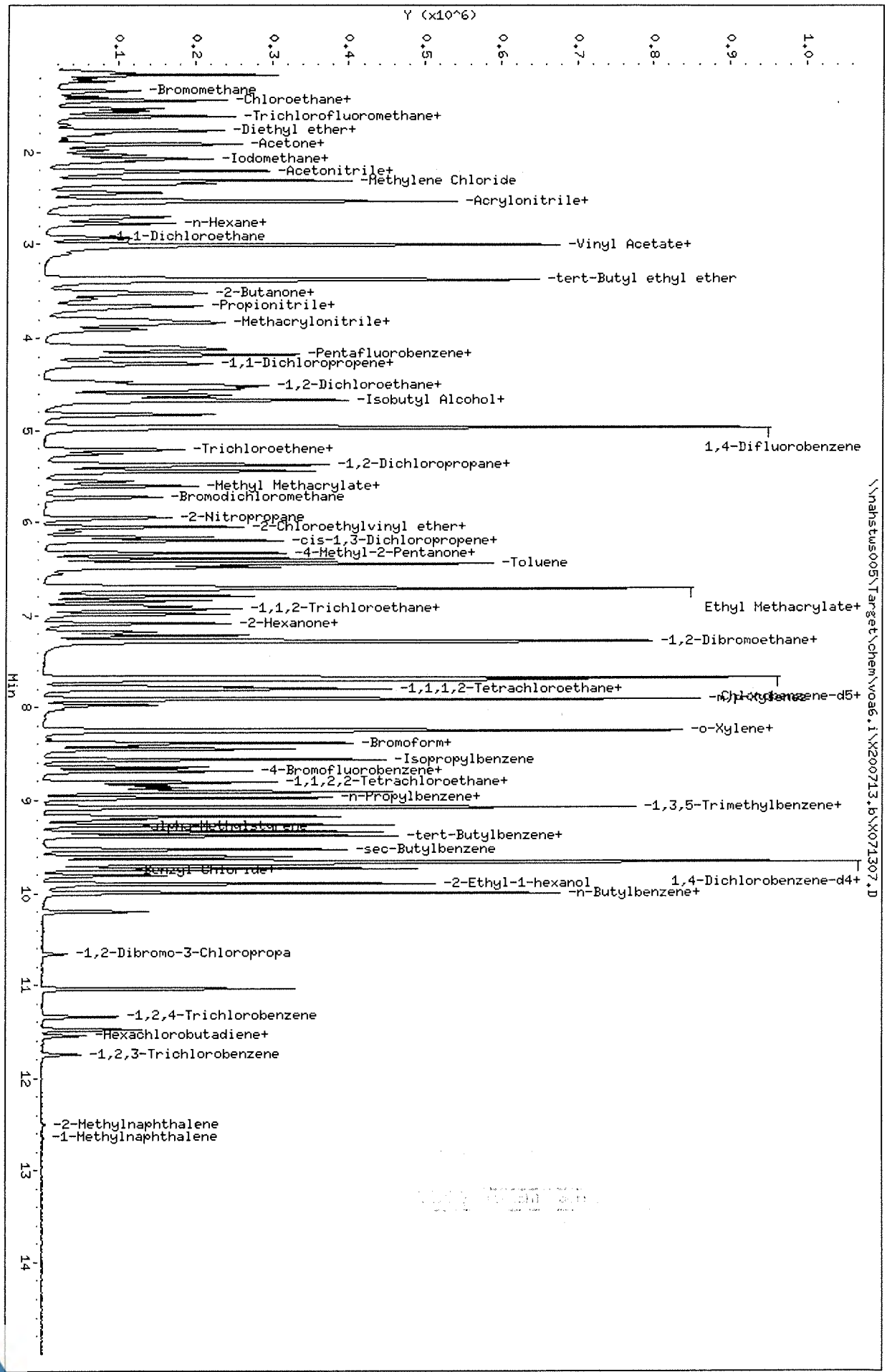
Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/l)	ON-COL (ug/l)
* 1 Pentafluorobenzene	168	4.189	4.189	(1.000)	253573	50.0000	
* 36 1,4-Difluorobenzene	114	4.970	4.970	(1.000)	421442	50.0000	
* 47 Chlorobenzene-d5	117	7.671	7.671	(1.000)	382758	50.0000	
* 70 1,4-Dichlorobenzene-d4	152	9.669	9.669	(1.000)	186382	50.0000	
$ 30 Dibromofluoromethane	113	4.103	4.103	(0.979)	57060	20.0000	20.14
$ 35 1,2-Dichloroethane-d4	65	4.476	4.476	(1.068)	78060	20.0000	20.57
$ 48 Toluene-d8	98	6.388	6.388	(0.833)	195468	20.0000	19.49
$ 69 4-Bromofluorobenzene	95	8.695	8.695	(1.134)	75648	20.0000	20.10
60 1,1,1,2-Tetrachloroethane	131	7.778	7.778	(1.014)	57406	20.0000	19.41
31 1,1,1-Trichloroethane	97	4.089	4.089	(0.976)	89722	20.0000	19.42
68 1,1,2,2-Tetrachloroethane	83	8.838	8.838	(0.914)	67545	20.0000	19.62
53 1,1,2-Trichloroethane	83	6.840	6.840	(0.892)	48065	20.0000	20.50
22 1,1-Dichloroethane	63	2.929	2.929	(0.699)	126480	20.0000	17.80
11 1,1-Dichloroethene	96	1.919	1.919	(0.458)	40964	20.0000	18.46
32 1,1-Dichloropropene	75	4.283	4.283	(0.862)	75083	20.0000	19.01
93 1,2,3-Trichlorobenzene	180	11.746	11.746	(1.215)	13199	20.0000	20.93(M)
71 1,2,3-Trichloropropane	75	8.867	8.867	(0.917)	59025	20.0000	19.49(M)
90 1,2,4-Trichlorobenzene	180	11.338	11.338	(1.173)	26708	20.0000	22.33
79 1,2,4-Trimethylbenzene	105	9.383	9.383	(0.970)	200298	20.0000	19.54
89 1,2-Dibromo-3-Chloropropane	155	10.658	10.658	(1.102)	5688	20.0000	18.92
57 1,2-Dibromoethane	107	7.262	7.262	(0.947)	59439	20.0000	21.09
88 1,2-Dichlorobenzene	146	9.999	9.999	(1.034)	100787	20.0000	19.39

Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\X071307.D Page 2
Report Date: 13-Aug-2020 14:51

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/l)	AMOUNTS ON-COL (ug/l)
33	1,2-Dichloroethane	62	4.562	4.562	(0.918)	101682	20.0000	20.27
42	1,2-Dichloropropane	63	5.443	5.443	(1.095)	78092	20.0000	20.06
75	1,3,5-Trimethylbenzene	105	9.067	9.067	(0.938)	196326	20.0000	19.38
83	1,3-Dichlorobenzene	146	9.612	9.612	(0.994)	110544	20.0000	19.34
54	1,3-Dichloropropane	76	6.983	6.983	(0.910)	97614	20.0000	19.48
84	1,4-Dichlorobenzene	146	9.683	9.683	(1.001)	109540	20.0000	18.82
26	2,2-Dichloropropane	77	3.516	3.516	(0.839)	81095	20.0000	18.07
24	2-Butanone	43	3.581	3.581	(0.855)	91155	40.0000	41.41
76	2-Chlorotoluene	91	8.974	8.974	(0.928)	165901	20.0000	18.68
52	2-Hexanone	43	7.090	7.090	(0.924)	149041	40.0000	41.10
77	4-Chlorotoluene	91	9.075	9.075	(0.939)	197676	20.0000	19.03
82	p-Isopropyltoluene	119	9.655	9.655	(0.999)	193573	20.0000	19.51
45	4-Methyl-2-Pentanone	43	6.331	6.331	(0.825)	212897	40.0000	40.76
10	Acetone	43	1.976	1.976	(0.472)	68543	40.0000	39.83
37	Benzene	78	4.519	4.519	(0.909)	229005	20.0000	20.01
74	Bromobenzene	156	8.810	8.810	(0.911)	66470	20.0000	19.47
29	Bromochloromethane	128	3.803	3.803	(0.908)	33088	20.0000	18.46
39	Bromodichloromethane	83	5.729	5.729	(1.153)	82567	20.0000	19.47
66	Bromoform	173	8.416	8.416	(1.097)	41754	20.0000	19.72
6	Bromomethane	94	1.339	1.339	(0.320)	34876	20.0000	19.05(M)
19	Carbon Disulfide	76	2.069	2.069	(0.494)	249663	40.0000	35.72
34	Carbon Tetrachloride	117	4.268	4.268	(0.859)	73956	20.0000	18.66(H)
59	Chlorobenzene	112	7.699	7.699	(1.004)	149101	20.0000	19.56
7	Chloroethane	64	1.403	1.403	(0.335)	39294	20.0000	17.63
28	Chloroform	83	3.917	3.917	(0.935)	108746	20.0000	19.53
3	Chloromethane	50	1.081	1.081	(0.258)	93790	20.0000	18.83
27	cis-1,2-Dichloroethene	96	3.530	3.530	(0.843)	61658	20.0000	18.95
46	cis-1,3-Dichloropropene	75	6.159	6.159	(1.239)	97390	20.0000	19.83
55	Dibromochloromethane	129	7.176	7.176	(0.936)	61467	20.0000	19.74
44	Dibromomethane	93	5.558	5.558	(1.118)	40799	20.0000	19.62
2	Dichlorodifluoromethane	85	0.973	0.973	(0.232)	49290	20.0000	18.40
61	Ethylbenzene	106	7.800	7.800	(1.017)	78012	20.0000	19.62
91	Hexachlorobutadiene	225	11.481	11.481	(1.187)	20285	20.0000	21.96
67	Isopropylbenzene	105	8.566	8.566	(1.117)	228992	20.0000	19.23
62	m,p-Xylenes	106	7.907	7.907	(1.031)	187695	40.0000	39.42
17	Methylene Chloride	84	2.306	2.306	(0.550)	58274	20.0000	18.69
87	n-Butylbenzene	91	9.999	9.999	(1.034)	174513	20.0000	20.04
73	n-Propylbenzene	91	8.917	8.917	(0.922)	277218	20.0000	19.51
92	Naphthalene	128	11.546	11.546	(1.194)	36314	20.0000	19.81
63	o-Xylene	106	8.244	8.244	(1.075)	90878	20.0000	18.89
81	sec-Butylbenzene	105	9.526	9.526	(0.985)	223860	20.0000	19.39
64	Styrene	104	8.265	8.265	(1.078)	163353	20.0000	19.62
78	tert-Butylbenzene	119	9.340	9.340	(0.966)	157640	20.0000	19.50
56	Tetrachloroethene	164	6.933	6.933	(0.904)	45838	20.0000	19.56
50	Toluene	91	6.453	6.453	(0.841)	234031	20.0000	19.51
20	trans-1,2-Dichloroethene	96	2.535	2.535	(0.605)	49591	20.0000	18.15
51	trans-1,3-Dichloropropene	75	6.682	6.682	(1.344)	90135	20.0000	19.90
38	Trichloroethene	130	5.214	5.214	(1.049)	59096	20.0000	19.48
8	Trichlorofluoromethane	101	1.561	1.561	(0.373)	77515	20.0000	18.49
5	Vinyl Chloride	62	1.145	1.145	(0.273)	74208	20.0000	17.79

QC Flag Legend

M - Compound response manually integrated.
H - Operator selected an alternate compound hit.

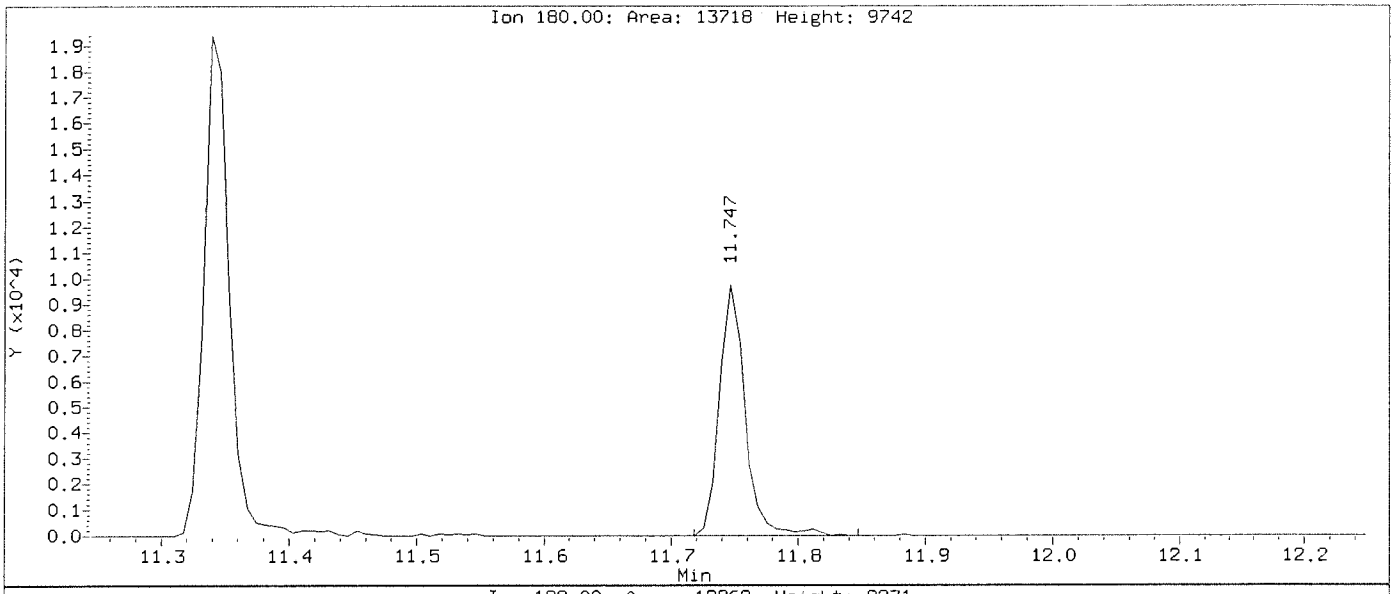


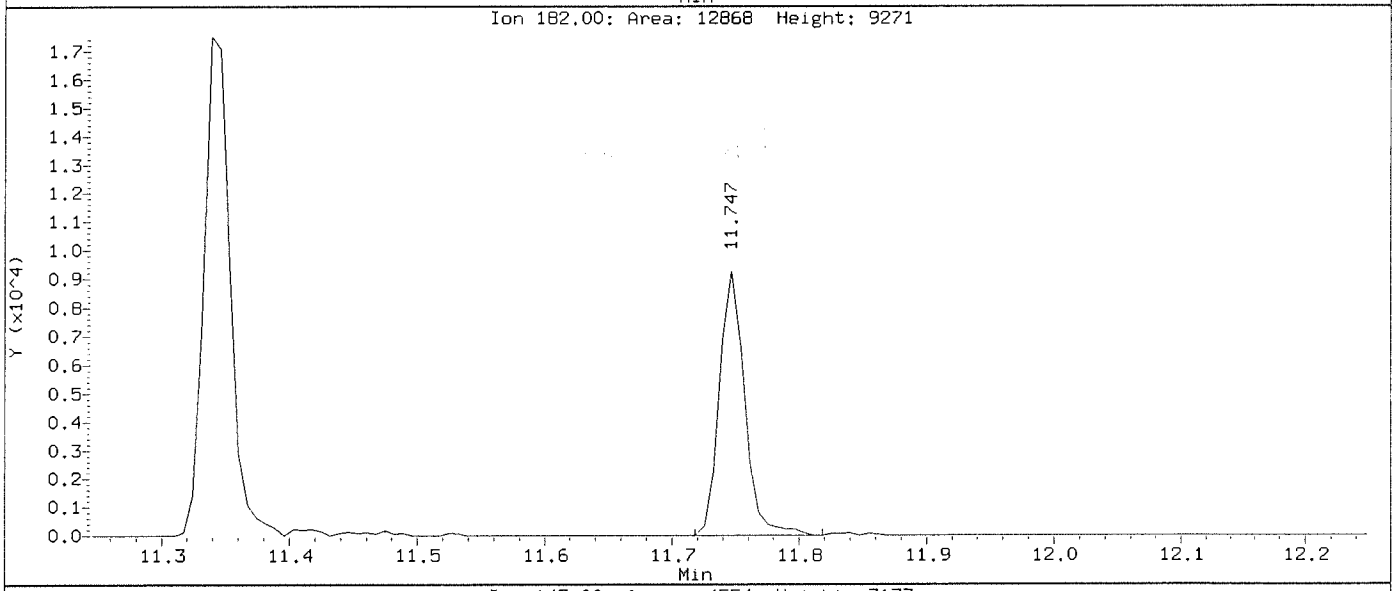
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Client ID: VSTD020
Sample Info: VSTD020;VSTD020;1;6;
Purge Volume: 5.0
Column phase: DB624

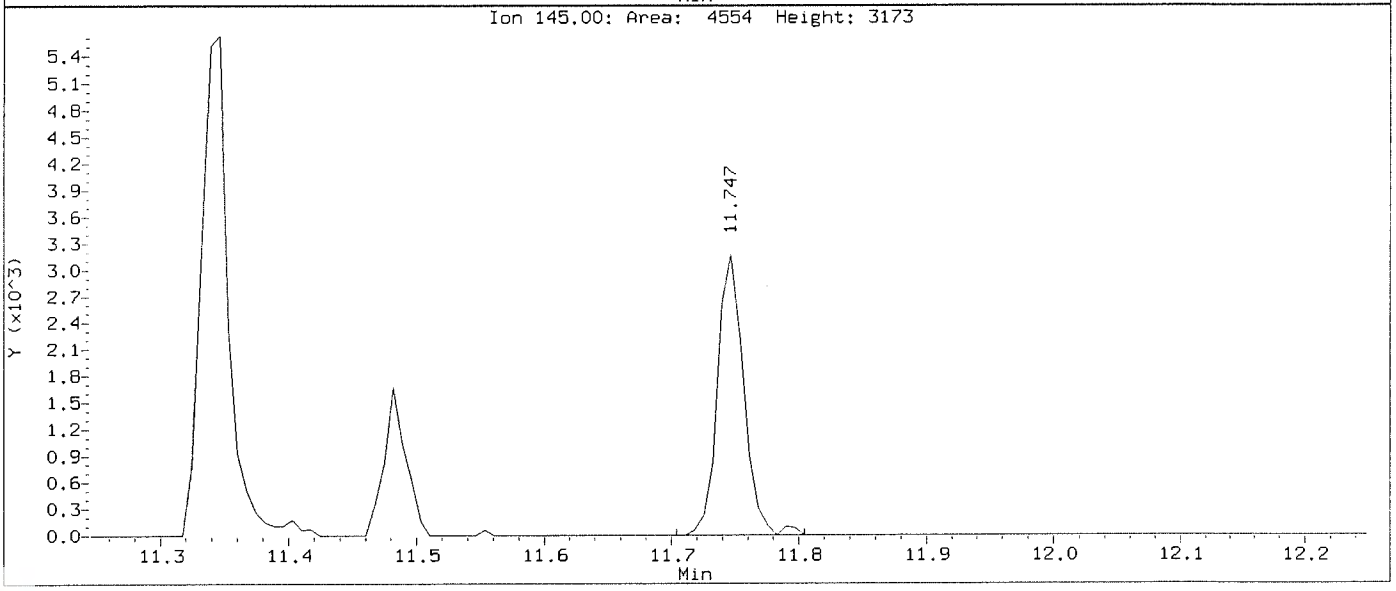
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Operator: PC
Column diameter: 0.18

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Instrument: voa6.i
Client Sample ID: VSTD020

Compound: 1,2,3-Trichlorobenzene
CAS Number: 87-61-6

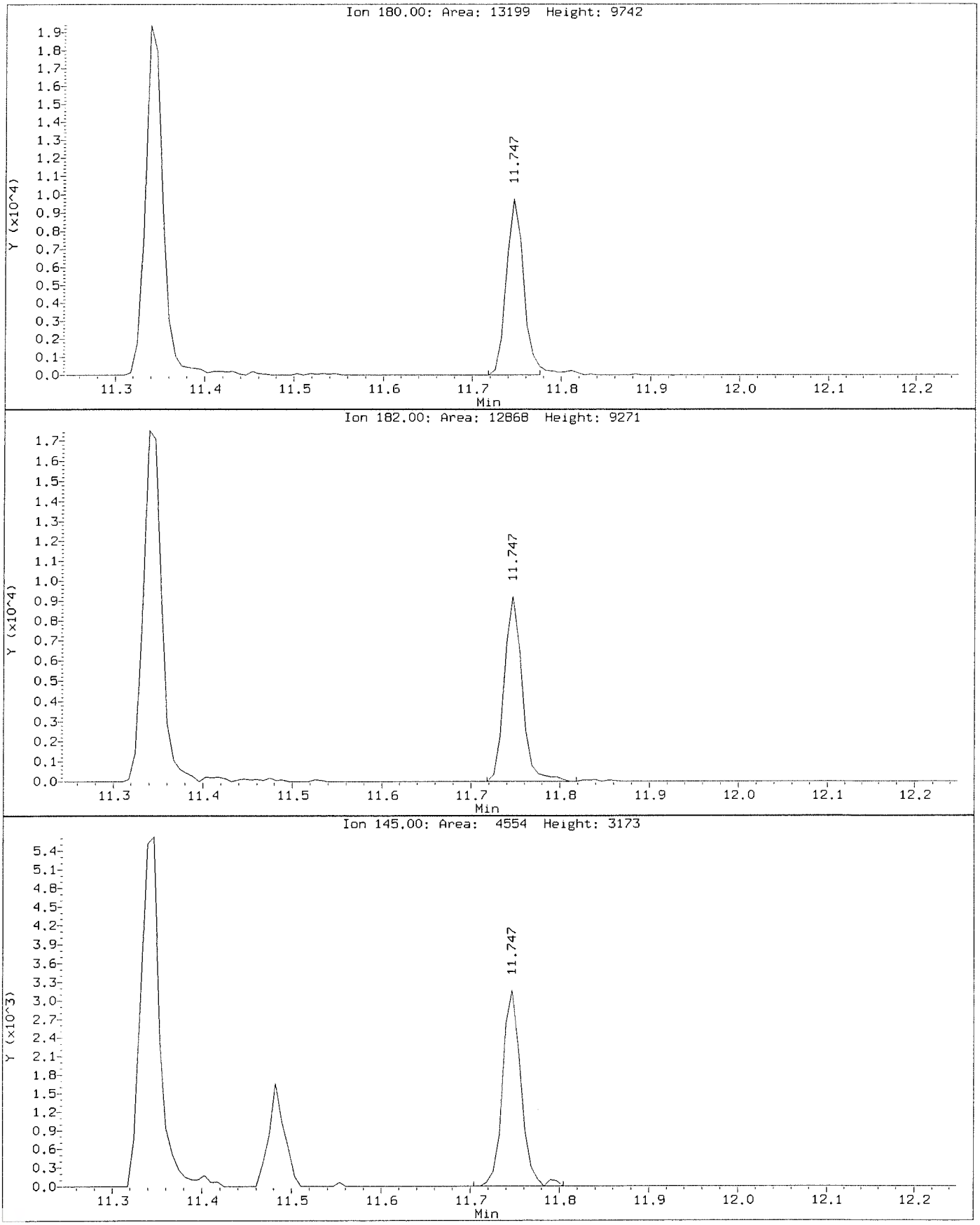






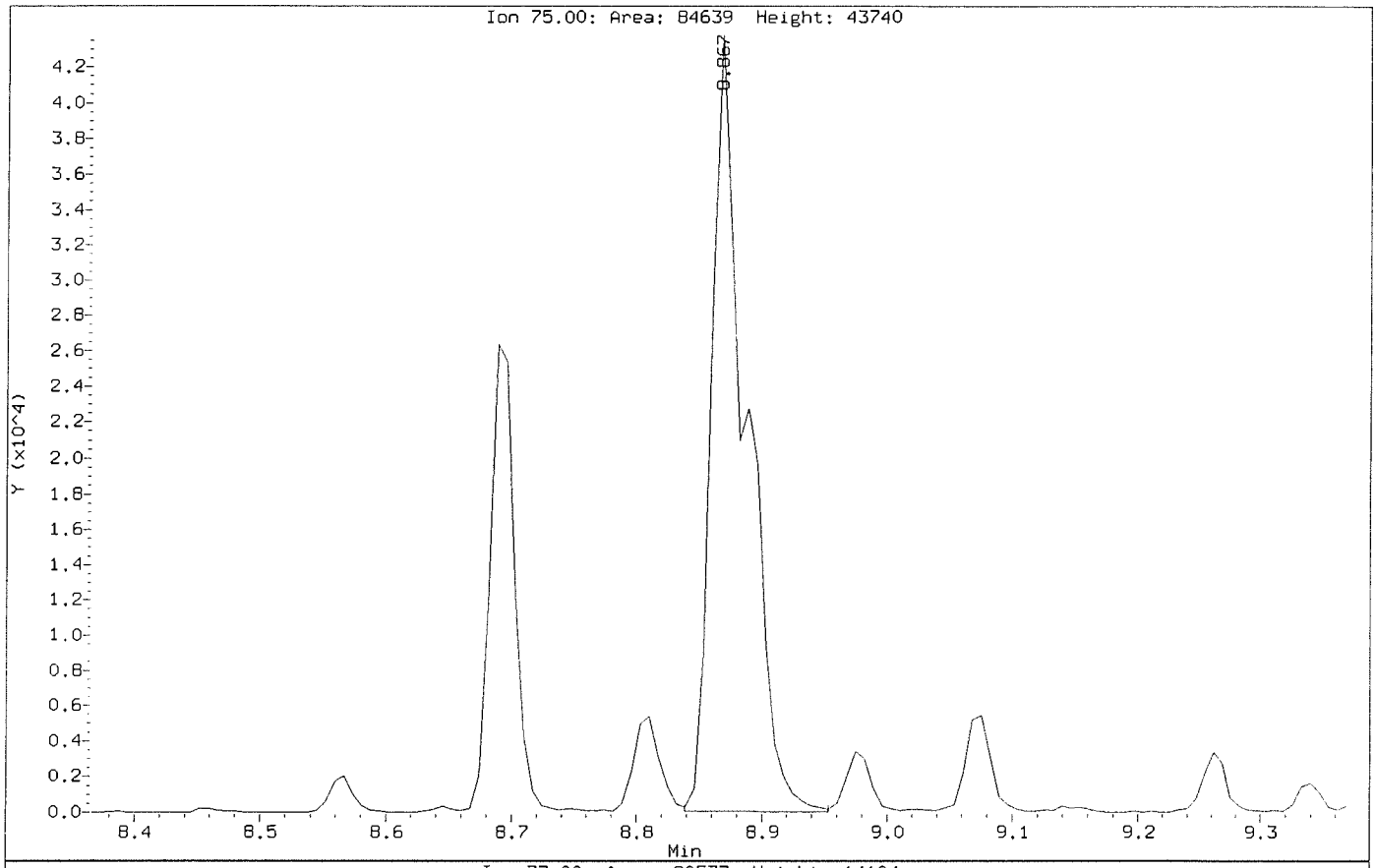
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Instrument: voa6.i
Client Sample ID: VSTD020

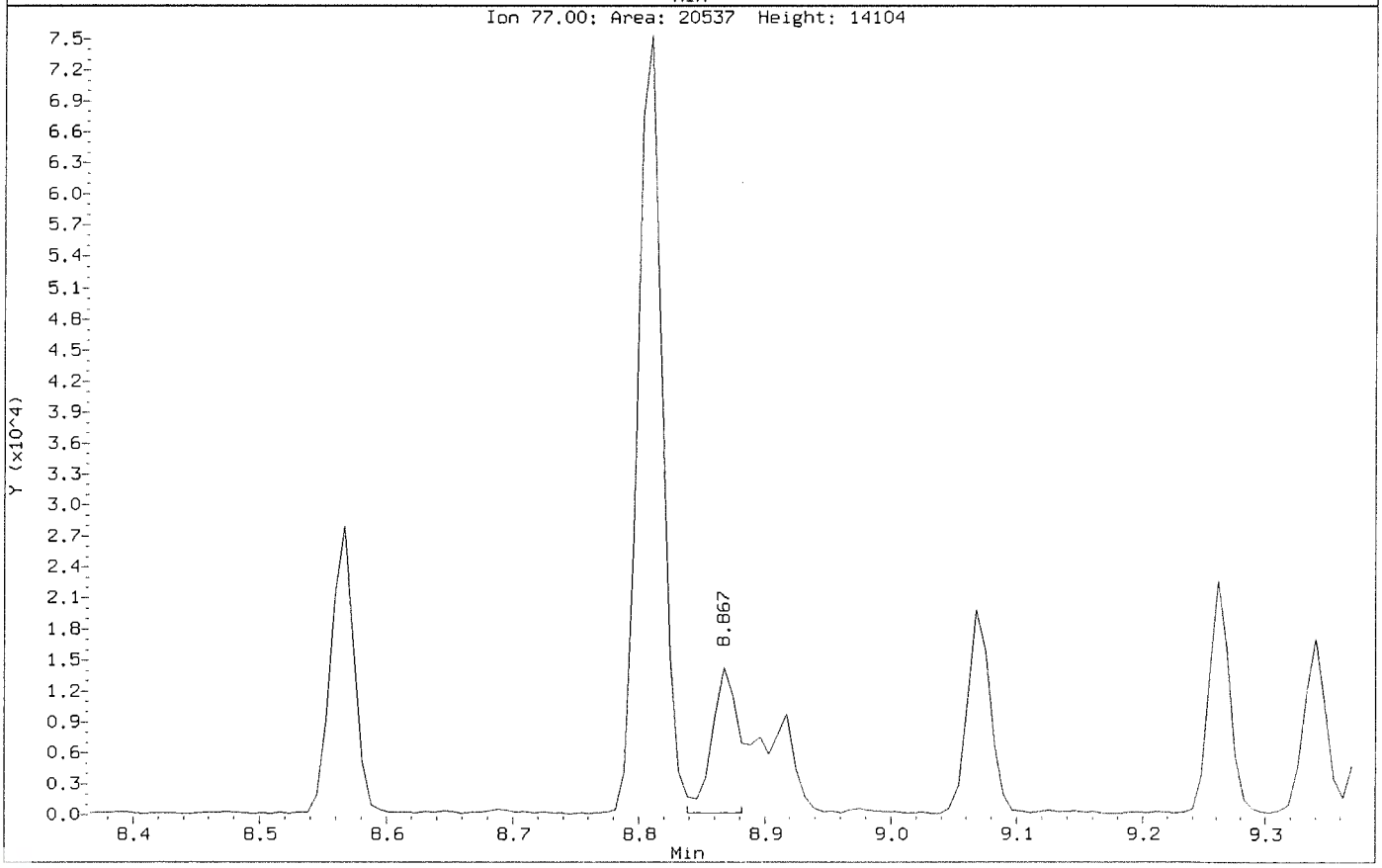
Compound: 1,2,3-Trichlorobenzene
CAS Number: 87-61-6



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Injection Date: 13-JUL-2020 12:54
Instrument: voa6.i
Client Sample ID: VSTD020

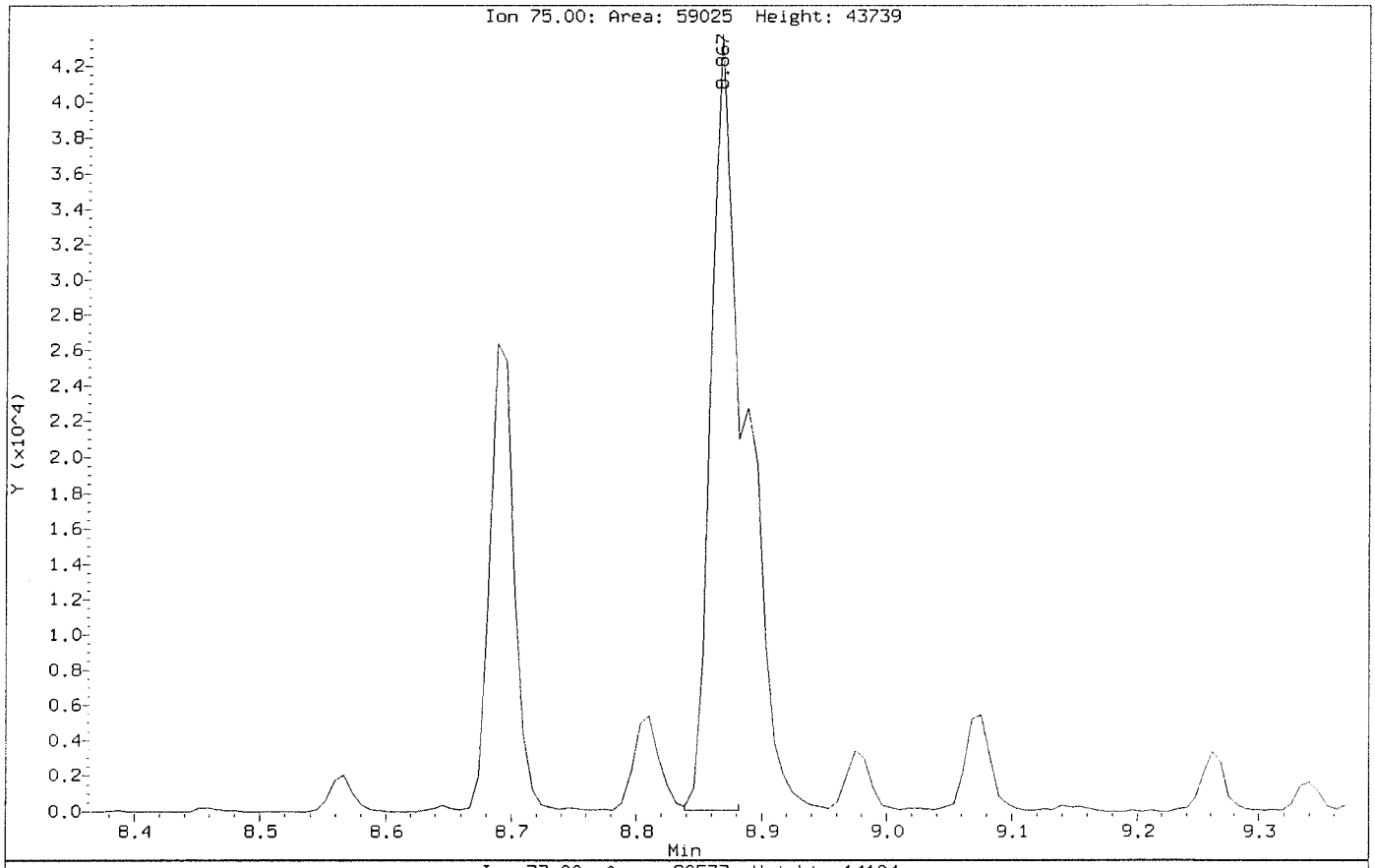
Compound: 1,2,3-Trichloropropane
CAS Number: 96-18-4

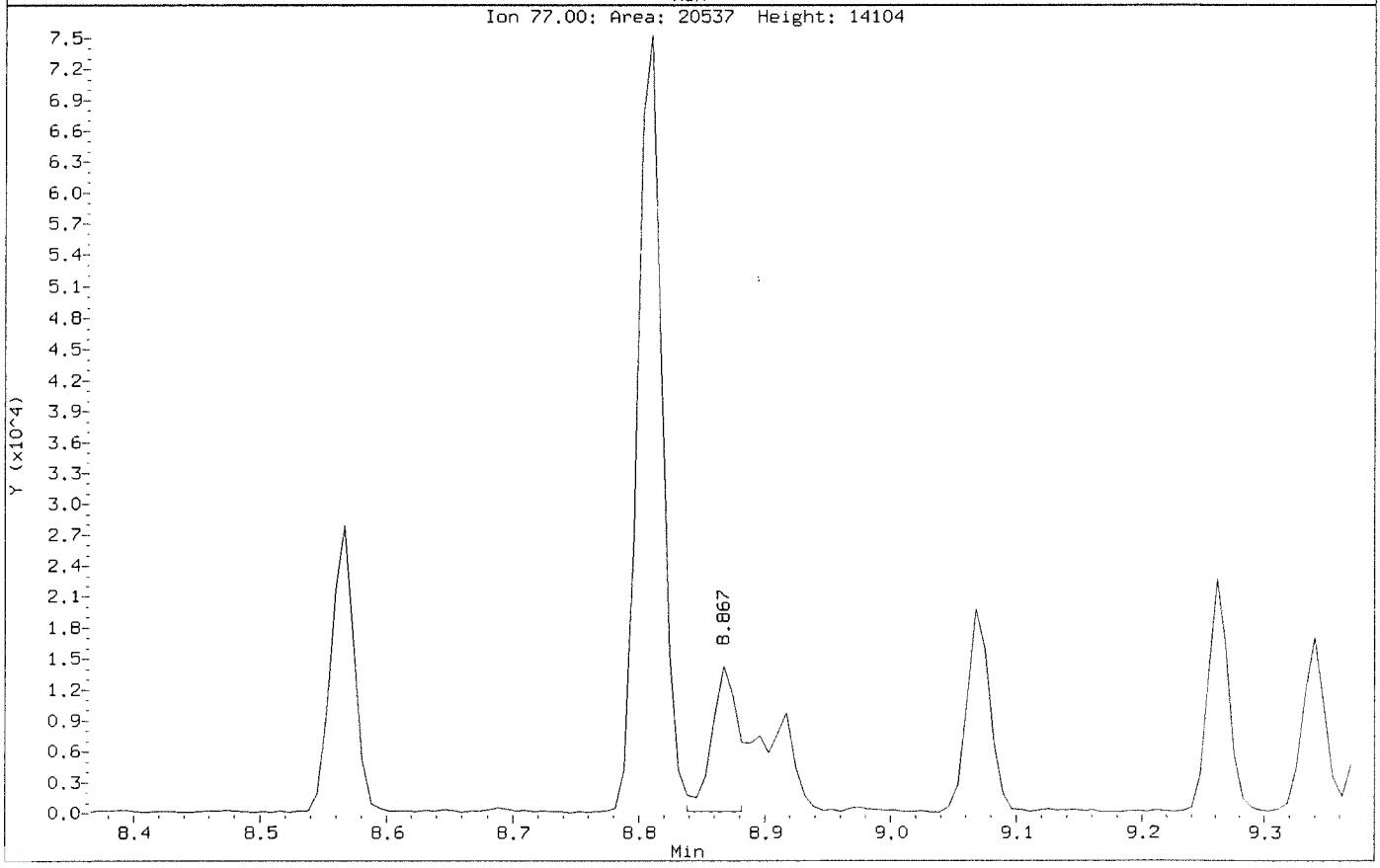




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Instrument: voa6.i
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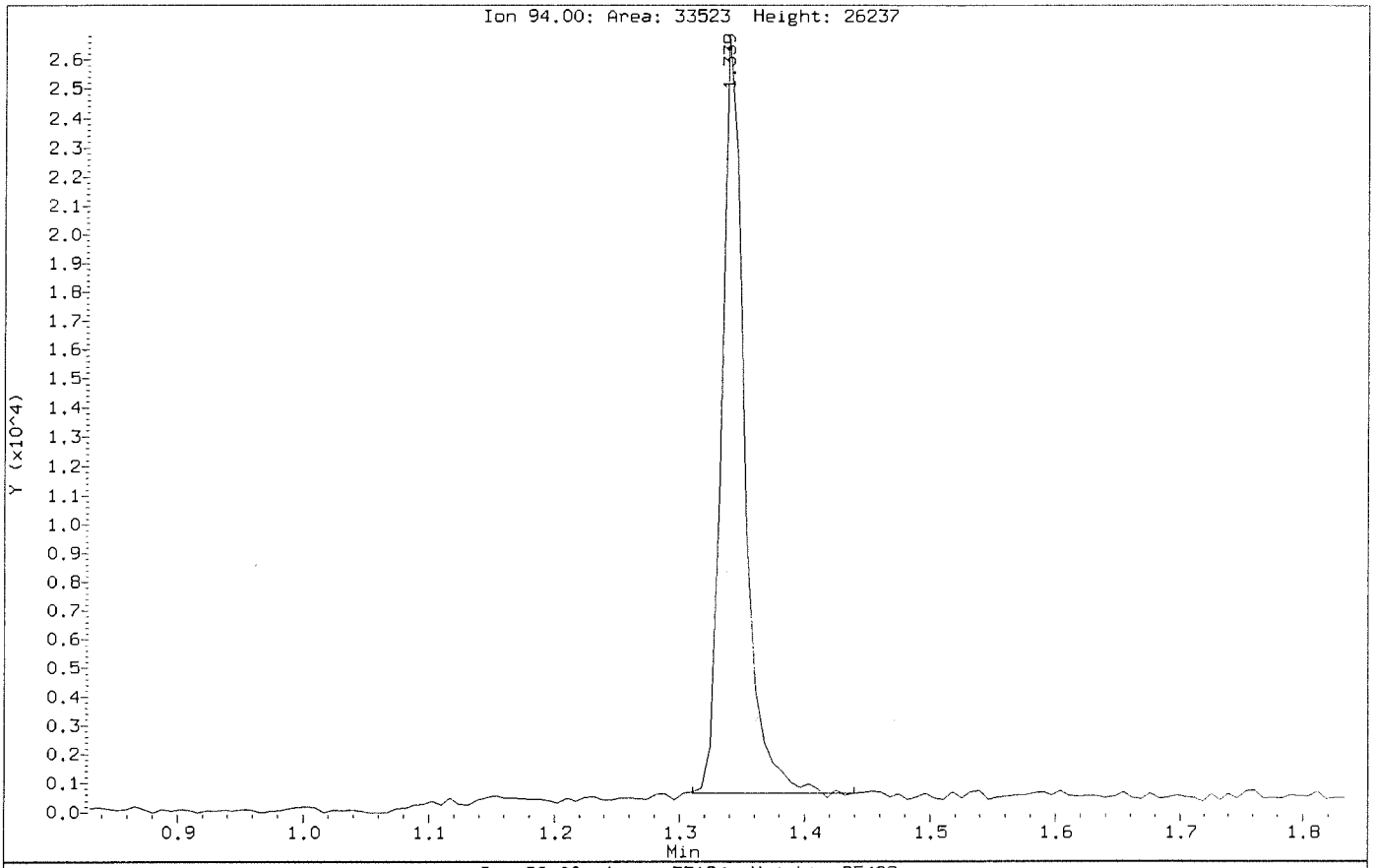
Compound: 1,2,3-Trichloropropane
CAS Number: 96-18-4

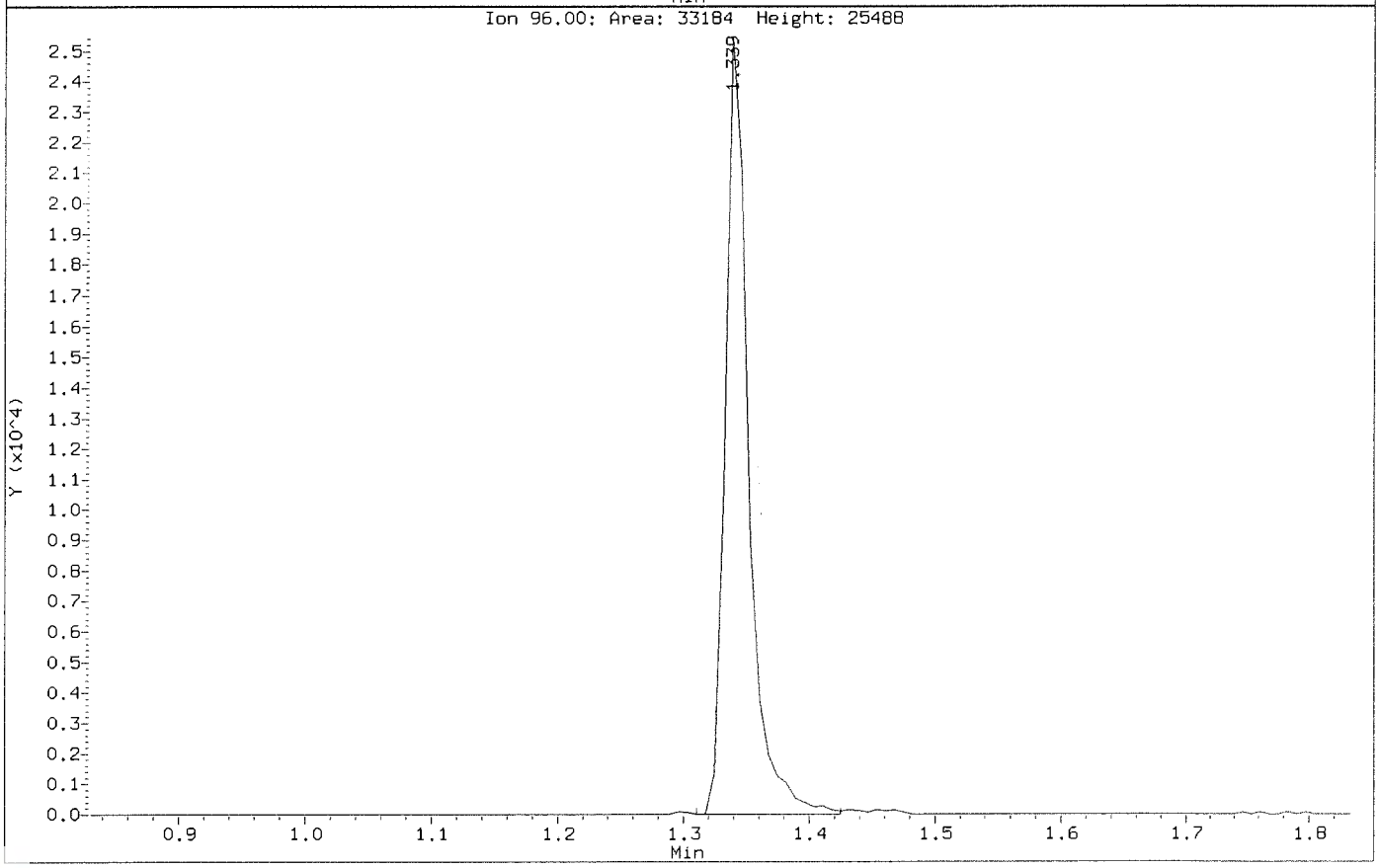




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Injection Date: 13-JUL-2020 12:54
Instrument: voa6.i
Client Sample ID: VSTD020

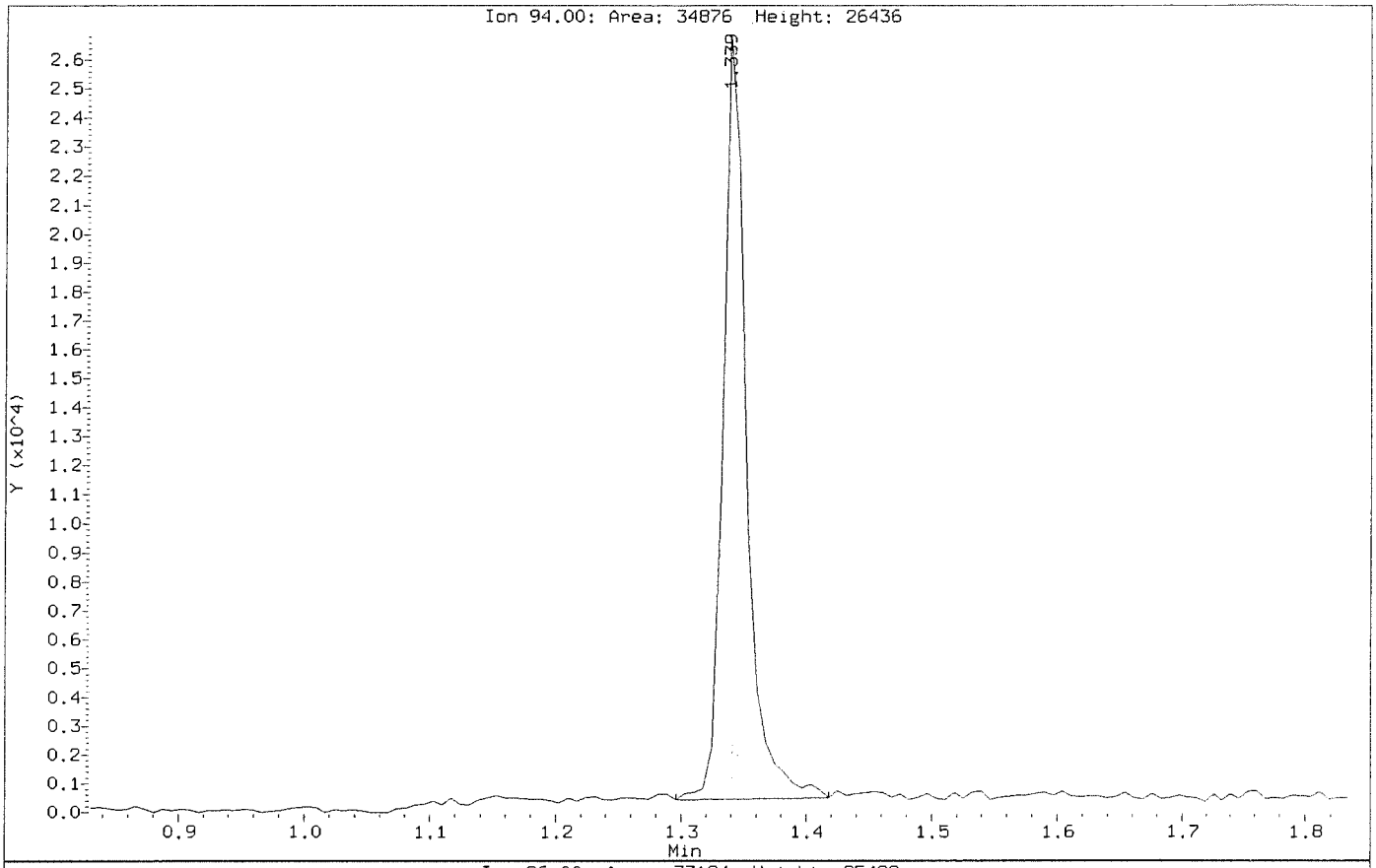
Compound: Bromomethane
CAS Number: 74-83-9

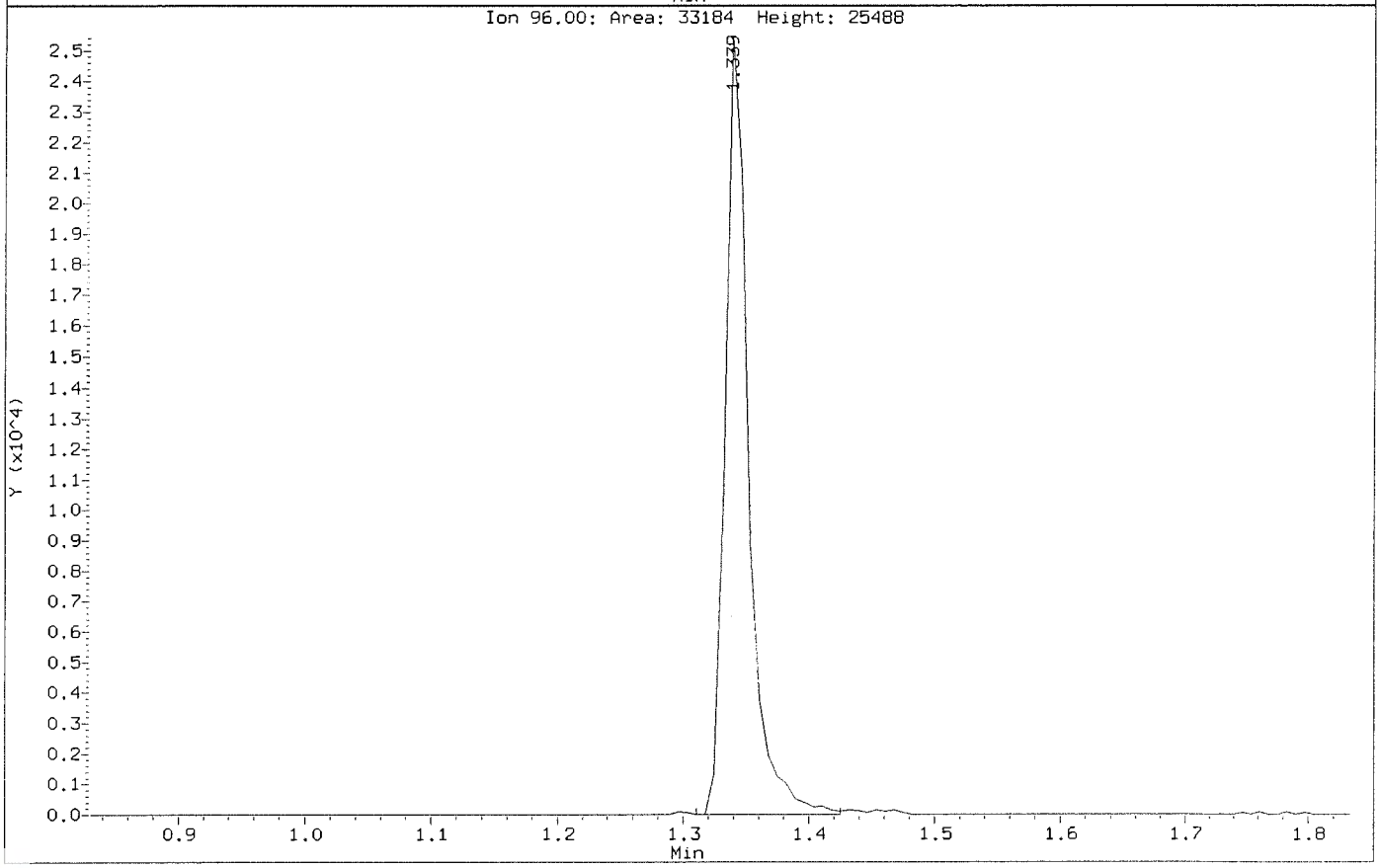




Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\X071307.D
Injection Date: 13-JUL-2020 12:54
Instrument: voa6.i
Client Sample ID: VSTD020

Compound: Bromomethane
CAS Number: 74-83-9





ALS Laboratory Group

Data file : \\nahstws005\Target\chem\voa6.i\X200713.b\X071308.D
Lab Smp Id: VSTD050 Client Smp ID: VSTD050
Inj Date : 13-JUL-2020 13:18
Operator : PC Inst ID: voa6.i
Smp Info : VSTD050;VSTD050;1;7;
Misc Info : HS18090001;WATER;0;1;
Comment :
Method : \\nahstws005\Target\chem\voa6.i\X200713.b\8260W.m
Meth Date : 13-Aug-2020 14:51 voa6.i Quant Type: ISTD
Cal Date : 13-JUL-2020 12:54 Cal File: X071307.D
Als bottle: 9 Calibration Sample, Level: 7
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: bhate.sub
Target Version: 4.14
Processing Host: NAHSTW7056

Concentration Formula: Amt * DF * (Uf/Vo)*1 * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Uf	5.000	ng unit correction factor
Vo	5.000	sample purged
Cpnd Variable		Local Compound Variable

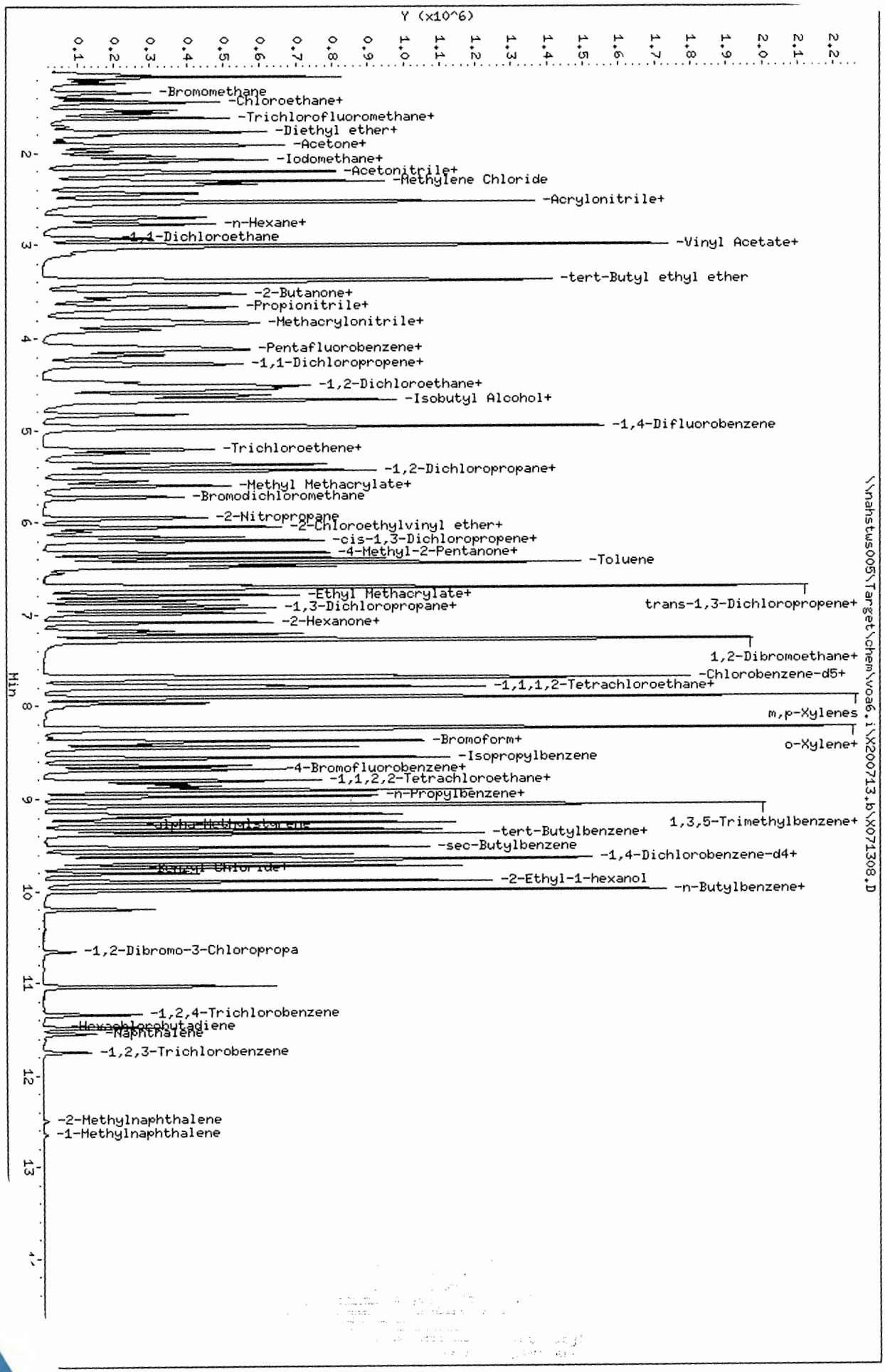
Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/l)	AMOUNTS ON-COL (ug/l)
* 1 Pentafluorobenzene	168	4.189	4.189	(1.000)	250164	50.0000	
* 36 1,4-Difluorobenzene	114	4.970	4.970	(1.000)	416710	50.0000	
* 47 Chlorobenzene-d5	117	7.671	7.671	(1.000)	383548	50.0000	
* 70 1,4-Dichlorobenzene-d4	152	9.669	9.669	(1.000)	184191	50.0000	
$ 30 Dibromofluoromethane	113	4.103	4.103	(0.979)	137160	50.0000	49.20
$ 35 1,2-Dichloroethane-d4	65	4.476	4.476	(1.068)	186102	50.0000	49.24
$ 48 Toluene-d8	98	6.388	6.388	(0.833)	479221	50.0000	47.69
$ 69 4-Bromofluorobenzene	95	8.688	8.688	(1.133)	186024	50.0000	50.12
60 1,1,1,2-Tetrachloroethane	131	7.778	7.778	(1.014)	145609	50.0000	49.14
31 1,1,1-Trichloroethane	97	4.089	4.089	(0.976)	220312	50.0000	48.33
68 1,1,2,2-Tetrachloroethane	83	8.838	8.838	(0.914)	169575	50.0000	49.86
53 1,1,2-Trichloroethane	83	6.840	6.840	(0.892)	118016	50.0000	50.25
22 1,1-Dichloroethane	63	2.929	2.929	(0.699)	337487	50.0000	48.14
11 1,1-Dichloroethene	96	1.919	1.919	(0.458)	111538	50.0000	50.96
32 1,1-Dichloropropene	75	4.283	4.283	(0.862)	184830	50.0000	47.34
93 1,2,3-Trichlorobenzene	180	11.746	11.746	(1.215)	32381	50.0000	51.96(M)
71 1,2,3-Trichloropropane	75	8.867	8.867	(0.917)	152205	50.0000	50.86(M)
90 1,2,4-Trichlorobenzene	180	11.338	11.338	(1.173)	64531	50.0000	54.61
79 1,2,4-Trimethylbenzene	105	9.383	9.383	(0.970)	511859	50.0000	50.53
89 1,2-Dibromo-3-Chloropropane	155	10.658	10.658	(1.102)	15053	50.0000	48.47
57 1,2-Dibromoethane	107	7.262	7.262	(0.947)	147910	50.0000	52.37
88 1,2-Dichlorobenzene	146	9.999	9.999	(1.034)	245893	50.0000	47.87

Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\X071308.D Page 2
Report Date: 13-Aug-2020 14:51

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/l)	AMOUNTS ON-COL (ug/l)
33	1,2-Dichloroethane	62	4.562	4.562	(0.918)	250459	50.0000	50.51
42	1,2-Dichloropropane	63	5.443	5.443	(1.095)	192541	50.0000	50.03
75	1,3,5-Trimethylbenzene	105	9.067	9.067	(0.938)	496766	50.0000	49.63
83	1,3-Dichlorobenzene	146	9.605	9.605	(0.993)	279597	50.0000	49.51
54	1,3-Dichloropropane	76	6.983	6.983	(0.910)	243528	50.0000	48.51
84	1,4-Dichlorobenzene	146	9.683	9.683	(1.001)	277784	50.0000	48.29
26	2,2-Dichloropropane	77	3.516	3.516	(0.839)	208780	50.0000	47.16
24	2-Butanone	43	3.581	3.581	(0.855)	237745	100.000	109.48
76	2-Chlorotoluene	91	8.974	8.974	(0.928)	429614	50.0000	48.97
52	2-Hexanone	43	7.090	7.090	(0.924)	377765	100.000	103.97
77	4-Chlorotoluene	91	9.075	9.075	(0.939)	500508	50.0000	48.76
82	p-Isopropyltoluene	119	9.655	9.655	(0.999)	503011	50.0000	51.31
45	4-Methyl-2-Pentanone	43	6.331	6.331	(0.825)	533236	100.000	101.88
10	Acetone	43	1.976	1.976	(0.472)	175674	100.000	109.94
37	Benzene	78	4.519	4.519	(0.909)	563766	50.0000	49.84
74	Bromobenzene	156	8.810	8.810	(0.911)	169832	50.0000	50.34
29	Bromochloromethane	128	3.803	3.803	(0.908)	78144	50.0000	44.20
39	Bromodichloromethane	83	5.729	5.729	(1.153)	205341	50.0000	48.97
66	Bromoform	173	8.416	8.416	(1.097)	105208	50.0000	49.58
6	Bromomethane	94	1.339	1.339	(0.320)	89079	50.0000	50.99
19	Carbon Disulfide	76	2.069	2.069	(0.494)	692438	100.000	100.43
34	Carbon Tetrachloride	117	4.268	4.268	(0.859)	187306	50.0000	47.80(H)
59	Chlorobenzene	112	7.699	7.699	(1.004)	372254	50.0000	48.75
7	Chloroethane	64	1.403	1.403	(0.335)	109135	50.0000	49.63
28	Chloroform	83	3.910	3.910	(0.933)	263288	50.0000	47.94
3	Chloromethane	50	1.081	1.081	(0.258)	240898	50.0000	46.30
27	cis-1,2-Dichloroethene	96	3.530	3.530	(0.843)	158287	50.0000	49.32
46	cis-1,3-Dichloropropene	75	6.159	6.159	(1.239)	241608	50.0000	49.76
55	Dibromochloromethane	129	7.176	7.176	(0.936)	154666	50.0000	49.56
44	Dibromomethane	93	5.558	5.558	(1.118)	100368	50.0000	48.82
2	Dichlorodifluoromethane	85	0.973	0.973	(0.232)	132468	50.0000	50.15
61	Ethylbenzene	106	7.800	7.800	(1.017)	195374	50.0000	49.04
91	Hexachlorobutadiene	225	11.481	11.481	(1.187)	48180	50.0000	52.79
67	Isopropylbenzene	105	8.566	8.566	(1.117)	587299	50.0000	49.23
62	m,p-Xylenes	106	7.907	7.907	(1.031)	472914	100.000	99.13
17	Methylene Chloride	84	2.306	2.306	(0.550)	153830	50.0000	52.34
87	n-Butylbenzene	91	9.999	9.999	(1.034)	445629	50.0000	51.78
73	n-Propylbenzene	91	8.917	8.917	(0.922)	710975	50.0000	50.65
92	Naphthalene	128	11.546	11.546	(1.194)	94043	50.0000	49.89
63	o-Xylene	106	8.244	8.244	(1.075)	234305	50.0000	48.61
81	sec-Butylbenzene	105	9.526	9.526	(0.985)	578409	50.0000	50.70
64	Styrene	104	8.265	8.265	(1.078)	413214	50.0000	49.53
78	tert-Butylbenzene	119	9.340	9.340	(0.966)	403727	50.0000	50.55
56	Tetrachloroethene	164	6.933	6.933	(0.904)	112059	50.0000	47.73
50	Toluene	91	6.453	6.453	(0.841)	581543	50.0000	48.39
20	trans-1,2-Dichloroethene	96	2.535	2.535	(0.605)	132114	50.0000	49.02
51	trans-1,3-Dichloropropene	75	6.682	6.682	(1.344)	220310	50.0000	49.20
38	Trichloroethene	130	5.214	5.214	(1.049)	149525	50.0000	49.85
8	Trichlorofluoromethane	101	1.561	1.561	(0.373)	206168	50.0000	49.85
5	Vinyl Chloride	62	1.145	1.145	(0.273)	201301	50.0000	48.93

QC Flag Legend

M - Compound response manually integrated.
H - Operator selected an alternate compound hit.

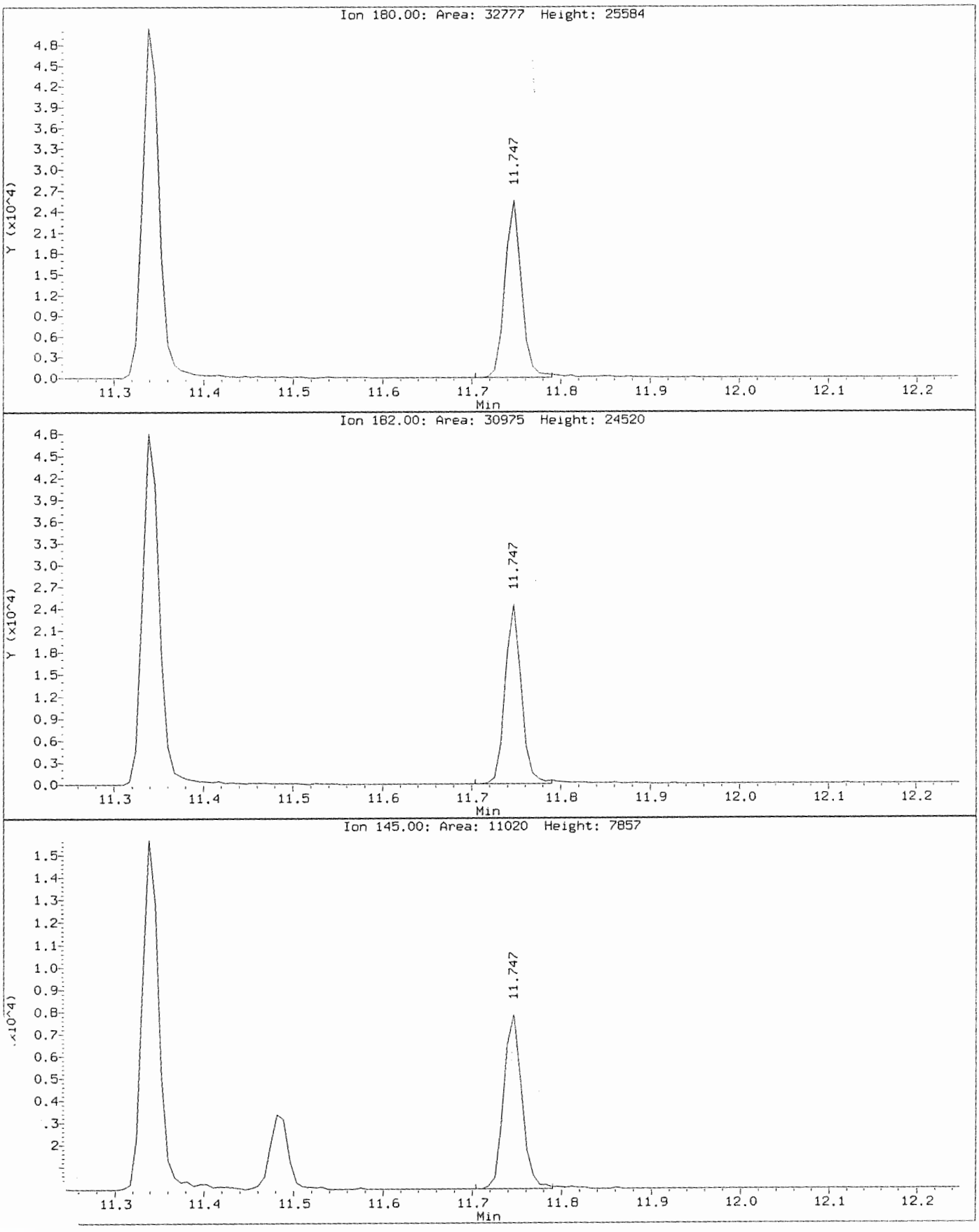


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Column phase: DB624

Instrument: voa6.i
Operator: PC
Column diameter: 0.18

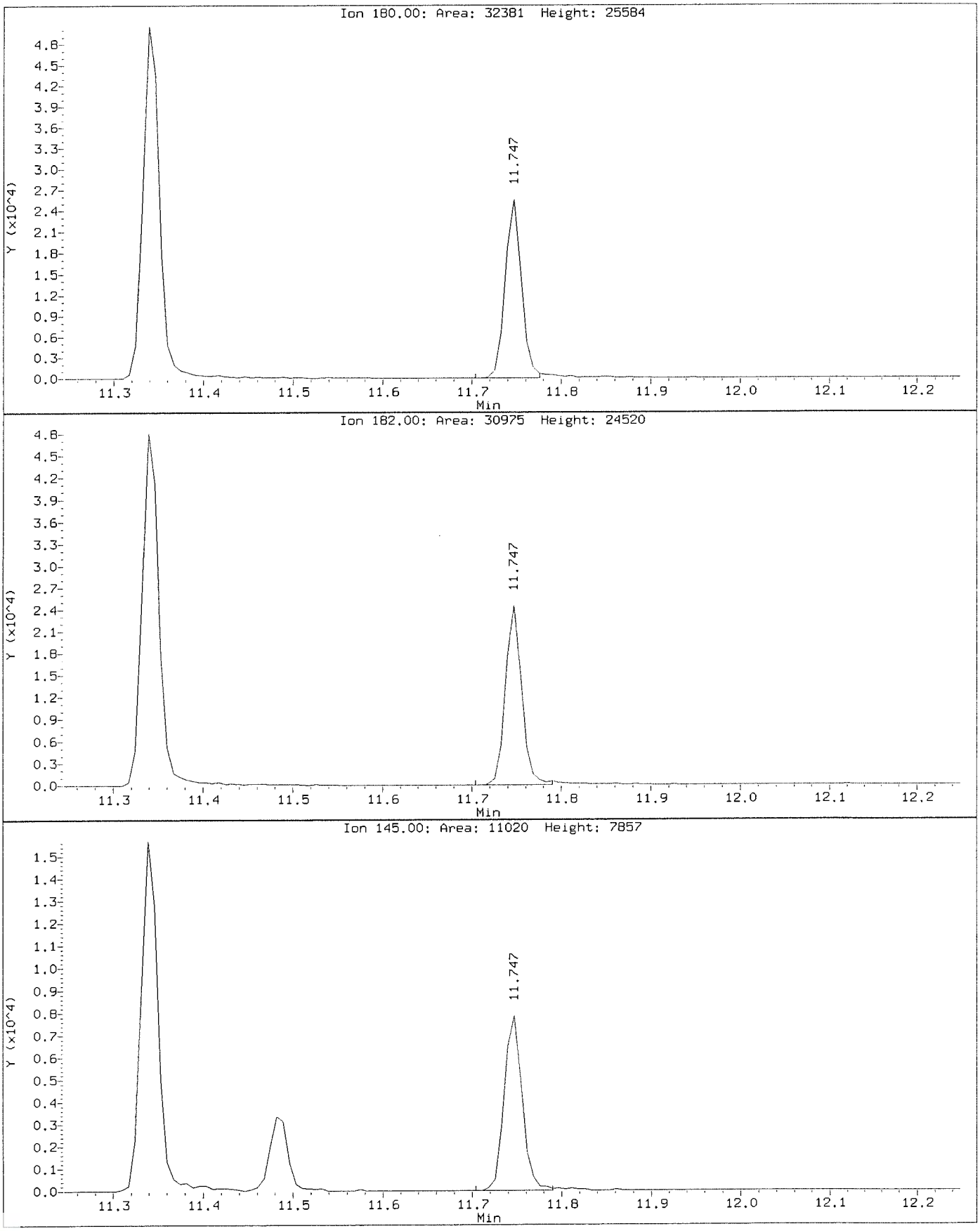
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Instrument: voa6.i
Client Sample ID: VSTD050

Compound: 1,2,3-Trichlorobenzene
CAS Number: 87-61-6



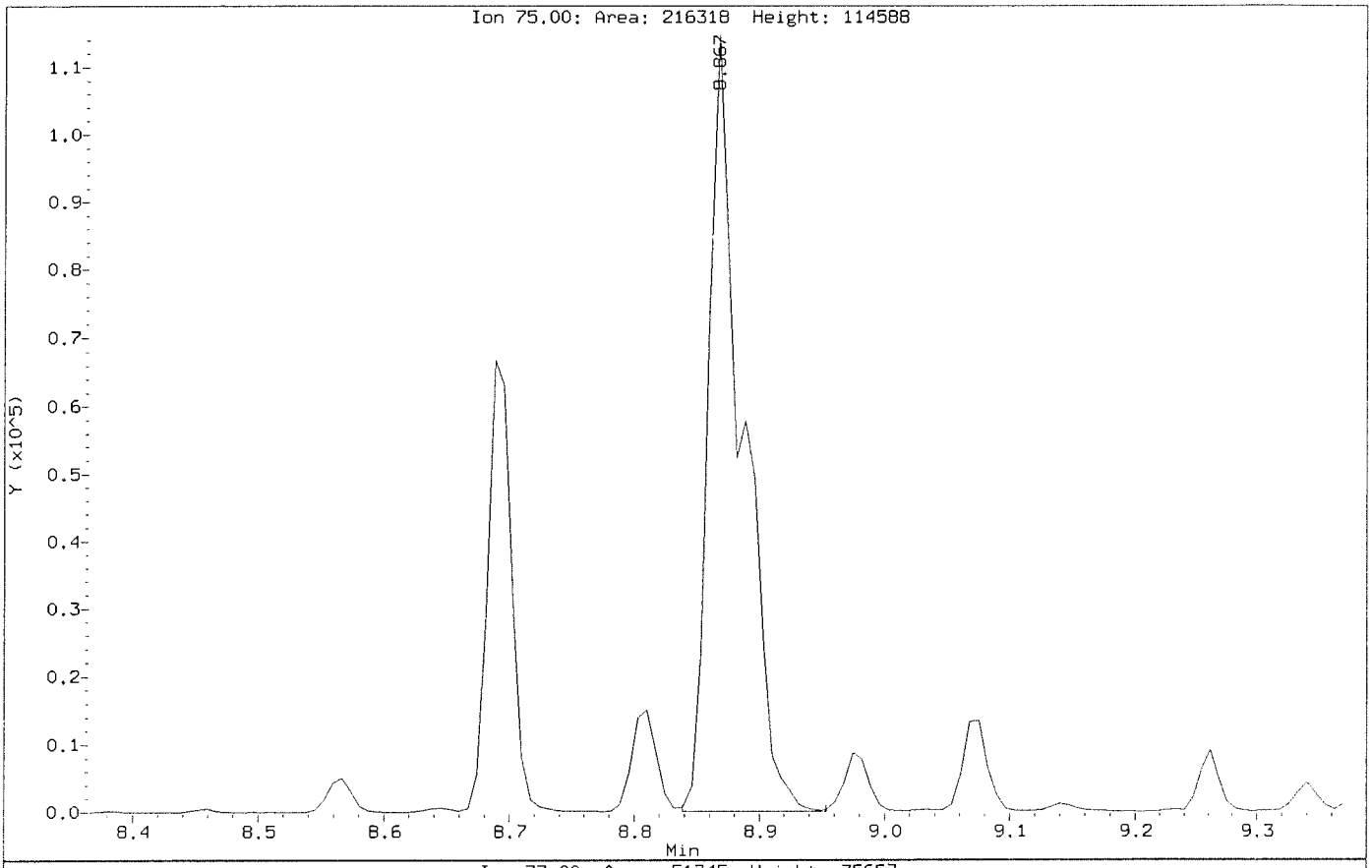
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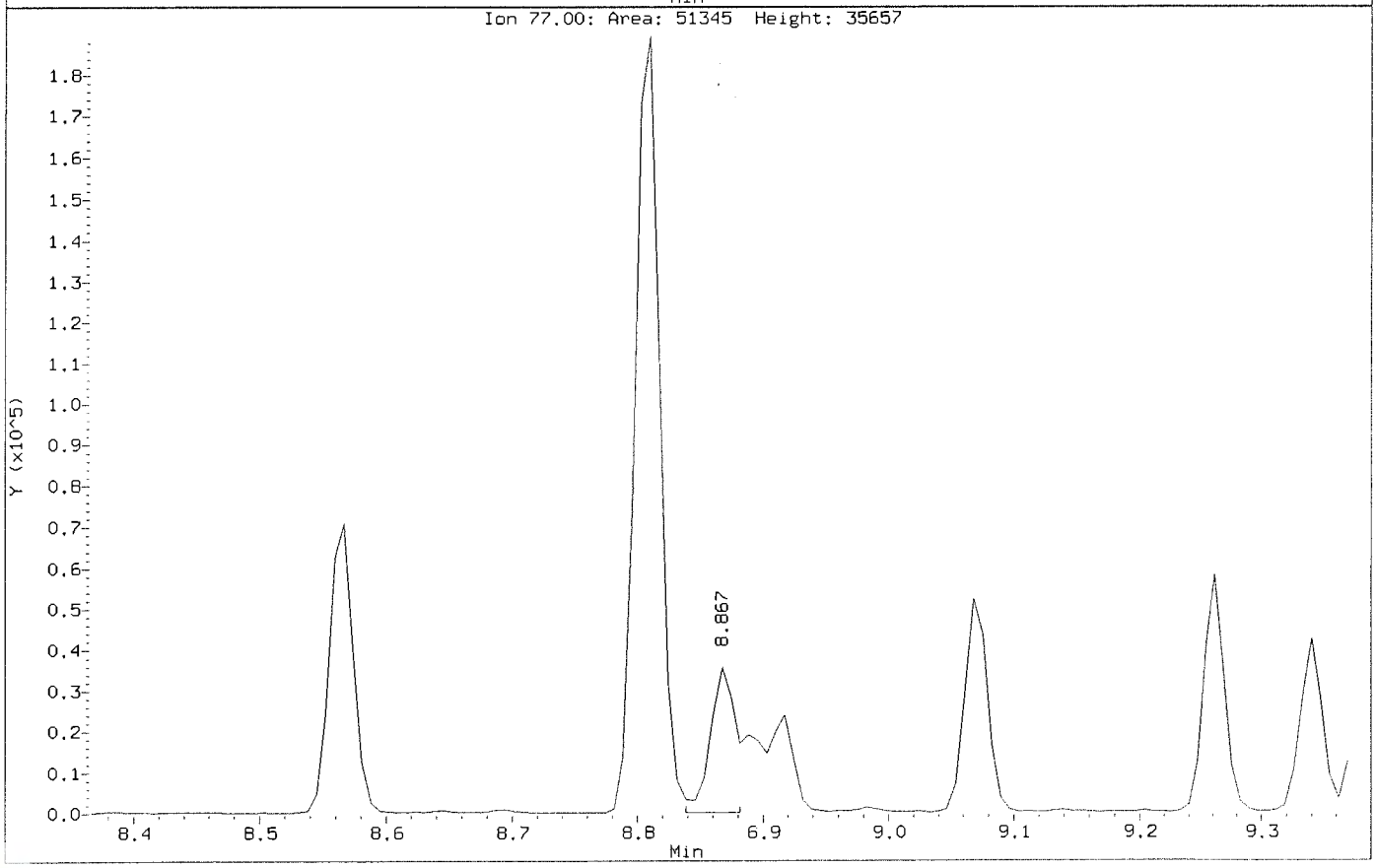
Compound: 1,2,3-Trichlorobenzene
CAS Number: 87-61-6



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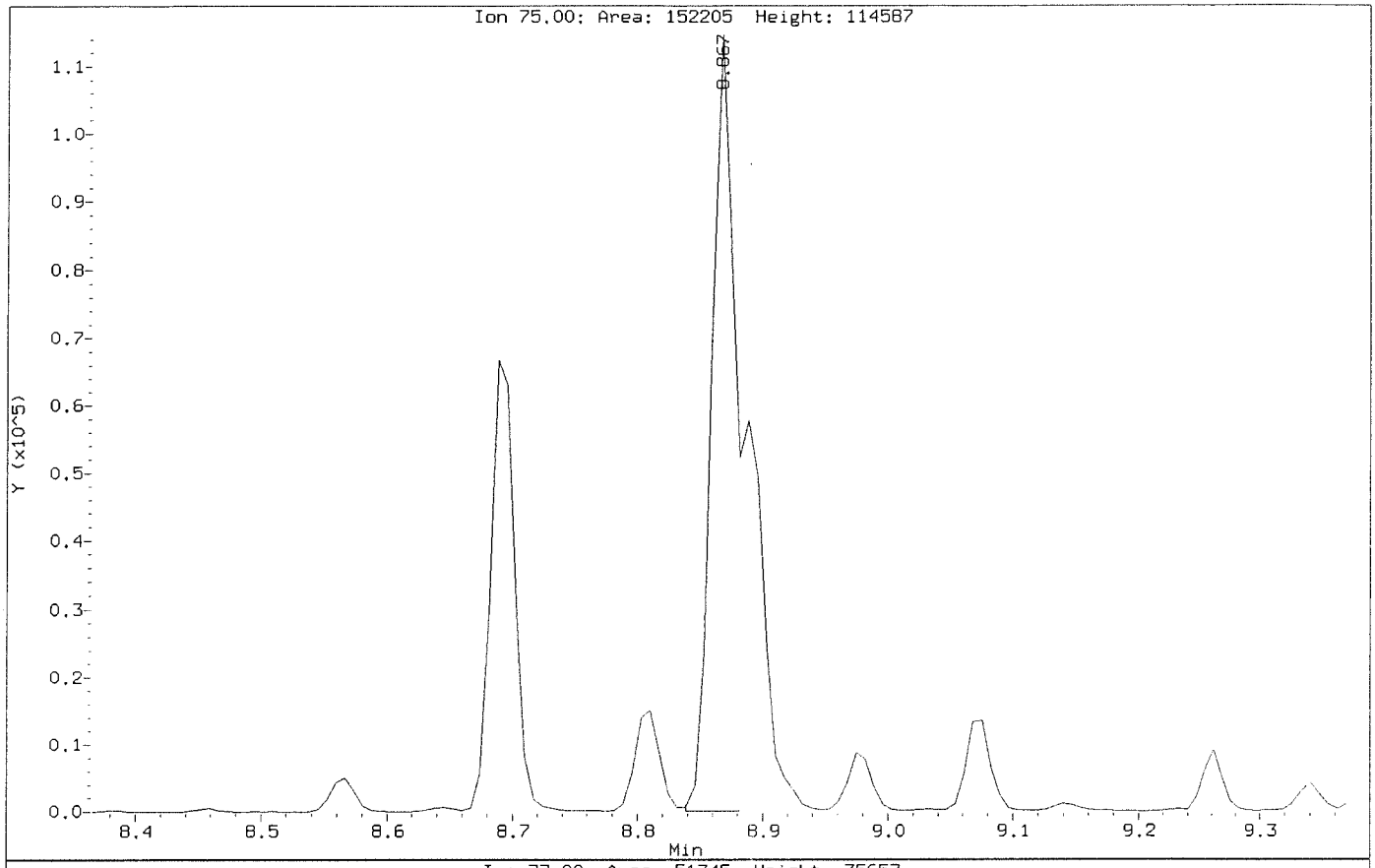
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CAS Number: 96-18-4

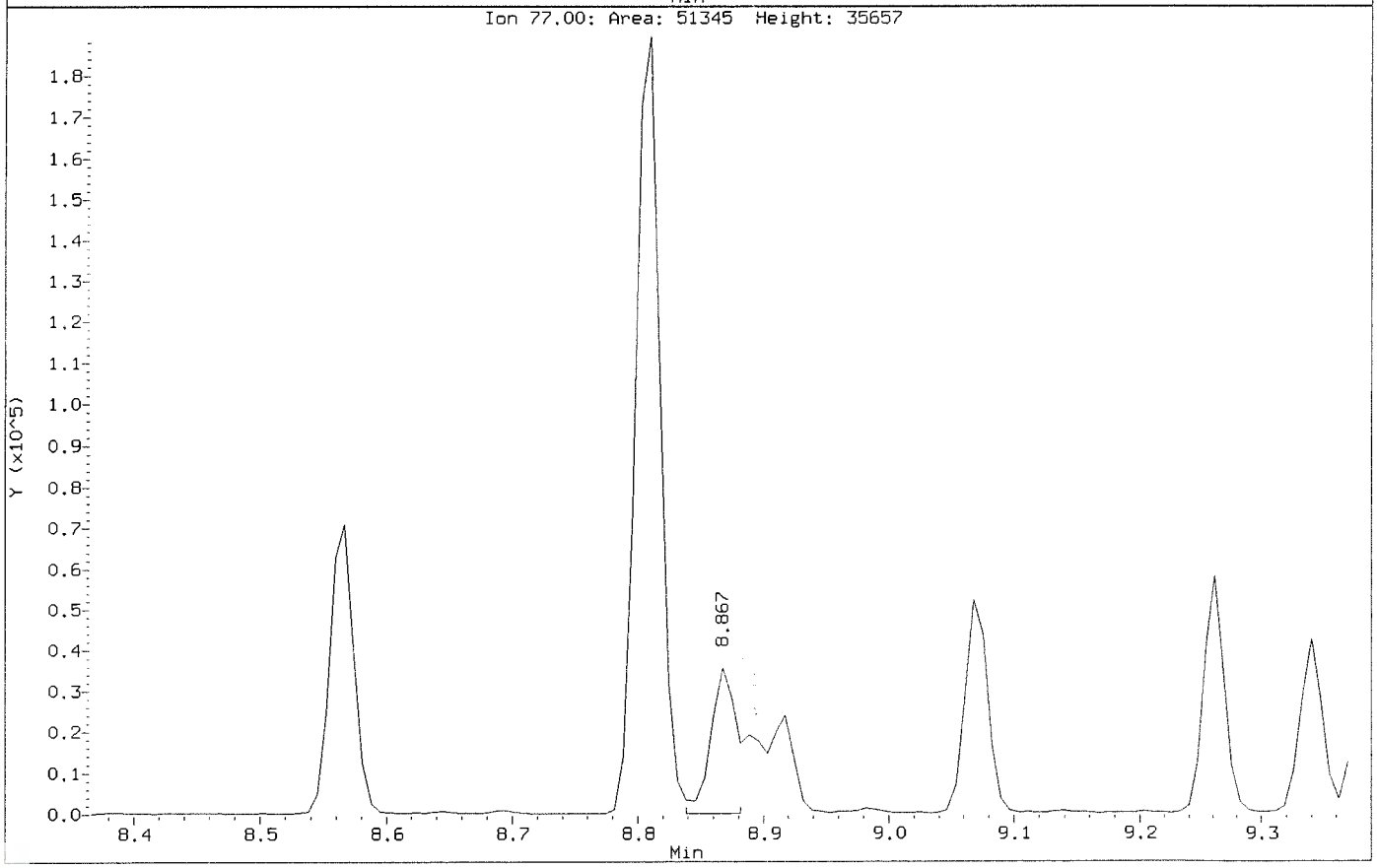




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Injection Date: 13-JUL-2020 13:18
Instrument: voa6.i
Client Sample ID: VSTD050

Compound: 1,2,3-Trichloropropane
CAS Number: 96-18-4





ALS Laboratory Group

Data file : \\nahstws005\Target\chem\voa6.i\X200713.b\X071309.D
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Inj Date : 13-JUL-2020 13:42
Operator : PC Inst ID: voa6.i
Smp Info : VSTD100;VSTD100;1;8;
Misc Info : HS18090001;WATER;0;1;
Comment :
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Meth Date : 13-Aug-2020 14:51 voa6.i Quant Type: ISTD
Cal Date : 13-JUL-2020 13:18 Cal File: X071308.D
Als bottle: 10 Calibration Sample, Level: 8
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: bhate.sub
Target Version: 4.14
Processing Host: NAHSTW7056

Concentration Formula: Amt * DF * (Uf/Vo)*1 * CpndVariable

Name	Value	Description
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Uf	5.000	ng unit correction factor
Vo	5.000	sample purged
Cpnd Variable		Local Compound Variable

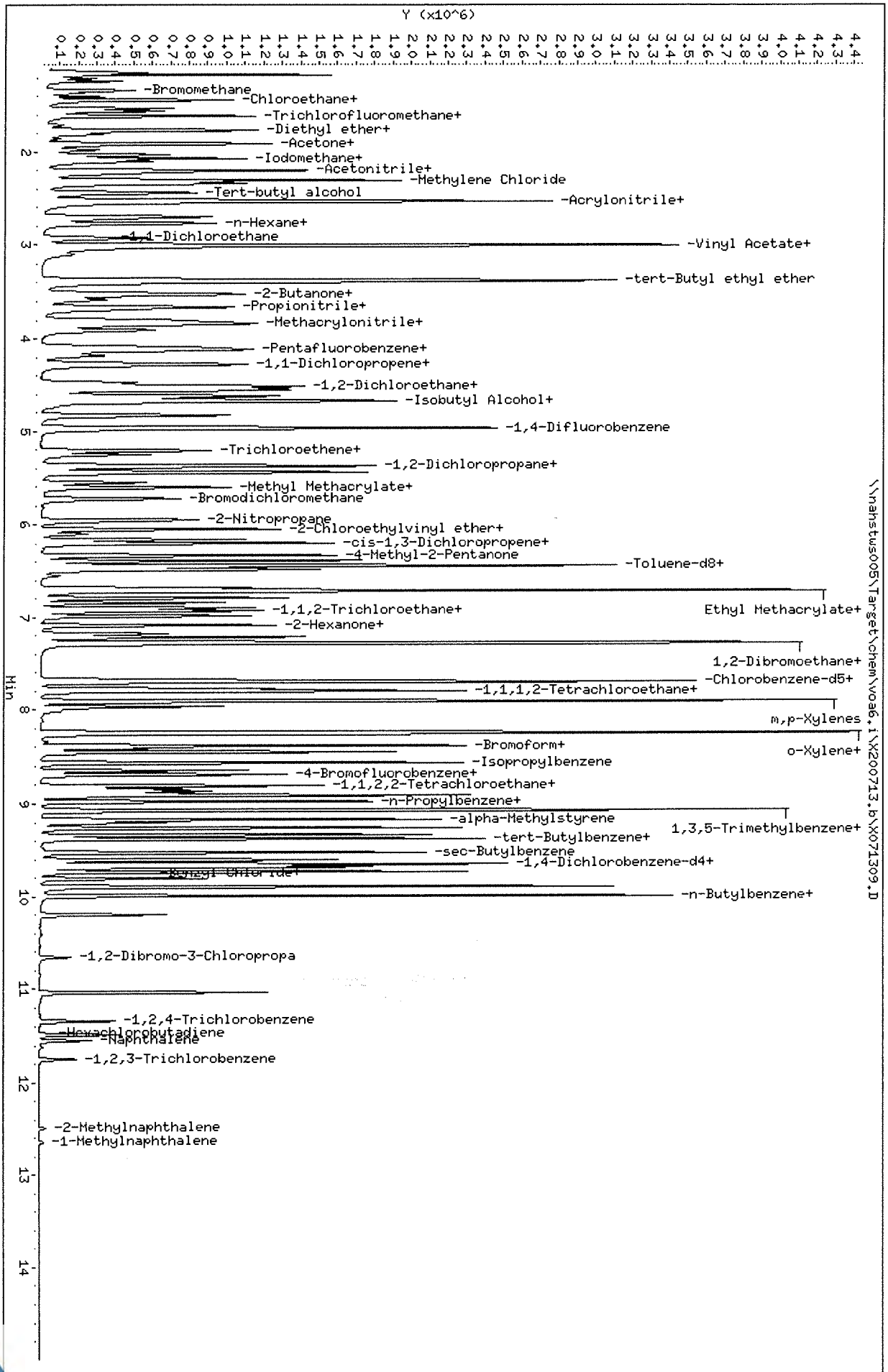
Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/l)	AMOUNTS ON-COL (ug/l)
* 1 Pentafluorobenzene	168	4.189	4.189	(1.000)	241410	50.0000	
* 36 1,4-Difluorobenzene	114	4.970	4.970	(1.000)	394471	50.0000	
* 47 Chlorobenzene-d5	117	7.670	7.670	(1.000)	367611	50.0000	
* 70 1,4-Dichlorobenzene-d4	152	9.669	9.669	(1.000)	175701	50.0000	
$ 30 Dibromofluoromethane	113	4.103	4.103	(0.979)	266517	100.000	99.15
$ 35 1,2-Dichloroethane-d4	65	4.476	4.476	(1.068)	358725	100.000	98.02
$ 48 Toluene-d8	98	6.388	6.388	(0.833)	894200	100.000	92.86
$ 69 4-Bromofluorobenzene	95	8.695	8.695	(1.134)	353354	100.000	99.86
60 1,1,1,2-Tetrachloroethane	131	7.778	7.778	(1.014)	276323	100.000	97.31
31 1,1,1-Trichloroethane	97	4.089	4.089	(0.976)	435679	100.000	99.06
68 1,1,2,2-Tetrachloroethane	83	8.845	8.845	(0.915)	321806	100.000	99.20
53 1,1,2-Trichloroethane	83	6.847	6.847	(0.893)	221967	100.000	98.61
22 1,1-Dichloroethane	63	2.929	2.929	(0.699)	651027	100.000	96.24
11 1,1-Dichloroethene	96	1.919	1.919	(0.458)	199334	100.000	94.38
32 1,1-Dichloropropene	75	4.282	4.282	(0.862)	372169	100.000	100.70
93 1,2,3-Trichlorobenzene	180	11.746	11.746	(1.215)	51441	100.000	86.54
71 1,2,3-Trichloropropane	75	8.867	8.867	(0.917)	288717	100.000	101.15(M)
90 1,2,4-Trichlorobenzene	180	11.338	11.338	(1.173)	101490	100.000	90.05
79 1,2,4-Trimethylbenzene	105	9.382	9.382	(0.970)	992825	100.000	102.75
89 1,2-Dibromo-3-Chloropropane	155	10.657	10.657	(1.102)	28602	100.000	95.24
57 1,2-Dibromoethane	107	7.262	7.262	(0.947)	279316	100.000	103.19
88 1,2-Dichlorobenzene	146	9.998	9.998	(1.034)	477874	100.000	97.53

Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\X071309.D Page 2
Report Date: 13-Aug-2020 14:51

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/l)	AMOUNTS ON-COL (ug/l)
33	1,2-Dichloroethane	62	4.562	4.562	(0.918)	486248	100.000	103.59
42	1,2-Dichloropropane	63	5.443	5.443	(1.095)	369055	100.000	101.32
75	1,3,5-Trimethylbenzene	105	9.067	9.067	(0.938)	972293	100.000	101.84
83	1,3-Dichlorobenzene	146	9.612	9.612	(0.994)	536878	100.000	99.67
54	1,3-Dichloropropane	76	6.983	6.983	(0.910)	461077	100.000	95.84
84	1,4-Dichlorobenzene	146	9.683	9.683	(1.001)	536352	100.000	97.76
26	2,2-Dichloropropane	77	3.516	3.516	(0.839)	412965	100.000	96.67
24	2-Butanone	43	3.580	3.580	(0.855)	455527	200.000	217.38(A)
76	2-Chlorotoluene	91	8.981	8.981	(0.929)	824896	100.000	98.57
52	2-Hexanone	43	7.090	7.090	(0.924)	721641	200.000	207.23(A)
77	4-Chlorotoluene	91	9.074	9.074	(0.939)	963032	100.000	98.35
82	p-Isopropyltoluene	119	9.655	9.655	(0.999)	969641	100.000	103.70
45	4-Methyl-2-Pentanone	43	6.331	6.331	(0.825)	1029988	200.000	205.32(A)
10	Acetone	43	1.976	1.976	(0.472)	288895	200.000	190.19
37	Benzene	78	4.519	4.519	(0.909)	1106101	100.000	103.29
74	Bromobenzene	156	8.809	8.809	(0.911)	321499	100.000	99.91
29	Bromochloromethane	128	3.802	3.802	(0.908)	155940	100.000	91.40
39	Bromodichloromethane	83	5.729	5.729	(1.153)	400516	100.000	100.90
66	Bromoform	173	8.415	8.415	(1.097)	206928	100.000	101.76
6	Bromomethane	94	1.338	1.338	(0.320)	166657	100.000	99.84
19	Carbon Disulfide	76	2.069	2.069	(0.494)	1252326	200.000	188.23
34	Carbon Tetrachloride	117	4.268	4.268	(0.859)	375558	100.000	101.25(H)
59	Chlorobenzene	112	7.699	7.699	(1.004)	718879	100.000	98.23
7	Chloroethane	64	1.403	1.403	(0.335)	202772	100.000	95.56
28	Chloroform	83	3.910	3.910	(0.933)	513955	100.000	96.97
3	Chloromethane	50	1.080	1.080	(0.258)	484693	100.000	94.67
27	cis-1,2-Dichloroethene	96	3.530	3.530	(0.843)	306783	100.000	99.06
46	cis-1,3-Dichloropropene	75	6.159	6.159	(1.239)	477276	100.000	103.85
55	Dibromochloromethane	129	7.176	7.176	(0.936)	295797	100.000	98.90
44	Dibromomethane	93	5.557	5.557	(1.118)	193496	100.000	99.42
2	Dichlorodifluoromethane	85	0.973	0.973	(0.232)	280967	100.000	110.22
61	Ethylbenzene	106	7.799	7.799	(1.017)	377900	100.000	98.98
91	Hexachlorobutadiene	225	11.488	11.488	(1.188)	68418	100.000	78.60
67	Isopropylbenzene	105	8.566	8.566	(1.117)	1145615	100.000	100.19
62	m,p-Xylenes	106	7.907	7.907	(1.031)	915114	200.000	200.15(A)
17	Methylene Chloride	84	2.305	2.305	(0.550)	277730	100.000	99.13
87	n-Butylbenzene	91	9.998	9.998	(1.034)	859162	100.000	104.67
73	n-Propylbenzene	91	8.917	8.917	(0.922)	1389902	100.000	103.81
92	Naphthalene	128	11.546	11.546	(1.194)	166338	100.000	91.45
63	o-Xylene	106	8.244	8.244	(1.075)	451830	100.000	97.80
81	sec-Butylbenzene	105	9.526	9.526	(0.985)	1119681	100.000	102.89
64	Styrene	104	8.265	8.265	(1.078)	795773	100.000	99.53
78	tert-Butylbenzene	119	9.339	9.339	(0.966)	769551	100.000	101.02
56	Tetrachloroethene	164	6.933	6.933	(0.904)	215710	100.000	95.86
50	Toluene	91	6.453	6.453	(0.841)	1104310	100.000	95.88
20	trans-1,2-Dichloroethene	96	2.535	2.535	(0.605)	259807	100.000	99.89
51	trans-1,3-Dichloropropene	75	6.682	6.682	(1.344)	427002	100.000	100.74
38	Trichloroethene	130	5.214	5.214	(1.049)	283882	100.000	99.98
8	Trichlorofluoromethane	101	1.560	1.560	(0.373)	402173	100.000	100.77
5	Vinyl Chloride	62	1.145	1.145	(0.273)	383986	100.000	96.72

QC Flag Legend

A - Target compound detected but, quantitated amount exceeded maximum amount.
M - Compound response manually integrated.
H - Operator selected an alternate compound hit.

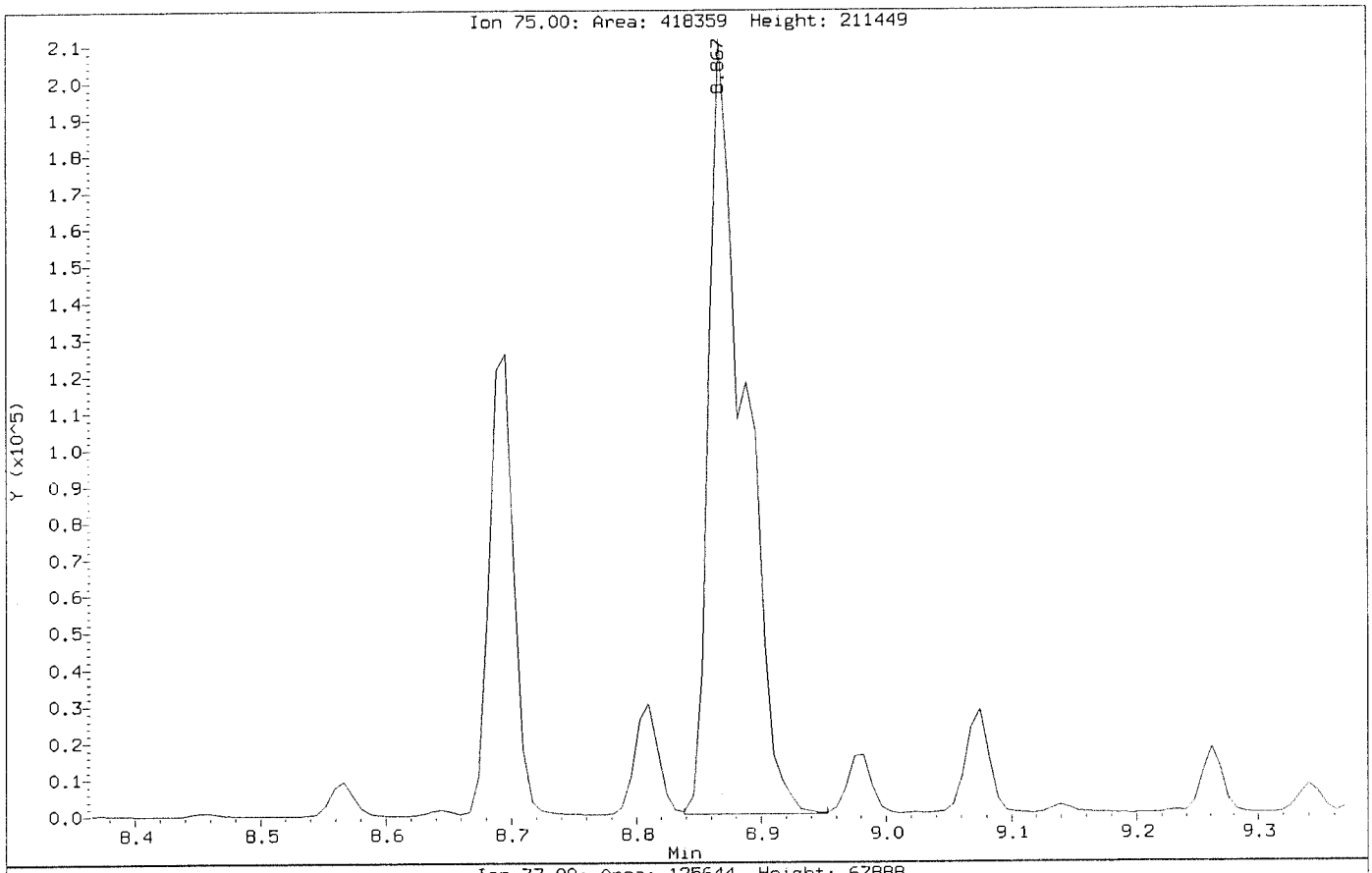


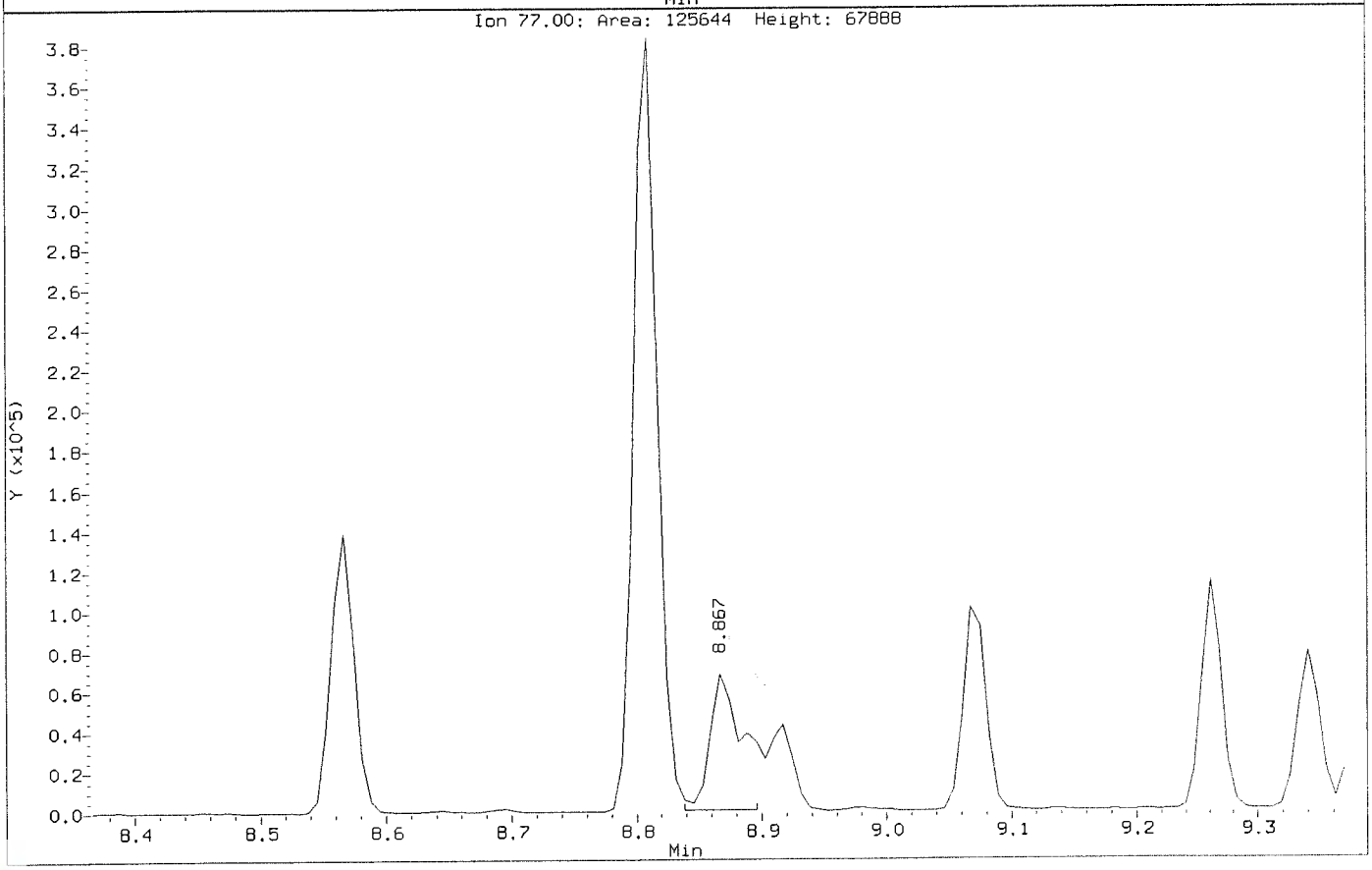
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Sample Info: VSTD100;VSTD100;1;8;
Purge Volume: 5.0
Column phase: DB624

Instrument: voa6,i
Operator: PC
Column diameter: 0.18

Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\Before\X071309.D
Injection Date: 13-JUL-2020 13:42
Instrument: voa6.i
Client Sample ID: VSTD100

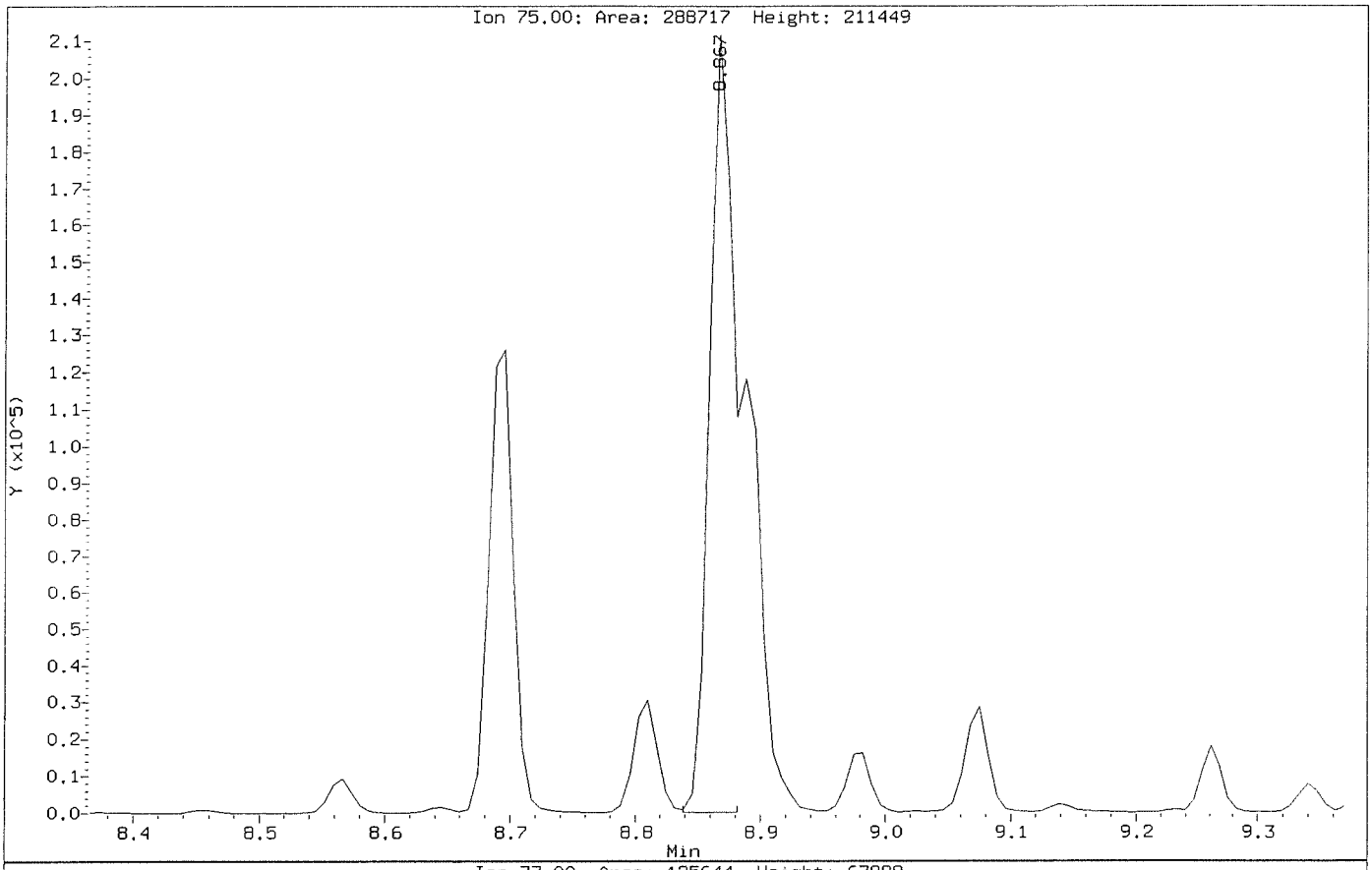
Compound: 1,2,3-Trichloropropane
CAS Number: 96-18-4

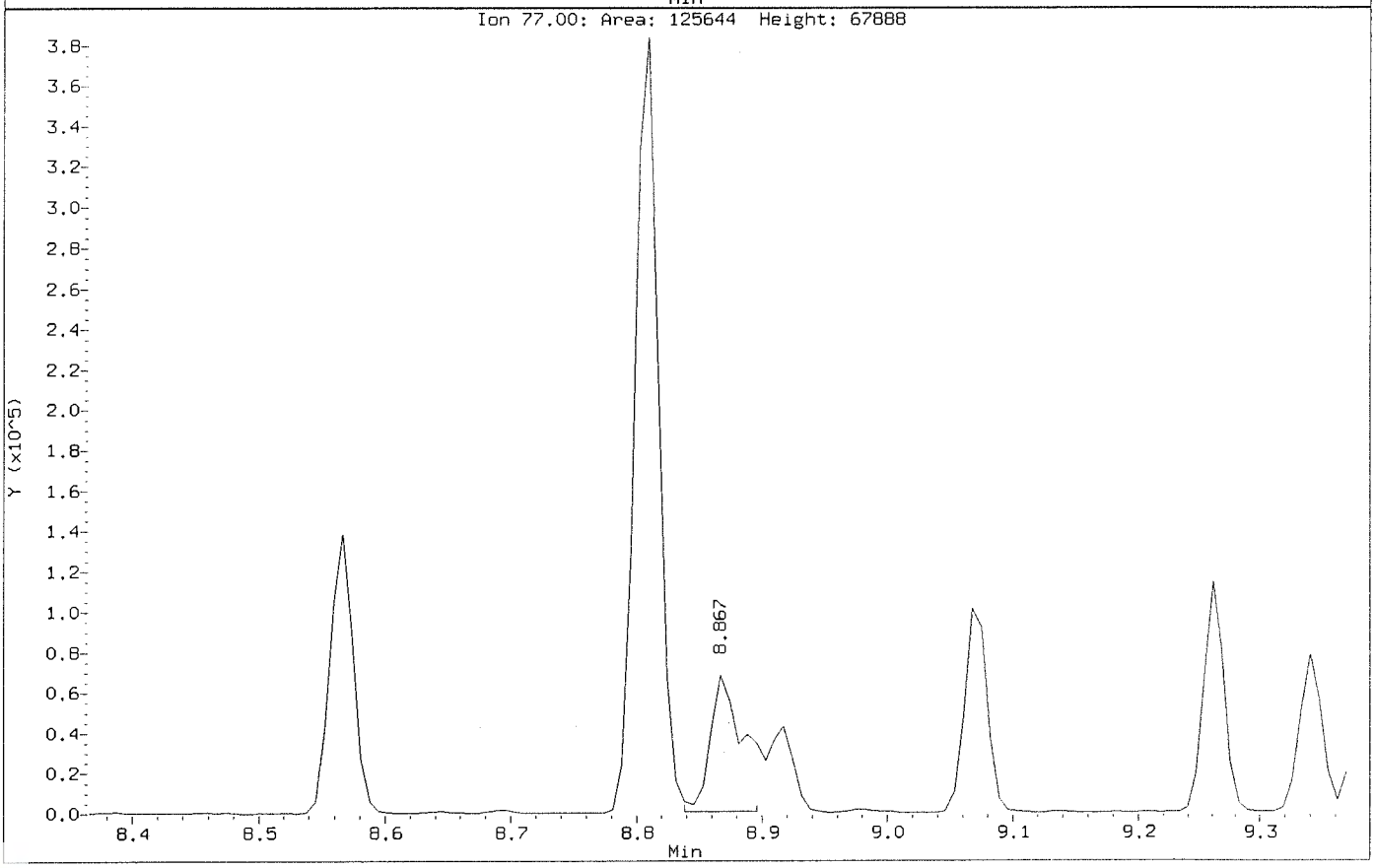




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Injection Date: 13-JUL-2020 13:42
Instrument: voa6.i
Client Sample ID: VSTD100

Compound: 1,2,3-Trichloropropane
CAS Number: 96-18-4





ALS Laboratory Group

Data file : \\nahstws005\Target\chem\voa6.i\X200713.b\X071310.D
Lab Smp Id: VSTD150 Client Smp ID: VSTD150
Inj Date : 13-JUL-2020 14:06
Operator : PC Inst ID: voa6.i
Smp Info : VSTD150;VSTD150;1;9;
Misc Info : HS18090001;WATER;0;1;
Comment :
Method : \\nahstws005\Target\chem\voa6.i\X200713.b\8260W.m
Meth Date : 13-Aug-2020 14:51 voa6.i Quant Type: ISTD
Cal Date : 13-JUL-2020 13:42 Cal File: X071309.D
Als bottle: 11 Calibration Sample, Level: 9
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: bhate.sub
Target Version: 4.14
Processing Host: NAHSTW7056

Concentration Formula: Amt * DF * (Uf/Vo)*1 * CpndVariable

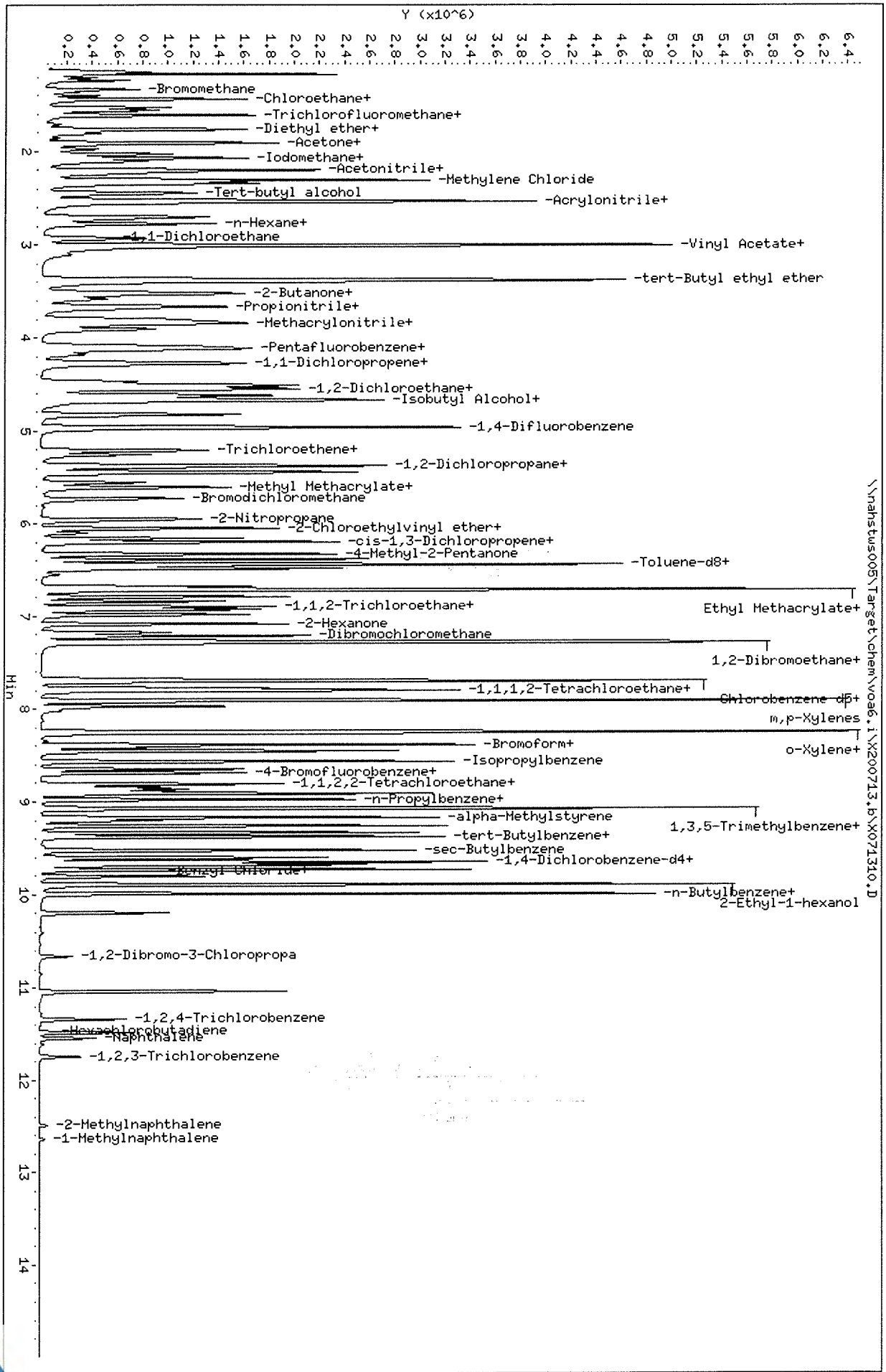
Name	Value	Description
DF	1.000	Dilution Factor
Uf	5.000	ng unit correction factor
Vo	5.000	sample purged
Cpnd Variable		Local Compound Variable

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/l)	AMOUNTS ON-COL (ug/l)
*	1 Pentafluorobenzene	168	4.189	4.189	(1.000)	230193	50.0000	
*	36 1,4-Difluorobenzene	114	4.970	4.970	(1.000)	377089	50.0000	
*	47 Chlorobenzene-d5	117	7.671	7.671	(1.000)	359232	50.0000	
*	70 1,4-Dichlorobenzene-d4	152	9.669	9.669	(1.000)	167954	50.0000	
$	30 Dibromofluoromethane	113	4.103	4.103	(0.979)	392708	150.000	153.26
$	35 1,2-Dichloroethane-d4	65	4.476	4.476	(1.068)	528876	150.000	151.37
$	48 Toluene-d8	98	6.388	6.388	(0.833)	1315908	150.000	139.84
$	69 4-Bromofluorobenzene	95	8.695	8.695	(1.134)	442637	150.000	128.16
	60 1,1,1,2-Tetrachloroethane	131	7.778	7.778	(1.014)	407626	150.000	146.90
	31 1,1,1-Trichloroethane	97	4.089	4.089	(0.976)	640355	150.000	152.69
	68 1,1,2,2-Tetrachloroethane	83	8.845	8.845	(0.915)	407473	150.000	131.40
	53 1,1,2-Trichloroethane	83	6.847	6.847	(0.893)	325485	150.000	147.97
	22 1,1-Dichloroethane	63	2.921	2.921	(0.697)	944016	150.000	146.35
	11 1,1-Dichloroethene	96	1.912	1.912	(0.456)	292253	150.000	145.12
	32 1,1-Dichloropropene	75	4.282	4.282	(0.862)	547442	150.000	154.95
	93 1,2,3-Trichlorobenzene	180	11.746	11.746	(1.215)	85702	150.000	150.84
	71 1,2,3-Trichloropropane	75	8.867	8.867	(0.917)	362910	150.000	133.01(M)
	90 1,2,4-Trichlorobenzene	180	11.338	11.338	(1.173)	166257	150.000	154.32
	79 1,2,4-Trimethylbenzene	105	9.383	9.383	(0.970)	1385102	150.000	149.96
	89 1,2-Dibromo-3-Chloropropane	155	10.658	10.658	(1.102)	43451	150.000	150.59
	37 1,2-Dibromoethane	107	7.262	7.262	(0.947)	409614	150.000	154.86
	3 1,2-Dichlorobenzene	146	9.999	9.999	(1.034)	692860	150.000	147.94

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/l)	AMOUNTS ON-COL (ug/l)
33	1,2-Dichloroethane	62	4.562	4.562	(0.918)	681533	150.000	151.88
42	1,2-Dichloropropane	63	5.443	5.443	(1.095)	525849	150.000	151.02
75	1,3,5-Trimethylbenzene	105	9.075	9.075	(0.939)	1353847	150.000	148.35
83	1,3-Dichlorobenzene	146	9.612	9.612	(0.994)	746116	150.000	144.91
54	1,3-Dichloropropane	76	6.983	6.983	(0.910)	668052	150.000	142.10
84	1,4-Dichlorobenzene	146	9.683	9.683	(1.001)	769104	150.000	146.65
26	2,2-Dichloropropane	77	3.516	3.516	(0.839)	594659	150.000	145.98
24	2-Butanone	43	3.580	3.580	(0.855)	672027	300.000	336.33(A)
76	2-Chlorotoluene	91	8.981	8.981	(0.929)	1110956	150.000	138.88
52	2-Hexanone	43	7.090	7.090	(0.924)	1084996	300.000	318.84(A)
77	4-Chlorotoluene	91	9.075	9.075	(0.939)	1349791	150.000	144.21
82	p-Isopropyltoluene	119	9.655	9.655	(0.999)	1398295	150.000	156.44
45	4-Methyl-2-Pentanone	43	6.331	6.331	(0.825)	1510293	300.000	308.09(A)
10	Acetone	43	1.976	1.976	(0.472)	434863	300.000	302.57(A)
37	Benzene	78	4.519	4.519	(0.909)	1592295	150.000	155.56
74	Bromobenzene	156	8.810	8.810	(0.911)	417656	150.000	135.78
29	Bromochloromethane	128	3.803	3.803	(0.908)	220921	150.000	135.79
39	Bromodichloromethane	83	5.729	5.729	(1.153)	579377	150.000	152.69
66	Bromoform	173	8.416	8.416	(1.097)	299848	150.000	150.89
6	Bromomethane	94	1.331	1.331	(0.318)	238785	150.000	150.56
19	Carbon Disulfide	76	2.069	2.069	(0.494)	1855037	300.000	292.40(A)
34	Carbon Tetrachloride	117	4.268	4.268	(0.859)	556069	150.000	156.84(H)
59	Chlorobenzene	112	7.699	7.699	(1.004)	1044850	150.000	146.11
7	Chloroethane	64	1.396	1.396	(0.333)	288073	150.000	142.38
28	Chloroform	83	3.910	3.910	(0.933)	746597	150.000	147.73
3	Chloromethane	50	1.081	1.081	(0.258)	733378	150.000	149.22
27	cis-1,2-Dichloroethene	96	3.530	3.530	(0.843)	447986	150.000	151.71
46	cis-1,3-Dichloropropene	75	6.159	6.159	(1.239)	687810	150.000	156.56
55	Dibromochloromethane	129	7.176	7.176	(0.936)	437555	150.000	149.72
44	Dibromomethane	93	5.557	5.557	(1.118)	278485	150.000	149.69
2	Dichlorodifluoromethane	85	0.973	0.973	(0.232)	414837	150.000	170.67
61	Ethylbenzene	106	7.807	7.807	(1.018)	550060	150.000	147.44
91	Hexachlorobutadiene	225	11.481	11.481	(1.187)	111325	150.000	133.79
67	Isopropylbenzene	105	8.566	8.566	(1.117)	1633594	150.000	146.21
62	m,p-Xylenes	106	7.907	7.907	(1.031)	1325989	300.000	296.78(A)
17	Methylene Chloride	84	2.305	2.305	(0.550)	426028	150.000	160.31
87	n-Butylbenzene	91	9.999	9.999	(1.034)	1242946	150.000	158.41
73	n-Propylbenzene	91	8.917	8.917	(0.922)	1838700	150.000	143.67
92	Naphthalene	128	11.546	11.546	(1.194)	271059	150.000	155.02
63	o-Xylene	106	8.244	8.244	(1.075)	642067	150.000	142.22
81	sec-Butylbenzene	105	9.526	9.526	(0.985)	1609476	150.000	154.72
64	Styrene	104	8.265	8.265	(1.078)	1131381	150.000	144.81
78	tert-Butylbenzene	119	9.340	9.340	(0.966)	1110686	150.000	152.52
56	Tetrachloroethene	164	6.933	6.933	(0.904)	316496	150.000	143.93
50	Toluene	91	6.453	6.453	(0.841)	1611330	150.000	143.16
20	trans-1,2-Dichloroethene	96	2.528	2.528	(0.603)	375359	150.000	151.36
51	trans-1,3-Dichloropropene	75	6.682	6.682	(1.344)	625897	150.000	154.47
38	Trichloroethene	130	5.207	5.207	(1.048)	414098	150.000	152.57
8	Trichlorofluoromethane	101	1.561	1.561	(0.373)	589104	150.000	154.81
5	Vinyl Chloride	62	1.145	1.145	(0.273)	590934	150.000	156.11

QC Flag Legend

A - Target compound detected but, quantitated amount exceeded maximum amount.
M - Compound response manually integrated.
H - Operator selected an alternate compound hit.

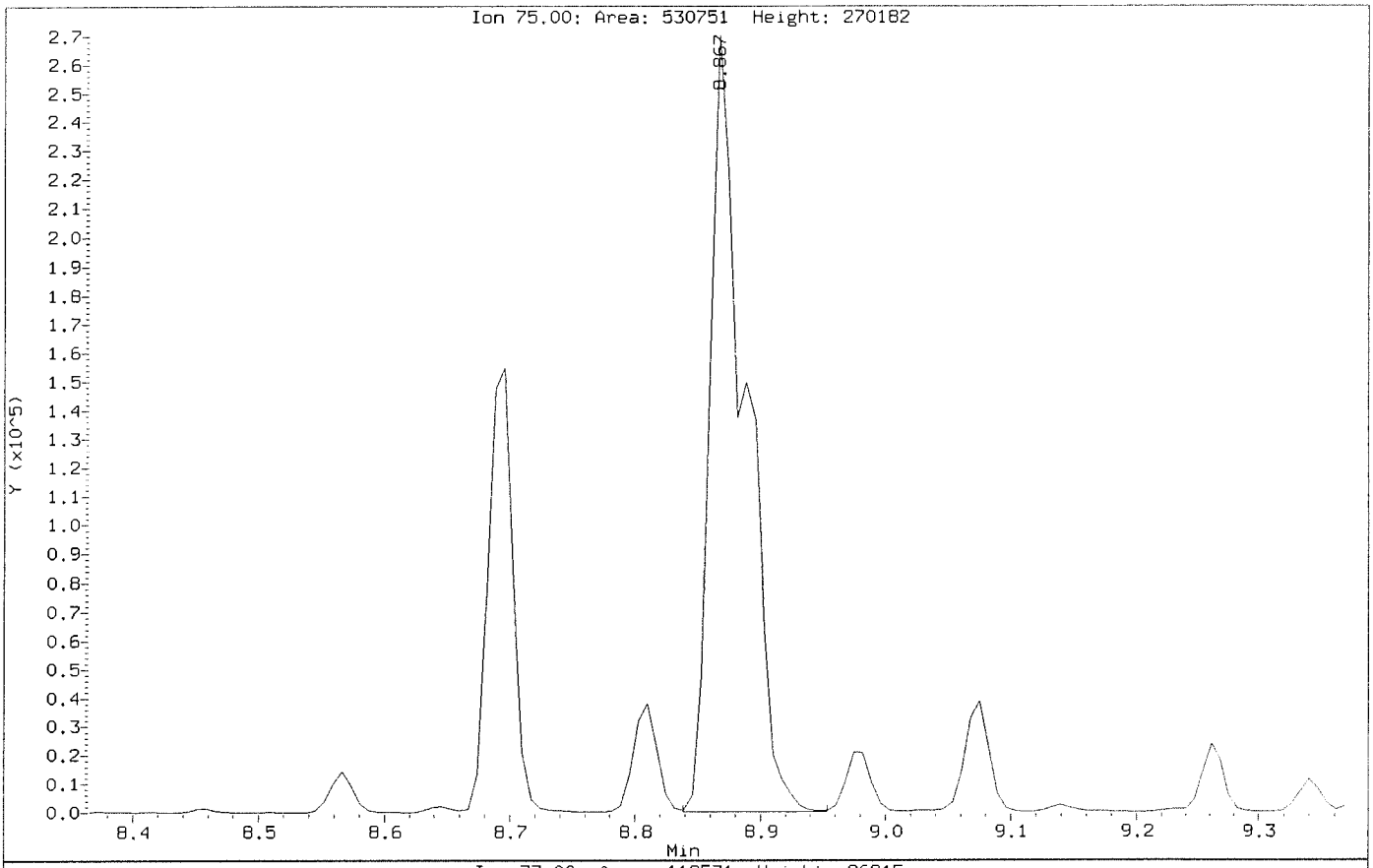


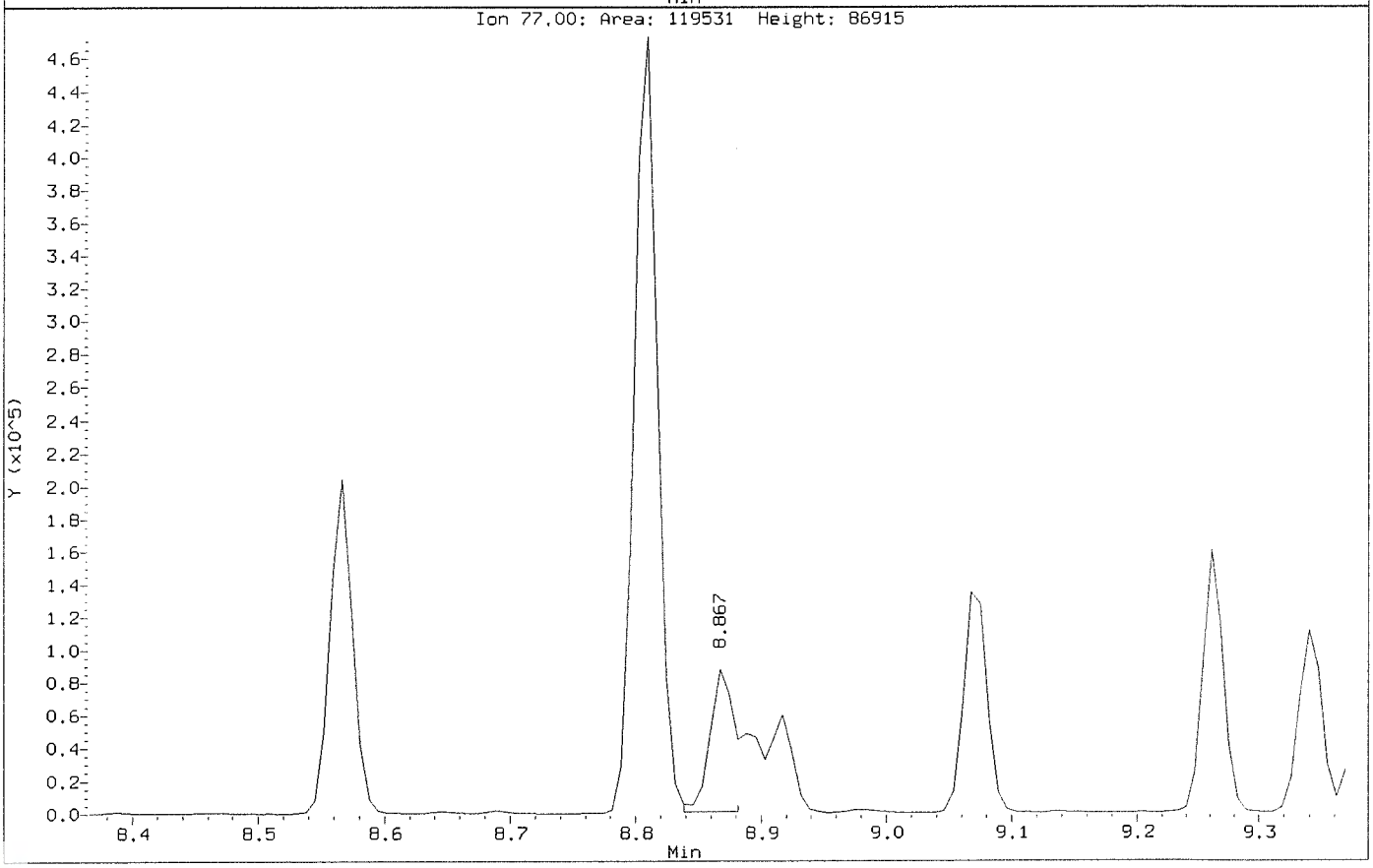
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Date : 13-JUL-2020 14:06
Client ID: VSTD150
Sample Info: VSTD150;VSTD150;1;9;
Purge Volume: 5.0
Column phase: DB624

Instrument: voa6.i
Operator: PC
Column diameter: 0.18

Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\Before\X071310.D
Injection Date: 13-JUL-2020 14:06
Instrument: voa6.i
Client Sample ID: VSTD150

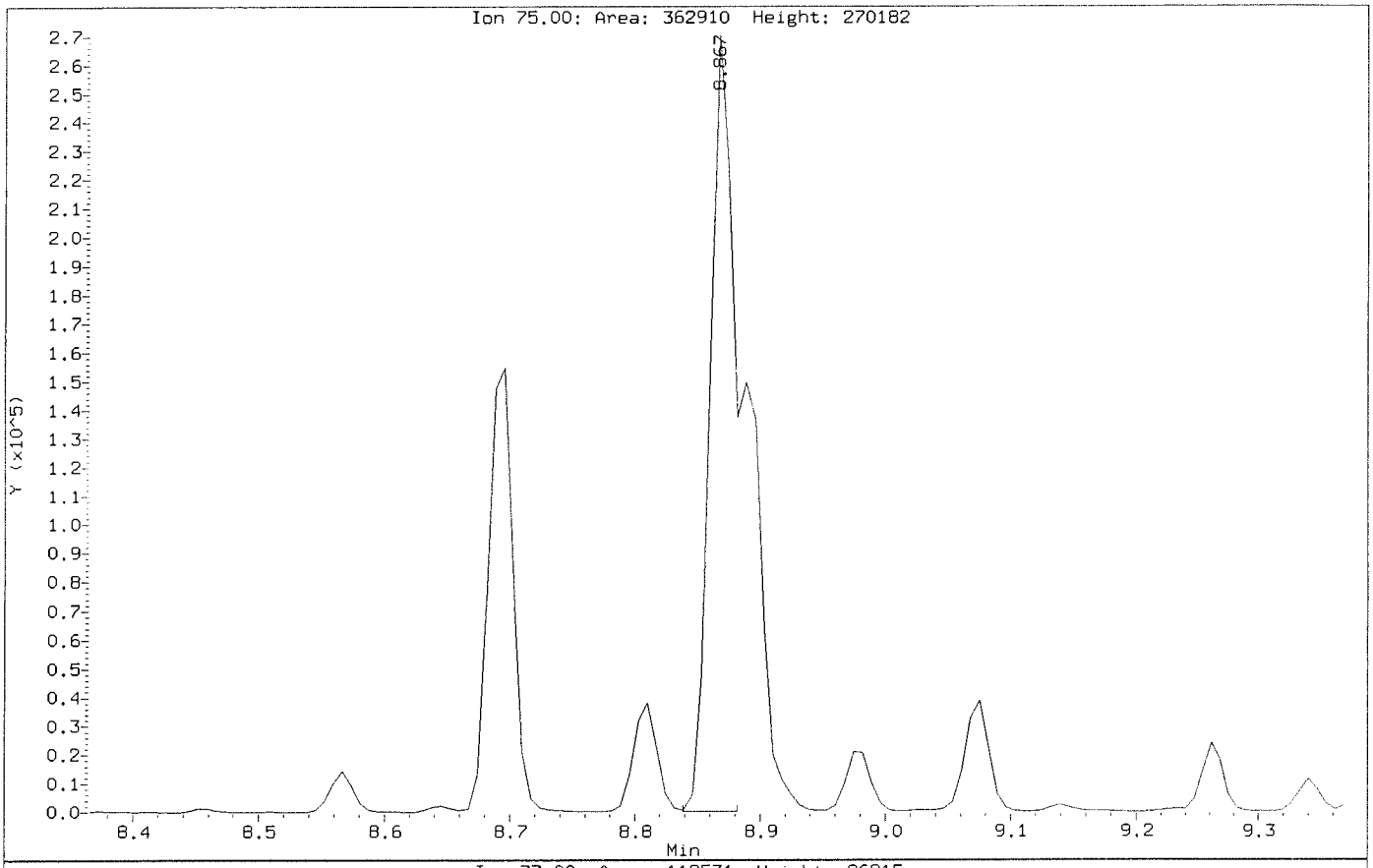
Compound: 1,2,3-Trichloropropane
CAS Number: 96-18-4

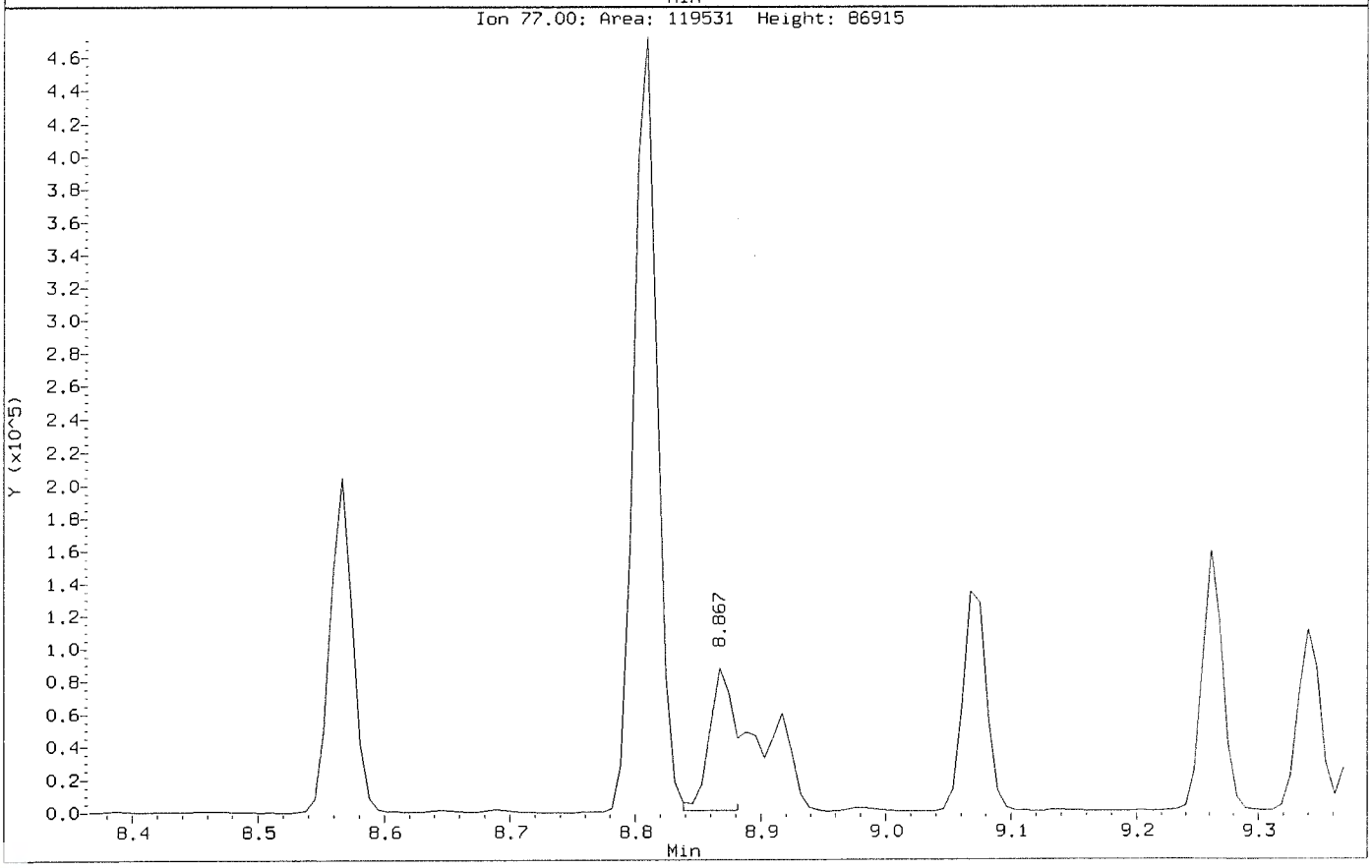




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Injection Date: 13-JUL-2020 14:06
Instrument: voa6.i
Client Sample ID: VSTD150

Compound: 1,2,3-Trichloropropane
CAS Number: 96-18-4





Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\X071311.D Page 1
Report Date: 13-Aug-2020 14:51

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Data file : \\nahstws005\Target\chem\voa6.i\X200713.b\X071311.D
Lab Smp Id: VSTD200 Client Smp ID: VSTD200
Inj Date : 13-JUL-2020 14:30
Operator : PC Inst ID: voa6.i
Smp Info : VSTD200;VSTD200;1;10;
Misc Info : HS18090001;WATER;0;1;
Comment :
Method : \\nahstws005\Target\chem\voa6.i\X200713.b\8260W.m
Meth Date : 13-Aug-2020 14:51 voa6.i Quant Type: ISTD
Cal Date : 13-JUL-2020 14:06 Cal File: X071310.D
Als bottle: 12 Calibration Sample, Level: 10
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: bhate.sub
Target Version: 4.14
Processing Host: NAHSTW7056

Concentration Formula: Amt * DF * (Uf/Vo)*1 * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Uf	5.000	ng unit correction factor
Vo	5.000	sample purged
Cpnd Variable		Local Compound Variable

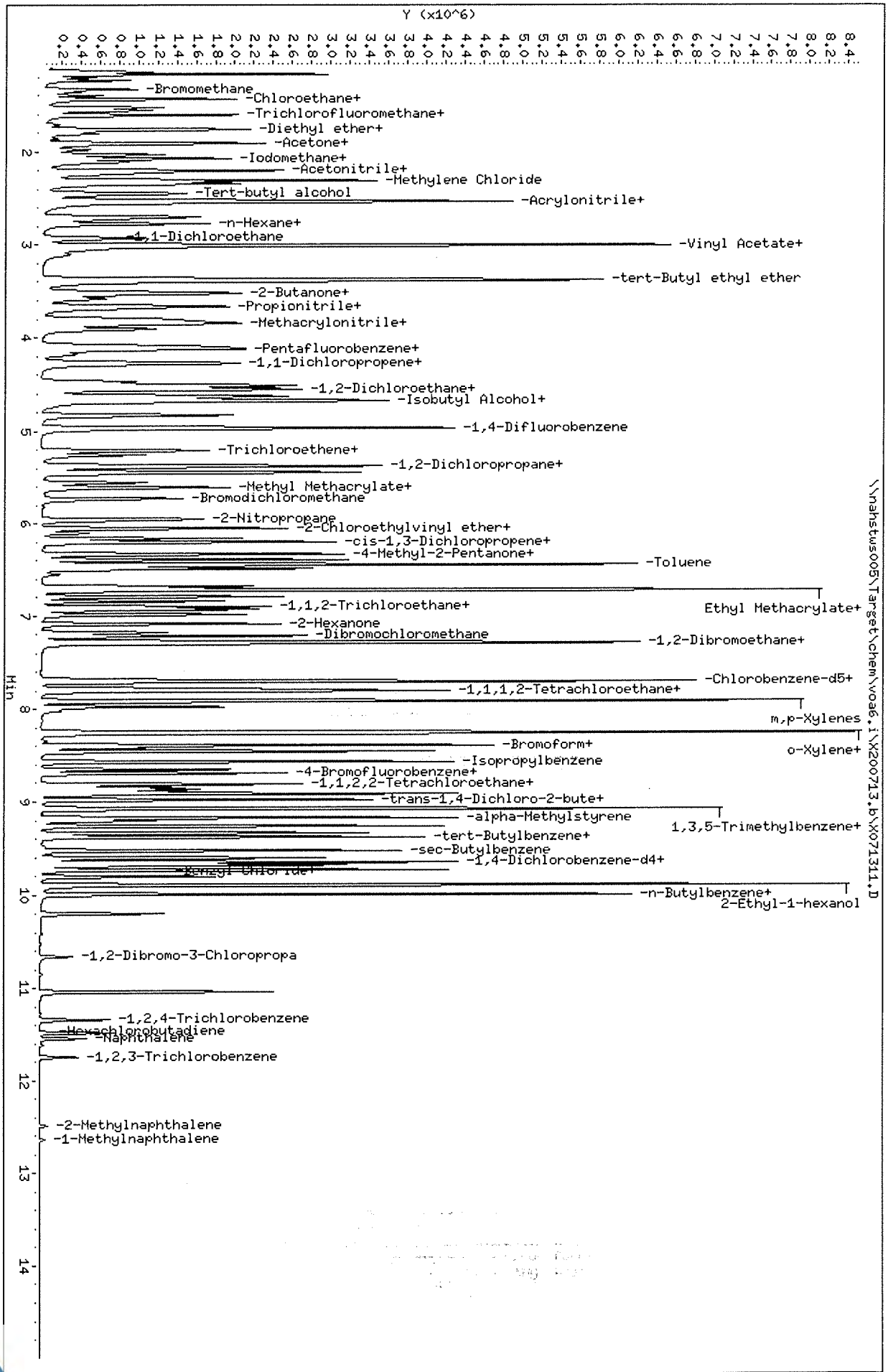
Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/l)	AMOUNTS ON-COL (ug/l)
* 1 Pentafluorobenzene	168	4.189	4.189	(1.000)	226606	50.0000	
* 36 1,4-Difluorobenzene	114	4.970	4.970	(1.000)	377615	50.0000	
* 47 Chlorobenzene-d5	117	7.671	7.671	(1.000)	350855	50.0000	
* 70 1,4-Dichlorobenzene-d4	152	9.669	9.669	(1.000)	165433	50.0000	
$ 30 Dibromofluoromethane	113	4.103	4.103	(0.979)	499552	200.000	198.07
$ 35 1,2-Dichloroethane-d4	65	4.476	4.476	(1.068)	688409	200.000	200.04(A)
$ 48 Toluene-d8	98	6.388	6.388	(0.833)	1699318	200.000	184.90
$ 69 4-Bromofluorobenzene	95	8.695	8.695	(1.134)	662646	200.000	196.73
60 1,1,1,2-Tetrachloroethane	131	7.778	7.778	(1.014)	519224	200.000	191.59
31 1,1,1-Trichloroethane	97	4.089	4.089	(0.976)	831504	200.000	201.41(A)
68 1,1,2,2-Tetrachloroethane	83	8.845	8.845	(0.915)	585059	200.000	191.54
53 1,1,2-Trichloroethane	83	6.847	6.847	(0.893)	404715	200.000	188.39
22 1,1-Dichloroethane	63	2.922	2.922	(0.697)	1227625	200.000	193.33
11 1,1-Dichloroethene	96	1.912	1.912	(0.456)	363508	200.000	183.36
32 1,1-Dichloropropene	75	4.283	4.283	(0.862)	699456	200.000	197.71
93 1,2,3-Trichlorobenzene	180	11.746	11.746	(1.215)	98407	200.000	175.84
71 1,2,3-Trichloropropane	75	8.867	8.867	(0.917)	515907	200.000	191.96(M)
90 1,2,4-Trichlorobenzene	180	11.338	11.338	(1.173)	182717	200.000	172.18
79 1,2,4-Trimethylbenzene	105	9.383	9.383	(0.970)	1655157	200.000	181.93
89 1,2-Dibromo-3-Chloropropane	155	10.658	10.658	(1.102)	57589	200.000	202.18(A)
57 1,2-Dibromoethane	107	7.262	7.262	(0.947)	444455	200.000	172.05
88 1,2-Dichlorobenzene	146	9.999	9.999	(1.034)	883809	200.000	191.59

Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\X071311.D Page 2
Report Date: 13-Aug-2020 14:51

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/l)	AMOUNTS ON-COL (ug/l)
33	1,2-Dichloroethane	62	4.562	4.562	(0.918)	911285	200.000	202.81(A)
42	1,2-Dichloropropane	63	5.443	5.443	(1.095)	692632	200.000	198.64
75	1,3,5-Trimethylbenzene	105	9.075	9.075	(0.939)	1699909	200.000	189.11
83	1,3-Dichlorobenzene	146	9.612	9.612	(0.994)	963269	200.000	189.94
54	1,3-Dichloropropane	76	6.983	6.983	(0.910)	873496	200.000	190.24
84	1,4-Dichlorobenzene	146	9.683	9.683	(1.001)	983089	200.000	190.31
26	2,2-Dichloropropane	77	3.516	3.516	(0.839)	761422	200.000	189.88
24	2-Butanone	43	3.581	3.581	(0.855)	867892	400.000	441.23(A)
76	2-Chlorotoluene	91	8.981	8.981	(0.929)	1515299	200.000	192.32
52	2-Hexanone	43	7.090	7.090	(0.924)	1349319	400.000	405.99(A)
77	4-Chlorotoluene	91	9.075	9.075	(0.939)	1692947	200.000	183.63
82	p-Isopropyltoluene	119	9.655	9.655	(0.999)	1751692	200.000	198.97
45	4-Methyl-2-Pentanone	43	6.331	6.331	(0.825)	2008333	400.000	419.47(A)
10	Acetone	43	1.976	1.976	(0.472)	491866	400.000	348.25(A)
37	Benzene	78	4.519	4.519	(0.909)	2076655	200.000	202.59(A)
74	Bromobenzene	156	8.810	8.810	(0.911)	570057	200.000	188.15
29	Bromochloromethane	128	3.803	3.803	(0.908)	276858	200.000	172.87
39	Bromodichloromethane	83	5.729	5.729	(1.153)	761279	200.000	200.35(A)
66	Bromoform	173	8.416	8.416	(1.097)	397885	200.000	205.01(A)
6	Bromomethane	94	1.331	1.331	(0.318)	310885	200.000	199.46
19	Carbon Disulfide	76	2.069	2.069	(0.494)	2225665	400.000	356.38(A)
34	Carbon Tetrachloride	117	4.268	4.268	(0.859)	716664	200.000	201.85(AH)
59	Chlorobenzene	112	7.699	7.699	(1.004)	1328129	200.000	190.16
7	Chloroethane	64	1.396	1.396	(0.333)	372253	200.000	186.90
28	Chloroform	83	3.910	3.910	(0.933)	960718	200.000	193.11
3	Chloromethane	50	1.081	1.081	(0.258)	989264	200.000	203.85(A)
27	cis-1,2-Dichloroethene	96	3.530	3.530	(0.843)	573367	200.000	197.24
46	cis-1,3-Dichloropropene	75	6.159	6.159	(1.239)	900590	200.000	204.70(A)
55	Dibromochloromethane	129	7.184	7.184	(0.937)	563221	200.000	197.32
44	Dibromomethane	93	5.558	5.558	(1.118)	370066	200.000	198.64
2	Dichlorodifluoromethane	85	0.973	0.973	(0.232)	515464	200.000	215.43(A)
61	Ethylbenzene	106	7.807	7.807	(1.018)	716131	200.000	196.54
91	Hexachlorobutadiene	225	11.481	11.481	(1.187)	123032	200.000	150.11
67	Isopropylbenzene	105	8.566	8.566	(1.117)	2135175	200.000	195.66
62	m,p-Xylenes	106	7.907	7.907	(1.031)	1708698	400.000	391.57(A)
17	Methylene Chloride	84	2.306	2.306	(0.550)	499769	200.000	191.30
87	n-Butylbenzene	91	9.999	9.999	(1.034)	1533778	200.000	198.46
73	n-Propylbenzene	91	8.917	8.917	(0.922)	2519224	200.000	199.85
92	Naphthalene	128	11.546	11.546	(1.194)	296243	200.000	171.87
63	o-Xylene	106	8.244	8.244	(1.075)	845487	200.000	191.75
81	sec-Butylbenzene	105	9.526	9.526	(0.985)	1978710	200.000	193.12
64	Styrene	104	8.265	8.265	(1.078)	1485668	200.000	194.70
78	tert-Butylbenzene	119	9.340	9.340	(0.966)	1281573	200.000	178.67
56	Tetrachloroethene	164	6.933	6.933	(0.904)	400280	200.000	186.38
50	Toluene	91	6.453	6.453	(0.841)	2077879	200.000	189.02
20	trans-1,2-Dichloroethene	96	2.528	2.528	(0.603)	474378	200.000	194.31
51	trans-1,3-Dichloropropene	75	6.682	6.682	(1.344)	832686	200.000	205.22(A)
38	Trichloroethene	130	5.207	5.207	(1.048)	541719	200.000	199.32
8	Trichlorofluoromethane	101	1.561	1.561	(0.373)	752087	200.000	200.77(A)
5	Vinyl Chloride	62	1.138	1.138	(0.272)	766186	200.000	205.61(A)

QC Flag Legend

A - Target compound detected but, quantitated amount exceeded maximum amount.
M - Compound response manually integrated.
H - Operator selected an alternate compound hit.

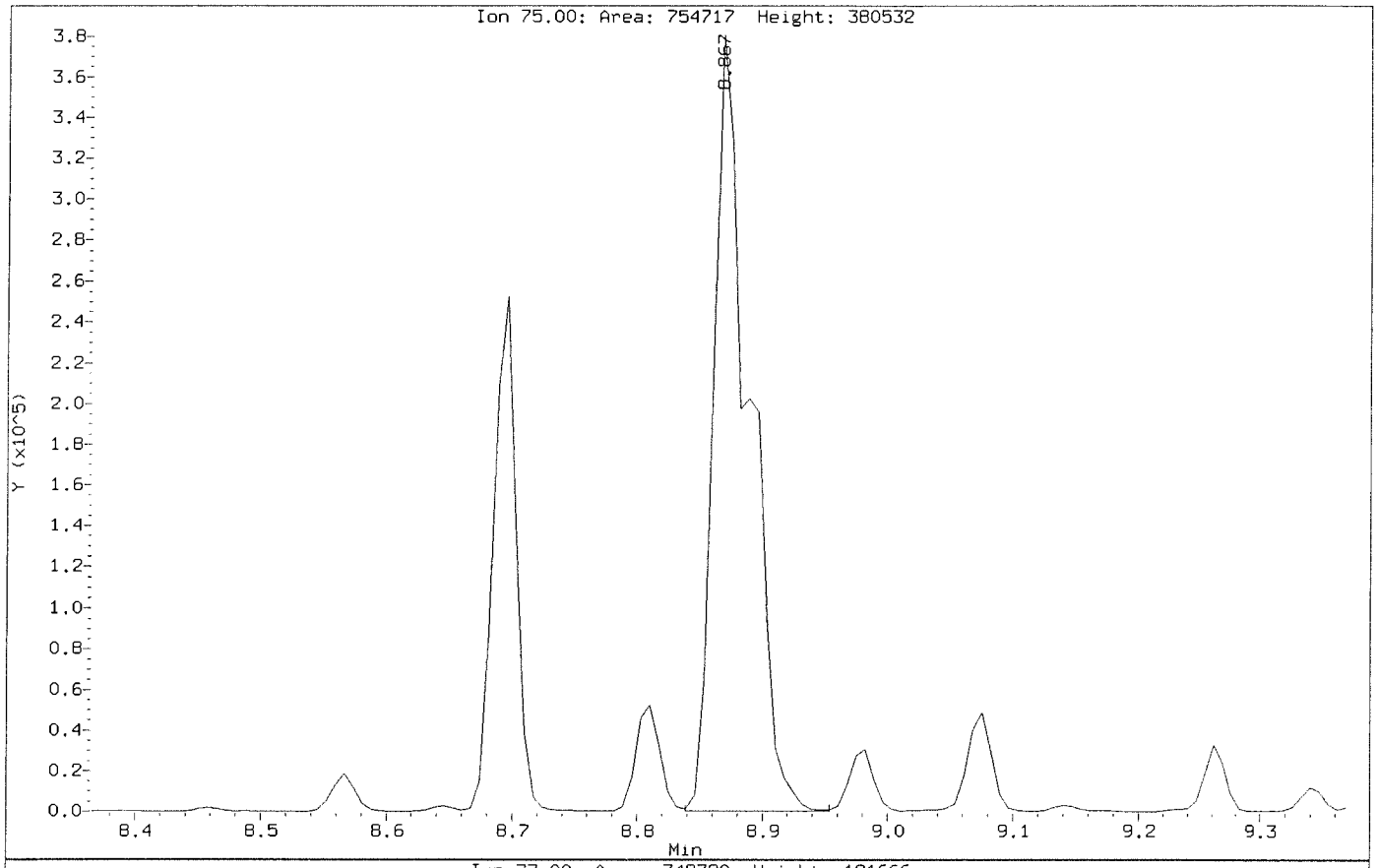


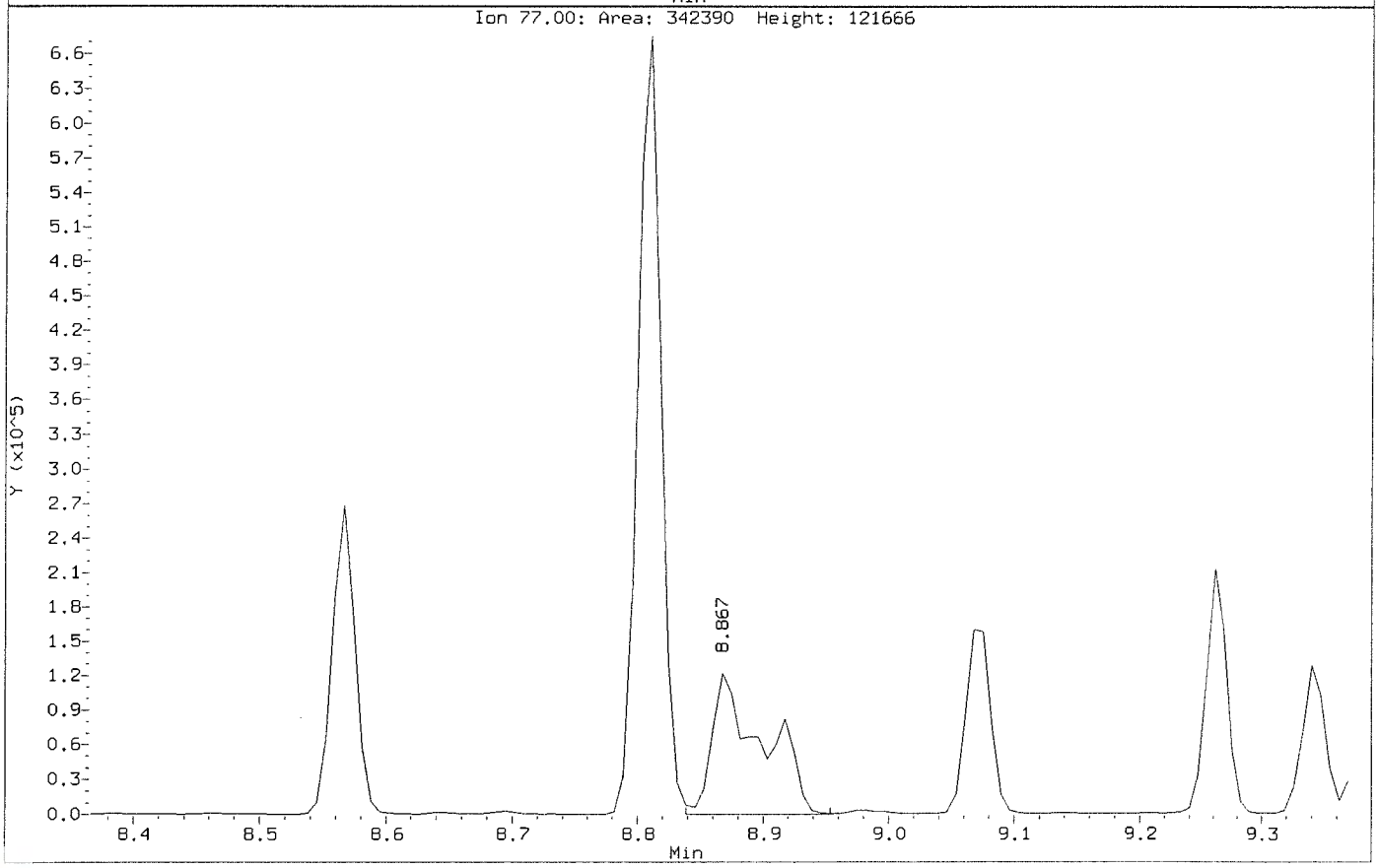
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Date : 13-JUL-2020 14:30
Client ID: VSTD200
Sample Info: VSTD200;VSTD200;1;10;
Purge Volume: 5.0
Column phase: DB624

Instrument: voa6.i
Operator: PC
Column diameter: 0.18

Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\Before\X071311.D
Injection Date: 13-JUL-2020 14:30
Instrument: voa6.i
Client Sample ID: VSTD200

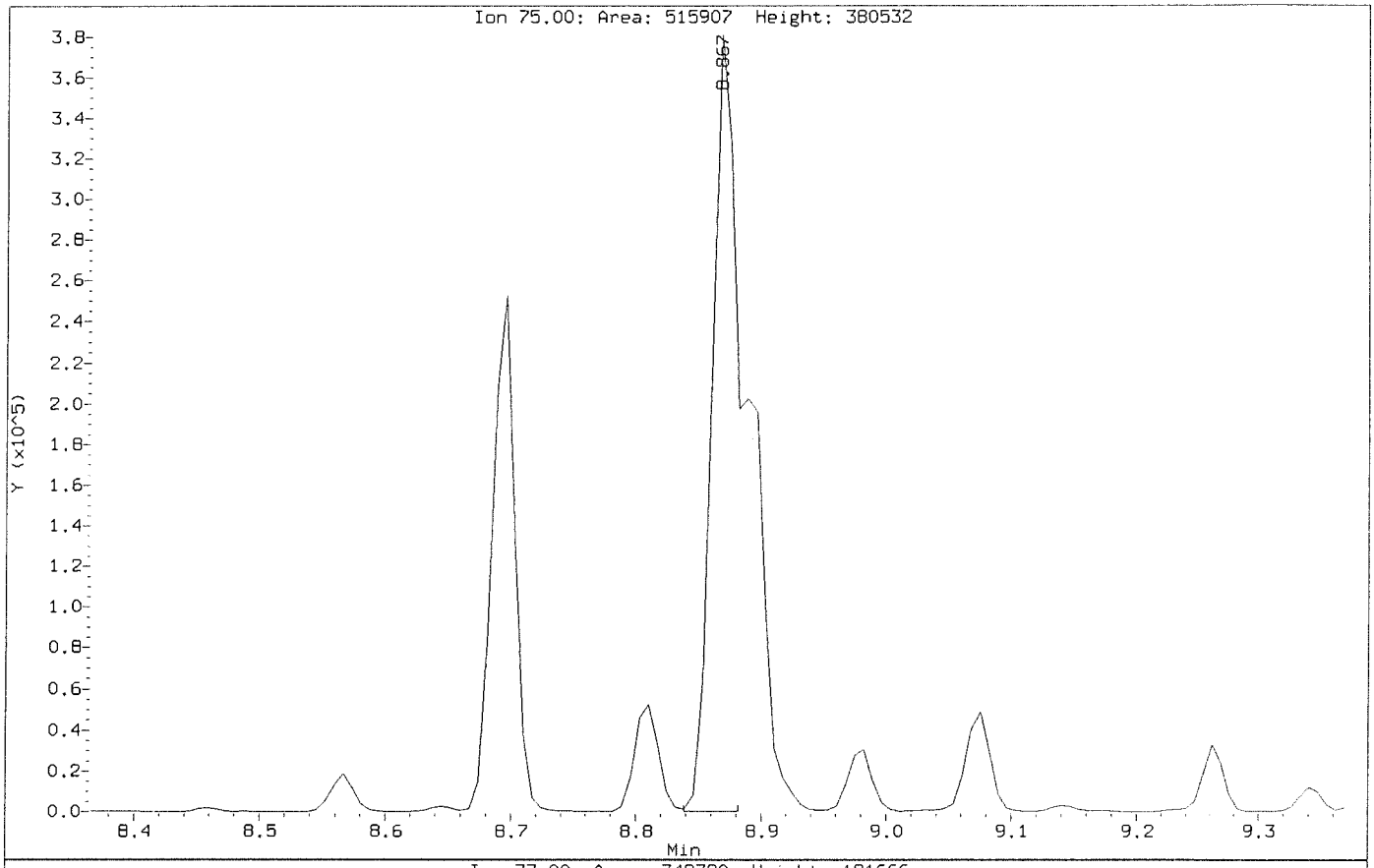
Compound: 1,2,3-Trichloropropane
CAS Number: 96-18-4

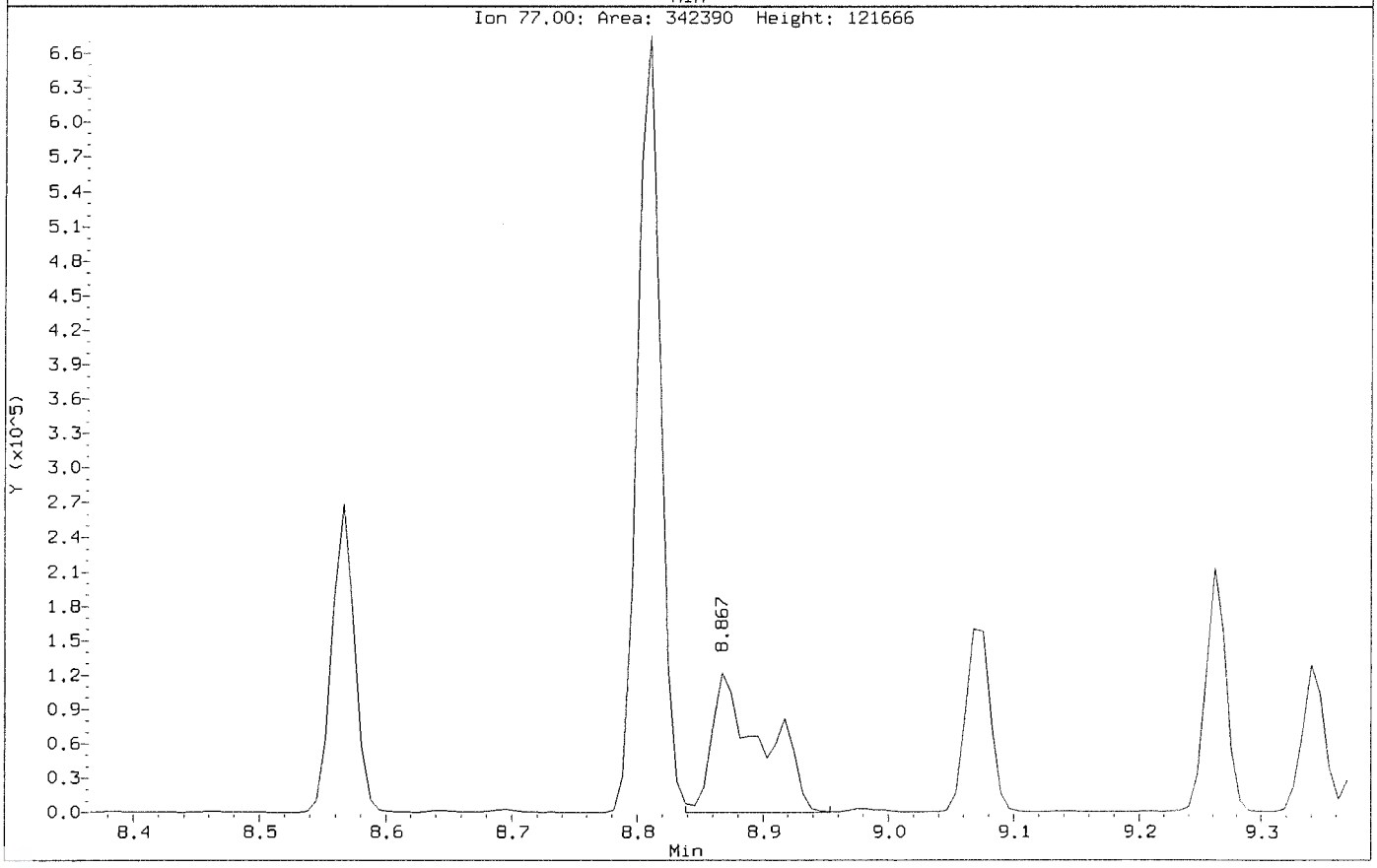




Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\X071311.D
Injection Date: 13-JUL-2020 14:30
Instrument: voa6.i
Client Sample ID: VSTD200

Compound: 1,2,3-Trichloropropane
CAS Number: 96-18-4





ALS Laboratory Group

Data file : \\nahstws005\Target\chem\voa6.i\X200713.b\X071313.D
Lab Smp Id: ICV Client Smp ID: ICV
Inj Date : 13-JUL-2020 15:42
Operator : PC Inst ID: voa6.i
Smp Info : CCV;CCV;2;;;ICV
Misc Info : HS18090001;WATER;0;1;
Comment :
Method : \\nahstws005\Target\chem\voa6.i\X200713.b\8260W.m
Meth Date : 13-Aug-2020 14:51 voa6.i Quant Type: ISTD
Cal Date : 13-JUL-2020 14:30 Cal File: X071311.D
Als bottle: 15 QC Sample: METHSPIKE
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: bhate.sub
Target Version: 4.14
Processing Host: NAHSTW7056

Concentration Formula: Amt * DF * (Uf/Vo)*1 * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Uf	5.000	ng unit correction factor
Vo	5.000	sample purged
Cpnd Variable		Local Compound Variable

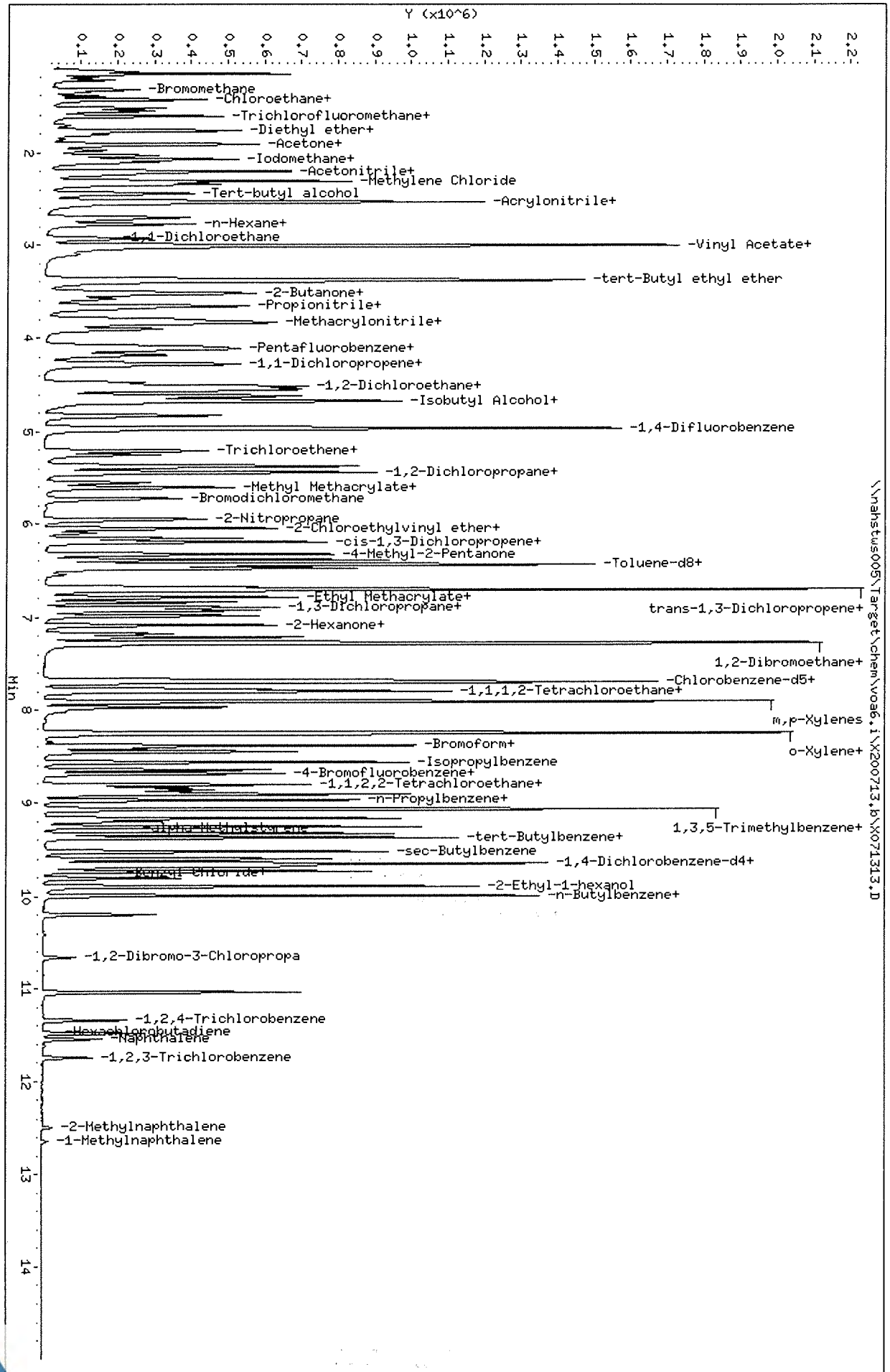
	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/l)	FINAL (ug/l)
*	1 Pentafluorobenzene	168	4.189	4.189	(1.000)	247155	50.0000	
*	36 1,4-Difluorobenzene	114	4.970	4.970	(1.000)	407373	50.0000	
*	47 Chlorobenzene-d5	117	7.671	7.671	(1.000)	373467	50.0000	
*	70 1,4-Dichlorobenzene-d4	152	9.662	9.669	(1.000)	159419	50.0000	
$	30 Dibromofluoromethane	113	4.103	4.103	(0.979)	141230	51.2819	51.28
$	35 1,2-Dichloroethane-d4	65	4.476	4.476	(1.068)	190337	50.9658	50.96
$	48 Toluene-d8	98	6.388	6.388	(0.833)	473220	48.3739	48.37
$	69 4-Bromofluorobenzene	95	8.695	8.695	(1.134)	178443	49.3711	49.37
	60 1,1,1,2-Tetrachloroethane	131	7.778	7.778	(1.014)	135780	47.0688	47.06
	31 1,1,1-Trichloroethane	97	4.089	4.089	(0.976)	210892	46.8363	46.83
	68 1,1,2,2-Tetrachloroethane	83	8.845	8.845	(0.915)	165689	56.2920	56.29
	53 1,1,2-Trichloroethane	83	6.840	6.847	(0.892)	114924	50.2570	50.25
	22 1,1-Dichloroethane	63	2.929	2.922	(0.699)	321262	46.3878	46.38
	11 1,1-Dichloroethene	96	1.919	1.912	(0.458)	95261	44.0570	44.05
	32 1,1-Dichloropropene	75	4.282	4.283	(0.862)	179702	47.0849	47.08
	93 1,2,3-Trichlorobenzene	180	11.746	11.746	(1.216)	32328	59.9466	59.94(M)
	71 1,2,3-Trichloropropane	75	8.867	8.867	(0.918)	146576	56.5986	56.59(M)
	90 1,2,4-Trichlorobenzene	180	11.338	11.338	(1.173)	58539	57.2465	57.24
	79 1,2,4-Trimethylbenzene	105	9.383	9.383	(0.971)	471204	53.7495	53.74
	89 1,2-Dibromo-3-Chloropropane	155	10.658	10.658	(1.103)	15964	59.0984	59.09
	57 1,2-Dibromoethane	107	7.262	7.262	(0.947)	142207	51.7160	51.71
	88 1,2-Dichlorobenzene	146	9.999	9.999	(1.035)	207603	46.7019	46.70

Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\X071313.D Page 2
Report Date: 13-Aug-2020 14:51

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/l)	CONCENTRATIONS FINAL (ug/l)
33 1,2-Dichloroethane	62	4.562	4.562	(0.918)	249342	51.4385	51.43
42 1,2-Dichloropropane	63	5.443	5.443	(1.095)	186946	49.6985	49.69
75 1,3,5-Trimethylbenzene	105	9.067	9.075	(0.938)	437198	50.4738	50.47
83 1,3-Dichlorobenzene	146	9.612	9.612	(0.995)	259004	52.9988	52.99
54 1,3-Dichloropropane	76	6.983	6.983	(0.910)	236003	48.2879	48.28
84 1,4-Dichlorobenzene	146	9.683	9.683	(1.002)	212867	42.7627	42.76
26 2,2-Dichloropropane	77	3.516	3.516	(0.839)	219725	50.2400	50.23
24 2-Butanone	43	3.581	3.581	(0.855)	240001	111.871	111.87
76 2-Chlorotoluene	91	8.974	8.981	(0.929)	379515	49.9851	49.98
52 2-Hexanone	43	7.090	7.090	(0.924)	378900	107.103	107.10
77 4-Chlorotoluene	91	9.075	9.075	(0.939)	451626	50.8376	50.83
82 p-Isopropyltoluene	119	9.655	9.655	(0.999)	435607	51.3469	51.34
45 4-Methyl-2-Pentanone	43	6.331	6.331	(0.825)	532905	104.567	104.56
10 Acetone	43	1.976	1.976	(0.472)	150047	94.4988	94.49
37 Benzene	78	4.519	4.519	(0.909)	556751	50.3486	50.34
74 Bromobenzene	156	8.810	8.810	(0.912)	159418	54.6017	54.60
29 Bromochloromethane	128	3.803	3.803	(0.908)	78132	44.7315	44.73
39 Bromodichloromethane	83	5.729	5.729	(1.153)	196256	47.8786	47.87
66 Bromoform	173	8.416	8.416	(1.097)	102128	49.4360	49.43
6 Bromomethane	94	1.338	1.331	(0.320)	81107	46.9145	46.91
19 Carbon Disulfide	76	2.069	2.069	(0.494)	584261	85.7763	85.77
34 Carbon Tetrachloride	117	4.268	4.268	(0.859)	178259	46.5407	46.54(H)
59 Chlorobenzene	112	7.699	7.699	(1.004)	358922	48.2798	48.27
7 Chloroethane	64	1.403	1.396	(0.335)	88562	40.7686	40.76
28 Chloroform	83	3.910	3.910	(0.933)	258616	47.6634	47.66
3 Chloromethane	50	1.081	1.081	(0.258)	241621	46.9784	46.97
27 cis-1,2-Dichloroethene	96	3.530	3.530	(0.843)	155775	49.1327	49.13
46 cis-1,3-Dichloropropene	75	6.159	6.159	(1.239)	236796	49.8932	49.89
55 Dibromochloromethane	129	7.176	7.184	(0.936)	147810	48.6502	48.65
44 Dibromomethane	93	5.558	5.558	(1.118)	97504	48.5143	48.51
2 Dichlorodifluoromethane	85	0.973	0.973	(0.232)	127948	49.0291	49.02
61 Ethylbenzene	106	7.800	7.807	(1.017)	183978	47.4353	47.43
91 Hexachlorobutadiene	225	11.481	11.481	(1.188)	43827	55.4923	55.49
67 Isopropylbenzene	105	8.566	8.566	(1.117)	514320	44.2788	44.27
62 m,p-Xylenes	106	7.907	7.907	(1.031)	423817	91.2429	91.24
17 Methylene Chloride	84	2.305	2.306	(0.550)	127302	43.6183	43.61
87 n-Butylbenzene	91	9.999	9.999	(1.035)	336495	45.1834	45.18
73 n-Propylbenzene	91	8.917	8.917	(0.923)	591132	48.6636	48.66
92 Naphthalene	128	11.546	11.546	(1.195)	98243	59.9674	59.96(M)
63 o-Xylene	106	8.244	8.244	(1.075)	212595	45.2978	45.29
81 sec-Butylbenzene	105	9.526	9.526	(0.986)	502348	50.8793	50.87
64 Styrene	104	8.258	8.265	(1.077)	382194	47.0561	47.05
78 tert-Butylbenzene	119	9.340	9.340	(0.967)	353469	51.1400	51.14
56 Tetrachloroethene	164	6.933	6.933	(0.904)	103735	45.3783	45.37
50 Toluene	91	6.453	6.453	(0.841)	559710	47.8347	47.83
20 trans-1,2-Dichloroethene	96	2.535	2.528	(0.605)	114744	43.0945	43.09
51 trans-1,3-Dichloropropene	75	6.682	6.682	(1.344)	217379	49.6618	49.66
38 Trichloroethene	130	5.214	5.207	(1.049)	141901	48.3975	48.39
8 Trichlorofluoromethane	101	1.561	1.561	(0.373)	177443	43.4306	43.43
5 Vinyl Chloride	62	1.145	1.138	(0.273)	169254	41.6454	41.64

QC Flag Legend

M - Compound response manually integrated.
H - Operator selected an alternate compound hit.

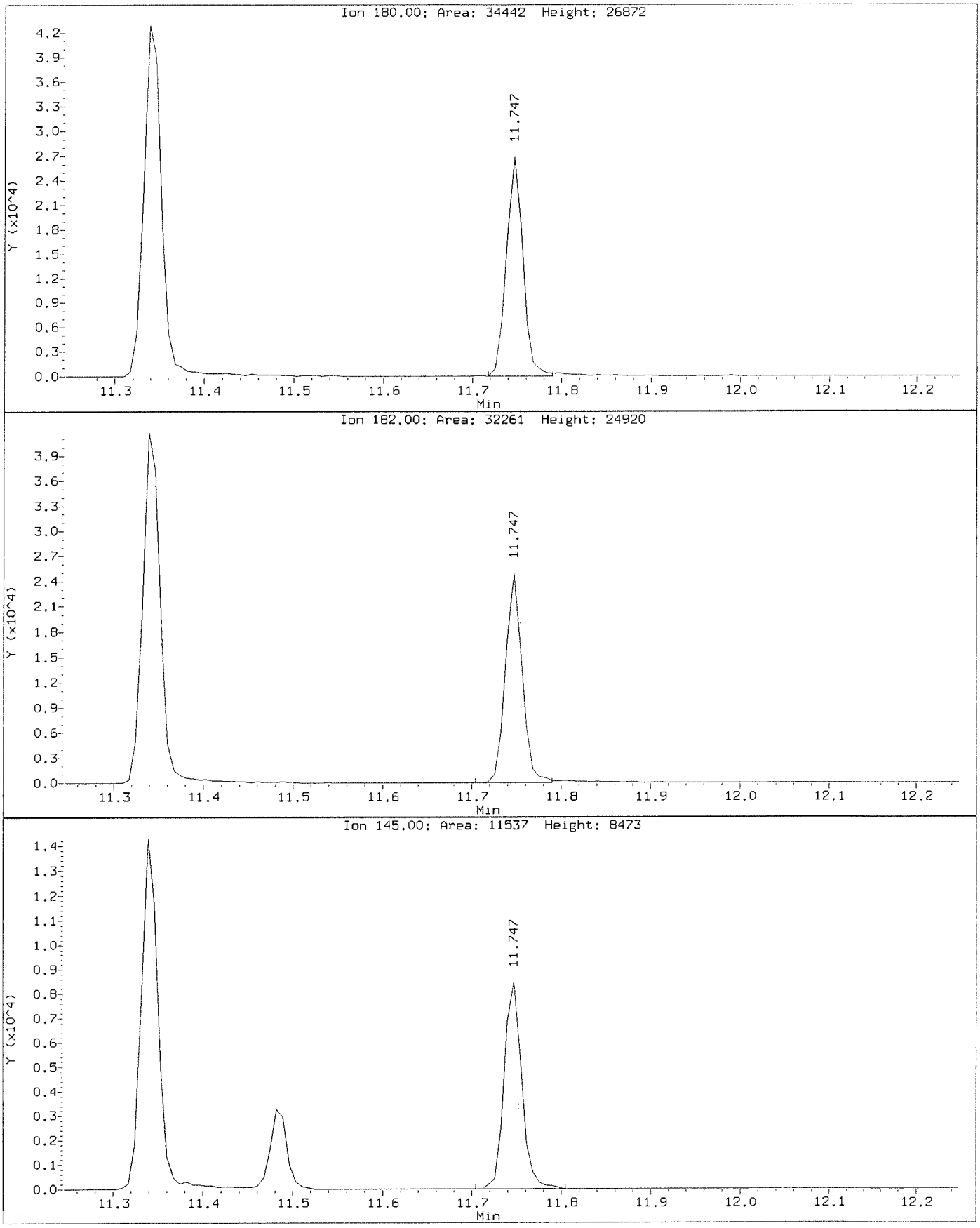


Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\X071313.D
Date : 13-JUL-2020 15:42
Client ID: ICV
Sample Info: CCV;CCV;2;;;ICV
Purge Volume: 5.0
Column phase: DB624

Instrument: voa6.i
Operator: PC
Column diameter: 0.18

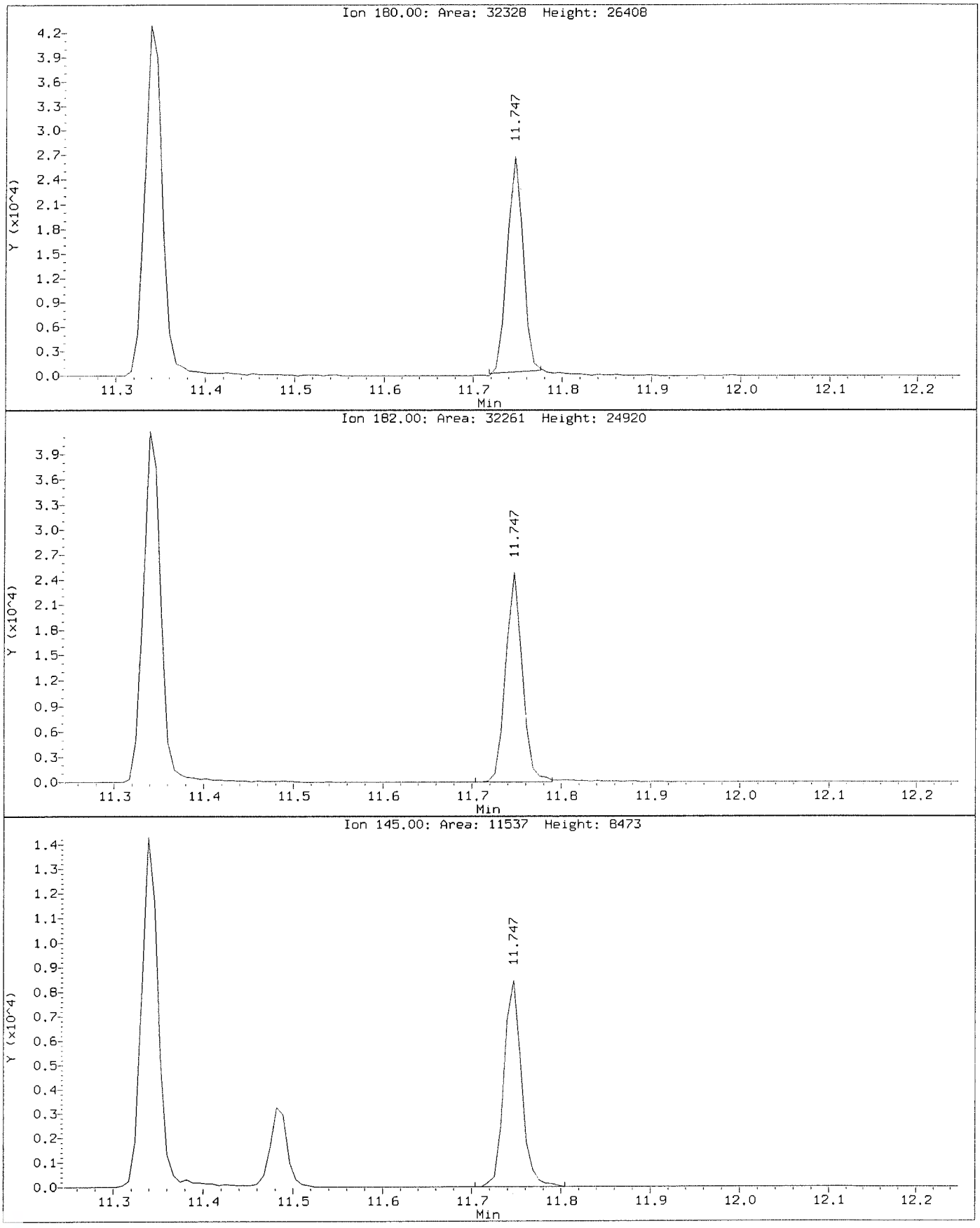
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Injection Date: 13-JUL-2020 15:42
Instrument: voa6.i
Client Sample ID: ICV

Compound: 1,2,3-Trichlorobenzene
CAS Number: 87-61-6



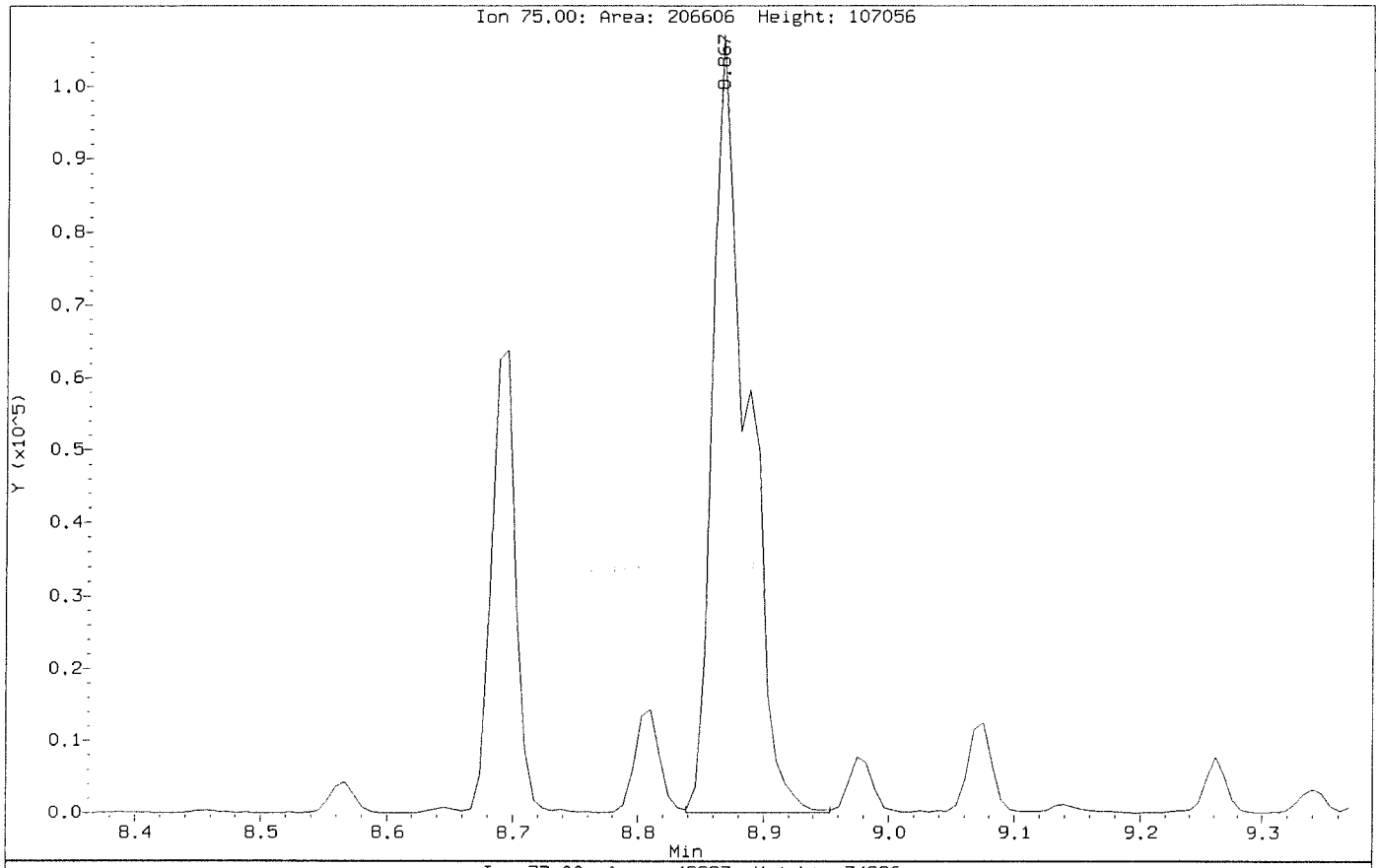
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Client Sample ID: ICV

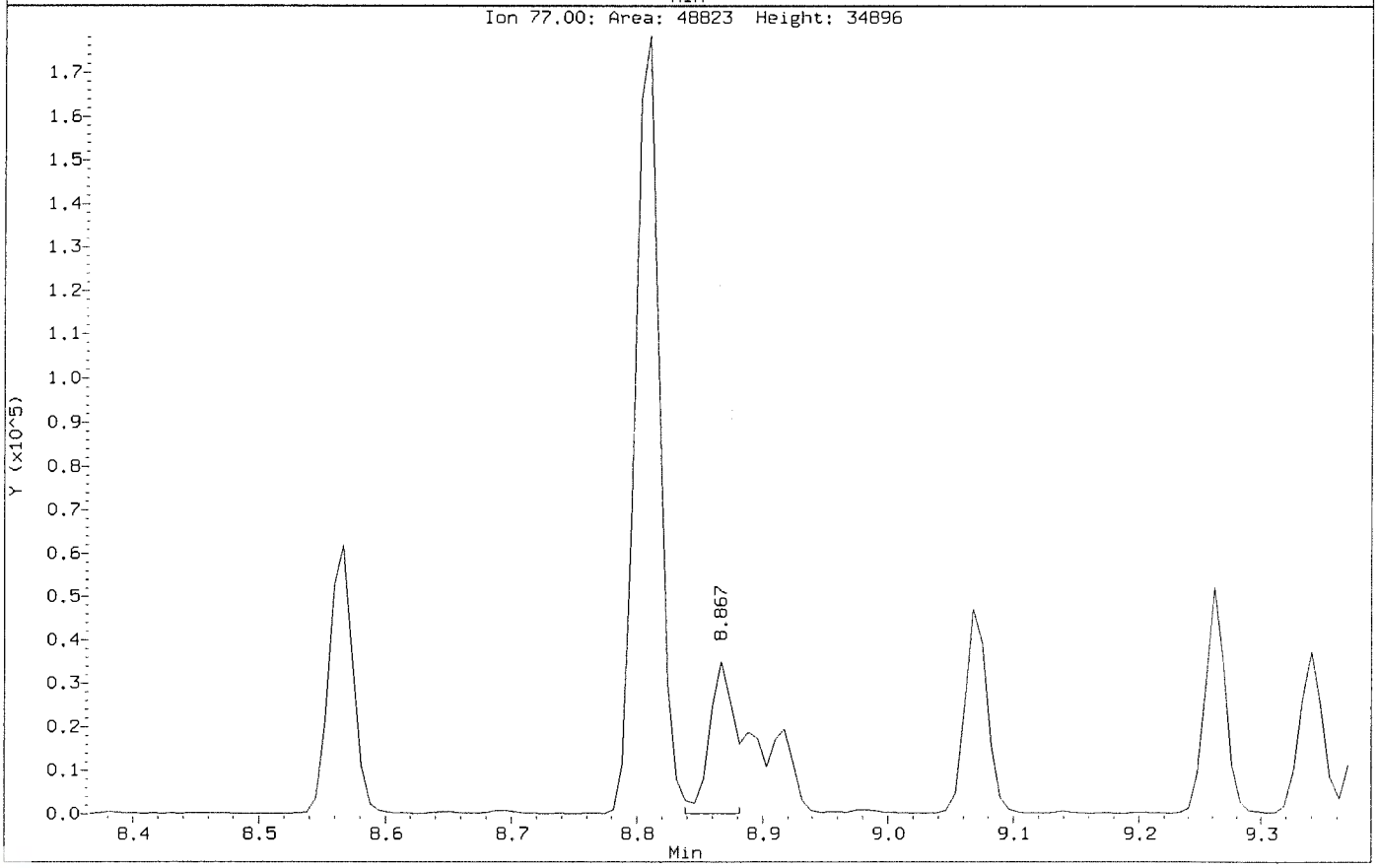
Compound: 1,2,3-Trichlorobenzene
CAS Number: 87-61-6



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Instrument: voa6.i
Client Sample ID: ICV

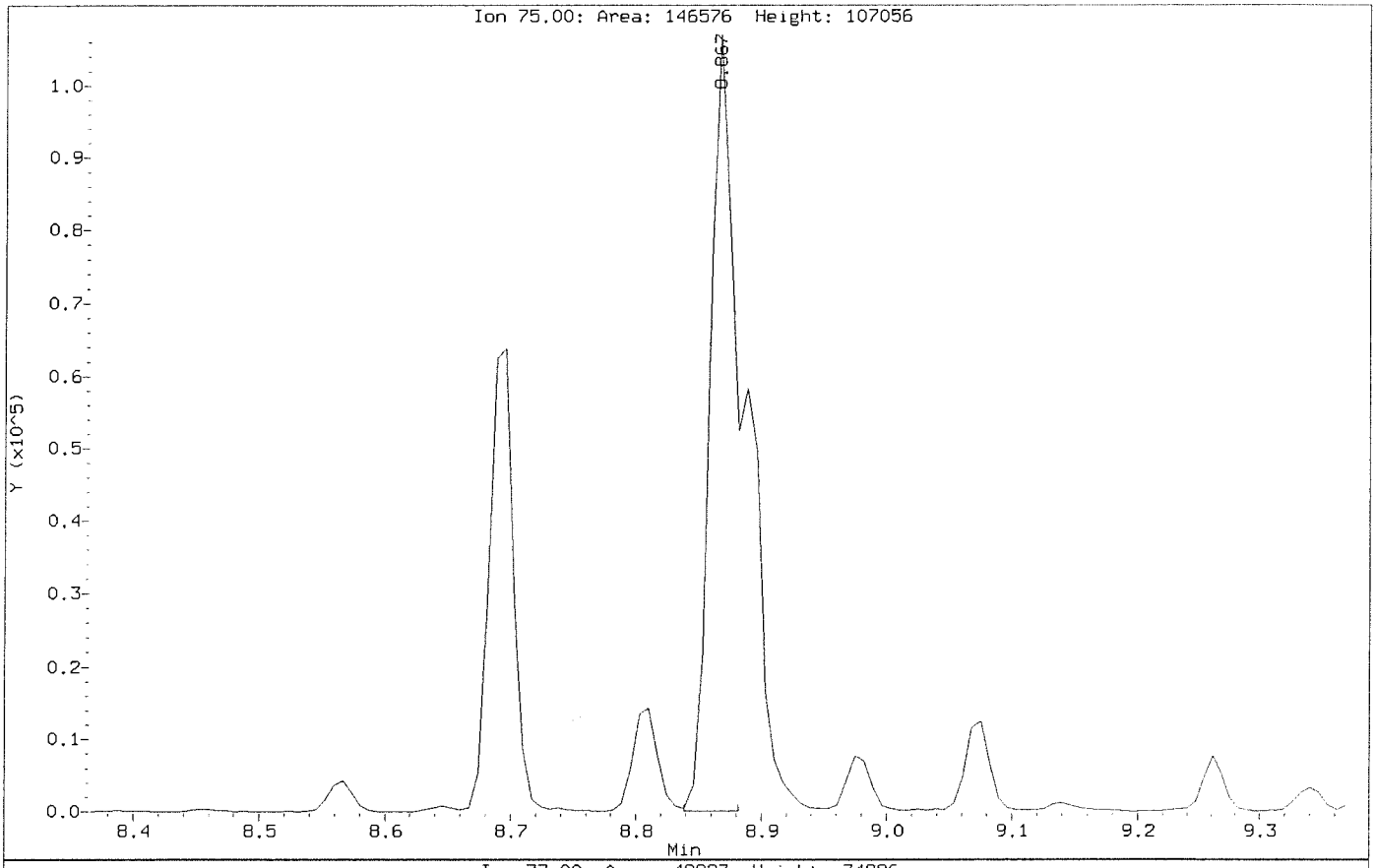
Compound: 1,2,3-Trichloropropane
CAS Number: 96-18-4

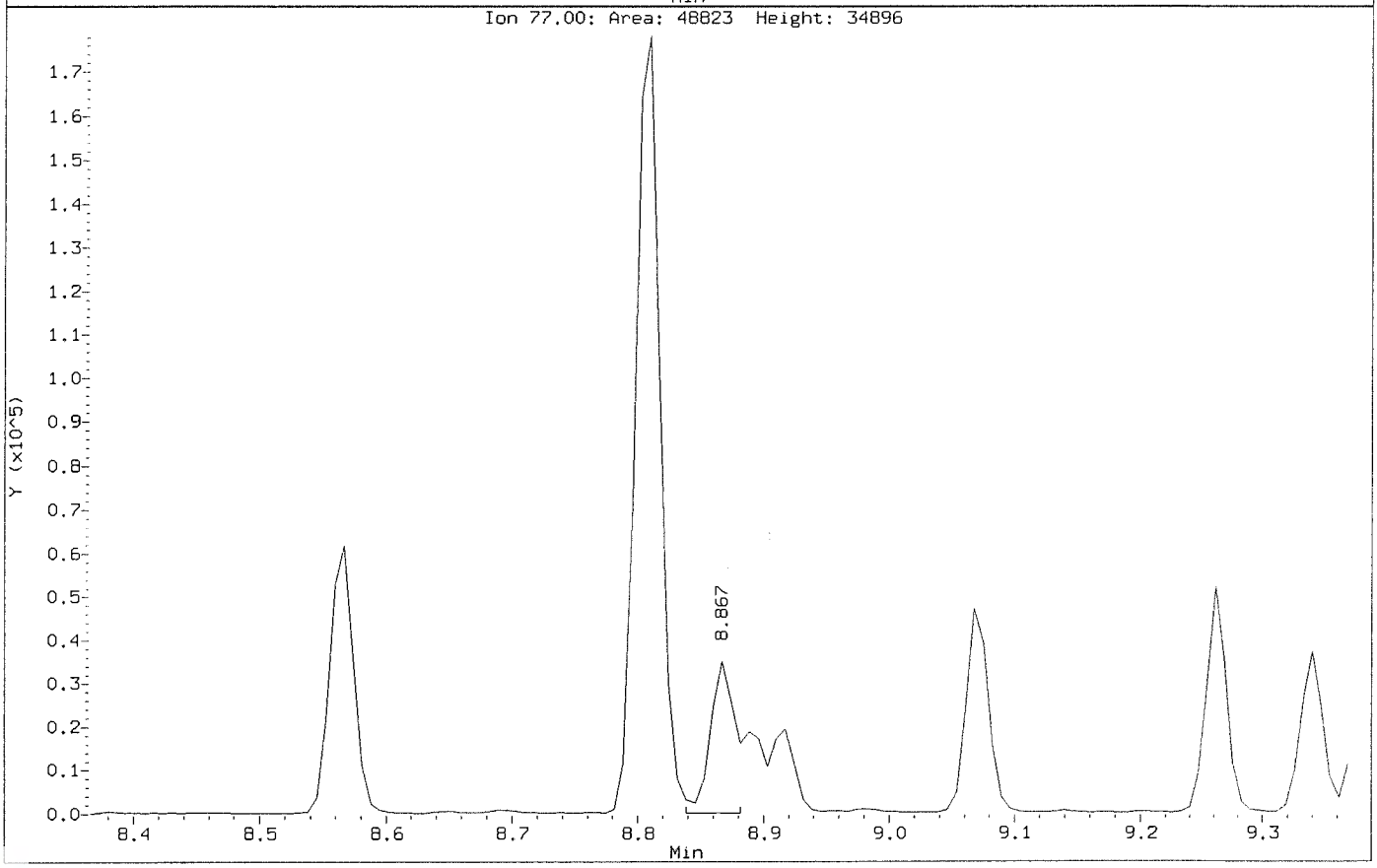




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Instrument: voa6.i
Client Sample ID: ICV

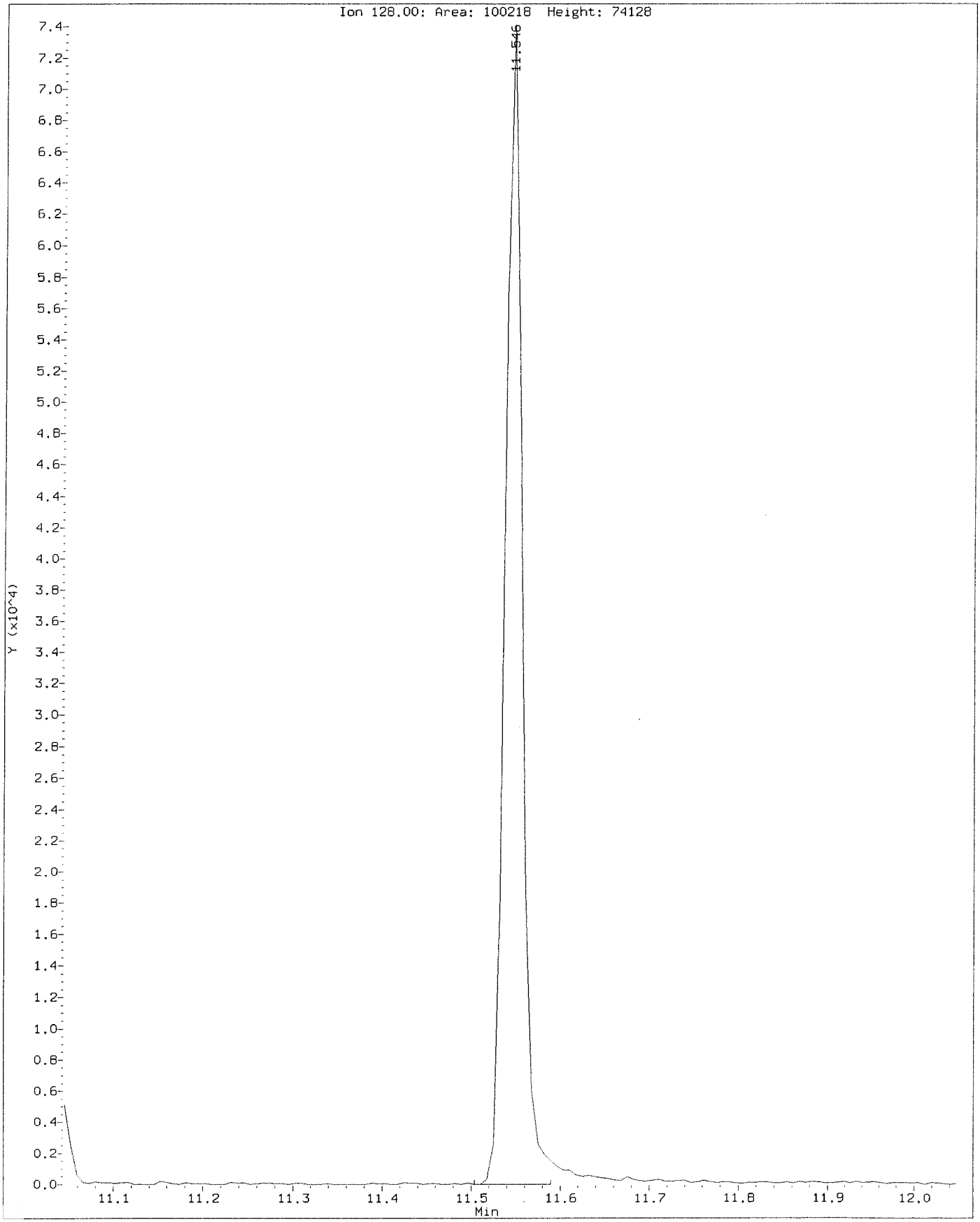
Compound: 1,2,3-Trichloropropane
CAS Number: 96-18-4





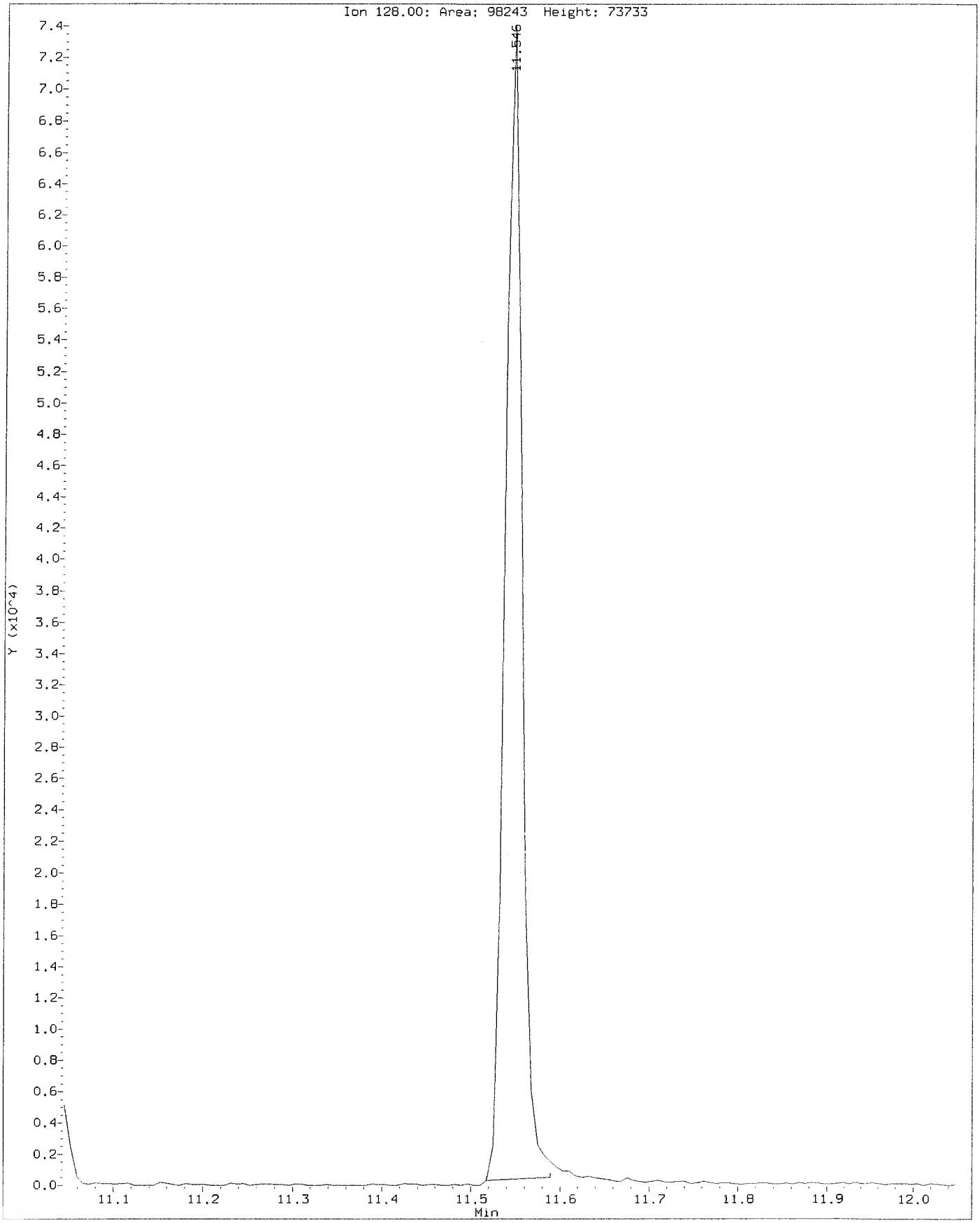
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Injection Date: 13-JUL-2020 15:42
Instrument: voa6.i
Client Sample ID: ICV

Compound: Naphthalene
CAS Number: 91-20-3



Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\X071313.D
Injection Date: 13-JUL-2020 15:42
Instrument: voa6.i
Client Sample ID: ICV

Compound: Naphthalene
CAS Number: 91-20-3



MSVOA06 -Logbook

Batch: 41087 **Analyst:** Presenta Cabascango

Date: 07-13-2020 **Reviewer:**

Method: 8260 **Laboratory:** Houston

Comments:

#	Samp ID	Type	Analyzed	DF	Init Wt/Vol	Final Vol	File ID	Matrix	Status	pH
1	BFB	TUNE	07-13-2020 10:03 am	1.00	50 mL	50 mL	X071301.D	Liquid	Y	NA
	Auto find/ purged									
2	VSTD000.25	ICAL1	07-13-2020 10:27 am	1.00	50 mL	50 mL	X071302.D	Liquid	Y	NA
	0.10 uL cal std/100 mL DI									
3	VSTD000.5	ICAL2	07-13-2020 10:55 am	1.00	50 mL	50 mL	X071303.D	Liquid	Y	NA
	0.10 uL cal std/50 mL DI									
4	VSTD001	ICAL3	07-13-2020 11:42 am	1.00	50 mL	50 mL	X071304.D	Liquid	Y	NA
	0.20 uL cal std/50 mL DI									
5	VSTD002	ICAL4	07-13-2020 12:06 pm	1.00	50 mL	50 mL	X071305.D	Liquid	Y	NA
	0.40 uL cal std/50 mL DI									
6	VSTD005	ICAL5	07-13-2020 12:30 pm	1.00	50 mL	50 mL	X071306.D	Liquid	Y	NA
	1.0 uL cal std/50 mL DI									
7	VSTD020	ICAL6	07-13-2020 12:54 pm	1.00	50 mL	50 mL	X071307.D	Liquid	Y	NA
	4.0 uL cal std/50 mL DI									
8	VSTD050	ICAL7	07-13-2020 01:18 pm	1.00	50 mL	50 mL	X071308.D	Liquid	Y	NA
	10 uL cal std/50 mL DI									
9	VSTD100	ICAL8	07-13-2020 01:42 pm	1.00	50 mL	50 mL	X071309.D	Liquid	Y	NA
	20 uL cal std/50 mL DI									
10	VSTD150	ICAL9	07-13-2020 02:06 pm	1.00	50 mL	50 mL	X071310.D	Liquid	Y	NA
	30 uL cal std/50 mL DI									
11	VSTD200	ICAL	07-13-2020 02:30 pm	1.00	50 mL	50 mL	X071311.D	Liquid	Y	NA
	40 uL cal std/50 mL DI									
12	BLANK	SAMP	07-13-2020 02:54 pm	1.00	50 mL	50 mL	X071312.D	Liquid	Y	NA
13	CCV	ICV	07-13-2020 03:42 pm	1.00	50 mL	50 mL	X071313.D	Liquid	Y	NA
	10 uL ical std/50 mL DI									
14	BFB	TUNE	07-13-2020 04:06 pm	1.00	50 mL	50 mL	Y071301.D	Liquid	Y	NA
	Auto find/ purged									
15	CCV	CCV	07-13-2020 04:30 pm	1.00	50 mL	50 mL	Y071302.D	Liquid	Y	NA
	10 uL cal std/50 mL DI									
16	BLANK	SAMP	07-13-2020 04:53 pm	1.00	50 mL	50 mL	Y071303.D	Liquid	Y	NA
17	CCB	SAMP	07-13-2020 05:17 pm	1.00	50 mL	50 mL	Y071304.D	Liquid	Y	NA
18	VLCSW-200713	LCS	07-13-2020 05:41 pm	1.00	50 mL	50 mL	Y071305.D	Liquid	Y	NA
	4.0 uL cal std/50 mL DI									
19	BLANK	SAMP	07-13-2020 06:05 pm	1.00	50 mL	50 mL	Y071306.D	Liquid	Y	NA
20	VBLKW-200713	MBLK	07-13-2020 06:29 pm	1.00	50 mL	50 mL	Y071307.D	Liquid	Y	NA
21	HS20070399-02	SAMP	07-13-2020 06:53 pm	1.00	50 mL	50 mL	Y071308.D	Liquid	Y	<2
22	HS20070399-01	SAMP	07-13-2020 07:17 pm	1.00	50 mL	50 mL	Y071309.D	Liquid	Y	<2
23	HS20070043-19	SAMP	07-13-2020 07:41 pm	200.0(	250 µL	50 mL	Y071310.D	Liquid	Y	<2
24	HS20070043-19	SAMP	07-13-2020 08:05 pm	20.00	2.5 mL	50 mL	Y071311.D	Liquid	Y	<2
25	HS20070043-19MS	MS	07-13-2020 08:29 pm	200.0(	250 µL	50 mL	Y071312.D	Liquid	Y	<2
	3.5 uL cal std/40 mL samp									
26	HS20070043-19MSD	MSD	07-13-2020 08:54 pm	200.0(	250 µL	50 mL	Y071313.D	Liquid	Y	<2
	3.5 uL cal std/40 mL samp									
27	HS20070096-06	SAMP	07-13-2020 09:18 pm	100.0(	500 µL	50 mL	Y071314.D	Liquid	Y	<2
28	HS20070043-05	SAMP	07-13-2020 09:42 pm	50.00	1 mL	50 mL	Y071315.D	Liquid	Y	<2
29	HS20070043-05	SAMP	07-13-2020 10:06 pm	500.0(	100 µL	50 mL	Y071316.D	Liquid	Y	<2
30	HS20070043-06	SAMP	07-13-2020 10:30 pm	50.00	1 mL	50 mL	Y071317.D	Liquid	Y	<2
31	HS20070043-06	SAMP	07-13-2020 10:54 pm	500.0(	100 µL	50 mL	Y071318.D	Liquid	Y	<2
32	HS20070043-11	SAMP	07-13-2020 11:18 pm	50.00	1 mL	50 mL	Y071319.D	Liquid	Y	<2

MSVOA06 -Logbook

#	Samp ID	Type	Analyzed	DF	Init Wt/Vol	Final Vol	File ID	Matrix	Status	pH
33	HS20070043-11	SAMP	07-13-2020 11:42 pm	500.0(	100 µL	50 mL	Y071320.D	Liquid	Y	<2
34	CCV-END	CCV	07-14-2020 12:06 am	1.00	50 mL	50 mL	Y071321.D	Liquid	Y	NA
	10 uL cal std/50 mL DI									
35	HS20070493-01	SAMP	07-14-2020 12:30 am	1.00	50 mL	50 mL	Y071322.D	Liquid	Y	<2
36	HS20070096-29	SAMP	07-14-2020 12:54 am	10.00	5 mL	50 mL	Y071323.D	Liquid	Y	<2
37	HS20070096-29	SAMP	07-14-2020 01:18 am	100.0(	500 µL	50 mL	Y071324.D	Liquid	Y	<2
38	HS20070096-24	SAMP	07-14-2020 01:42 am	10.00	5 mL	50 mL	Y071325.D	Liquid	Y	<2
39	HS20070096-24	SAMP	07-14-2020 02:06 am	100.0(	500 µL	50 mL	Y071326.D	Liquid	Y	<2
40	HS20070096-30	SAMP	07-14-2020 02:30 am	25.00	2 mL	50 mL	Y071327.D	Liquid	Y	<2
41	HS20070096-30	SAMP	07-14-2020 02:54 am	250.0(	200 µL	50 mL	Y071328.D	Liquid	Y	<2
42	HS20070096-34	SAMP	07-14-2020 03:18 am	25.00	2 mL	50 mL	Y071329.D	Liquid	Y	<2
43	HS20070096-34	SAMP	07-14-2020 03:42 am	500.0(	100 µL	50 mL	Y071330.D	Liquid	Y	<2
44	BLANK	SAMP	07-14-2020 04:07 am	1.00	50 mL	50 mL	Y071340.D	Liquid	Y	NA

Chemical	Value
SURR SPK ID	31106-38-06-
IS ID	31106-38-06
CAL STD ID	31106-38-01/02
BFB ID	31106-38-06

FORM 2
WATER VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: Contract:

Lab Code: Case No.: SAS No.: SDG No.: HS20070399

	CLIENT SAMPLE NO.	SMC1 (DCE) #	SMC2 #	SMC3 (TOL) #	OTHER #	TOT OUT
01	VLCSW-200713	108	105	96	100	0
02	VBLKW-200713	83	91	104	98	0
03	HS20070399-02	90	91	103	99	0
04	HS20070399-01	88	90	103	100	0
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		QC LIMITS
SMC1 (DCE)	= 1,2-Dichloroethane-d4	(0-130)
SMC2	= Dibromofluoromethane	(0-130)
SMC3 (TOL)	= Toluene-d8	(0-130)
OTHER	= 4-Bromofluorobenzene	(0-130)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D System Monitoring Compound diluted out

FORM 4
VOLATILE METHOD BLANK SUMMARY

CLIENT SAMPLE NO.

VBLKW-200713

Lab Name: Contract:

Lab Code: Case No.: SAS No.: SDG No.: HS20070399

Lab File ID: Y071307 Lab Sample ID: VBLKW-200713

Date Analyzed: 07/13/20 Time Analyzed: 1829

GC Column: DB624 ID: 0.18 (mm) Heated Purge: (Y/N) N

Instrument ID: VOA6

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	VLCSW-200713	VLCSW-200713	Y071305	1741
02	HS20070399-0	HS20070399-02	Y071308	1853
03	HS20070399-0	HS20070399-01	Y071309	1917
04	HS20070043-1	HS20070043-19M	Y071312	2029
05	HS20070043-1	HS20070043-19M	Y071313	2054
06				
07				
08				
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30				

COMMENTS:

FORM 5
VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: Contract:

Lab Code: Case No.: SAS No.: SDG No.: HS20070399

Lab File ID: Y071301 BFB Injection Date: 07/13/20

Instrument ID: VOA6 BFB Injection Time: 1606

GC Column: DB624 ID: 0.25 (mm) Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	29.8
75	30.0 - 60.0% of mass 95	53.5
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	8.2
173	Less than 2.0% of mass 174	0.7 (1.1)1
174	Greater than 50.0% of mass 95	59.5
175	5.0 - 9.0% of mass 174	4.2 (7.1)1
176	95.0 - 101.0% of mass 174	56.7 (95.3)1
177	5.0 - 9.0% of mass 176	4.3 (7.6)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	CCV	CCV	Y071302	07/13/20	1630
02	VLCSW-200713	VLCSW-200713	Y071305	07/13/20	1741
03	VBLKW-200713	VBLKW-200713	Y071307	07/13/20	1829
04	HS20070399-0	HS20070399-02	Y071308	07/13/20	1853
05	HS20070399-0	HS20070399-01	Y071309	07/13/20	1917
06	HS20070043-1	HS20070043-19M	Y071312	07/13/20	2029
07	HS20070043-1	HS20070043-19M	Y071313	07/13/20	2054
08	CCV-END	CCV-END	Y071321	07/14/20	0006
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

FORM 7B
VOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: Contract:

Lab Code: Case No.: SAS No.: SDG No.: HS20070399

Instrument ID: VOA6 Calibration Date: 07/13/20 Time: 1630

Lab File ID: Y071302 Init. Calib. Date(s): 07/13/20 07/13/20

Init. Calib. Times: 1027 1430

GC Column: DB624 ID: 0.18 (mm)

COMPOUND	RRF or AMOUNT	RRF50.000 or AMOUNT	CCAL RRF50.000	MIN RRF	%D or %DRIFT	MAX %D or %DRIFT	CURV TYPE
cis-1,3-Dichloropropene	0.5820000	0.5837549	0.5837549	0.2	-0.30	20.00	AVRG
trans-1,3-Dichloropropene	0.5370000	0.5173475	0.5173475	0.1	3.66	20.00	AVRG
1,3-Dichlorobenzene	1.5330000	1.4046181	1.4046181	0.6	8.37	20.00	AVRG
2,2-Dichloropropane	0.8850000	0.8211106	0.8211106	0.1	7.22	20.00	AVRG
1,1-Dichloropropene	0.4680000	0.3909305	0.3909305	0.1	16.47	20.00	AVRG
Dibromomethane	0.2460000	0.2373452	0.2373452	0.1	3.52	20.00	AVRG
1,2-Dibromoethane	0.3680000	0.3771333	0.3771333	0.1	-2.48	20.00	AVRG
trans-1,2-Dichloroethene	0.5390000	0.4944118	0.4944118	0.1	8.27	20.00	AVRG
1,1,1,2-Tetrachloroethane	0.3860000	0.3686790	0.3686790	0.1	4.49	20.00	AVRG
1,1,1-Trichloroethane	0.9110000	0.8141979	0.8141979	0.1	10.62	20.00	AVRG
1,1,2,2-Tetrachloroethane	0.9230000	0.9021128	0.9021128	0.3	2.26	20.00	AVRG
1,1,2-Trichloroethane	0.3060000	0.3064664	0.3064664	0.1	-0.15	20.00	AVRG
1,1-Dichloroethane	1.4010000	1.2700122	1.2700122	0.2	9.35	20.00	AVRG
1,1-Dichloroethene	0.4370000	0.4248281	0.4248281	0.1	2.78	20.00	AVRG
Trichloroethene	0.3600000	0.3389277	0.3389277	0.2	5.85	20.00	AVRG
1,2,3-Trichlorobenzene	0.1690000	0.1996819	0.1996819	0.01	-18.15	20.00	AVRG
Trichlorofluoromethane	0.8260000	0.7577796	0.7577796	0.1	8.26	20.00	AVRG
1,2,4-Trichlorobenzene	0.3210000	0.3848644	0.3848644	0.1	-19.90	20.00	AVRG
1,2,4-Trimethylbenzene	2.7500000	2.5000554	2.5000554	0.1	9.09	20.00	AVRG
Tetrachloroethene	0.3060000	0.2647244	0.2647244	0.2	13.49	20.00	AVRG
1,2-Dichlorobenzene	1.3940000	1.3163860	1.3163860	0.4	5.57	20.00	AVRG
1,2-Dichloroethane	0.5950000	0.5732682	0.5732682	0.1	3.65	20.00	AVRG
1,2-Dichloropropane	0.4620000	0.4545437	0.4545437	0.1	1.61	20.00	AVRG
1,3,5-Trimethylbenzene	2.7170000	2.3586591	2.3586591	0.1	13.19	20.00	AVRG
1,3-Dichloropropane	0.6540000	0.6261545	0.6261545	0.1	4.26	20.00	AVRG
1,4-Dichlorobenzene	1.5610000	1.4369478	1.4369478	0.4	7.95	20.00	AVRG
Toluene	1.5660000	1.4889204	1.4889204	0.4	4.92	20.00	AVRG
2-Butanone	0.4340000	0.4568493	0.4568493	0.1	-5.26	20.00	AVRG
2-Chlorotoluene	2.3810000	2.1141768	2.1141768	0.1	11.21	20.00	AVRG
2-Hexanone	0.4740000	0.4929398	0.4929398	0.1	-4.00	20.00	AVRG
4-Chlorotoluene	2.7860000	2.4771480	2.4771480	0.1	11.08	20.00	AVRG
tert-Butylbenzene	2.1680000	1.8300540	1.8300540	0.1	15.59	20.00	AVRG
4-Methyl-2-Pentanone	0.6820000	0.7151946	0.7151946	0.1	-4.87	20.00	AVRG
Acetone	102.28249	100.00000	0.3275272	0.1	-2.28	20.00	LINR
Benzene	1.3570000	1.2863260	1.2863260	0.5	5.21	20.00	AVRG
Bromobenzene	0.9160000	0.8722661	0.8722661	0.1	4.77	20.00	AVRG
Bromochloromethane	0.3530000	0.3039586	0.3039586	0.1	13.89	20.00	AVRG
Bromodichloromethane	0.5030000	0.4891198	0.4891198	0.2	2.76	20.00	AVRG
Bromoform	0.2760000	0.2721633	0.2721633	0.1	1.39	20.00	AVRG
romomethane	53.012119	50.000000	0.3698836	0.1	-6.02	20.00	LINR
rbon Disulfide	1.3780000	1.3183932	1.3183932	0.1	4.32	20.00	AVRG
bon Tetrachloride	0.4700000	0.3928932	0.3928932	0.1	16.40	20.00	AVRG

FORM 7B
VOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: Contract:

Lab Code: Case No.: SAS No.: SDG No.: HS2007039

Instrument ID: VOA6 Calibration Date: 07/13/20 Time: 1630

Lab File ID: Y071302 Init. Calib. Date(s): 07/13/20 07/13/20

Init. Calib. Times: 1027 1430

GC Column: DB624 ID: 0.18 (mm)

COMPOUND	RRF or AMOUNT	RRF50.000 or AMOUNT	CCAL RRF50.000	MIN RRF	%D or %DRIFT	MAX %D or %DRIFT	CURV TYPE
Chlorobenzene	0.9950000	0.9484300	0.9484300	0.5	4.68	20.00	AVRG
Chloroethane	0.4390000	0.4140735	0.4140735	0.1	5.68	20.00	AVRG
Chloroform	1.0980000	0.9999319	0.9999319	0.2	8.93	20.00	AVRG
Chloromethane	51.026670	50.000000	1.0650391	0.1	-2.05	20.00	LINR
cis-1,2-Dichloroethene	0.6410000	0.5962467	0.5962467	0.1	6.98	20.00	AVRG
Dibromochloromethane	0.4060000	0.3962572	0.3962572	0.1	2.40	20.00	AVRG
Dichlorodifluoromethane	0.5280000	0.5356756	0.5356756	0.1	-1.45	20.00	AVRG
Ethylbenzene	0.5190000	0.4803331	0.4803331	0.1	7.45	20.00	AVRG
Hexachlorobutadiene	0.2480000	0.2373491	0.2373491	0.1	4.29	20.00	AVRG
Isopropylbenzene	1.5550000	1.3522971	1.3522971	0.1	13.04	20.00	AVRG
m,p-Xylenes	0.6220000	0.5735867	0.5735867	0.1	7.78	20.00	AVRG
Methylene Chloride	49.422438	50.000000	0.5815011	0.1	1.16	20.00	LINR
n-Butylbenzene	2.3360000	2.0262773	2.0262773	0.5	13.26	20.00	AVRG
n-Propylbenzene	3.8100000	3.3341666	3.3341666	0.1	12.49	20.00	AVRG
Naphthalene	58.222301	50.000000	0.5979426	0.2	-16.44	20.00	LINR
o-Xylene	0.6280000	0.5762270	0.5762270	0.3	8.24	20.00	AVRG
sec-Butylbenzene	3.0960000	2.5427054	2.5427054	0.1	17.87	20.00	AVRG
Styrene	1.0870000	1.0395022	1.0395022	0.3	4.37	20.00	AVRG
Vinyl Chloride	0.8220000	0.7806518	0.7806518	0.1	5.03	20.00	AVRG
1,2,3-Trichloropropane	0.8120000	0.8129995	0.8129995	0.1	-0.12	20.00	AVRG
p-Isopropyltoluene	2.6610000	2.2578732	2.2578732	0.1	15.15	20.00	AVRG
1,2-Dibromo-3-Chloropropane	52.960359	50.000000	8.95e-002	0.05	-5.92	20.00	LINR
1,2-Dichloroethane-d4	51.224711	50.000000	0.7740500	0.1	-2.45	20.00	LINR
Dibromofluoromethane	49.956527	50.000000	0.5566781	0.1	0.09	20.00	LINR
Toluene-d8	1.3100000	1.3074221	1.3074221	0.1	0.20	20.00	AVRG
4-Bromofluorobenzene	51.354840	50.000000	0.4967937	0.1	-2.71	20.00	LINR

FORM VII VOA

FORM 7B
VOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: Contract:

Lab Code: Case No.: SAS No.: SDG No.: HS20070399

Instrument ID: VOA6 Calibration Date: 07/14/20 Time: 0006

Lab File ID: Y071321 Init. Calib. Date(s): 07/13/20 07/13/20

Init. Calib. Times: 1027 1430

GC Column: DB624 ID: 0.18 (mm)

COMPOUND	RRF or AMOUNT	RRF50.000 or AMOUNT	CCAL RRF50.000	MIN RRF	%D or %DRIFT	MAX %D or %DRIFT	CURV TYPE
cis-1,3-Dichloropropene	0.5820000	0.5633342	0.5633342	0.2	3.21	50.00	AVRG
trans-1,3-Dichloropropene	0.5370000	0.5200576	0.5200576	0.1	3.16	50.00	AVRG
1,3-Dichlorobenzene	1.5330000	1.4131028	1.4131028	0.6	7.82	50.00	AVRG
2,2-Dichloropropane	0.8850000	0.7262000	0.7262000	0.1	17.94	50.00	AVRG
1,1-Dichloropropene	0.4680000	0.4171870	0.4171870	0.1	10.86	50.00	AVRG
Dibromomethane	0.2460000	0.2406911	0.2406911	0.1	2.16	50.00	AVRG
1,2-Dibromoethane	0.3680000	0.3722763	0.3722763	0.1	-1.16	50.00	AVRG
trans-1,2-Dichloroethene	0.5390000	0.4377175	0.4377175	0.1	18.79	50.00	AVRG
1,1,1,2-Tetrachloroethane	0.3860000	0.3711917	0.3711917	0.1	3.84	50.00	AVRG
1,1,1-Trichloroethane	0.9110000	0.8927700	0.8927700	0.1	2.00	50.00	AVRG
1,1,2,2-Tetrachloroethane	0.9230000	0.8800682	0.8800682	0.3	4.65	50.00	AVRG
1,1,2-Trichloroethane	0.3060000	0.3028351	0.3028351	0.1	1.03	50.00	AVRG
1,1-Dichloroethane	1.4010000	1.3025553	1.3025553	0.2	7.03	50.00	AVRG
1,1-Dichloroethene	0.4370000	0.3790342	0.3790342	0.1	13.26	50.00	AVRG
Trichloroethene	0.3600000	0.3374693	0.3374693	0.2	6.26	50.00	AVRG
1,2,3-Trichlorobenzene	0.1690000	0.1448004	0.1448004	0.01	14.32	50.00	AVRG
Trichlorofluoromethane	0.8260000	0.7205112	0.7205112	0.1	12.77	50.00	AVRG
1,2,4-Trichlorobenzene	0.3210000	0.3007789	0.3007789	0.1	6.30	50.00	AVRG
1,2,4-Trimethylbenzene	2.7500000	2.5210268	2.5210268	0.1	8.33	50.00	AVRG
Tetrachloroethene	0.3060000	0.2570111	0.2570111	0.2	16.01	50.00	AVRG
1,2-Dichlorobenzene	1.3940000	1.2838219	1.2838219	0.4	7.90	50.00	AVRG
1,2-Dichloroethane	0.5950000	0.6135493	0.6135493	0.1	-3.12	50.00	AVRG
1,2-Dichloropropane	0.4620000	0.4593551	0.4593551	0.1	0.57	50.00	AVRG
1,3,5-Trimethylbenzene	2.7170000	2.4144584	2.4144584	0.1	11.14	50.00	AVRG
1,3-Dichloropropane	0.6540000	0.6320757	0.6320757	0.1	3.35	50.00	AVRG
1,4-Dichlorobenzene	1.5610000	1.4205412	1.4205412	0.4	9.00	50.00	AVRG
Toluene	1.5660000	1.5009797	1.5009797	0.4	4.15	50.00	AVRG
2-Butanone	0.4340000	0.4395960	0.4395960	0.1	-1.29	50.00	AVRG
2-Chlorotoluene	2.3810000	2.2088712	2.2088712	0.1	7.23	50.00	AVRG
2-Hexanone	0.4740000	0.4465781	0.4465781	0.1	5.78	50.00	AVRG
4-Chlorotoluene	2.7860000	2.5100415	2.5100415	0.1	9.90	50.00	AVRG
tert-Butylbenzene	2.1680000	1.8939751	1.8939751	0.1	12.64	50.00	AVRG
4-Methyl-2-Pentanone	0.6820000	0.6647010	0.6647010	0.1	2.54	50.00	AVRG
Acetone	73.983313	100.00000	0.2403474	0.1	26.02	50.00	LINR
Benzene	1.3570000	1.3854132	1.3854132	0.5	-2.09	50.00	AVRG
Bromobenzene	0.9160000	0.8982757	0.8982757	0.1	1.93	50.00	AVRG
Bromochloromethane	0.3530000	0.3449398	0.3449398	0.1	2.28	50.00	AVRG
Bromodichloromethane	0.5030000	0.4898878	0.4898878	0.2	2.61	50.00	AVRG
Bromoform	0.2760000	0.2630830	0.2630830	0.1	4.68	50.00	AVRG
Bromomethane	46.828606	50.000000	0.3275749	0.1	6.34	50.00	LINR
Carbon Disulfide	1.3780000	1.1260619	1.1260619	0.1	18.28	50.00	AVRG
Carbon Tetrachloride	0.4700000	0.4135007	0.4135007	0.1	12.02	50.00	AVRG

FORM 7B
VOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: Contract:

Lab Code: Case No.: SAS No.: SDG No.: HS2007039

Instrument ID: VOA6 Calibration Date: 07/14/20 Time: 0006

Lab File ID: Y071321 Init. Calib. Date(s): 07/13/20 07/13/20

Init. Calib. Times: 1027 1430

GC Column: DB624 ID: 0.18 (mm)

COMPOUND	RRF or AMOUNT	RRF50.000 or AMOUNT	CCAL RRF50.000	MIN RRF	%D or %DRIFT	MAX %D or %DRIFT	CURV TYPE
Chlorobenzene	0.9950000	0.9537696	0.9537696	0.5	4.14	50.00	AVRG
Chloroethane	0.4390000	0.3948084	0.3948084	0.1	10.07	50.00	AVRG
Chloroform	1.0980000	1.1288082	1.1288082	0.2	-2.80	50.00	AVRG
Chloromethane	55.928462	50.000000	1.1709027	0.1	-11.86	50.00	LINR
cis-1,2-Dichloroethene	0.6410000	0.6674741	0.6674741	0.1	-4.13	50.00	AVRG
Dibromochloromethane	0.4060000	0.4003101	0.4003101	0.1	1.40	50.00	AVRG
Dichlorodifluoromethane	0.5280000	0.5188148	0.5188148	0.1	1.74	50.00	AVRG
Ethylbenzene	0.5190000	0.4770988	0.4770988	0.1	8.07	50.00	AVRG
Hexachlorobutadiene	0.2480000	0.2061950	0.2061950	0.1	16.86	50.00	AVRG
Isopropylbenzene	1.5550000	1.3364428	1.3364428	0.1	14.06	50.00	AVRG
m,p-Xylenes	0.6220000	0.5768654	0.5768654	0.1	7.26	50.00	AVRG
Methylene Chloride	45.650888	50.000000	0.5383333	0.1	8.70	50.00	LINR
n-Butylbenzene	2.3360000	1.9765688	1.9765688	0.5	15.39	50.00	AVRG
n-Propylbenzene	3.8100000	3.3898293	3.3898293	0.1	11.03	50.00	AVRG
Naphthalene	43.072287	50.000000	0.4389473	0.2	13.86	50.00	LINR
o-Xylene	0.6280000	0.5840071	0.5840071	0.3	7.00	50.00	AVRG
sec-Butylbenzene	3.0960000	2.6051864	2.6051864	0.1	15.85	50.00	AVRG
Styrene	1.0870000	1.0552117	1.0552117	0.3	2.92	50.00	AVRG
Vinyl Chloride	0.8220000	0.7853609	0.7853609	0.1	4.46	50.00	AVRG
1,2,3-Trichloropropane	0.8120000	0.7841345	0.7841345	0.1	3.43	50.00	AVRG
p-Isopropyltoluene	2.6610000	2.2818644	2.2818644	0.1	14.25	50.00	AVRG
1,2-Dibromo-3-Chloropropane	41.276950	50.000000	6.93e-002	0.05	17.45	50.00	LINR
1,2-Dichloroethane-d4	52.740352	50.000000	0.7971053	0.1	-5.48	50.00	LINR
Dibromofluoromethane	53.717030	50.000000	0.5985134	0.1	-7.43	50.00	LINR
Toluene-d8	1.3100000	1.2796621	1.2796621	0.1	2.32	50.00	AVRG
4-Bromofluorobenzene	50.291165	50.000000	0.4866102	0.1	-0.58	50.00	LINR

FORM VII VOA

FORM 8
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: Contract:

Lab Code: Case No.: SAS No.: SDG No.: HS20070399

Lab File ID (Standard): Y071302 Date Analyzed: 07/13/20

Instrument ID: VOA6 Time Analyzed: 1630

GC Column: DB624 ID: 0.18 (mm) Heated Purge: (Y/N) N

		IS1 (CBZ)		IS2 (DFB)		IS3 (DCB)	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
	12 HOUR STD	368334	7.67	404036	4.97	180422	9.67
	UPPER LIMIT	736668	8.17	808072	5.47	360844	10.17
	LOWER LIMIT	184167	7.17	202018	4.47	90211	9.17
	CLIENT SAMPLE NO.						
01	VLCSW-200713	384433	7.67	425559	4.97	183279	9.67
02	VBLKW-200713	400784	7.67	469827	4.97	172093	9.67
03	HS20070399-02	403756	7.67	482893	4.97	178960	9.67
04	HS20070399-01	394950	7.67	482556	4.97	165364	9.67
05	HS20070043-19	394114	7.67	456678	4.97	186396	9.67
06	HS20070043-19	379981	7.67	444347	4.97	167189	9.67
07							
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

IS1 (CBZ) = Chlorobenzene-d5
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (DCB) = 1,4-Dichlorobenzene-d4

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

FORM 8
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: Contract:

Lab Code: Case No.: SAS No.: SDG No.: HS20070399

Lab File ID (Standard): Y071302 Date Analyzed: 07/13/20

Instrument ID: VOA6 Time Analyzed: 1630

GC Column: DB624 ID: 0.18 (mm) Heated Purge: (Y/N) N

		IS4 AREA #	RT #	AREA #	RT #	AREA #	RT #
	12 HOUR STD	234782	4.19				
	UPPER LIMIT	469564	4.69				
	LOWER LIMIT	117391	3.69				
	CLIENT SAMPLE NO.						
01	VLCSW-200713	247907	4.19				
02	VBLKW-200713	302657	4.19				
03	HS20070399-02	304942	4.19				
04	HS20070399-01	313854	4.19				
05	HS20070043-19	292495	4.19				
06	HS20070043-19	289133	4.19				
07							
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

IS4 = Pentafluorobenzene

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

FORM VIII VOA

Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\Y071301.D

Date : 13-JUL-2020 16:06

Client ID: BFB

Instrument: voa6.i

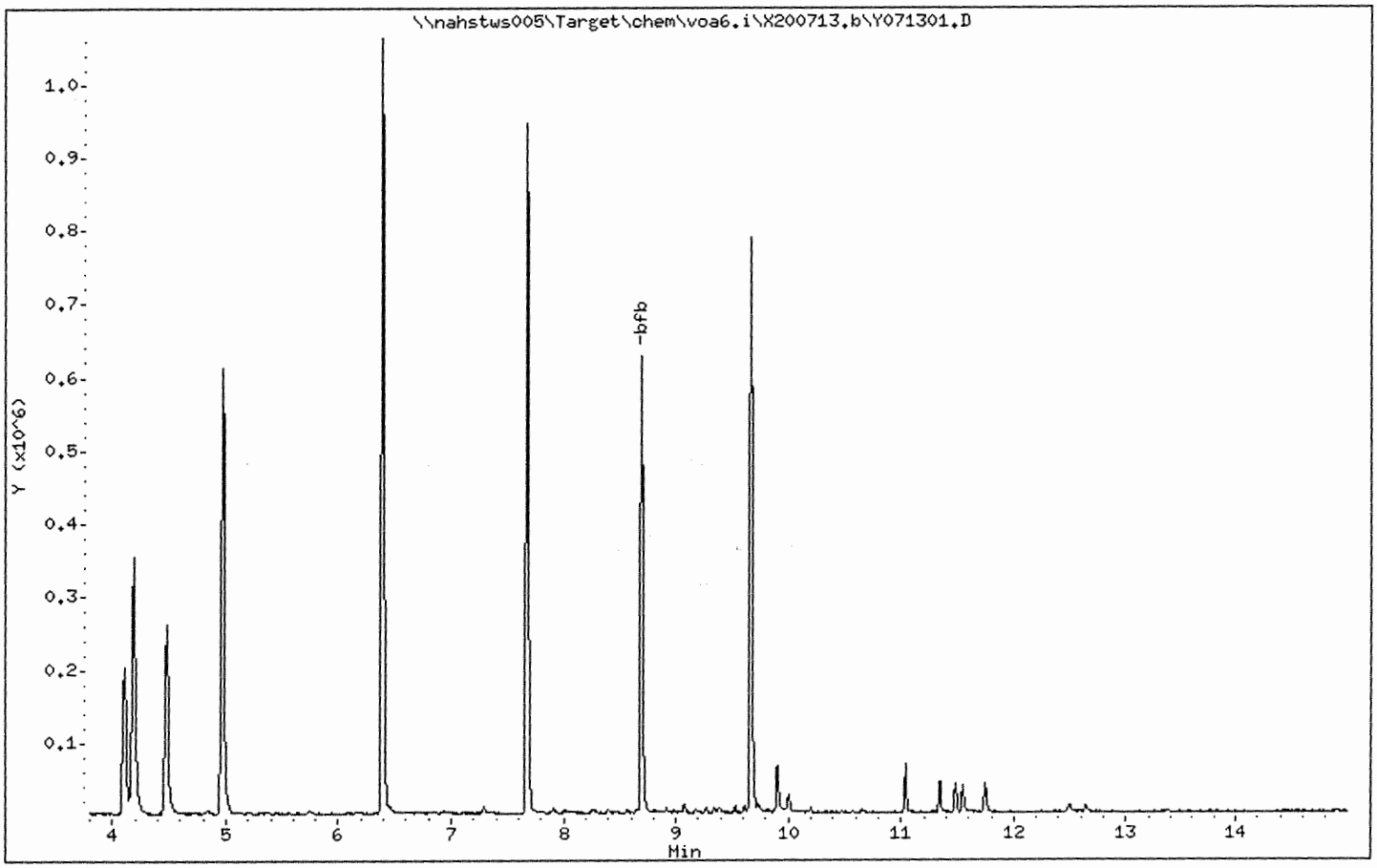
Sample Info: BFB;BFB;3;;BFB

Volume Injected (uL): 2.0

Operator: PC

Column phase: DB624

Column diameter: 0.25



Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\Y071301.D

Date : 13-JUL-2020 16:06

Client ID: BFB

Instrument: voa6.i

Sample Info: BFB;BFB;3;;BFB

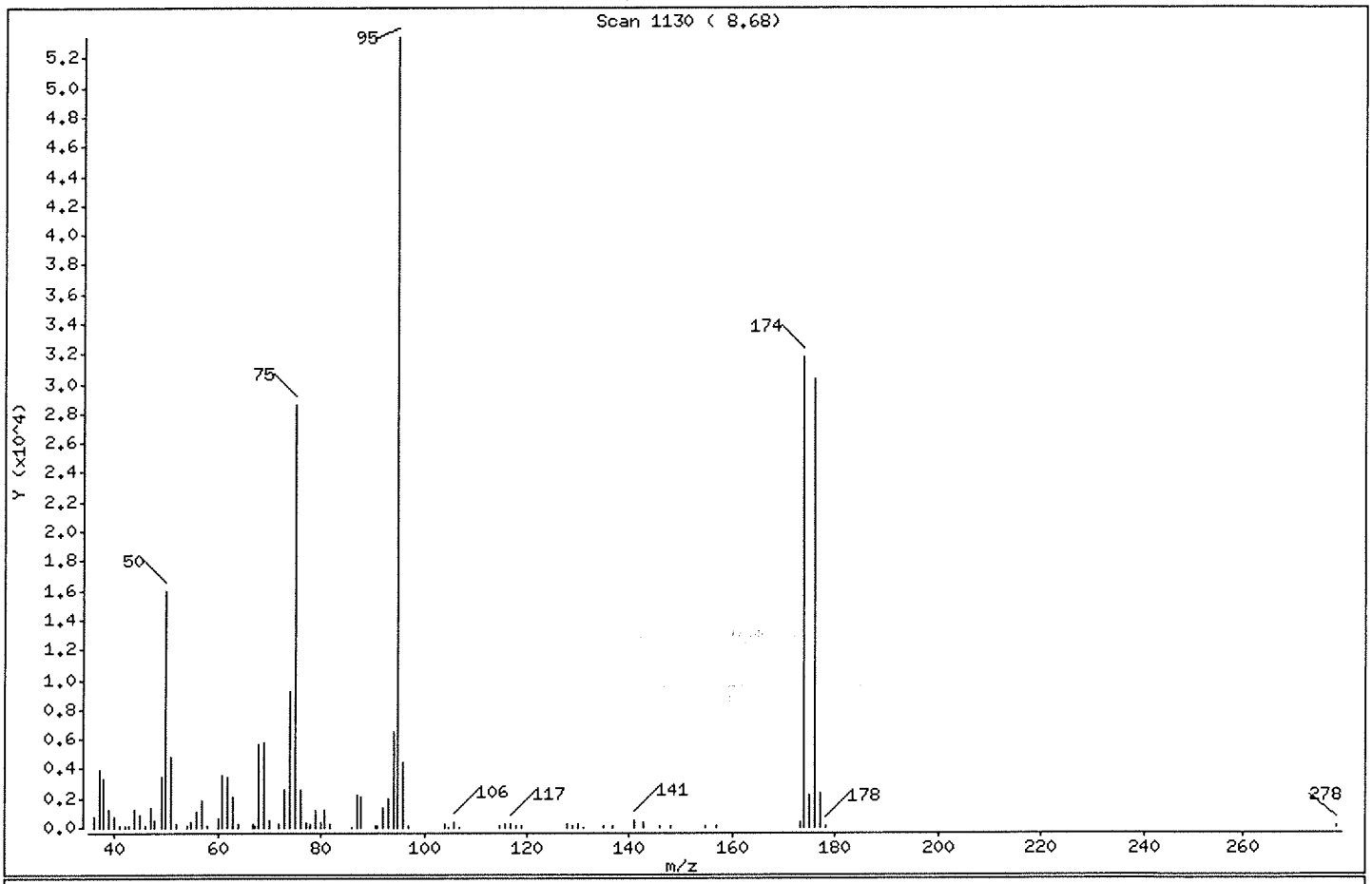
Volume Injected (uL): 2.0

Operator: PC

Column phase: DB624

Column diameter: 0.25

1 bfb



m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
95	Base Peak, 100% relative abundance	100.00
50	15.00 - 40.00% of mass 95	29.79
75	30.00 - 60.00% of mass 95	53.48
96	5.00 - 9.00% of mass 95	8.18
173	Less than 2.00% of mass 174	0.66 (1.12)
174	Greater than 50.00% of mass 95	59.48
175	5.00 - 9.00% of mass 174	4.21 (7.07)
176	95.00 - 101.00% of mass 174	56.69 (95.31)
177	5.00 - 9.00% of mass 176	4.30 (7.58)

Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\Y071301.D

Date : 13-JUL-2020 16:06

Client ID: BFB Instrument: voa6.i

Sample Info: BFB;BFB;3;;BFB

Volume Injected (uL): 2.0 Operator: PC

Column phase: DB624 Column diameter: 0.25

Data File: Y071301.D
Spectrum: Scan 1130 (8.68)
Location of Maximum: 95.00
Number of points: 82

m/z	Y	m/z	Y	m/z	Y	m/z	Y
36.00	739	58.00	77	81.90	220	127.90	223
37.00	3957	60.00	608	86.10	50	128.80	123
38.00	3280	60.90	3545	86.90	2206	130.00	207
39.00	1235	62.00	3421	87.90	2106	130.80	59
39.90	783	63.00	2141	90.60	81	134.90	108
41.00	77	63.90	219	91.10	158	136.80	99
42.00	125	66.80	186	92.00	1369	140.90	521
42.90	121	67.10	179	93.00	2007	142.70	385
44.00	1242	68.00	5692	94.00	6535	145.80	104
45.00	863	69.00	5775	95.00	53400	147.90	121
46.10	98	69.90	541	96.00	4367	154.80	105
47.00	1361	72.00	276	96.90	173	156.80	164
47.90	477	73.00	2629	103.90	200	173.00	355
49.00	3432	74.00	9246	104.80	57	173.90	31760
50.00	15906	75.00	28560	106.00	314	174.90	2247
51.00	4736	76.00	2569	106.90	61	175.90	30272
51.90	261	77.00	378	114.70	149	177.00	2296
54.00	111	77.80	245	115.90	207	178.00	63
55.00	333	78.90	1211	116.90	225	278.00	167
56.00	1123	79.90	368	117.70	144		
57.00	1839	80.80	1260	119.00	181		

Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\Y071302.D
Report Date: 18-Aug-2020 13:32

ALS Laboratory Group

Data file : \\nahstws005\Target\chem\voa6.i\X200713.b\Y071302.D
Lab Smp Id: CCV Client Smp ID: CCV
Inj Date : 13-JUL-2020 16:30
Operator : PC Inst ID: voa6.i
Smp Info : CCV;CCV;2;;;
Misc Info : HS18090001;WATER;0;1;
Comment :
Method : \\nahstws005\Target\chem\voa6.i\X200713.b\8260W.m
Meth Date : 18-Aug-2020 13:32 voa6.i Quant Type: ISTD
Cal Date : 13-JUL-2020 14:30 Cal File: X071311.D
Als bottle: 17 Continuing Calibration Sample
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: bhate.sub
Target Version: 4.14
Processing Host: NAHSTW7056

Concentration Formula: Amt * DF * (Uf/Vo)*1 * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Uf	5.000	ng unit correction factor
Vo	5.000	sample purged
Cpnd Variable		Local Compound Variable

		QUANT SIG					AMOUNTS	
	Compounds	MASS	RT	EXP RT	REL RT	RESPONSE	CAL-AMT (ug/l)	ON-COL (ug/l)
*	1 Pentafluorobenzene	168	4.189	4.189	(1.000)	234782	50.0000	
*	36 1,4-Difluorobenzene	114	4.970	4.970	(1.000)	404036	50.0000	
*	47 Chlorobenzene-d5	117	7.670	7.670	(1.000)	368334	50.0000	
*	70 1,4-Dichlorobenzene-d4	152	9.669	9.669	(1.000)	180422	50.0000	
$	30 Dibromofluoromethane	113	4.103	4.103	(0.979)	130698	50.0000	49.95
$	35 1,2-Dichloroethane-d4	65	4.476	4.476	(1.068)	181733	50.0000	51.22
$	48 Toluene-d8	98	6.388	6.388	(0.833)	481568	50.0000	49.91
$	69 4-Bromofluorobenzene	95	8.695	8.695	(1.134)	182986	50.0000	51.35
	60 1,1,1,2-Tetrachloroethane	131	7.778	7.778	(1.014)	135797	50.0000	47.73
	31 1,1,1-Trichloroethane	97	4.089	4.089	(0.976)	191159	50.0000	44.69
	68 1,1,2,2-Tetrachloroethane	83	8.845	8.845	(0.915)	162761	50.0000	48.86
	53 1,1,2-Trichloroethane	83	6.840	6.840	(0.892)	112882	50.0000	50.05
	22 1,1-Dichloroethane	63	2.929	2.929	(0.699)	298176	50.0000	45.32
	11 1,1-Dichloroethene	96	1.919	1.919	(0.458)	99742	50.0000	48.56
	32 1,1-Dichloropropene	75	4.282	4.282	(0.862)	157950	50.0000	41.72
	93 1,2,3-Trichlorobenzene	180	11.746	11.746	(1.215)	36027	50.0000	59.02(M)
	71 1,2,3-Trichloropropane	75	8.867	8.867	(0.917)	146683	50.0000	50.04(M)
	90 1,2,4-Trichlorobenzene	180	11.338	11.338	(1.173)	69438	50.0000	59.99(M)
	'9 1,2,4-Trimethylbenzene	105	9.382	9.382	(0.970)	451065	50.0000	45.46
	' 1,2-Dibromo-3-Chloropropane	155	10.657	10.657	(1.102)	16148	50.0000	52.96
	1,2-Dibromoethane	107	7.262	7.262	(0.947)	138911	50.0000	51.22
	,2-Dichlorobenzene	146	9.998	9.998	(1.034)	237505	50.0000	47.20

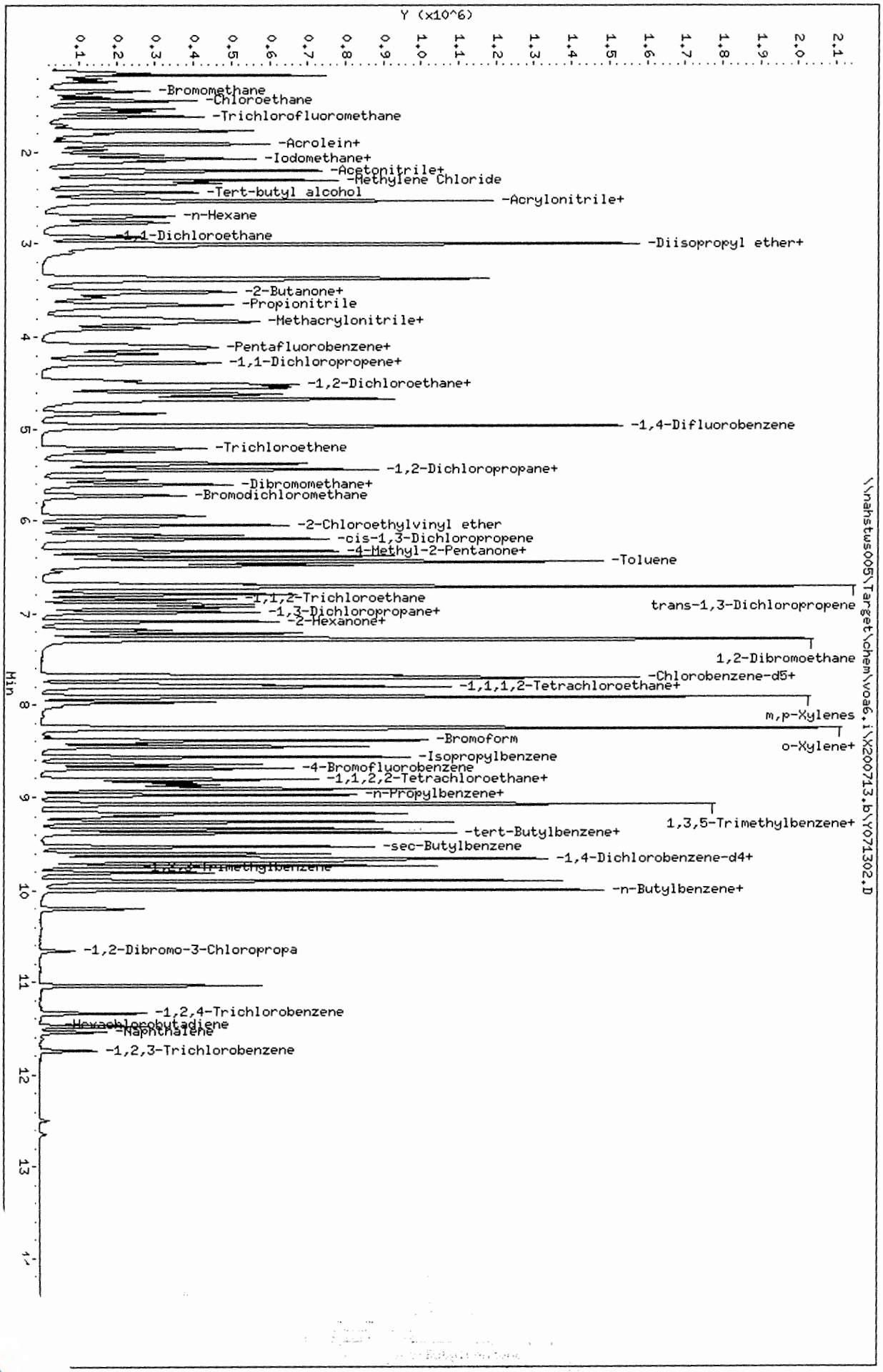
Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\Y071302.D Page 2
Report Date: 18-Aug-2020 13:32

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/l)	AMOUNTS ON-COL (ug/l)
33	1,2-Dichloroethane	62	4.562	4.562	(0.918)	231621	50.0000	48.17
42	1,2-Dichloropropane	63	5.443	5.443	(1.095)	183652	50.0000	49.22
75	1,3,5-Trimethylbenzene	105	9.067	9.067	(0.938)	425554	50.0000	43.41
83	1,3-Dichlorobenzene	146	9.612	9.612	(0.994)	253424	50.0000	45.82
54	1,3-Dichloropropane	76	6.983	6.983	(0.910)	230634	50.0000	47.84
84	1,4-Dichlorobenzene	146	9.683	9.683	(1.001)	259257	50.0000	46.01
26	2,2-Dichloropropane	77	3.516	3.516	(0.839)	192782	50.0000	46.40
24	2-Butanone	43	3.580	3.580	(0.855)	214520	100.000	105.26
76	2-Chlorotoluene	91	8.974	8.974	(0.928)	381444	50.0000	44.39
52	2-Hexanone	43	7.090	7.090	(0.924)	363133	100.000	104.07
77	4-Chlorotoluene	91	9.074	9.074	(0.939)	446932	50.0000	44.45
82	p-Isopropyltoluene	119	9.655	9.655	(0.999)	407370	50.0000	42.42
45	4-Methyl-2-Pentanone	43	6.331	6.331	(0.825)	526861	100.000	104.82
10	Acetone	43	1.976	1.976	(0.472)	153795	100.000	102.28
37	Benzene	78	4.519	4.519	(0.909)	519722	50.0000	47.38
74	Bromobenzene	156	8.809	8.809	(0.911)	157376	50.0000	47.62
29	Bromochloromethane	128	3.802	3.802	(0.908)	71364	50.0000	43.00
39	Bromodichloromethane	83	5.729	5.729	(1.153)	197622	50.0000	48.61
66	Bromoform	173	8.415	8.415	(1.097)	100247	50.0000	49.20
6	Bromomethane	94	1.338	1.338	(0.320)	86842	50.0000	53.01
19	Carbon Disulfide	76	2.069	2.069	(0.494)	619070	100.000	95.67
34	Carbon Tetrachloride	117	4.268	4.268	(0.859)	158743	50.0000	41.78
59	Chlorobenzene	112	7.699	7.699	(1.004)	349339	50.0000	47.64
7	Chloroethane	64	1.403	1.403	(0.335)	97217	50.0000	47.11
28	Chloroform	83	3.917	3.917	(0.935)	234766	50.0000	45.54
3	Chloromethane	50	1.081	1.081	(0.258)	250052	50.0000	51.02
27	cis-1,2-Dichloroethene	96	3.530	3.530	(0.843)	139988	50.0000	46.48
46	cis-1,3-Dichloropropene	75	6.159	6.159	(1.239)	235858	50.0000	50.10
55	Dibromochloromethane	129	7.176	7.176	(0.936)	145955	50.0000	48.70
44	Dibromomethane	93	5.557	5.557	(1.118)	95896	50.0000	48.10
2	Dichlorodifluoromethane	85	0.973	0.973	(0.232)	125767	50.0000	50.73
61	Ethylbenzene	106	7.799	7.799	(1.017)	176923	50.0000	46.25
91	Hexachlorobutadiene	225	11.481	11.481	(1.187)	42823	50.0000	47.90
67	Isopropylbenzene	105	8.566	8.566	(1.117)	498097	50.0000	43.47
62	m,p-Xylenes	106	7.907	7.907	(1.031)	422543	100.000	92.23
17	Methylene Chloride	84	2.305	2.305	(0.550)	136526	50.0000	49.42
87	n-Butylbenzene	91	9.998	9.998	(1.034)	365585	50.0000	43.37
73	n-Propylbenzene	91	8.917	8.917	(0.922)	601557	50.0000	43.75
92	Naphthalene	128	11.546	11.546	(1.194)	107882	50.0000	58.22
63	o-Xylene	106	8.244	8.244	(1.075)	212244	50.0000	45.85
81	sec-Butylbenzene	105	9.526	9.526	(0.985)	458760	50.0000	41.05
64	Styrene	104	8.265	8.265	(1.078)	382884	50.0000	47.79
78	tert-Butylbenzene	119	9.339	9.339	(0.966)	330182	50.0000	42.20
56	Tetrachloroethene	164	6.933	6.933	(0.904)	97507	50.0000	43.24
50	Toluene	91	6.453	6.453	(0.841)	548420	50.0000	47.52
20	trans-1,2-Dichloroethene	96	2.535	2.535	(0.605)	116079	50.0000	45.89
51	trans-1,3-Dichloropropene	75	6.682	6.682	(1.344)	209027	50.0000	48.14
38	Trichloroethene	130	5.214	5.214	(1.049)	136939	50.0000	47.09
8	Trichlorofluoromethane	101	1.560	1.560	(0.373)	177913	50.0000	45.84
5	Vinyl Chloride	62	1.145	1.145	(0.273)	183283	50.0000	47.47

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Report Date: 18-Aug-2020 13:32

QC Flag Legend

M - Compound response manually integrated.

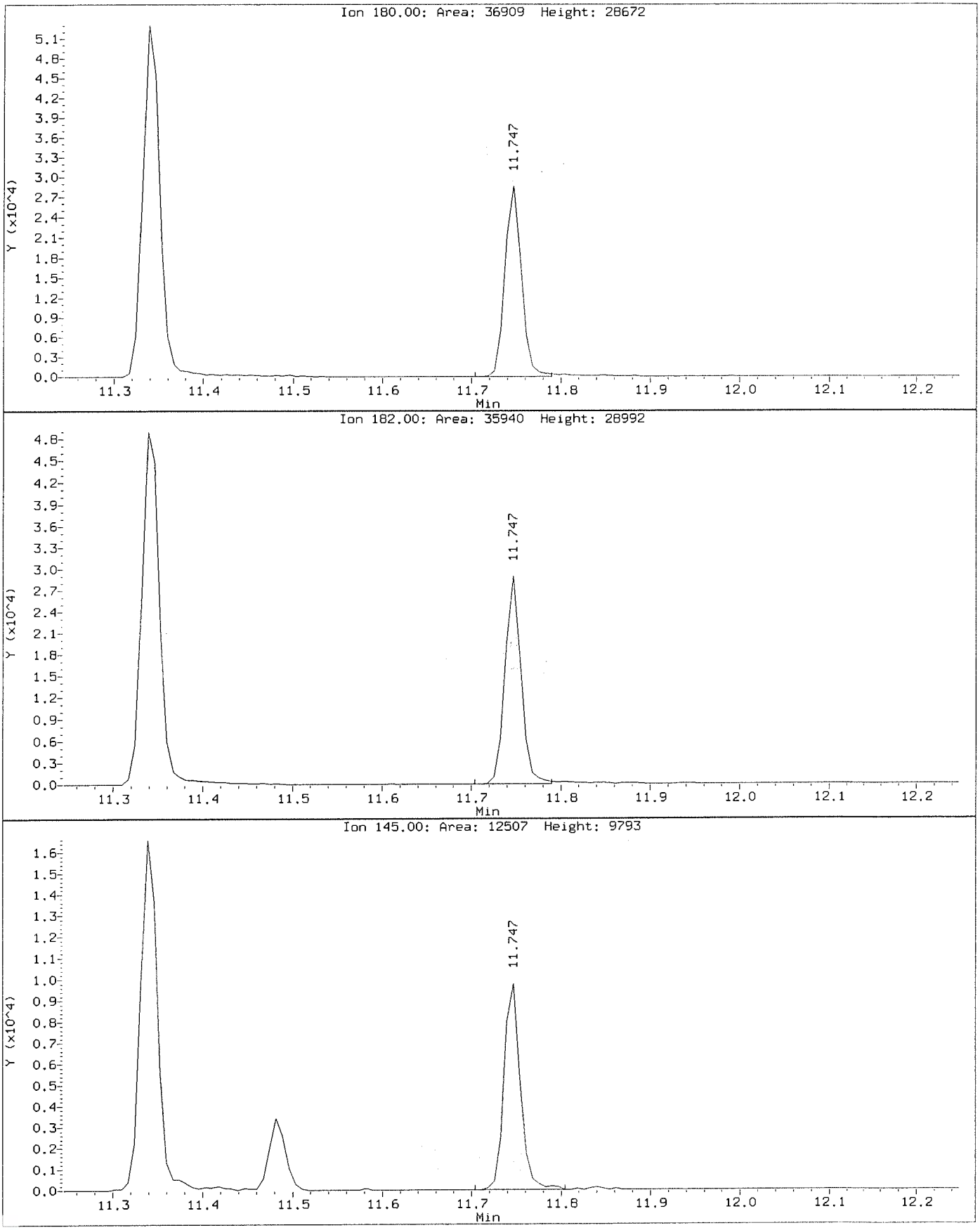


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Date : 13-JUL-2020 16:30
Client ID: CCV
Sample Info: CCV;CCV;2;;;
Purge Volume: 5.0
Column phase: DB624

Instrument: voa6.i
Operator: PC
Column diameter: 0.18

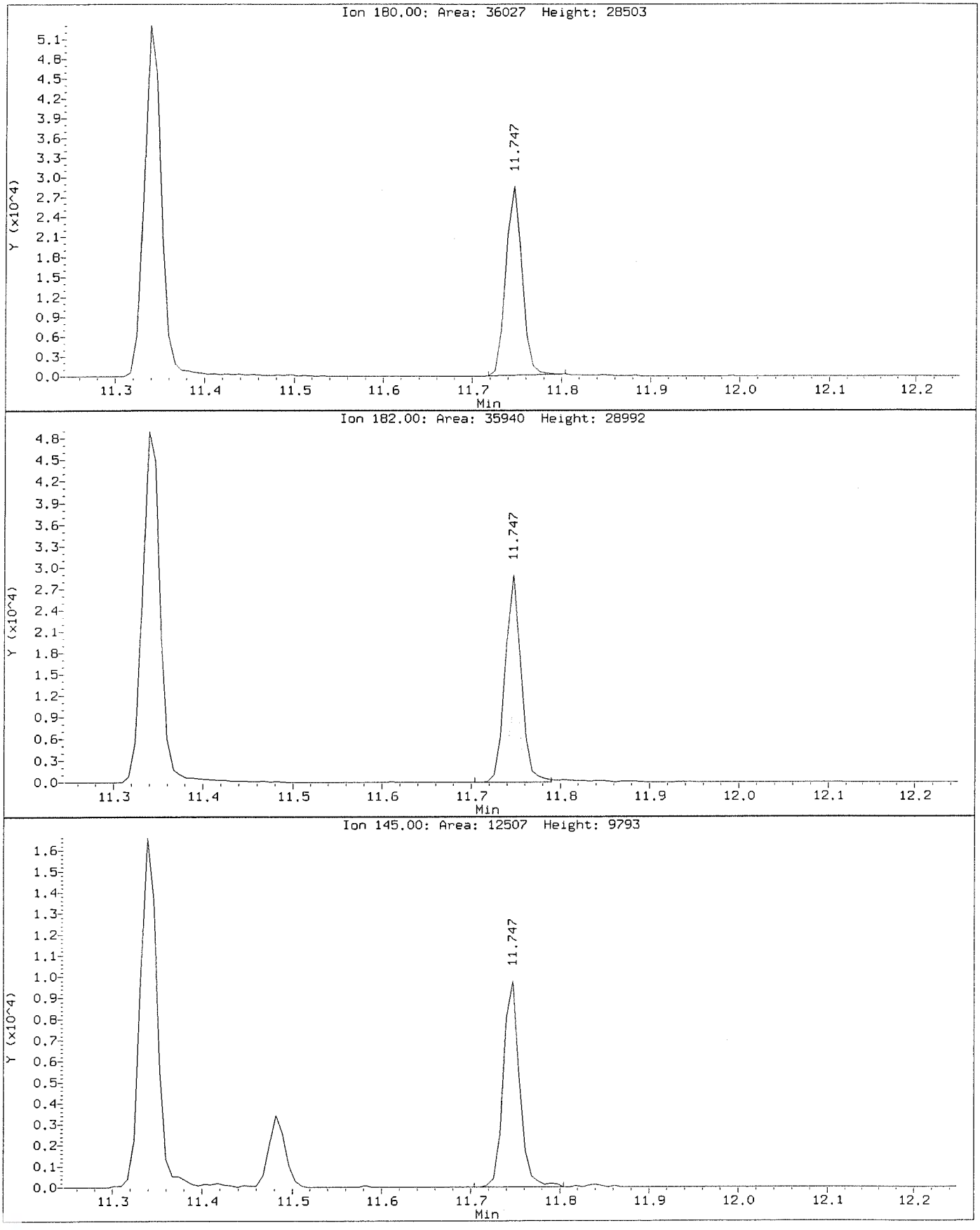
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Injection Date: 13-JUL-2020 16:30
Instrument: voa6.i
Client Sample ID: CCV

Compound: 1,2,3-Trichlorobenzene
CAS Number: 87-61-6



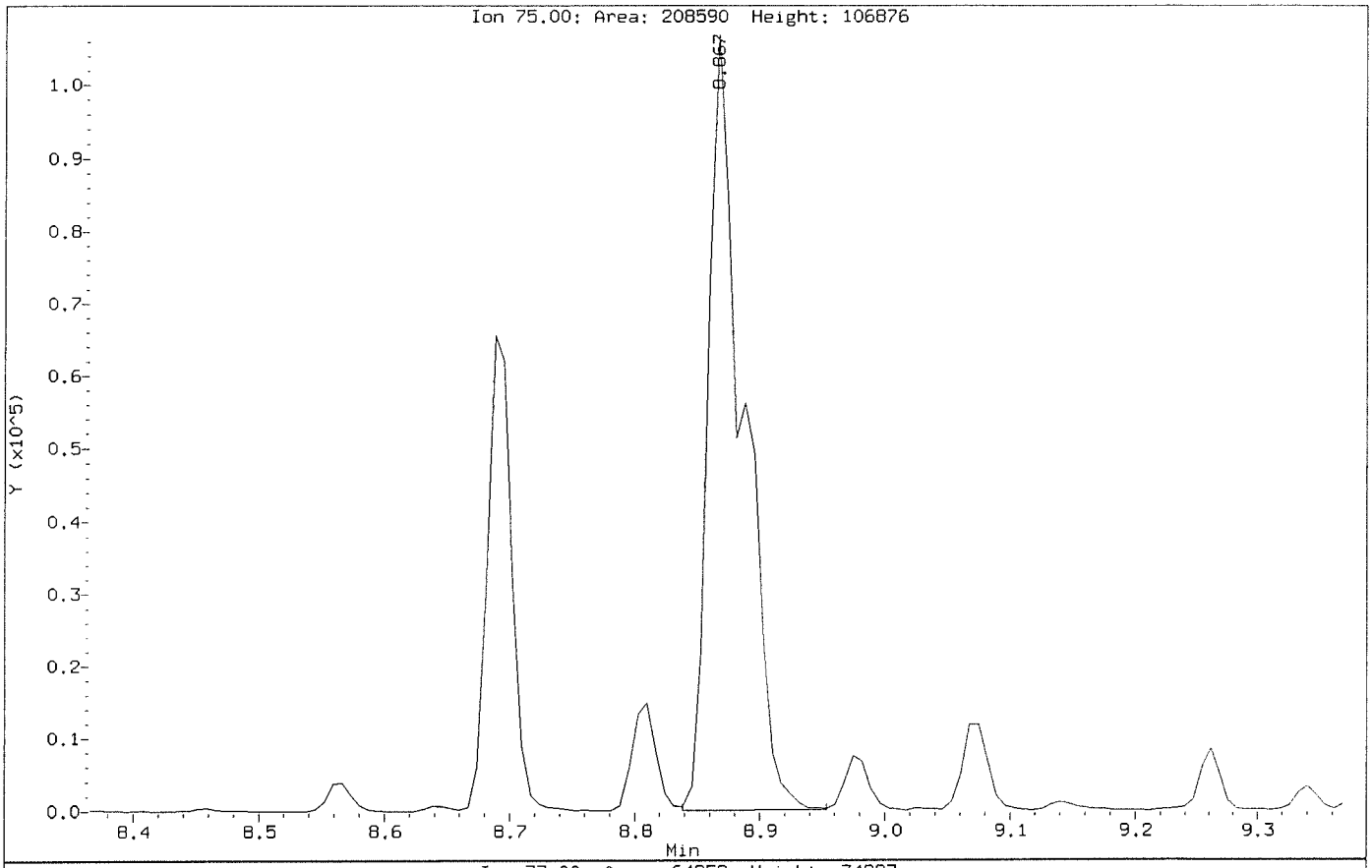
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Instrument: voa6.i
Client Sample ID: CCV

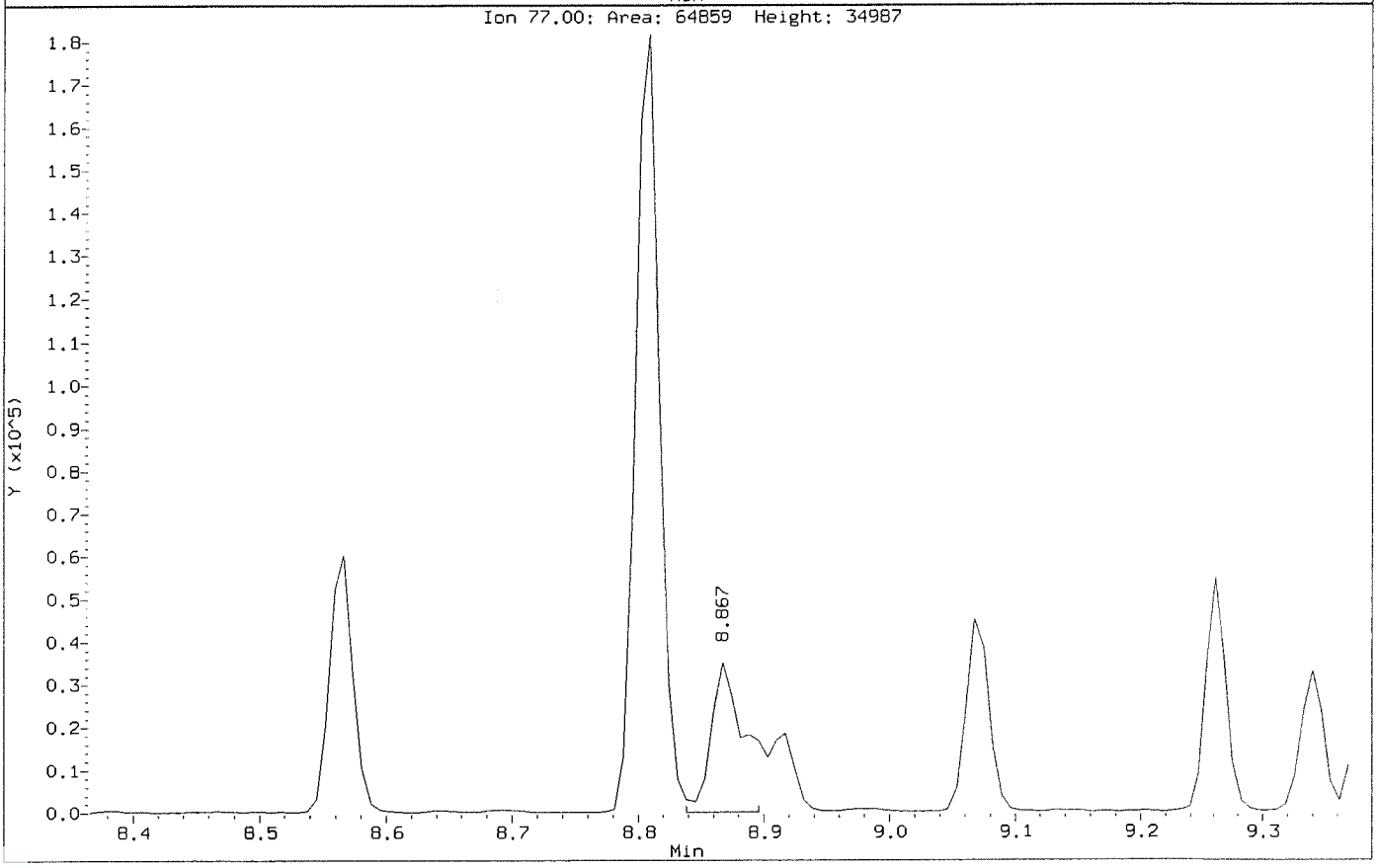
Compound: 1,2,3-Trichlorobenzene
CAS Number: 87-61-6



Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\Before\Y071302.D
Injection Date: 13-JUL-2020 16:30
Instrument: voa6.i
Client Sample ID: CCV

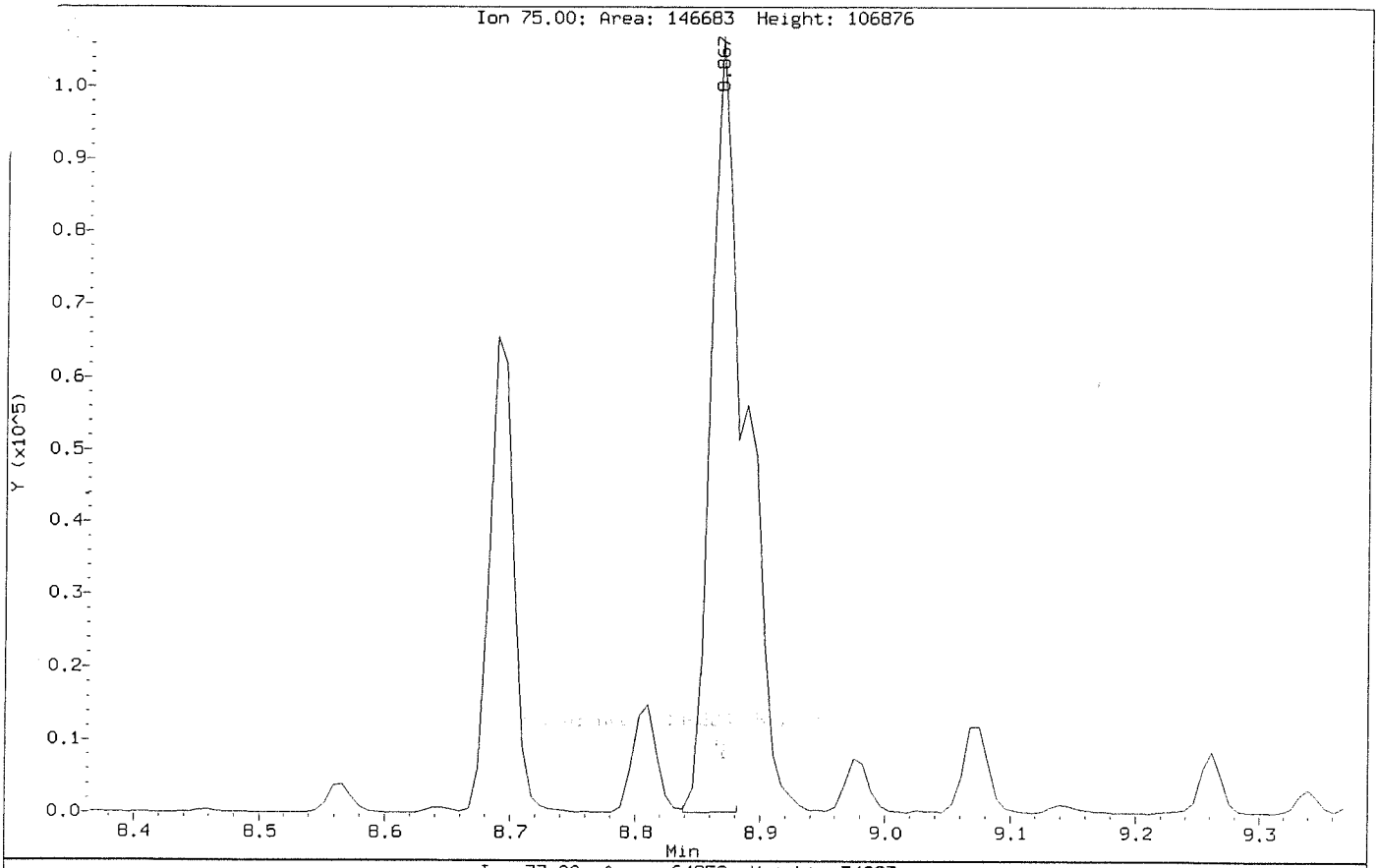
Compound: 1,2,3-Trichloropropane
CAS Number: 96-18-4

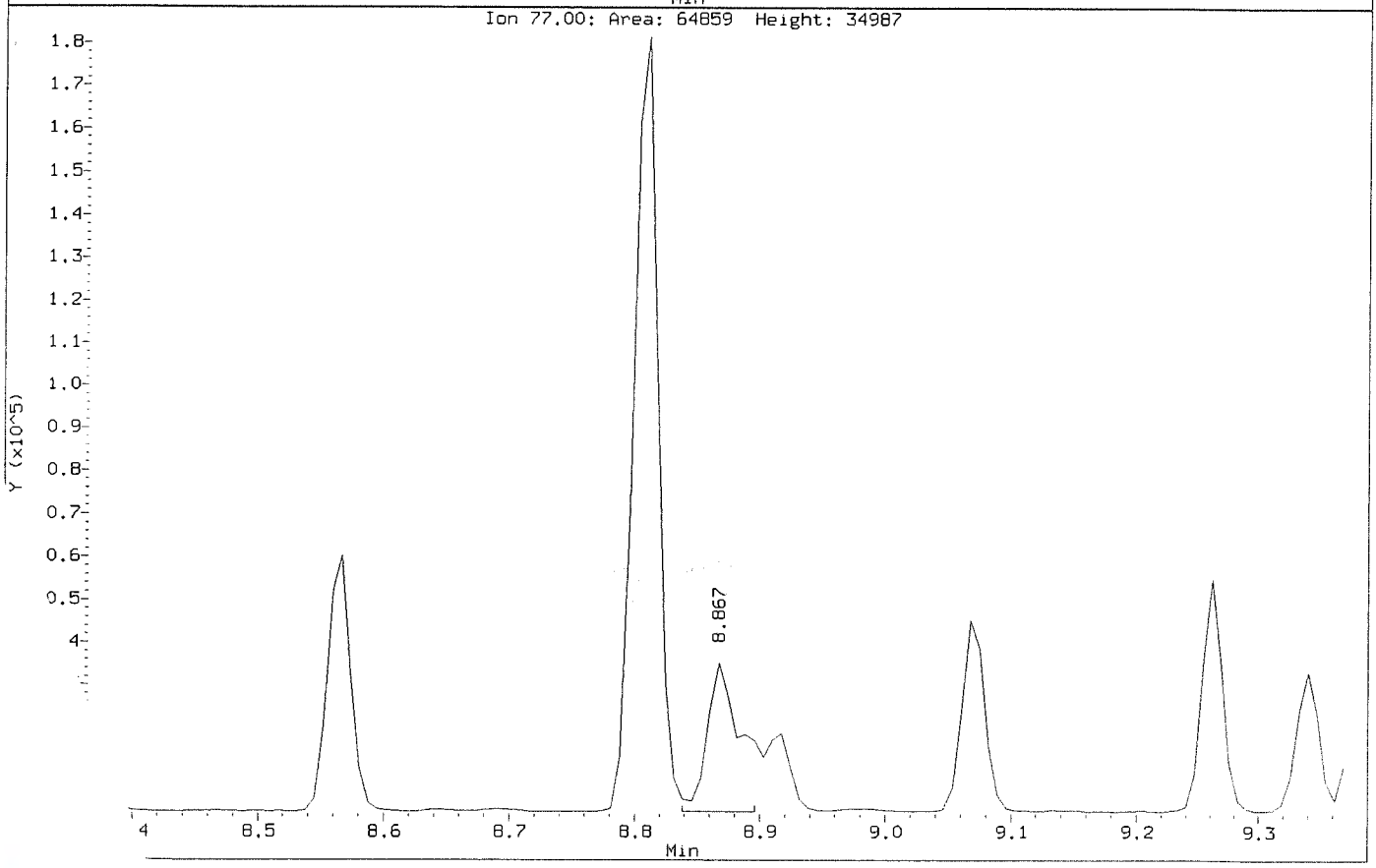




.e: \\nahstws005\Target\chem\voa6.i\X200713.b\Y071302.D
on Date: 13-JUL-2020 16:30
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Sample ID: CCV

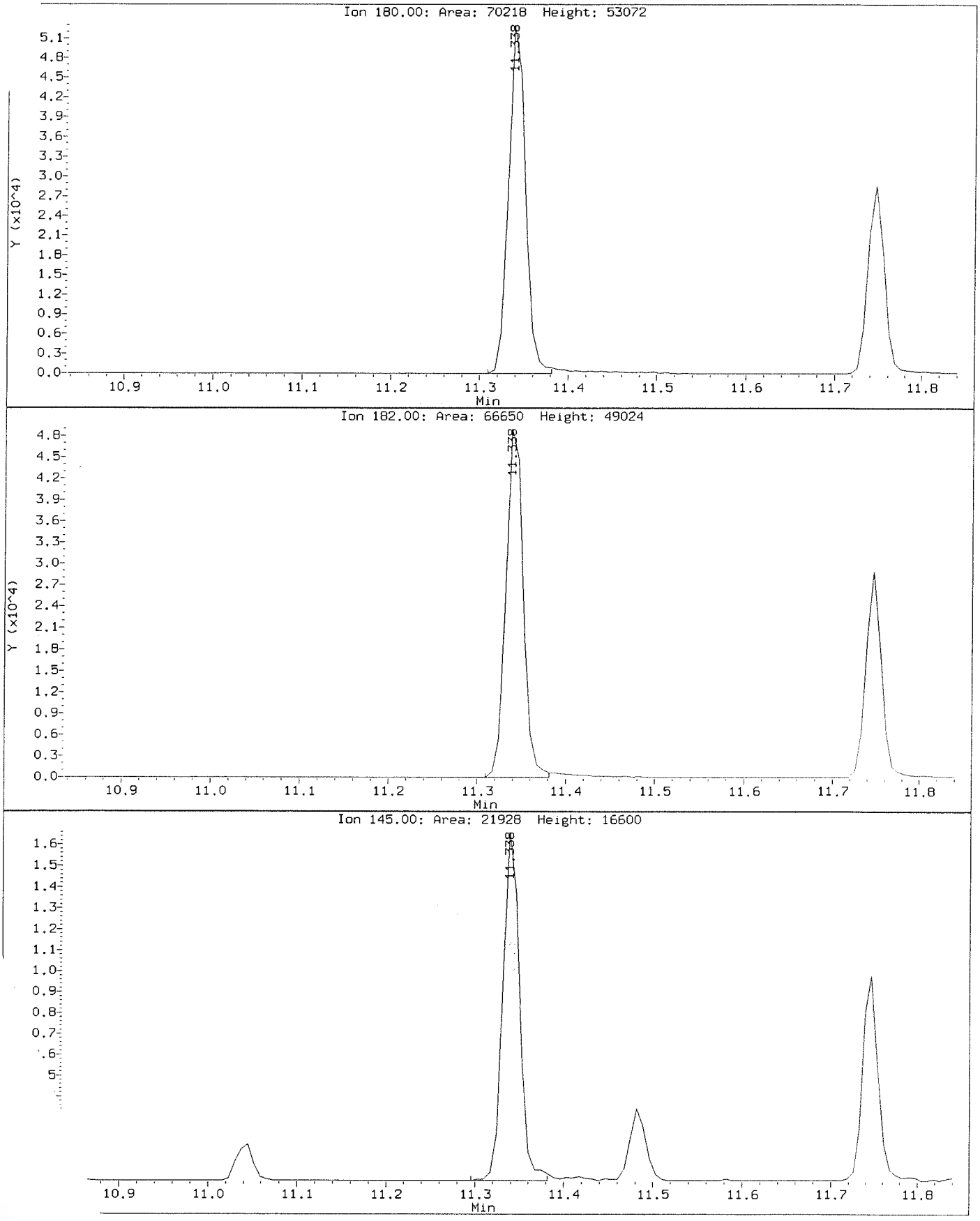
und: 1,2,3-Trichloropropane
lumber: 96-18-4





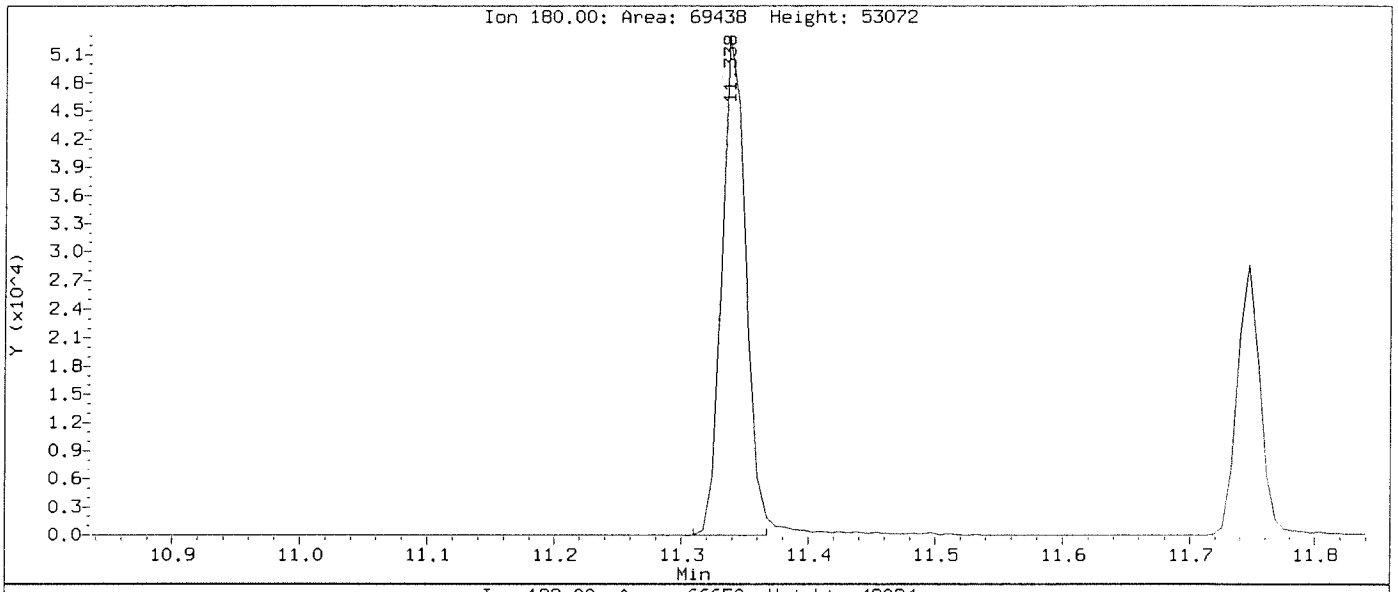
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on Date: 13-JUL-2020 16:30
ent: voa6.i
Sample ID: CCV

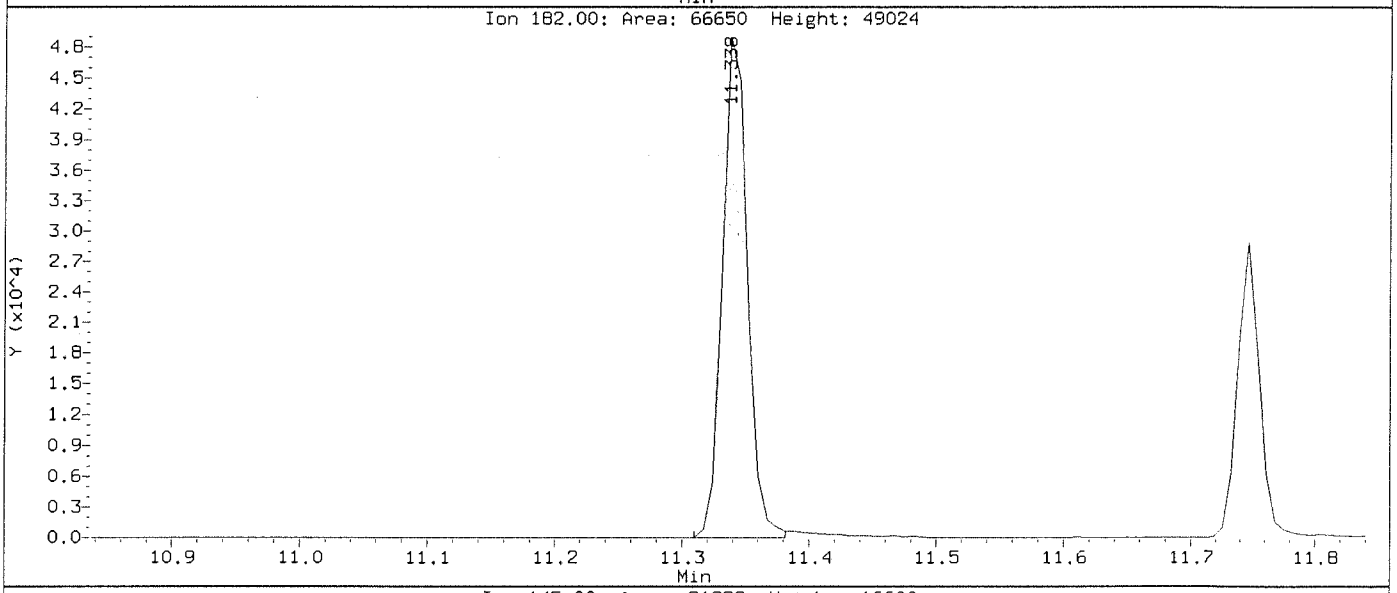
und: 1.2,4-Trichlorobenzene
lumber: 120-82-1

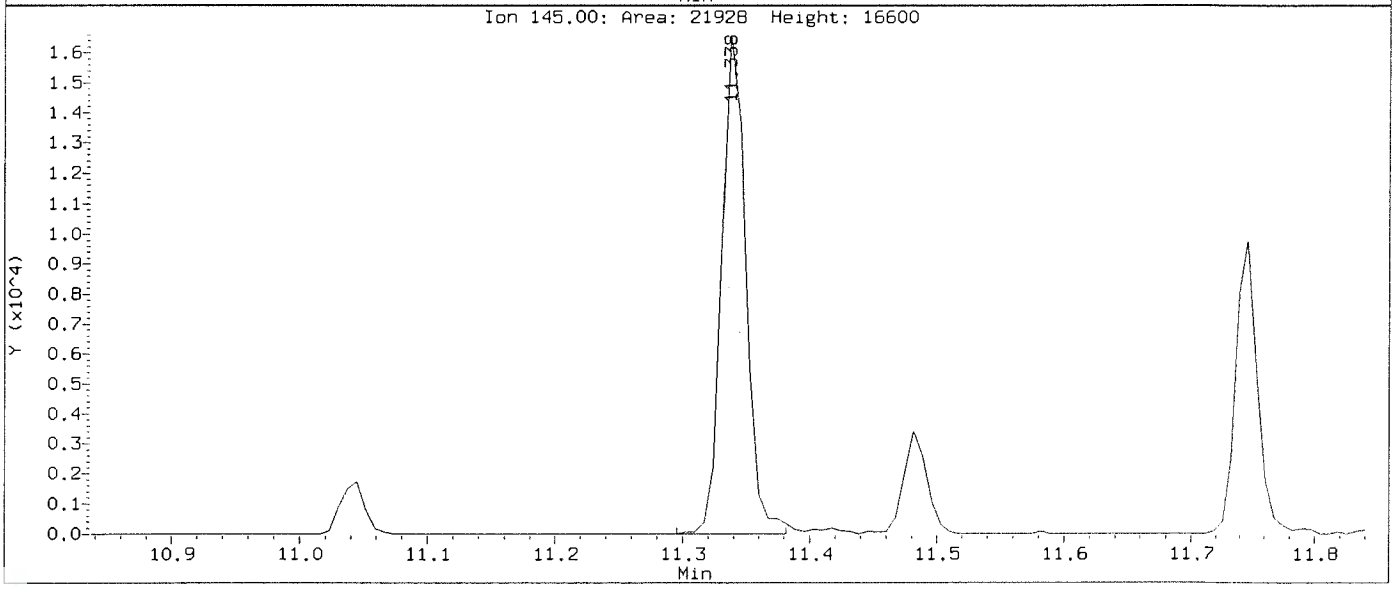


Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\Y071302.D
Injection Date: 13-JUL-2020 16:30
Instrument: voa6.i
Client Sample ID: CCV

Compound: 1,2,4-Trichlorobenzene
CAS Number: 120-82-1







ALS Laboratory Group

Data file : \\nahstws005\Target\chem\voa6.i\X200713.b\Y071305.D
Lab Smp Id: VLCSW-200713 Client Smp ID: VLCSW-200713
Inj Date : 13-JUL-2020 17:41
Operator : PC Inst ID: voa6.i
Smp Info : VLCSW-200713;VLCSW-200713;3;;LCS
Misc Info : HS18090001;WATER;0;1;
Comment :
Method : \\nahstws005\Target\chem\voa6.i\X200713.b\8260W.m
Meth Date : 18-Aug-2020 13:32 voa6.i Quant Type: ISTD
Cal Date : 13-JUL-2020 14:30 Cal File: X071311.D
Als bottle: 20 QC Sample: LCS
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: bhate.sub
Target Version: 4.14
Processing Host: NAHSTW7056

Concentration Formula: Amt * DF * (Uf/Vo)*1 * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Uf	5.000	ng unit correction factor
Vo	5.000	sample purged
Cpnd Variable		Local Compound Variable

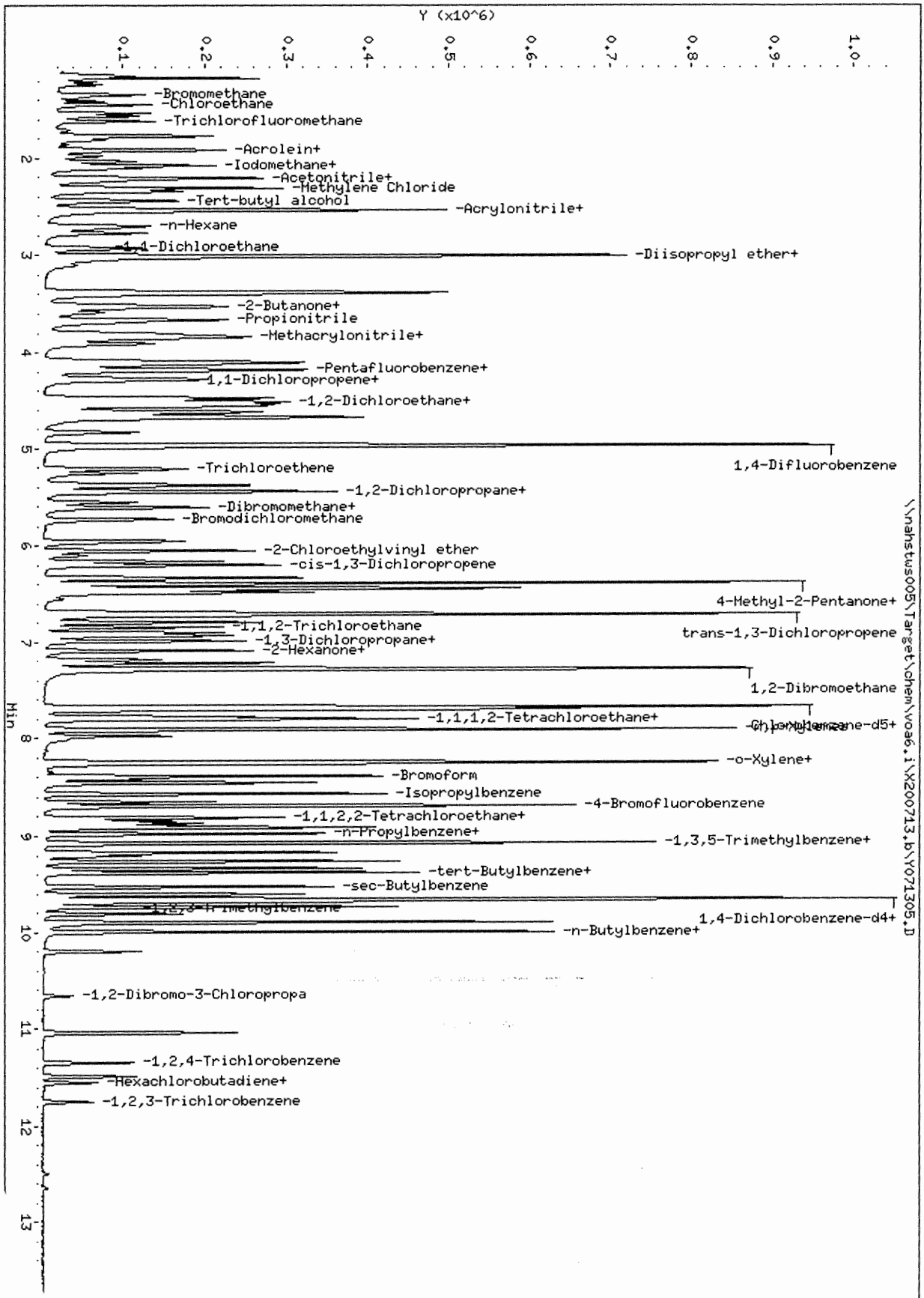
Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/l)	FINAL (ug/l)
* 1 Pentafluorobenzene	168	4.189	4.189	(1.000)	247907	50.0000	
* 36 1,4-Difluorobenzene	114	4.970	4.970	(1.000)	425559	50.0000	
* 47 Chlorobenzene-d5	117	7.671	7.670	(1.000)	384433	50.0000	
* 70 1,4-Dichlorobenzene-d4	152	9.669	9.669	(1.000)	183279	50.0000	
$ 30 Dibromofluoromethane	113	4.103	4.103	(0.979)	144596	52.3466	52.34
$ 35 1,2-Dichloroethane-d4	65	4.476	4.476	(1.068)	203270	54.2418	54.24
$ 48 Toluene-d8	98	6.388	6.388	(0.833)	481716	47.8377	47.83
$ 69 4-Bromofluorobenzene	95	8.688	8.695	(1.133)	186040	50.0116	50.01
60 1,1,1,2-Tetrachloroethane	131	7.778	7.778	(1.014)	56951	19.1792	19.17
31 1,1,1-Trichloroethane	97	4.089	4.089	(0.976)	83885	18.5732	18.57
68 1,1,2,2-Tetrachloroethane	83	8.845	8.845	(0.915)	66732	19.7203	19.72
53 1,1,2-Trichloroethane	83	6.840	6.840	(0.892)	48581	20.6388	20.63
22 1,1-Dichloroethane	63	2.929	2.929	(0.699)	136621	19.6672	19.66
11 1,1-Dichloroethene	96	1.919	1.919	(0.458)	37528	17.3036	17.30
32 1,1-Dichloropropene	75	4.290	4.282	(0.863)	71550	17.9461	17.94
93 1,2,3-Trichlorobenzene	180	11.746	11.746	(1.215)	15850	25.5648	25.56
1 1,2,3-Trichloropropane	75	8.867	8.867	(0.917)	60164	20.2072	20.20(M)
1,2,4-Trichlorobenzene	180	11.345	11.338	(1.173)	28681	24.3964	24.39
1,2,4-Trimethylbenzene	105	9.383	9.382	(0.970)	195891	19.4360	19.43
,2-Dibromo-3-Chloropropane	155	10.658	10.657	(1.102)	6537	21.8965	21.89
2-Dibromoethane	107	7.262	7.262	(0.947)	59603	21.0573	21.05
-Dichlorobenzene	146	9.999	9.998	(1.034)	99034	19.3782	19.37

Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\Y071305.D Page 2
Report Date: 18-Aug-2020 13:32

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/l)	CONCENTRATIONS FINAL (ug/l)
33	1,2-Dichloroethane	62	4.562	4.562	(0.918)	103527	20.4446	20.44
42	1,2-Dichloropropane	63	5.443	5.443	(1.095)	75545	19.2250	19.22
75	1,3,5-Trimethylbenzene	105	9.067	9.067	(0.938)	184489	18.5262	18.52
83	1,3-Dichlorobenzene	146	9.605	9.612	(0.993)	109501	19.4897	19.48
54	1,3-Dichloropropane	76	6.983	6.983	(0.910)	99129	19.7039	19.70
84	1,4-Dichlorobenzene	146	9.683	9.683	(1.001)	110973	19.3910	19.39
26	2,2-Dichloropropane	77	3.516	3.516	(0.839)	85354	19.4569	19.45
24	2-Butanone	43	3.580	3.580	(0.855)	94642	43.9814	43.98
76	2-Chlorotoluene	91	8.974	8.974	(0.928)	160555	18.3934	18.39
52	2-Hexanone	43	7.090	7.090	(0.924)	153865	42.2520	42.25
77	4-Chlorotoluene	91	9.075	9.074	(0.939)	189462	18.5505	18.55
82	p-Isopropyltoluene	119	9.655	9.655	(0.999)	175114	17.9543	17.95
45	4-Methyl-2-Pentanone	43	6.331	6.331	(0.825)	218415	41.6350	41.63
10	Acetone	43	1.976	1.976	(0.472)	57416	33.5549	33.55
37	Benzene	78	4.519	4.519	(0.909)	230423	19.9473	19.94
74	Bromobenzene	156	8.809	8.809	(0.911)	65720	19.5792	19.57
29	Bromochloromethane	128	3.803	3.802	(0.908)	33307	19.0108	19.01
39	Bromodichloromethane	83	5.729	5.729	(1.153)	81842	19.1129	19.11
66	Bromoform	173	8.416	8.415	(1.097)	40913	19.2394	19.23
6	Bromomethane	94	1.338	1.338	(0.320)	35673	19.9836	19.98
19	Carbon Disulfide	76	2.069	2.069	(0.494)	234868	34.3767	34.37
34	Carbon Tetrachloride	117	4.275	4.268	(0.860)	68520	17.1250	17.12
59	Chlorobenzene	112	7.699	7.699	(1.004)	147616	19.2899	19.28
7	Chloroethane	64	1.403	1.403	(0.335)	35391	16.2425	16.24
28	Chloroform	83	3.910	3.917	(0.933)	108743	19.9808	19.98
3	Chloromethane	50	1.081	1.081	(0.258)	100499	20.4830	20.48
27	cis-1,2-Dichloroethene	96	3.530	3.530	(0.843)	64589	20.3101	20.31
46	cis-1,3-Dichloropropene	75	6.159	6.159	(1.239)	96298	19.4230	19.42
55	Dibromochloromethane	129	7.176	7.176	(0.936)	61103	19.5378	19.53
44	Dibromomethane	93	5.557	5.557	(1.118)	40245	19.1687	19.16
2	Dichlorodifluoromethane	85	0.973	0.973	(0.232)	44871	17.1422	17.14
61	Ethylbenzene	106	7.799	7.799	(1.017)	75522	18.9165	18.91
91	Hexachlorobutadiene	225	11.481	11.481	(1.187)	17620	19.4055	19.40
67	Isopropylbenzene	105	8.566	8.566	(1.117)	211116	17.6569	17.65
62	m,p-Xylenes	106	7.907	7.907	(1.031)	183423	38.3624	38.36
17	Methylene Chloride	84	2.305	2.305	(0.550)	56882	18.6638	18.66
87	n-Butylbenzene	91	9.999	9.998	(1.034)	152396	17.7992	17.79
73	n-Propylbenzene	91	8.917	8.917	(0.922)	251882	18.0362	18.03
92	Naphthalene	128	11.546	11.546	(1.194)	45768	25.0414	25.04
63	o-Xylene	106	8.244	8.244	(1.075)	90832	18.8016	18.80
81	sec-Butylbenzene	105	9.526	9.526	(0.985)	196177	17.2827	17.28
64	Styrene	104	8.265	8.265	(1.078)	161268	19.2891	19.28
78	tert-Butylbenzene	119	9.340	9.339	(0.966)	142002	17.8703	17.87
56	Tetrachloroethene	164	6.933	6.933	(0.904)	40703	17.2974	17.29
50	Toluene	91	6.453	6.453	(0.841)	230144	19.1078	19.10
20	trans-1,2-Dichloroethene	96	2.535	2.535	(0.605)	52017	19.4768	19.47
51	trans-1,3-Dichloropropene	75	6.682	6.682	(1.344)	90444	19.7796	19.77
38	Trichloroethene	130	5.214	5.214	(1.049)	57302	18.7085	18.70
8	Trichlorofluoromethane	101	1.560	1.560	(0.373)	64099	15.6412	15.64
5	Vinyl Chloride	62	1.145	1.145	(0.273)	71208	17.4678	17.46

QC Flag Legend

M - Compound response manually integrated.

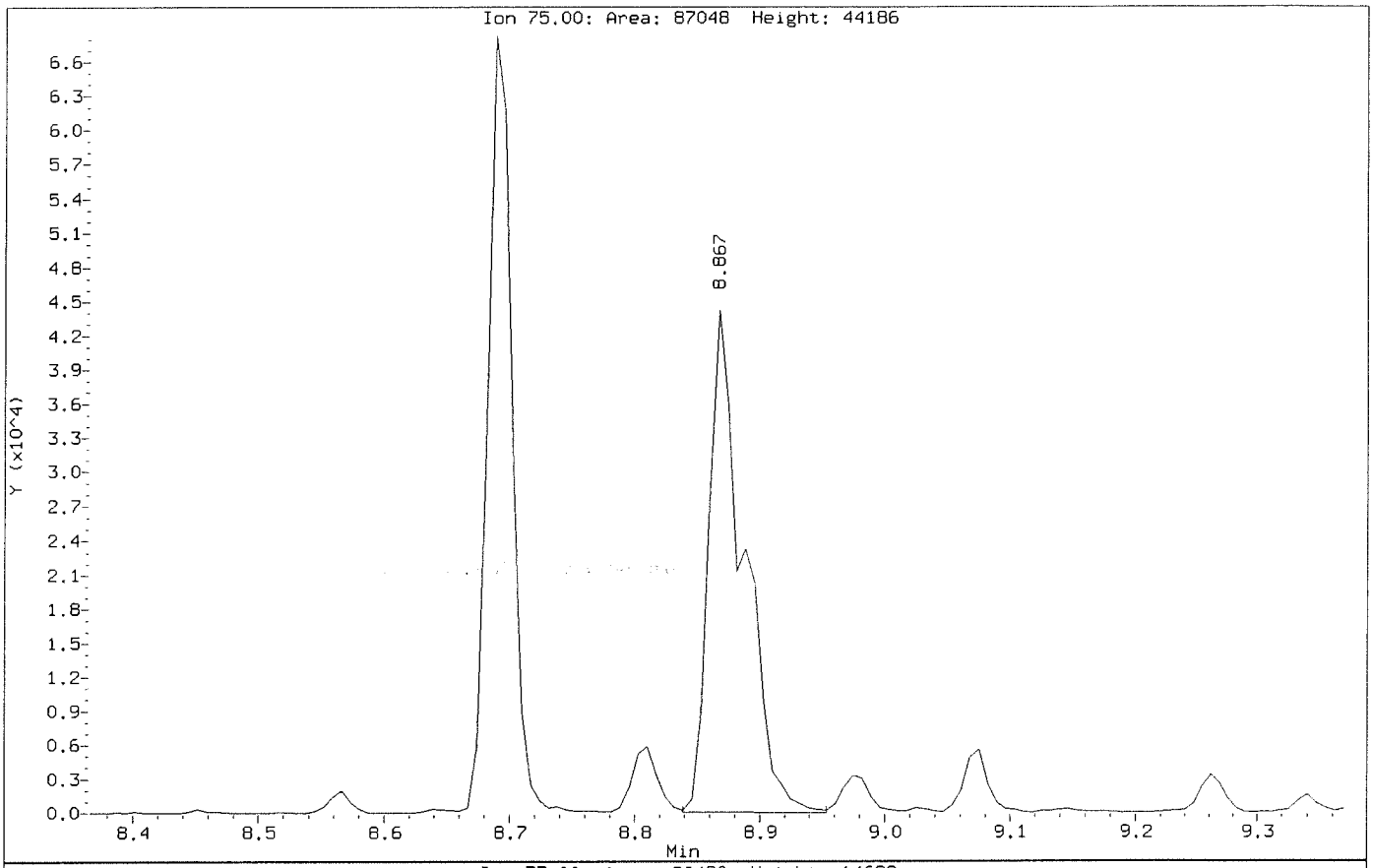


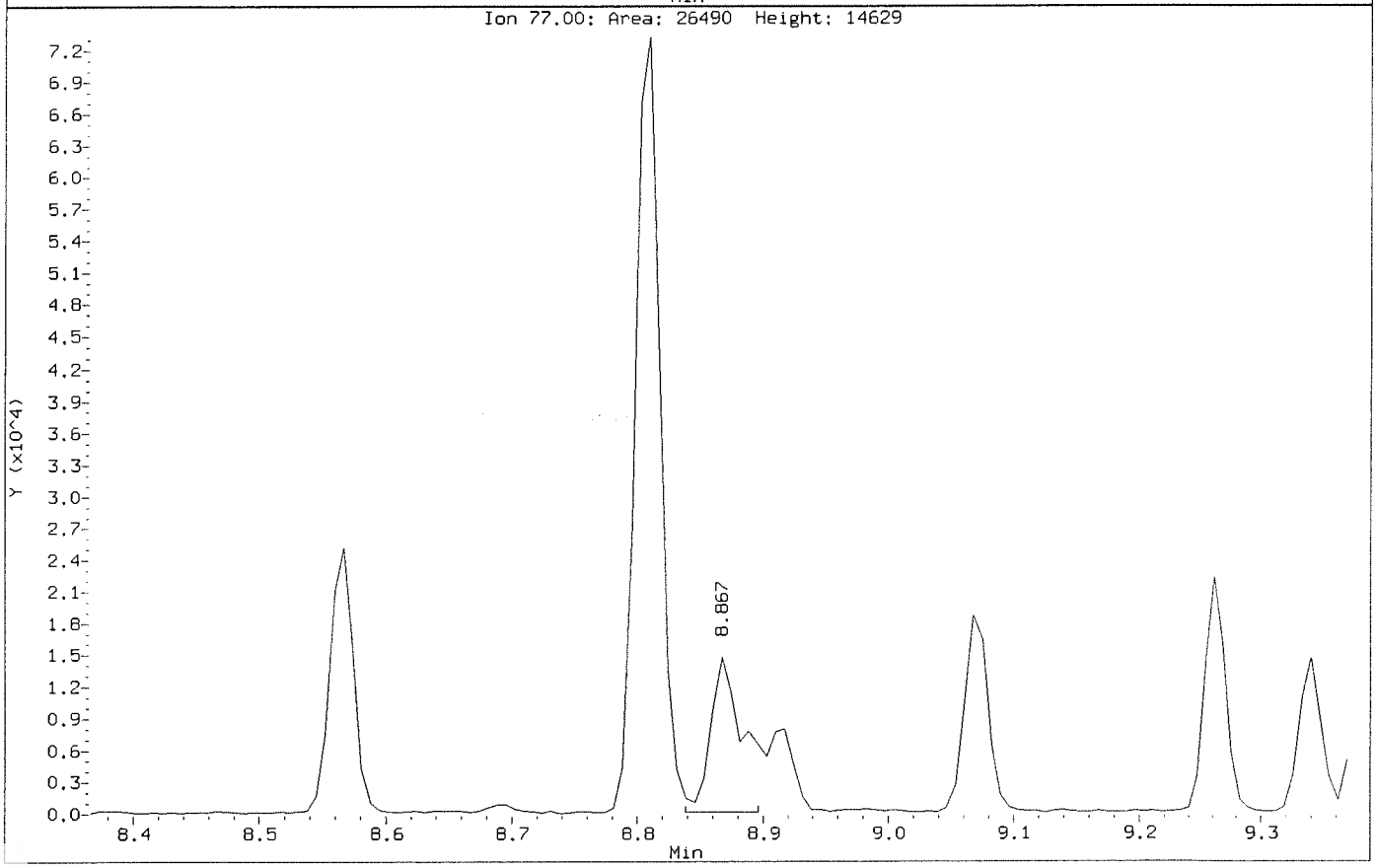
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Date : 13-JUL-2020 17:41
Client ID: VLCSW-200713
Sample Info: VLCSW-200713;VLCSW-200713;3;;LCS
Purge Volume: 5.0
Column phase: DB624

Instrument: voa6.i
Operator: PC
Column diameter: 0.18

Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\Before\Y071305.D
Injection Date: 13-JUL-2020 17:41
Instrument: voa6.i
Client Sample ID: VLCSW-200713

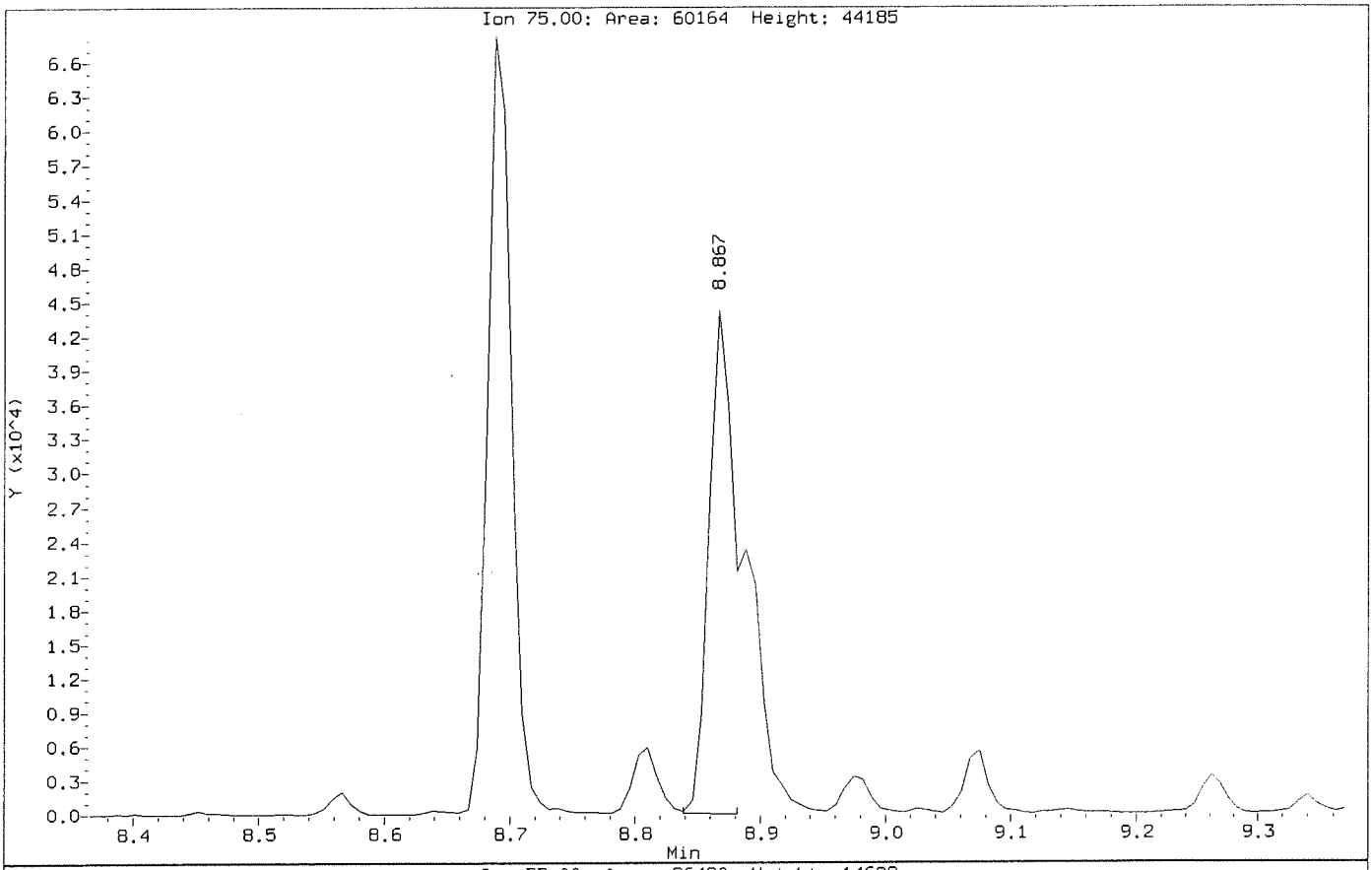
Compound: 1,2,3-Trichloropropane
CAS Number: 96-18-4

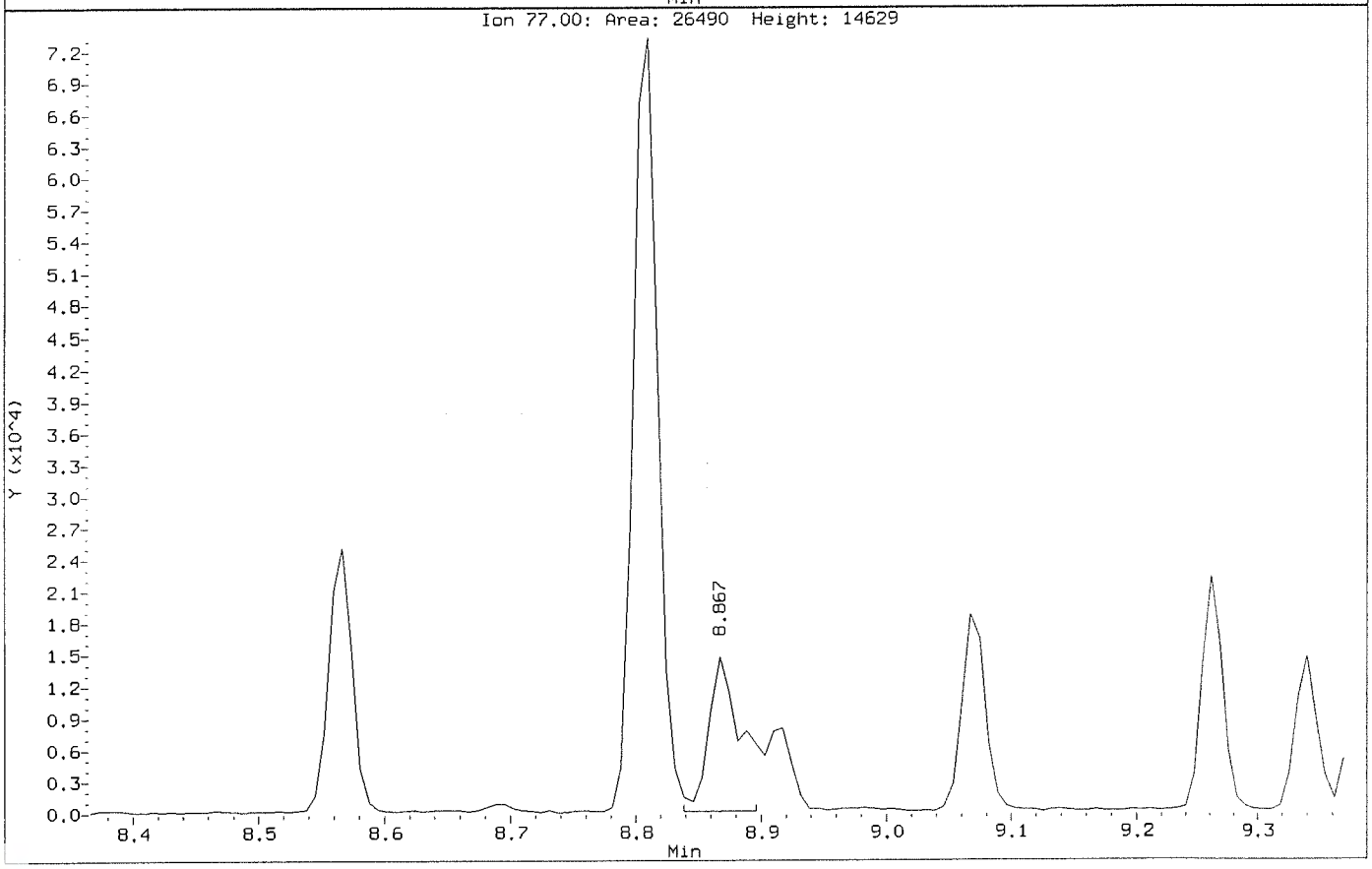




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Injection Date: 13-JUL-2020 17:41
Instrument: voa6.i
Client Sample ID: VLCSW-200713

Compound: 1,2,3-Trichloropropane
CAS Number: 96-18-4





ALS Laboratory Group

Data file : \\nahstws005\Target\chem\voa6.i\X200713.b\Y071307.D
Lab Smp Id: VBLKW-200713 Client Smp ID: VBLKW-200713
Inj Date : 13-JUL-2020 18:29
Operator : PC Inst ID: voa6.i
Smp Info : VBLKW-200713;VBLKW-200713;3;;BLANK
Misc Info : HS18090001;WATER;0;1;
Comment :
Method : \\nahstws005\Target\chem\voa6.i\X200713.b\8260W.m
Meth Date : 18-Aug-2020 13:32 voa6.i Quant Type: ISTD
Cal Date : 13-JUL-2020 14:30 Cal File: X071311.D
Als bottle: 22 QC Sample: BLANK
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: bhate.sub
Target Version: 4.14
Processing Host: NAHSTW7056

Concentration Formula: Amt * DF * (Uf/Vo)*1 * CpndVariable

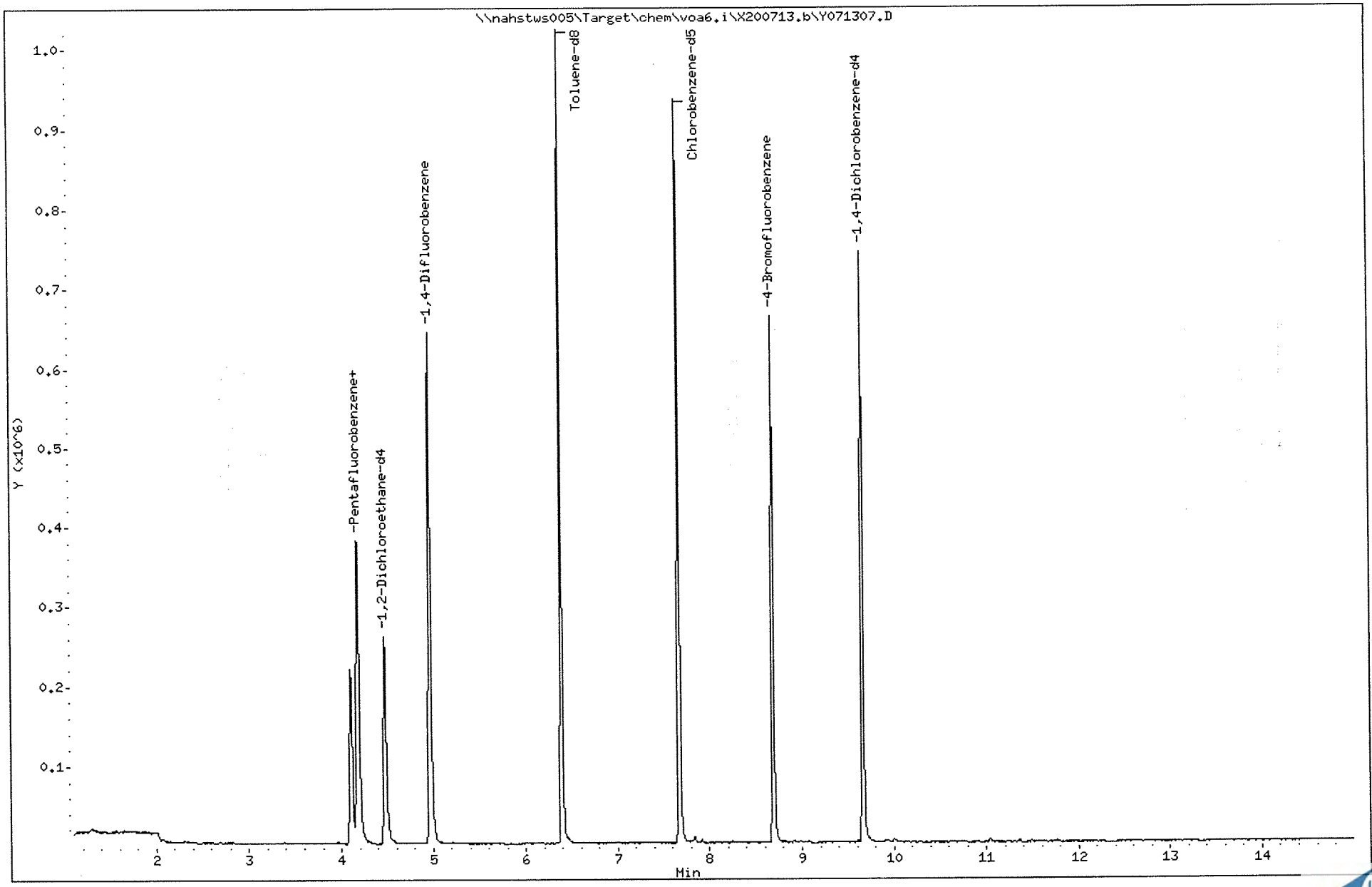
Name	Value	Description
DF	1.000	Dilution Factor
Uf	5.000	ng unit correction factor
Vo	5.000	sample purged
Cpnd Variable		Local Compound Variable

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/l)	FINAL (ug/l)
* 1 Pentafluorobenzene	168	4.189	4.189	(1.000)	302657	50.0000	
* 36 1,4-Difluorobenzene	114	4.970	4.970	(1.000)	469827	50.0000	
* 47 Chlorobenzene-d5	117	7.671	7.670	(1.000)	400784	50.0000	
* 70 1,4-Dichlorobenzene-d4	152	9.669	9.669	(1.000)	172093	50.0000	
$ 30 Dibromofluoromethane	113	4.104	4.103	(0.979)	153063	45.3770	45.37
$ 35 1,2-Dichloroethane-d4	65	4.476	4.476	(1.068)	189099	41.4129	41.41
$ 48 Toluene-d8	98	6.389	6.388	(0.833)	544147	51.8329	51.83
$ 69 4-Bromofluorobenzene	95	8.695	8.695	(1.134)	190036	48.9908	48.99

Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\Y071307.D
Date : 13-JUL-2020 18:29
Client ID: VBLKW-200713
Sample Info: VBLKW-200713;VBLKW-200713;3;;BLANK
Purge Volume: 5.0
Column phase: DB624

Instrument: voa6.i

Operator: PC
Column diameter: 0.18



Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\Y071308.D Page 1
Report Date: 18-Aug-2020 13:30

ALS Laboratory Group

Data file : \\nahstws005\Target\chem\voa6.i\X200713.b\Y071308.D
Lab Smp Id: HS20070399-02 Client Smp ID: HS20070399-02
Inj Date : 13-JUL-2020 18:53
Operator : PC Inst ID: voa6.i
Smp Info : HS20070399-02;HS20070399-02;;;
Misc Info : HS18090001;WATER;0;1;
Comment :
Method : \\nahstws005\Target\chem\voa6.i\X200713.b\8260W.m
Meth Date : 18-Aug-2020 13:29 dev.giga Quant Type: ISTD
Cal Date : 13-JUL-2020 14:30 Cal File: X071311.D
Als bottle: 23
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: bhate.sub
Target Version: 4.14
Processing Host: NAHSTW7056

Concentration Formula: Amt * DF * (Uf/Vo)*1 * CpndVariable

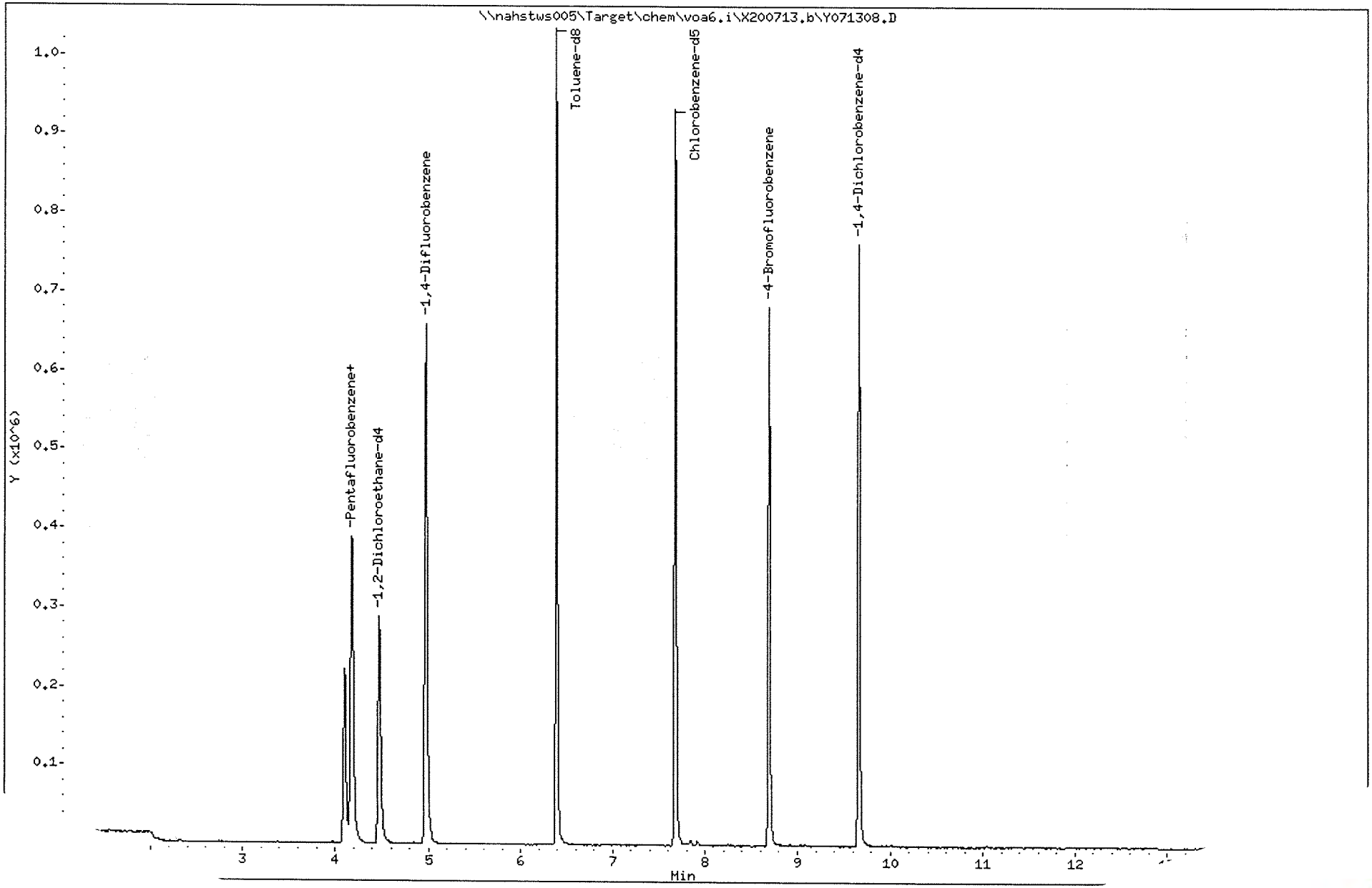
Name	Value	Description
DF	1.000	Dilution Factor
Uf	5.000	ng unit correction factor
Vo	5.000	sample purged
Cpnd Variable		Local Compound Variable

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/l)	FINAL (ug/l)
* 1 Pentafluorobenzene	168	4.189	4.189	(1.000)	304942	50.0000	
* 36 1,4-Difluorobenzene	114	4.970	4.970	(1.000)	482893	50.0000	
* 47 Chlorobenzene-d5	117	7.671	7.671	(1.000)	403756	50.0000	
* 70 1,4-Dichlorobenzene-d4	152	9.669	9.669	(1.000)	178960	50.0000	
$ 30 Dibromofluoromethane	113	4.103	4.103	(0.979)	155358	45.7128	45.71
$ 35 1,2-Dichloroethane-d4	65	4.476	4.476	(1.068)	206064	44.7624	44.76
$ 48 Toluene-d8	98	6.388	6.388	(0.833)	545241	51.5549	51.55
$ 69 4-Bromofluorobenzene	95	8.695	8.695	(1.134)	193775	49.5935	49.59

00989536

Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\Y071308.D
Date : 13-JUL-2020 18:53
Client ID: HS20070399-02
Sample Info: HS20070399-02;HS20070399-02;;;
Purge Volume: 5.0
Column phase: DB624

Instrument: voa6.i
Operator: PC
Column diameter: 0.18



Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\Y071309.D Page 1
Report Date: 18-Aug-2020 13:30

ALS Laboratory Group

Data file : \\nahstws005\Target\chem\voa6.i\X200713.b\Y071309.D
Lab Smp Id: HS20070399-01 Client Smp ID: HS20070399-01
Inj Date : 13-JUL-2020 19:17
Operator : PC Inst ID: voa6.i
Smp Info : HS20070399-01;HS20070399-01;;;
Misc Info : HS18090001;WATER;0;1;
Comment :
Method : \\nahstws005\Target\chem\voa6.i\X200713.b\8260W.m
Meth Date : 18-Aug-2020 13:29 dev.giga Quant Type: ISTD
Cal Date : 13-JUL-2020 14:30 Cal File: X071311.D
Als bottle: 24
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: bhate.sub
Target Version: 4.14
Processing Host: NAHSTW7056

Concentration Formula: Amt * DF * (Uf/Vo)*1 * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Uf	5.000	ng unit correction factor
Vo	5.000	sample purged
Cpnd Variable		Local Compound Variable

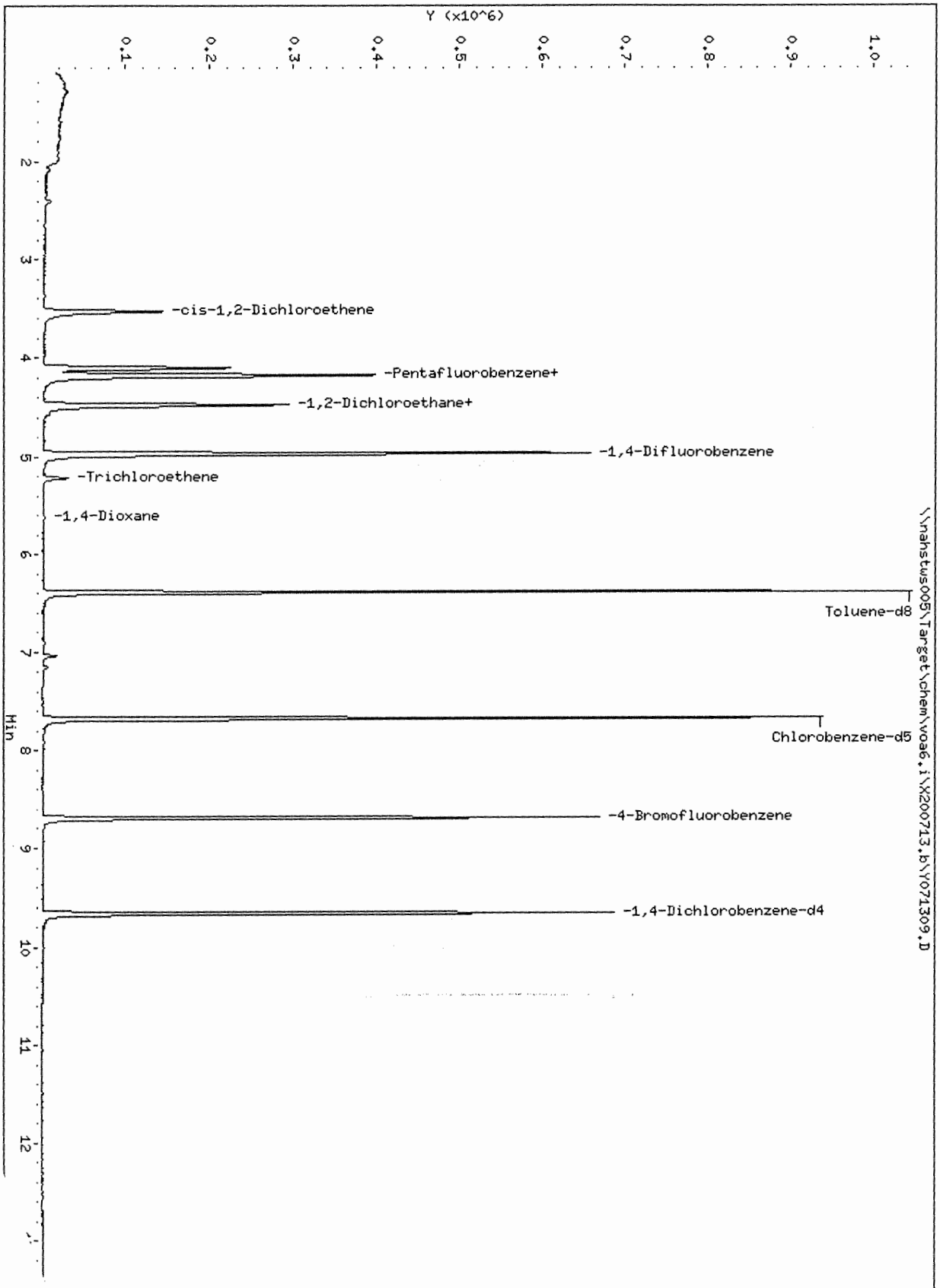
Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/l)	FINAL (ug/l)
* 1 Pentafluorobenzene	168	4.189	4.189	(1.000)	313854	50.0000	
* 36 1,4-Difluorobenzene	114	4.970	4.970	(1.000)	482556	50.0000	
* 47 Chlorobenzene-d5	117	7.671	7.671	(1.000)	394950	50.0000	
* 70 1,4-Dichlorobenzene-d4	152	9.669	9.669	(1.000)	165364	50.0000	
$ 30 Dibromofluoromethane	113	4.104	4.103	(0.979)	157998	45.1686	45.16
$ 35 1,2-Dichloroethane-d4	65	4.476	4.476	(1.068)	209536	44.2282	44.22
$ 48 Toluene-d8	98	6.389	6.388	(0.833)	535173	51.7311	51.73
$ 69 4-Bromofluorobenzene	95	8.695	8.695	(1.134)	191631	50.1442	50.14
33 1,2-Dichloroethane	62	4.569	4.562	(0.919)	5084	0.88541	0.88(a)
27 cis-1,2-Dichloroethene	96	3.538	3.530	(0.844)	64326	15.9772	15.97
38 Trichloroethene	130	5.214	5.207	(1.049)	9660	2.78137	2.78(a)

QC Flag Legend

- Target compound detected but, quantitated amount Below Limit Of Quantitation(BLOQ).

Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\Y071309.D
Date : 13-JUL-2020 19:17
Client ID: HS20070399-01
Sample Info: HS20070399-01;HS20070399-01;;;
Purge Volume: 5.0
Column phase: DB624

Instrument: voa6.i
Operator: PC
Column diameter: 0.18



Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\Y071309.D

Date : 13-JUL-2020 19:17

Client ID: HS20070399-01

Instrument: voa6.i

Sample Info: HS20070399-01;HS20070399-01;;;

Purge Volume: 5.0

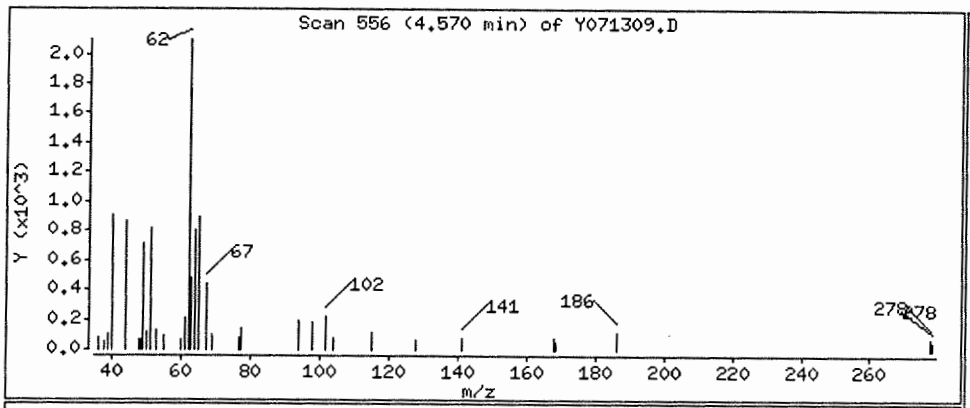
Operator: PC

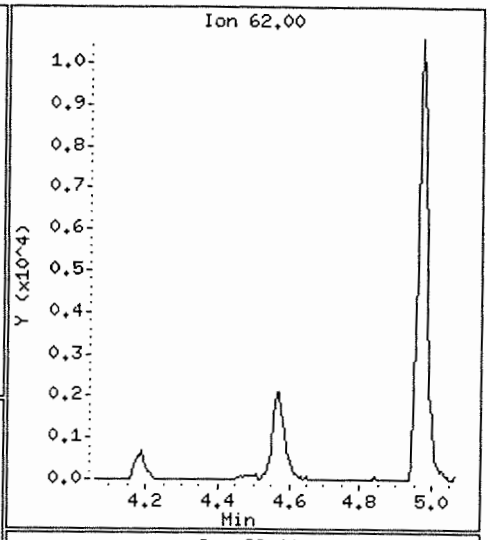
Column phase: DB624

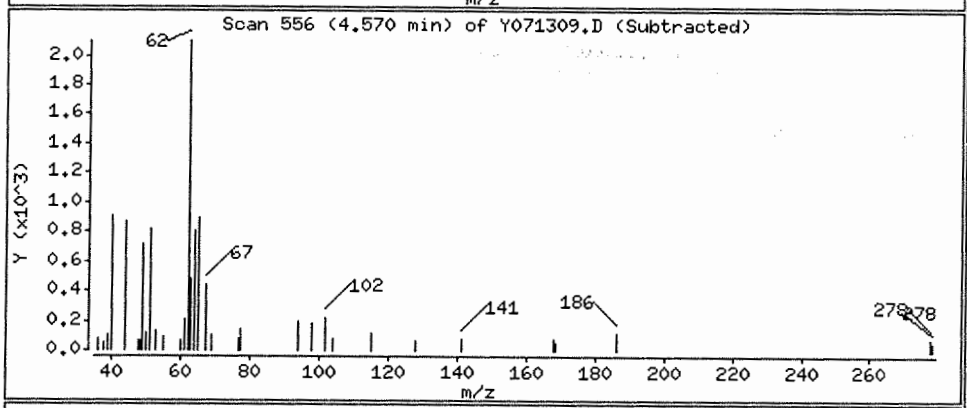
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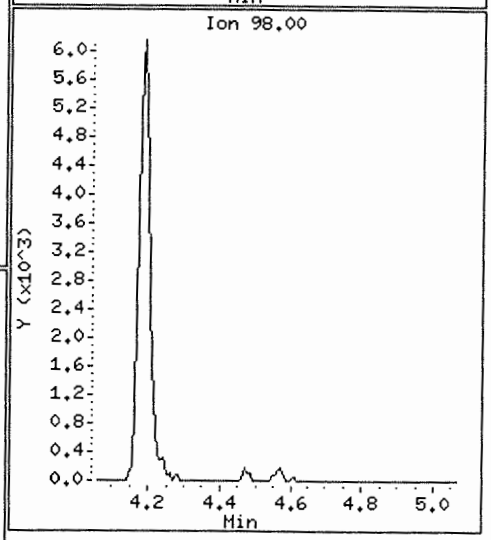
33 1,2-Dichloroethane

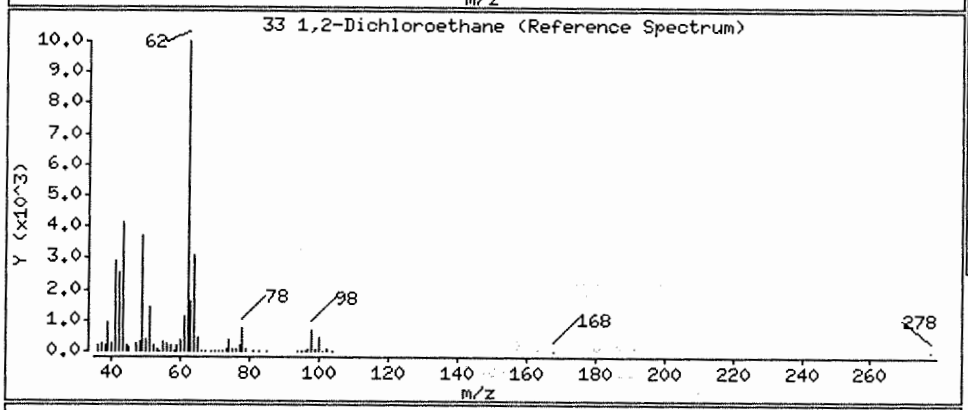
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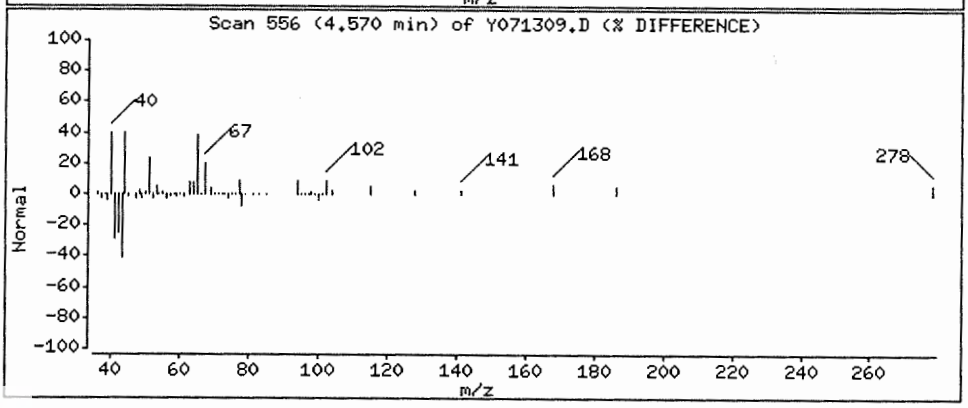












Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\Y071309.D

Date : 13-JUL-2020 19:17

Client ID: HS20070399-01

Instrument: voa6.i

Sample Info: HS20070399-01;HS20070399-01;;;

Purge Volume: 5.0

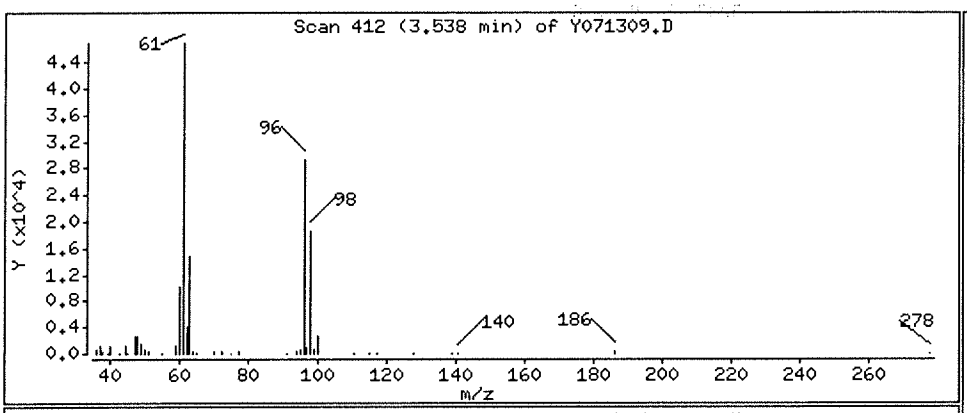
Operator: PC

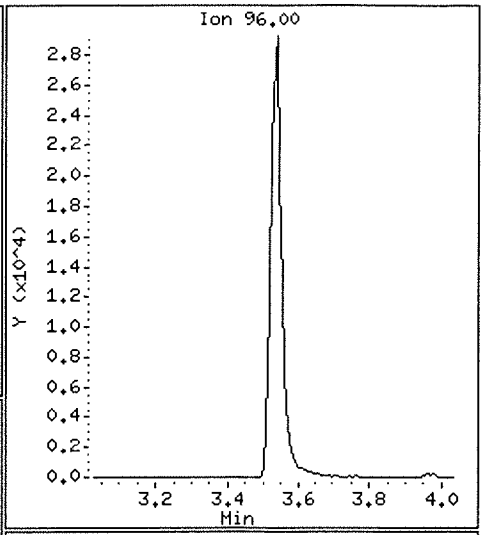
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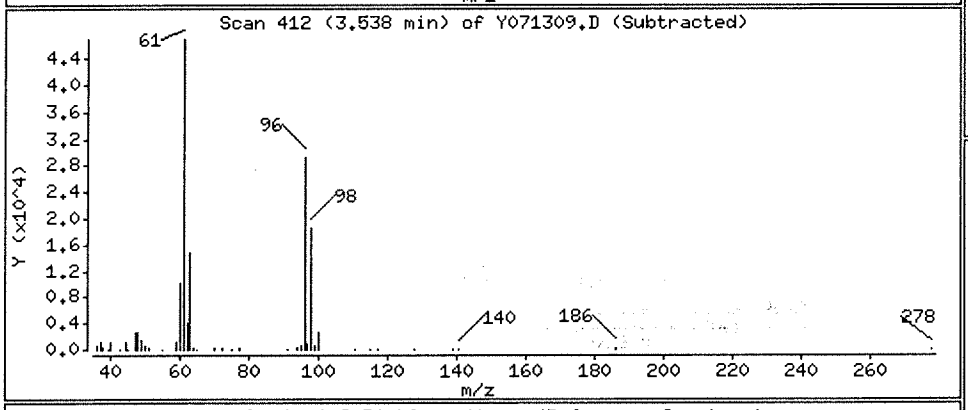
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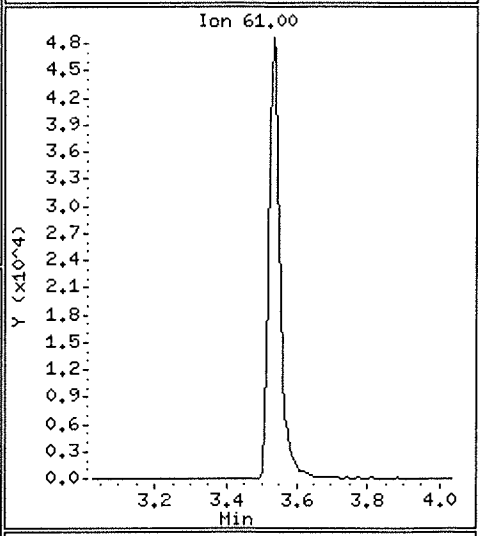
27 cis-1,2-Dichloroethene

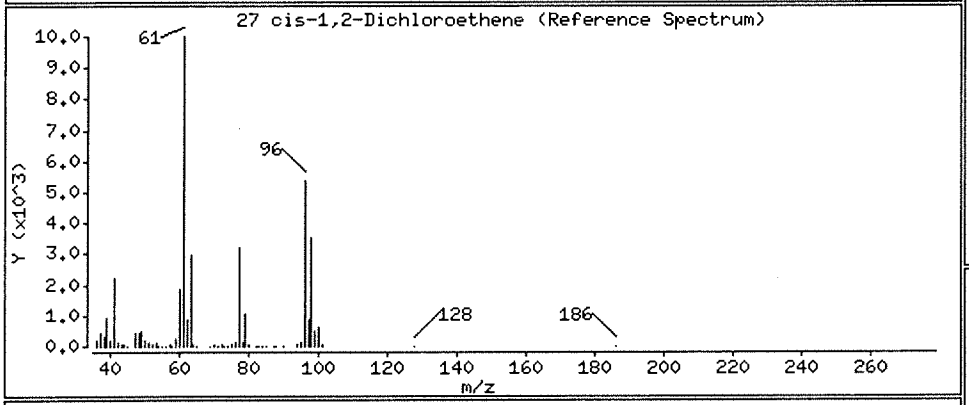
Concentration: 15.97 ug/l

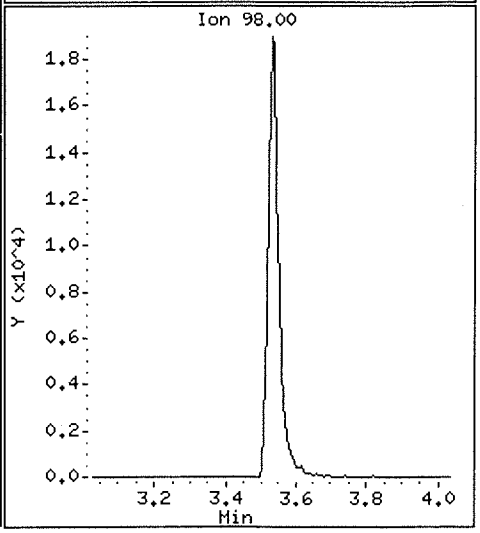


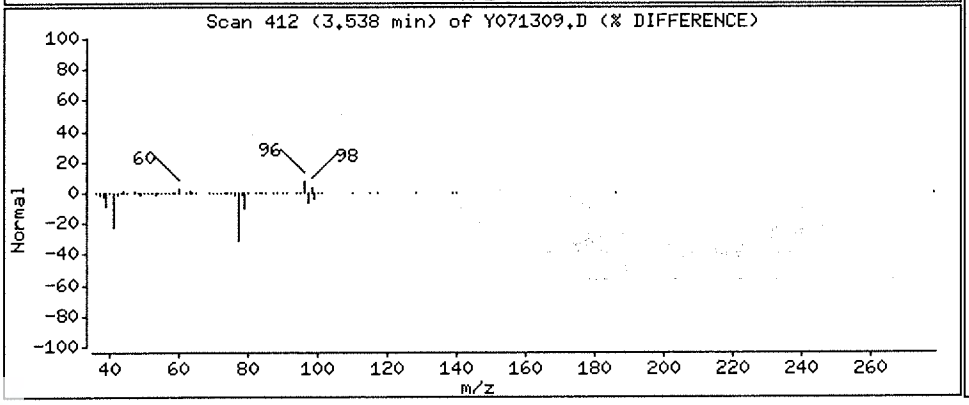












Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\Y071309.D

Date : 13-JUL-2020 19:17

Client ID: HS20070399-01

Instrument: voa6.i

Sample Info: HS20070399-01;HS20070399-01;;;

Purge Volume: 5.0

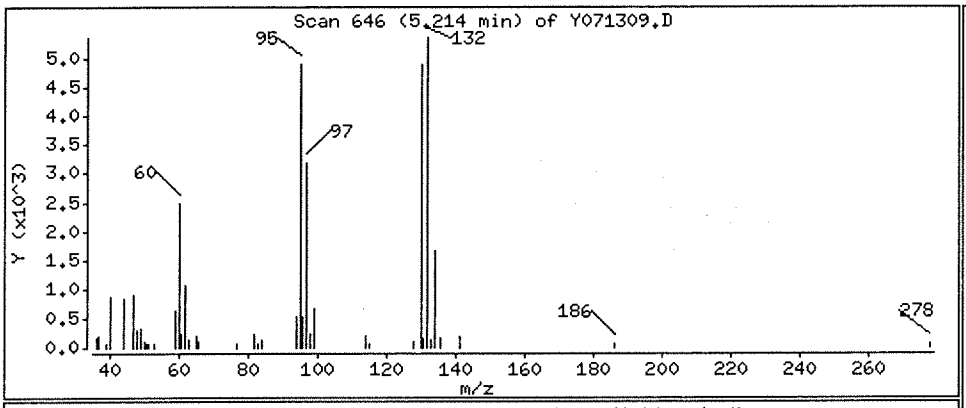
Operator: PC

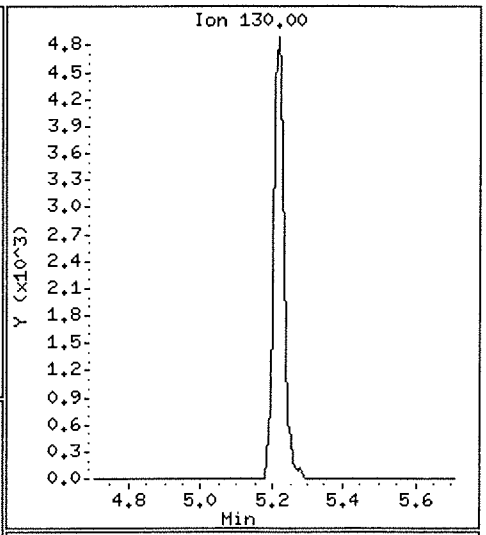
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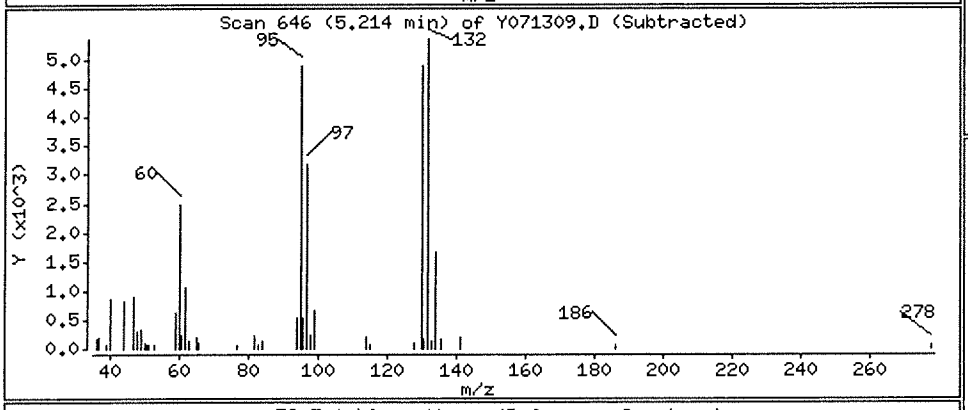
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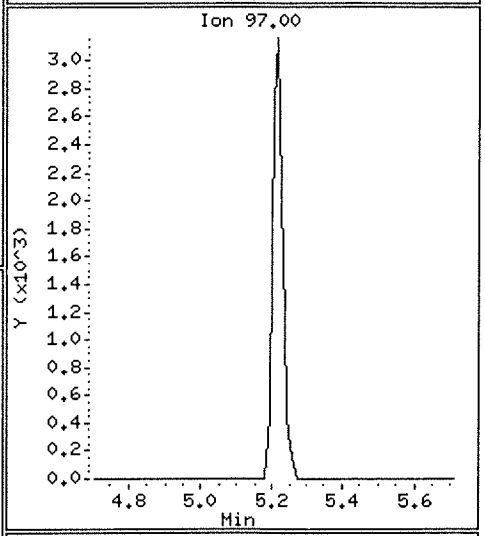
38 Trichloroethene

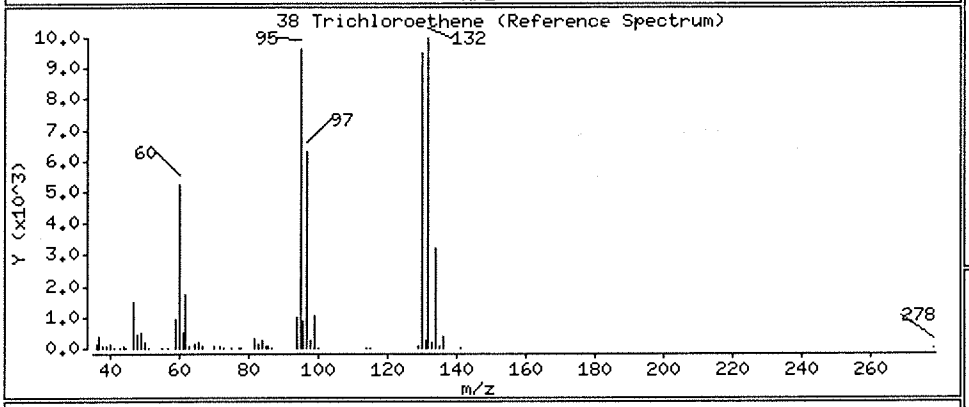
Concentration: 2.78 ug/l

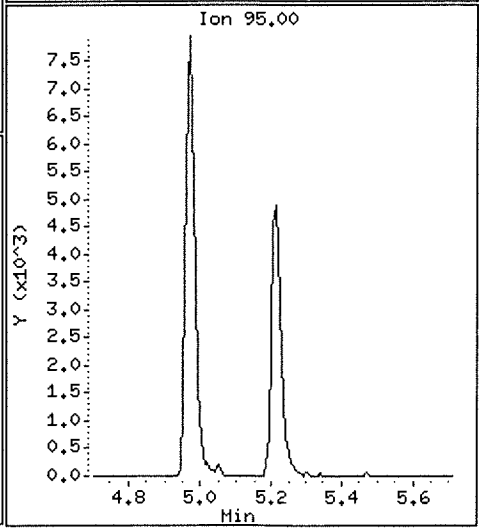


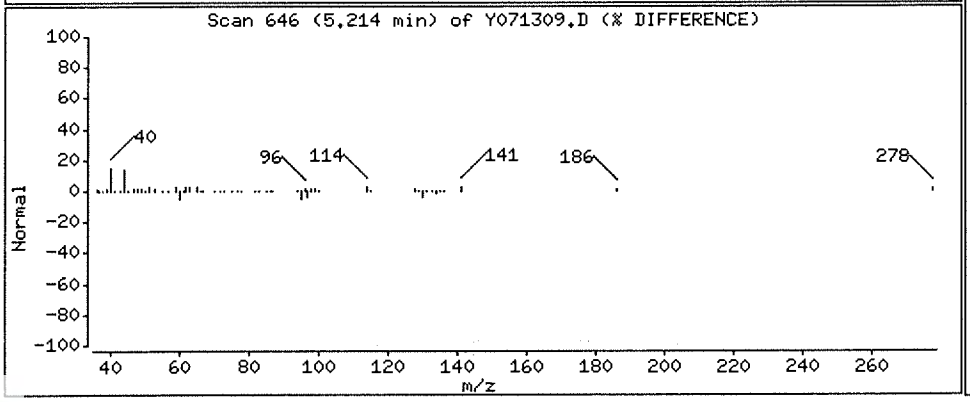












ALS Laboratory Group

ata file : \\nahstws005\Target\chem\voa6.i\X200713.b\Y071312.D
Lab Smp Id: HS20070043-19MS Client Smp ID: HS20070043-19MS
Inj Date : 13-JUL-2020 20:29
Operator : PC Inst ID: voa6.i
Smp Info : HS20070043-19MS;HS20070043-19MS;3;;MS
Misc Info : HS18090001;WATER;0;200;
Comment :
Method : \\nahstws005\Target\chem\voa6.i\X200713.b\8260W.m
Meth Date : 18-Aug-2020 13:32 voa6.i Quant Type: ISTD
Cal Date : 13-JUL-2020 14:30 Cal File: X071311.D
Als bottle: 27 QC Sample: MS
Dil Factor: 200.00000
Integrator: HP RTE Compound Sublist: bhate.sub
Target Version: 4.14
Processing Host: NAHSTW7056

Concentration Formula: Amt * DF * (Uf/Vo)*1 * CpndVariable

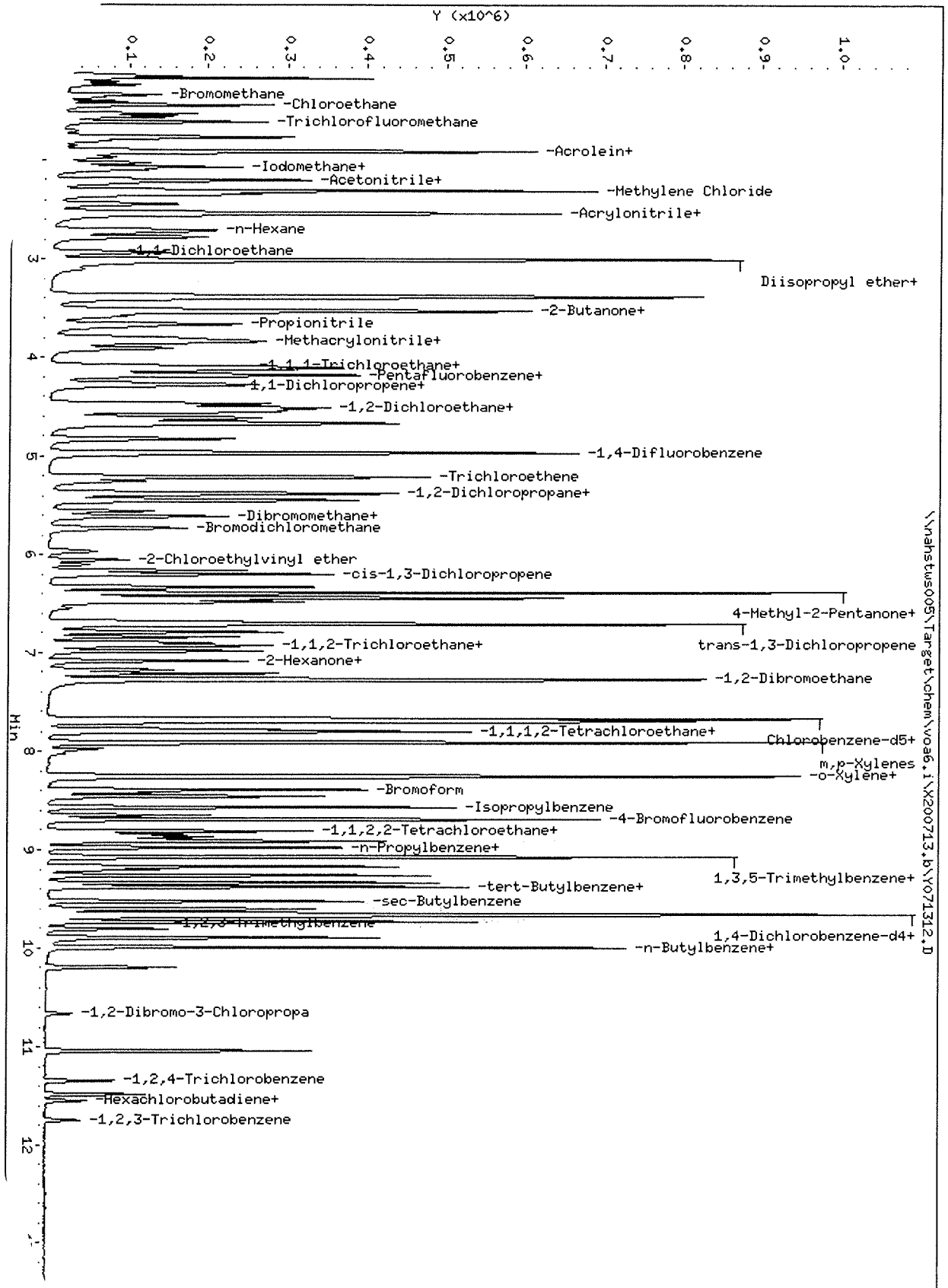
Name	Value	Description
DF	200.000	Dilution Factor
Uf	5.000	ng unit correction factor
Vo	5.000	sample purged
Cpnd Variable		Local Compound Variable

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/l)	FINAL (ug/l)
*	1 Pentafluorobenzene	168	4.189	4.189	(1.000)	292495	50.0000	
*	36 1,4-Difluorobenzene	114	4.970	4.970	(1.000)	456678	50.0000	
*	47 Chlorobenzene-d5	117	7.670	7.670	(1.000)	394114	50.0000	
*	70 1,4-Dichlorobenzene-d4	152	9.669	9.669	(1.000)	186396	50.0000	
$	30 Dibromofluoromethane	113	4.103	4.103	(0.979)	148486	45.5498	45.54
$	35 1,2-Dichloroethane-d4	65	4.476	4.476	(1.068)	199178	45.1052	45.10
$	48 Toluene-d8	98	6.388	6.388	(0.833)	513952	49.7853	49.78
$	69 4-Bromofluorobenzene	95	8.695	8.695	(1.134)	192755	50.5496	50.54
	60 1,1,1,2-Tetrachloroethane	131	7.778	7.778	(1.014)	62076	20.3916	4078.32
	31 1,1,1-Trichloroethane	97	4.089	4.089	(0.976)	106621	20.0086	4001.71
	68 1,1,2,2-Tetrachloroethane	83	8.838	8.845	(0.914)	71667	20.8245	4164.90
	53 1,1,2-Trichloroethane	83	6.840	6.840	(0.892)	51573	21.3717	4274.33
	22 1,1-Dichloroethane	63	2.929	2.929	(0.699)	164845	20.1127	4022.54
	11 1,1-Dichloroethene	96	1.919	1.919	(0.458)	48106	18.7996	3759.92
	32 1,1-Dichloropropene	75	4.290	4.282	(0.863)	89968	21.0280	4205.60
	93 1,2,3-Trichlorobenzene	180	11.746	11.746	(1.215)	11437	18.1385	3627.69
	'1 1,2,3-Trichloropropane	75	8.867	8.867	(0.917)	62315	20.5797	4115.93(M)
	) 1,2,4-Trichlorobenzene	180	11.345	11.338	(1.173)	23758	19.8709	3974.17
	1,2,4-Trimethylbenzene	105	9.382	9.382	(0.970)	220007	21.4637	4292.74
	1,2-Dibromo-3-Chloropropane	155	10.657	10.657	(1.102)	5786	19.2275	3845.50
	.2-Dibromoethane	107	7.262	7.262	(0.947)	63775	21.9778	4395.56
	2-Dichlorobenzene	146	9.998	9.998	(1.034)	108824	20.9377	4187.54

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/l)	FINAL (ug/l)
33	1,2-Dichloroethane	62	4.562	4.562	(0.918)	114437	21.0592	4211.83
42	1,2-Dichloropropane	63	5.443	5.443	(1.095)	87870	20.8377	4167.54
75	1,3,5-Trimethylbenzene	105	9.067	9.067	(0.938)	214049	21.1351	4227.01
83	1,3-Dichlorobenzene	146	9.612	9.612	(0.994)	114905	20.1095	4021.90
54	1,3-Dichloropropane	76	6.983	6.983	(0.910)	108415	21.0204	4204.07
84	1,4-Dichlorobenzene	146	9.683	9.683	(1.001)	116849	20.0764	4015.27
26	2,2-Dichloropropane	77	3.516	3.516	(0.839)	94860	18.3275	3665.50
24	2-Butanone	43	3.580	3.580	(0.855)	96202	37.8913	7578.25
76	2-Chlorotoluene	91	8.981	8.974	(0.929)	172342	19.4136	3882.72
52	2-Hexanone	43	7.090	7.090	(0.924)	150939	40.4304	8086.07
77	4-Chlorotoluene	91	9.074	9.074	(0.939)	213795	20.5829	4116.58
82	p-Isopropyltoluene	119	9.655	9.655	(0.999)	209689	21.1397	4227.93
45	4-Methyl-2-Pentanone	43	6.331	6.331	(0.825)	228778	42.5392	8507.84
10	Acetone	43	1.976	1.976	(0.472)	57412	27.8224	5564.48
37	Benzene	78	4.519	4.519	(0.909)	269580	21.7469	4349.37
74	Bromobenzene	156	8.809	8.809	(0.911)	72600	21.2671	4253.42
29	Bromochloromethane	128	3.802	3.802	(0.908)	37866	18.3183	3663.65
39	Bromodichloromethane	83	5.729	5.729	(1.153)	91797	19.9770	3995.39
66	Bromoform	173	8.415	8.415	(1.097)	44346	20.3415	4068.30
6	Bromomethane	94	1.338	1.338	(0.320)	44909	21.3927	4278.53
19	Carbon Disulfide	76	2.069	2.069	(0.494)	279367	34.6566	6931.32
34	Carbon Tetrachloride	117	4.268	4.268	(0.859)	88868	20.6971	4139.41
59	Chlorobenzene	112	7.699	7.699	(1.004)	168962	21.5370	4307.39
7	Chloroethane	64	1.403	1.403	(0.335)	47270	18.3872	3677.43
28	Chloroform	83	3.910	3.917	(0.933)	127017	19.7807	3956.14
3	Chloromethane	50	1.080	1.081	(0.258)	125274	21.5436	4308.71
27	cis-1,2-Dichloroethene	96	3.530	3.530	(0.843)	223495	59.5650	11913.00
46	cis-1,3-Dichloropropene	75	6.159	6.159	(1.239)	109905	20.6570	4131.39
55	Dibromochloromethane	129	7.176	7.176	(0.936)	66393	20.7078	4141.55
44	Dibromomethane	93	5.557	5.557	(1.118)	45116	20.0244	4004.88
2	Dichlorodifluoromethane	85	0.973	0.973	(0.232)	65927	21.3469	4269.38
61	Ethylbenzene	106	7.799	7.799	(1.017)	87138	21.2899	4257.98
91	Hexachlorobutadiene	225	11.481	11.481	(1.187)	19082	20.6642	4132.83
67	Isopropylbenzene	105	8.566	8.566	(1.117)	260603	21.2604	4252.08
62	m,p-Xylenes	106	7.907	7.907	(1.031)	205624	41.9493	8389.86
17	Methylene Chloride	84	2.305	2.305	(0.550)	151764	43.9495	8789.90
87	n-Butylbenzene	91	9.998	9.998	(1.034)	187225	21.5014	4300.28
73	n-Propylbenzene	91	8.917	8.917	(0.922)	259292	18.2563	3651.25
92	Naphthalene	128	11.546	11.546	(1.194)	35758	19.5263	3905.26
63	o-Xylene	106	8.244	8.244	(1.075)	103032	20.8030	4160.60
81	sec-Butylbenzene	105	9.526	9.526	(0.985)	218273	18.9078	3781.55
64	Styrene	104	8.265	8.265	(1.078)	176804	20.6279	4125.57
78	tert-Butylbenzene	119	9.339	9.339	(0.966)	179875	22.2579	4451.57
56	Tetrachloroethene	164	6.933	6.933	(0.904)	51316	21.2719	4254.37
50	Toluene	91	6.453	6.453	(0.841)	262612	21.2679	4253.57
20	trans-1,2-Dichloroethene	96	2.535	2.535	(0.605)	61335	19.4649	3892.97
51	trans-1,3-Dichloropropene	75	6.682	6.682	(1.344)	95379	19.4375	3887.49
18	Trichloroethene	130	5.214	5.214	(1.049)	150674	45.8414	9168.27
1	Trichlorofluoromethane	101	1.560	1.560	(0.373)	91510	18.9259	3785.18
	Vinyl Chloride	62	1.145	1.145	(0.273)	97766	20.3267	4065.34

lag Legend

Compound response manually integrated.

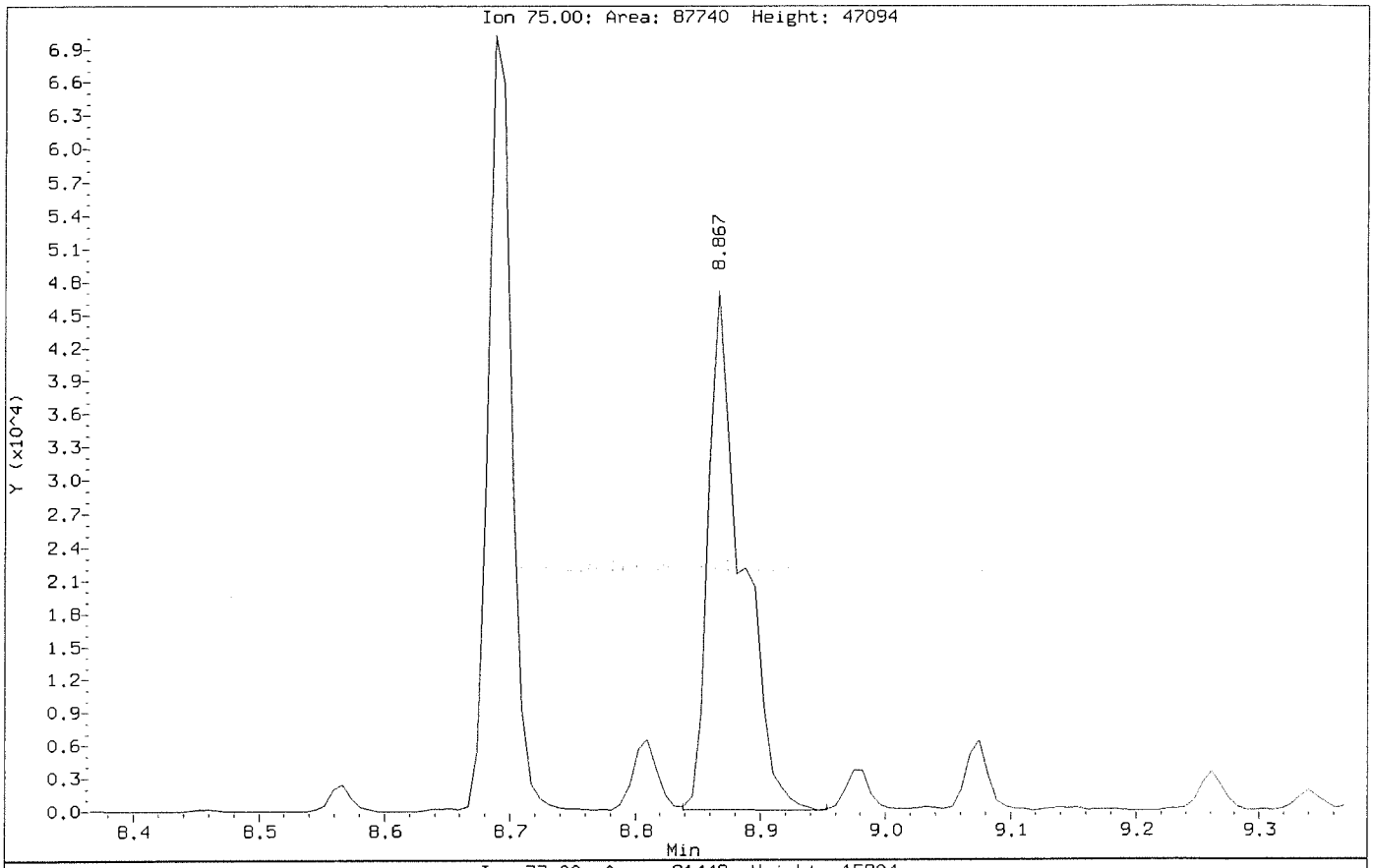


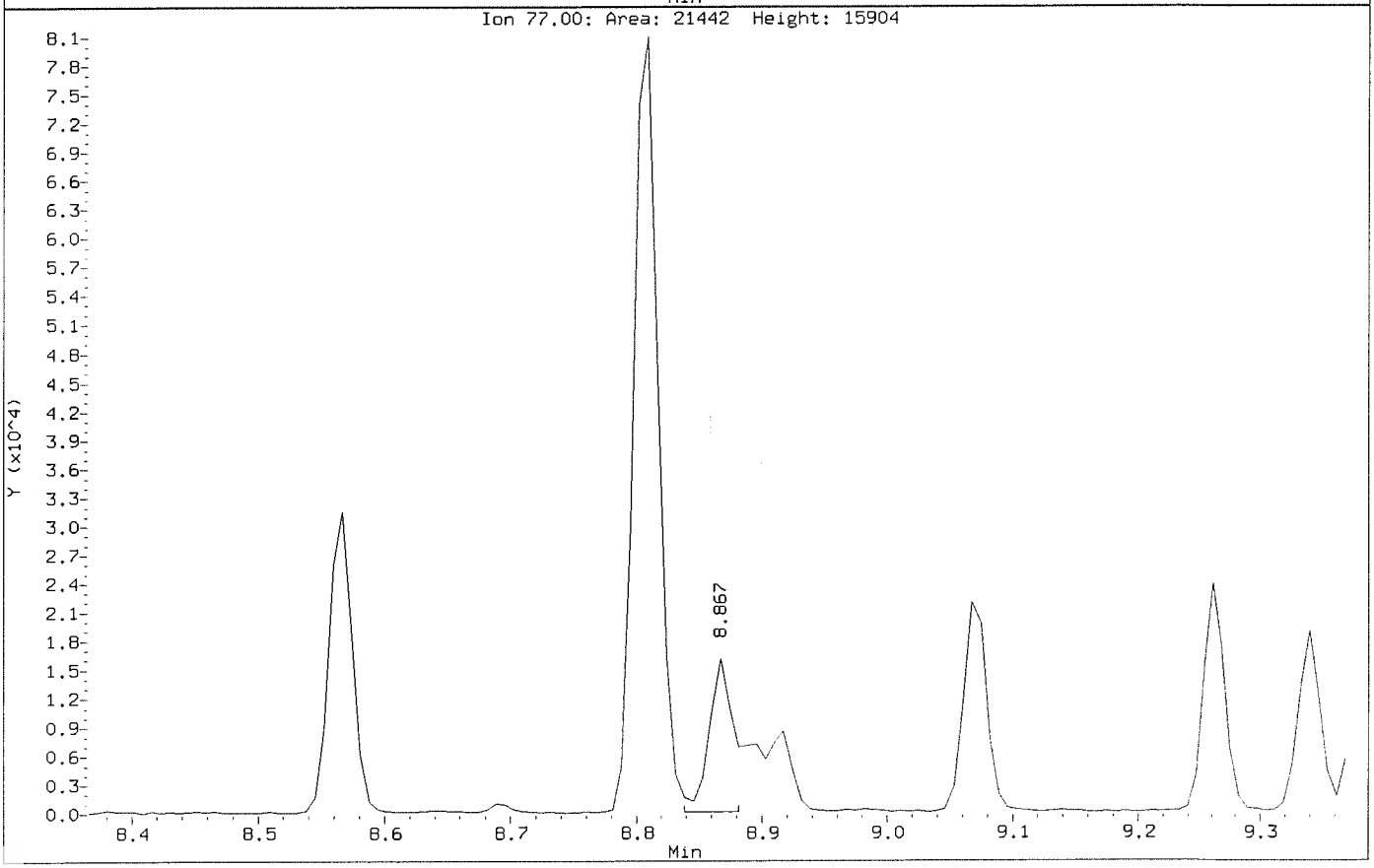
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Sample Info: HS200700043-19MS;HS200700043-19MS;3;;MS
Purge Volume: 5.0
Column phase: DB624

Instrument: voa6.i
Operator: PC
Column diameter: 0.18

Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\Before\Y071312.D
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Instrument: voa6.i
Client Sample ID: HS20070043-19MS

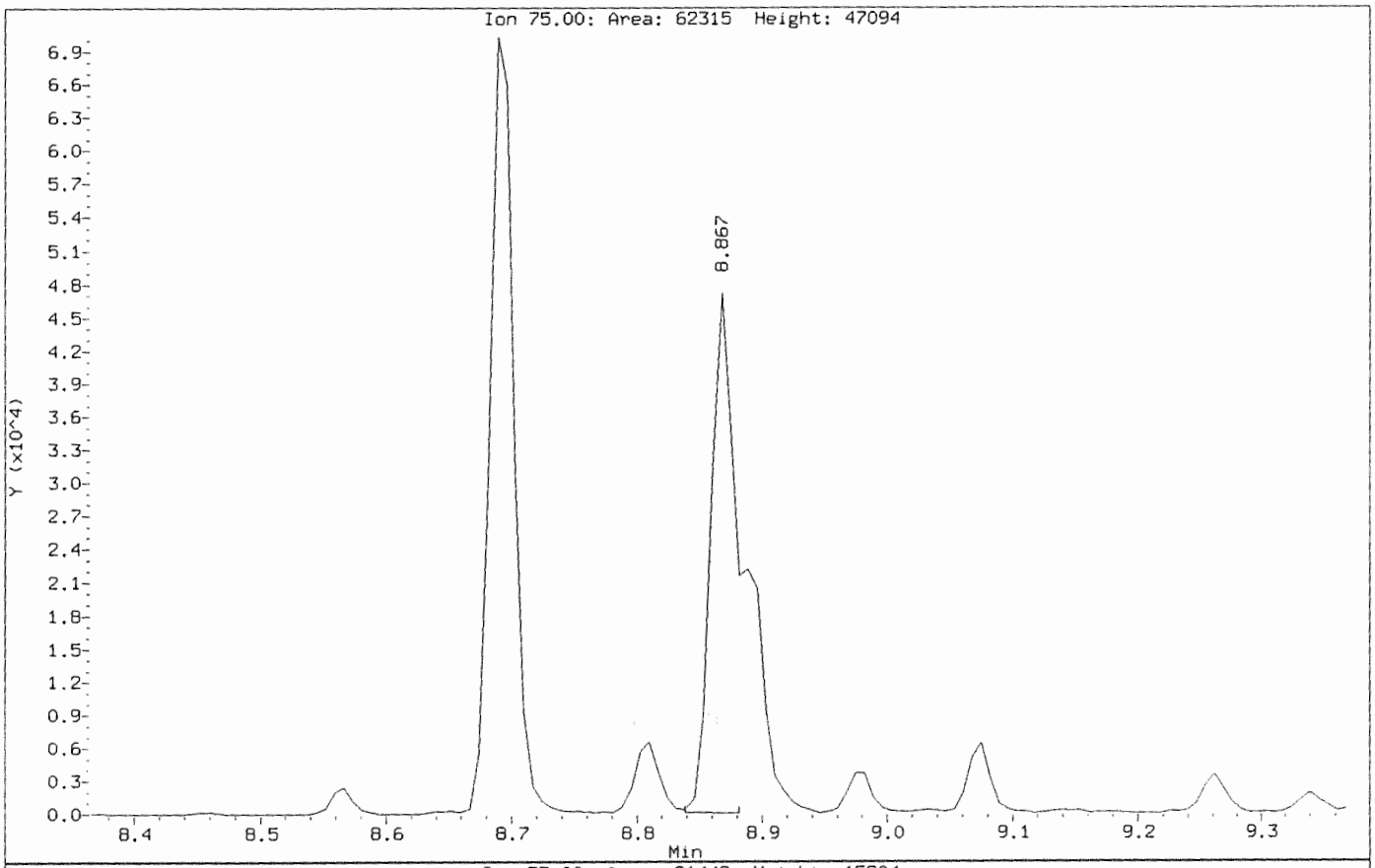
Compound: 1,2,3-Trichloropropane
CAS Number: 96-18-4

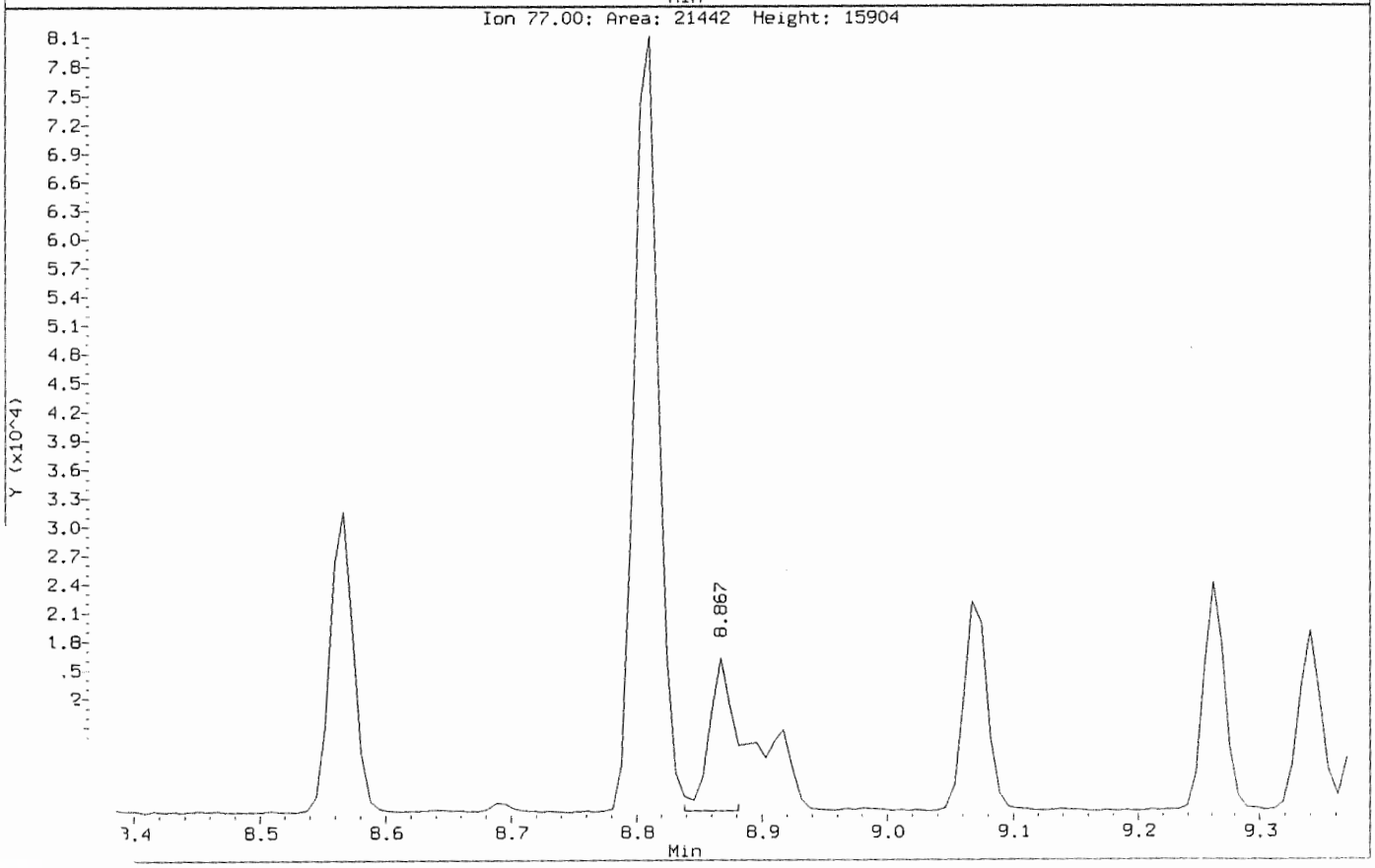




Data File: \\nahstws005\Target\chem\voa6.i\X200713.b\Y071312.D
Injection Date: 13-JUL-2020 20:29
Instrument: voa6.i
Client Sample ID: HS20070043-19MS

Compound: 1,2,3-Trichloropropane
CAS Number: 96-18-4





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Data file : \\nahstws005\Target\chem\voa6.i\X200713.b\Y071313.D
Lab Smp Id: HS20070043-19MSD Client Smp ID: HS20070043-19MSD
Inj Date : 13-JUL-2020 20:54
Operator : PC Inst ID: voa6.i
Smp Info : HS20070043-19MSD;HS20070043-19MSD;3;;MSD
Misc Info : HS18090001;WATER;0;200;
Comment :
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Meth Date : 18-Aug-2020 13:32 voa6.i Quant Type: ISTD
Cal Date : 13-JUL-2020 14:30 Cal File: X071311.D
Als bottle: 27 QC Sample: MSD
Dil Factor: 200.00000
Integrator: HP RTE Compound Sublist: bhate.sub
Target Version: 4.14
Processing Host: NAHSTW7056

Concentration Formula: Amt * DF * (Uf/Vo)*1 * CpndVariable

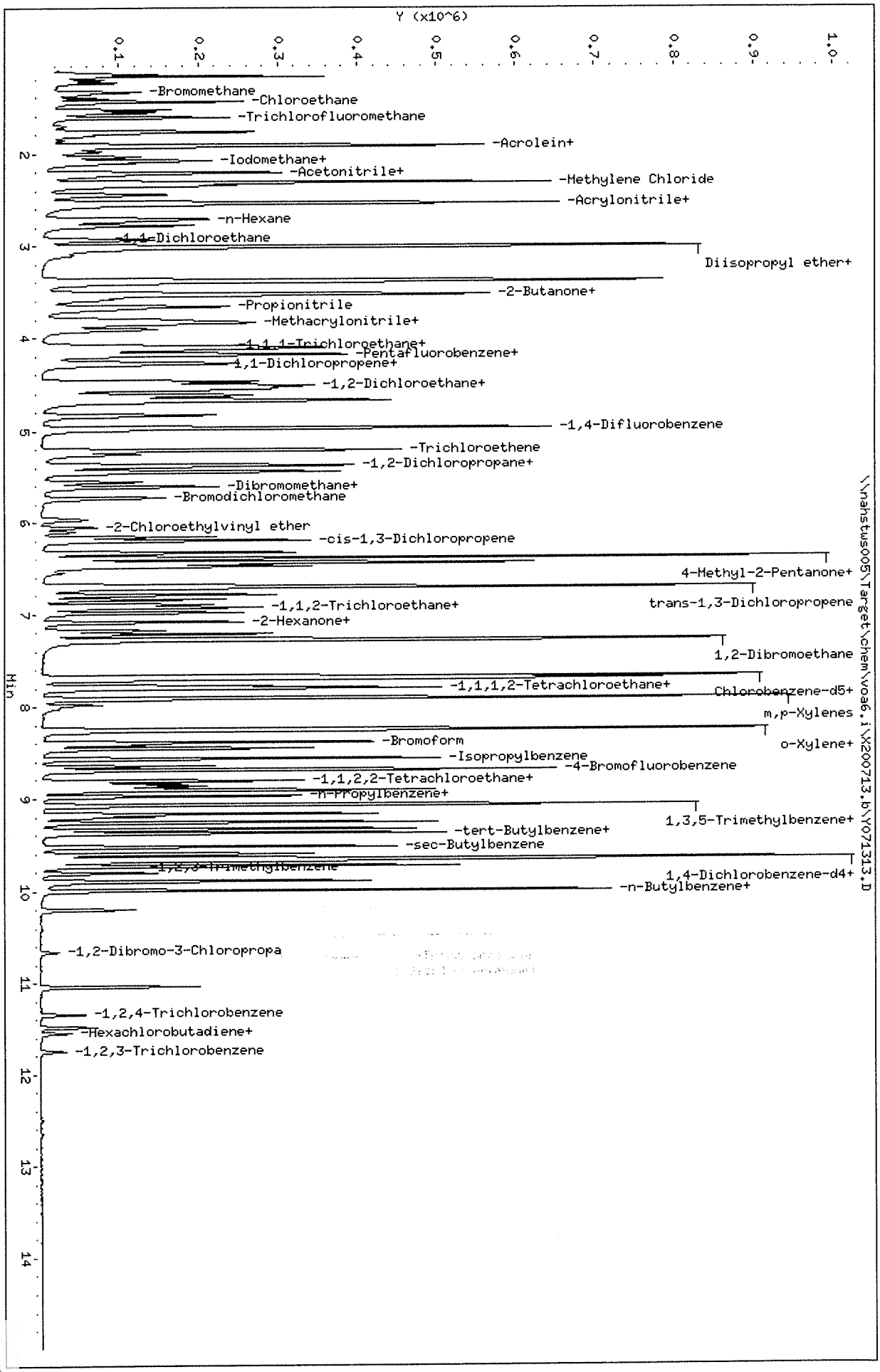
Name	Value	Description
DF	200.000	Dilution Factor
Uf	5.000	ng unit correction factor
Vo	5.000	sample purged
Cpnd Variable		Local Compound Variable

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/l)	FINAL (ug/l)
* 1 Pentafluorobenzene	168	4.189	4.189	(1.000)	289133	50.0000	
* 36 1,4-Difluorobenzene	114	4.970	4.970	(1.000)	444347	50.0000	
* 47 Chlorobenzene-d5	117	7.671	7.670	(1.000)	379981	50.0000	
* 70 1,4-Dichlorobenzene-d4	152	9.669	9.669	(1.000)	167189	50.0000	
$ 30 Dibromofluoromethane	113	4.103	4.103	(0.979)	148235	46.0023	46.00
$ 35 1,2-Dichloroethane-d4	65	4.476	4.476	(1.068)	191767	43.9407	43.94
$ 48 Toluene-d8	98	6.388	6.388	(0.833)	506701	50.9085	50.90
$ 69 4-Bromofluorobenzene	95	8.695	8.695	(1.134)	180181	48.9933	48.99
60 1,1,1,2-Tetrachloroethane	131	7.778	7.778	(1.014)	61676	21.0138	4202.75
31 1,1,1-Trichloroethane	97	4.089	4.089	(0.976)	99175	18.8277	3765.53
68 1,1,2,2-Tetrachloroethane	83	8.845	8.845	(0.915)	72750	23.5677	4713.54
53 1,1,2-Trichloroethane	83	6.840	6.840	(0.892)	51279	22.0402	4408.03
22 1,1-Dichloroethane	63	2.929	2.929	(0.699)	154461	19.0649	3812.98
11 1,1-Dichloroethene	96	1.919	1.919	(0.458)	42661	16.8656	3373.12
32 1,1-Dichloropropene	75	4.290	4.282	(0.863)	86108	20.6844	4136.87
3 1,2,3-Trichlorobenzene	180	11.746	11.746	(1.215)	8385	14.8259	2965.18
1,2,3-Trichloropropane	75	8.867	8.867	(0.917)	64024	23.5732	4714.63(M)
1,2,4-Trichlorobenzene	180	11.345	11.338	(1.173)	16307	15.2058	3041.16
,2,4-Trimethylbenzene	105	9.383	9.382	(0.970)	211729	23.0292	4605.83
2-Dibromo-3-Chloropropane	155	10.658	10.657	(1.102)	4588	17.1505	3430.10
-Dibromoethane	107	7.262	7.262	(0.947)	62817	22.4528	4490.56
Dichlorobenzene	146	9.999	9.998	(1.034)	105169	22.5591	4511.81

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/l)	FINAL (ug/l)
33 1,2-Dichloroethane	62	4.562	4.562	(0.918)	114394	21.6354	4327.08
42 1,2-Dichloropropane	63	5.443	5.443	(1.095)	84345	20.5568	4111.36
75 1,3,5-Trimethylbenzene	105	9.067	9.067	(0.938)	204614	22.5245	4504.90
83 1,3-Dichlorobenzene	146	9.612	9.612	(0.994)	114639	22.3678	4473.56
54 1,3-Dichloropropane	76	6.983	6.983	(0.910)	104228	20.9602	4192.04
84 1,4-Dichlorobenzene	146	9.683	9.683	(1.001)	116669	22.3483	4469.65
26 2,2-Dichloropropane	77	3.516	3.516	(0.839)	87966	17.1932	3438.63
24 2-Butanone	43	3.580	3.580	(0.855)	94209	37.5378	7507.55
76 2-Chlorotoluene	91	8.974	8.974	(0.928)	147782	18.5595	3711.89
52 2-Hexanone	43	7.090	7.090	(0.924)	153299	42.5898	8517.96
77 4-Chlorotoluene	91	9.075	9.074	(0.939)	201155	21.5908	4318.16
82 p-Isopropyltoluene	119	9.655	9.655	(0.999)	210085	23.6128	4722.55
45 4-Methyl-2-Pentanone	43	6.331	6.331	(0.825)	217801	42.0044	8400.88
10 Acetone	43	1.976	1.976	(0.472)	52907	25.6640	5132.80
37 Benzene	78	4.519	4.519	(0.909)	256207	21.2416	4248.32
74 Bromobenzene	156	8.809	8.809	(0.911)	71491	23.3482	4669.63
29 Bromochloromethane	128	3.803	3.802	(0.908)	36774	17.9969	3599.37
39 Bromodichloromethane	83	5.729	5.729	(1.153)	83748	18.7311	3746.21
66 Bromoform	173	8.416	8.415	(1.097)	44466	21.1552	4231.04
6 Bromomethane	94	1.338	1.338	(0.320)	38321	18.3234	3664.68
19 Carbon Disulfide	76	2.069	2.069	(0.494)	251896	31.6121	6322.41
34 Carbon Tetrachloride	117	4.268	4.268	(0.859)	84414	20.2053	4041.06
59 Chlorobenzene	112	7.699	7.699	(1.004)	159103	21.0346	4206.91
7 Chloroethane	64	1.403	1.403	(0.335)	42406	16.6870	3337.39
28 Chloroform	83	3.910	3.917	(0.933)	121394	19.1249	3824.97
3 Chloromethane	50	1.081	1.081	(0.258)	116811	20.4189	4083.77
27 cis-1,2-Dichloroethene	96	3.530	3.530	(0.843)	209628	56.5189	11303.77
46 cis-1,3-Dichloropropene	75	6.159	6.159	(1.239)	97583	18.8500	3769.99
55 Dibromochloromethane	129	7.176	7.176	(0.936)	65802	21.2868	4257.35
44 Dibromomethane	93	5.557	5.557	(1.118)	43714	19.9406	3988.11
2 Dichlorodifluoromethane	85	0.973	0.973	(0.232)	60194	19.7172	3943.44
61 Ethylbenzene	106	7.799	7.799	(1.017)	85131	21.5732	4314.63
91 Hexachlorobutadiene	225	11.481	11.481	(1.187)	10750	12.9787	2595.74
67 Isopropylbenzene	105	8.566	8.566	(1.117)	253527	21.4524	4290.48
62 m,p-Xylenes	106	7.907	7.907	(1.031)	204200	43.2083	8641.65
17 Methylene Chloride	84	2.305	2.305	(0.550)	140652	41.1189	8223.77
87 n-Butylbenzene	91	9.999	9.998	(1.034)	177579	22.7365	4547.30
73 n-Propylbenzene	91	8.917	8.917	(0.922)	301207	23.6438	4728.76
92 Naphthalene	128	11.546	11.546	(1.194)	25169	15.5913	3118.26
63 o-Xylene	106	8.244	8.244	(1.075)	95278	19.9530	3990.59
81 sec-Butylbenzene	105	9.526	9.526	(0.985)	237305	22.9179	4583.58
64 Styrene	104	8.265	8.265	(1.078)	175827	21.2769	4255.37
78 tert-Butylbenzene	119	9.340	9.339	(0.966)	173160	23.8885	4777.70
56 Tetrachloroethene	164	6.933	6.933	(0.904)	49707	21.3713	4274.25
50 Toluene	91	6.453	6.453	(0.841)	254088	21.3429	4268.58
20 trans-1,2-Dichloroethene	96	2.535	2.535	(0.605)	59197	19.0048	3800.96
51 trans-1,3-Dichloropropene	75	6.682	6.682	(1.344)	94112	19.7115	3942.29
38 Trichloroethene	130	5.214	5.214	(1.049)	144195	45.0876	9017.52
8 Trichlorofluoromethane	101	1.560	1.560	(0.373)	84878	17.7584	3551.68
5 Vinyl Chloride	62	1.145	1.145	(0.273)	84438	17.7598	3551.96

QC Flag Legend

M - Compound response manually integrated.

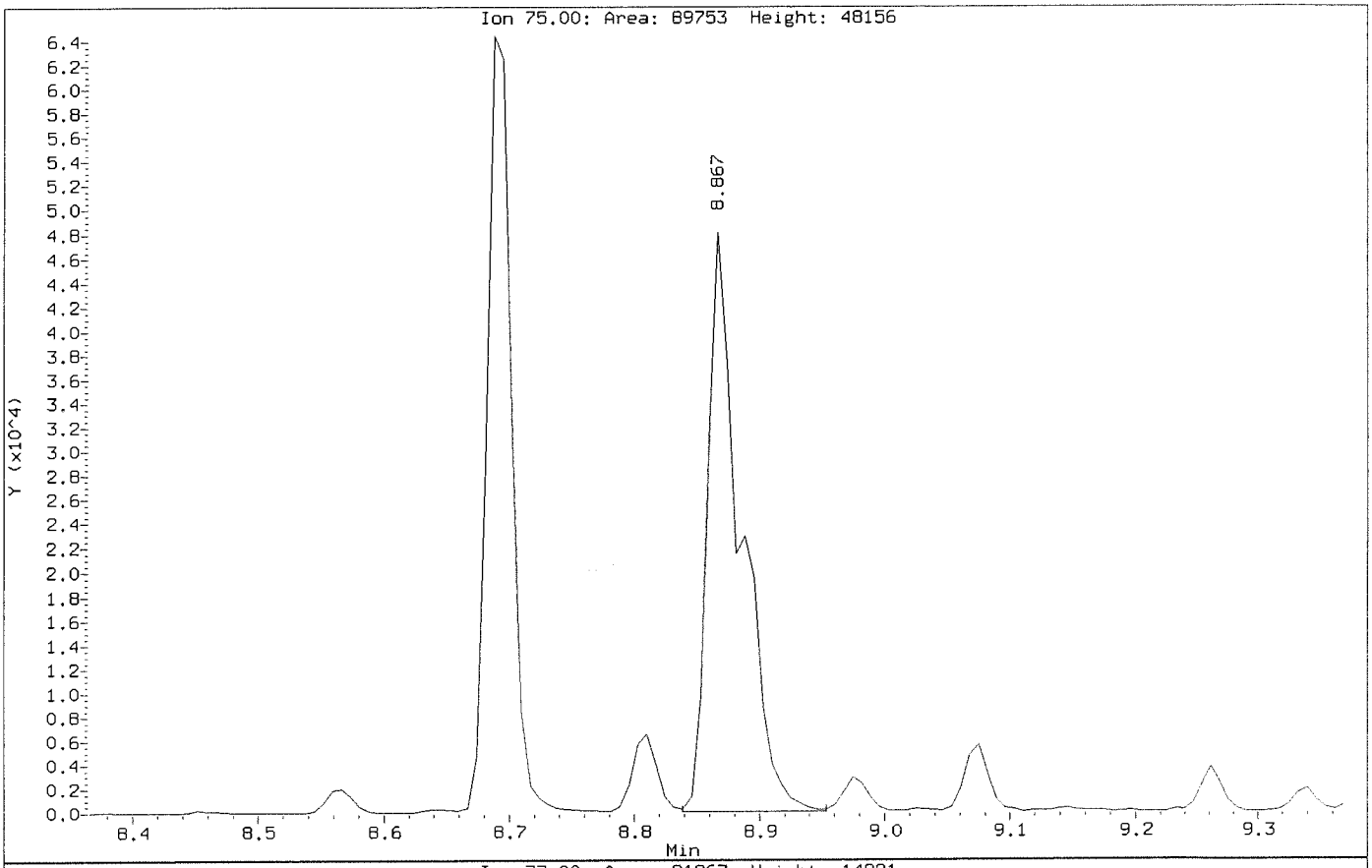


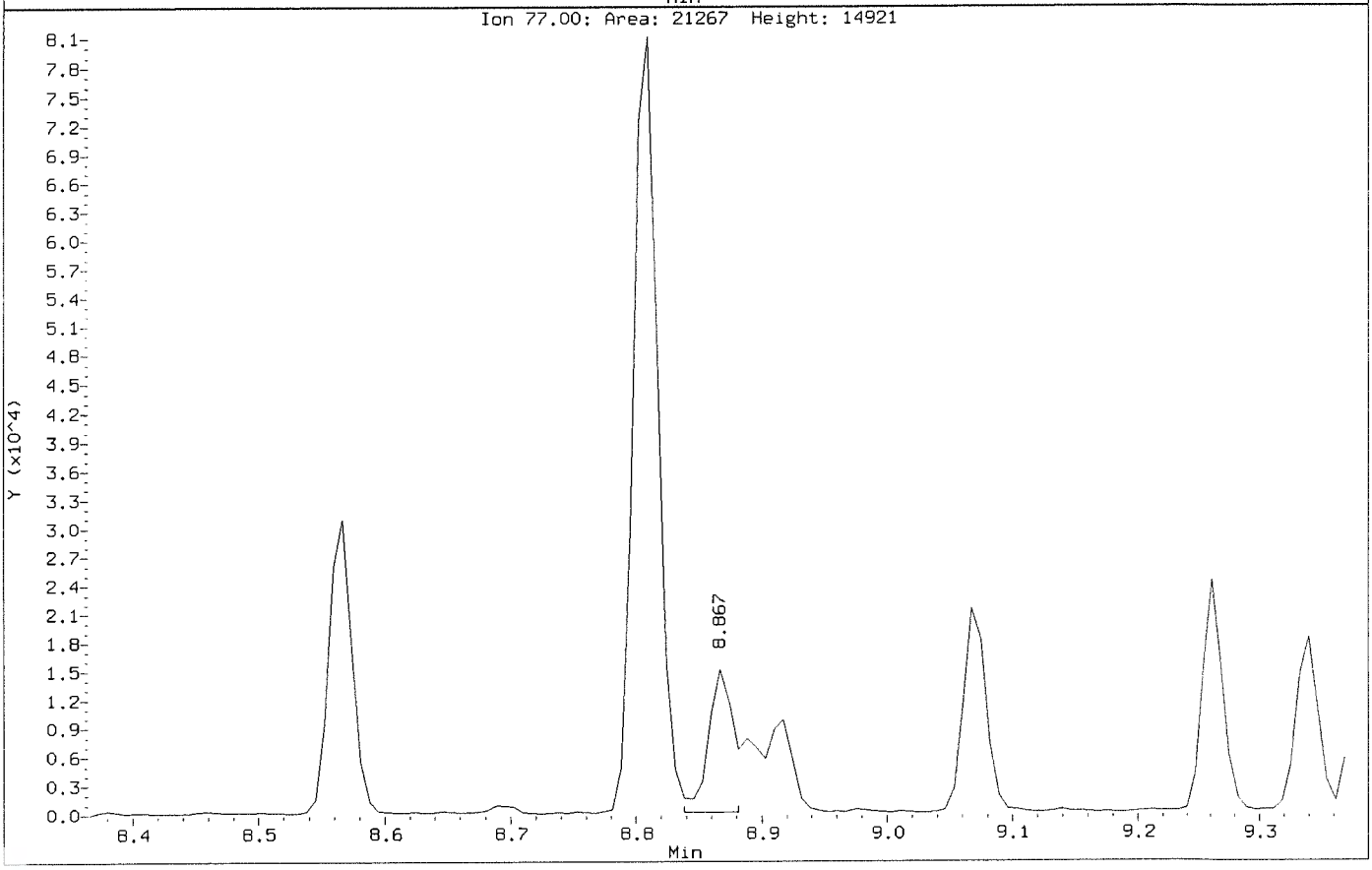
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Sample Info: HS20070043-19MSD;HS20070043-19MSD;3;;MSD
Purge Volume: 5.0
Column phase: DB624

Instrument: voa6.i
Operator: PC
Column diameter: 0.18

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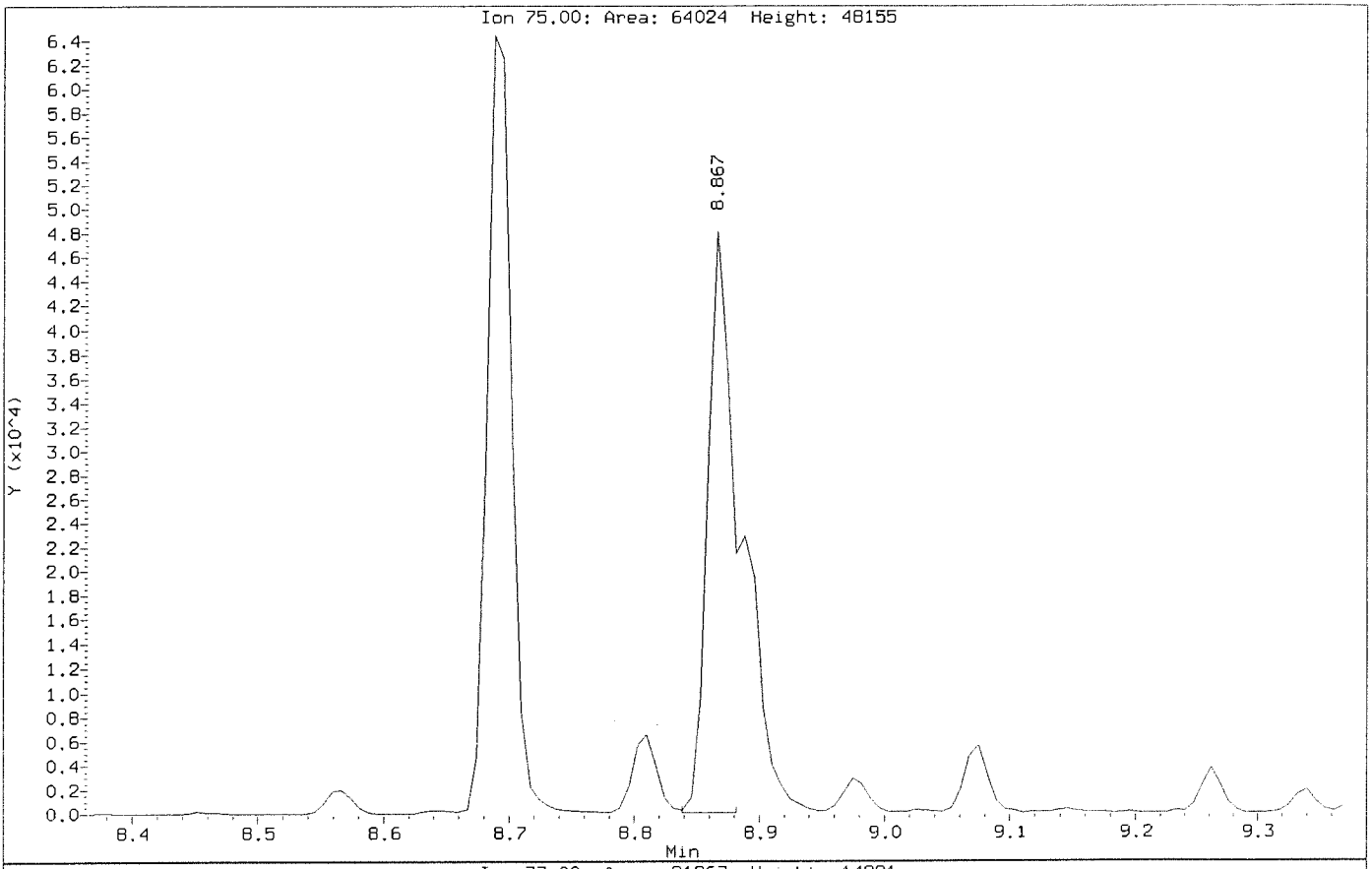
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CAS Number: 96-18-4

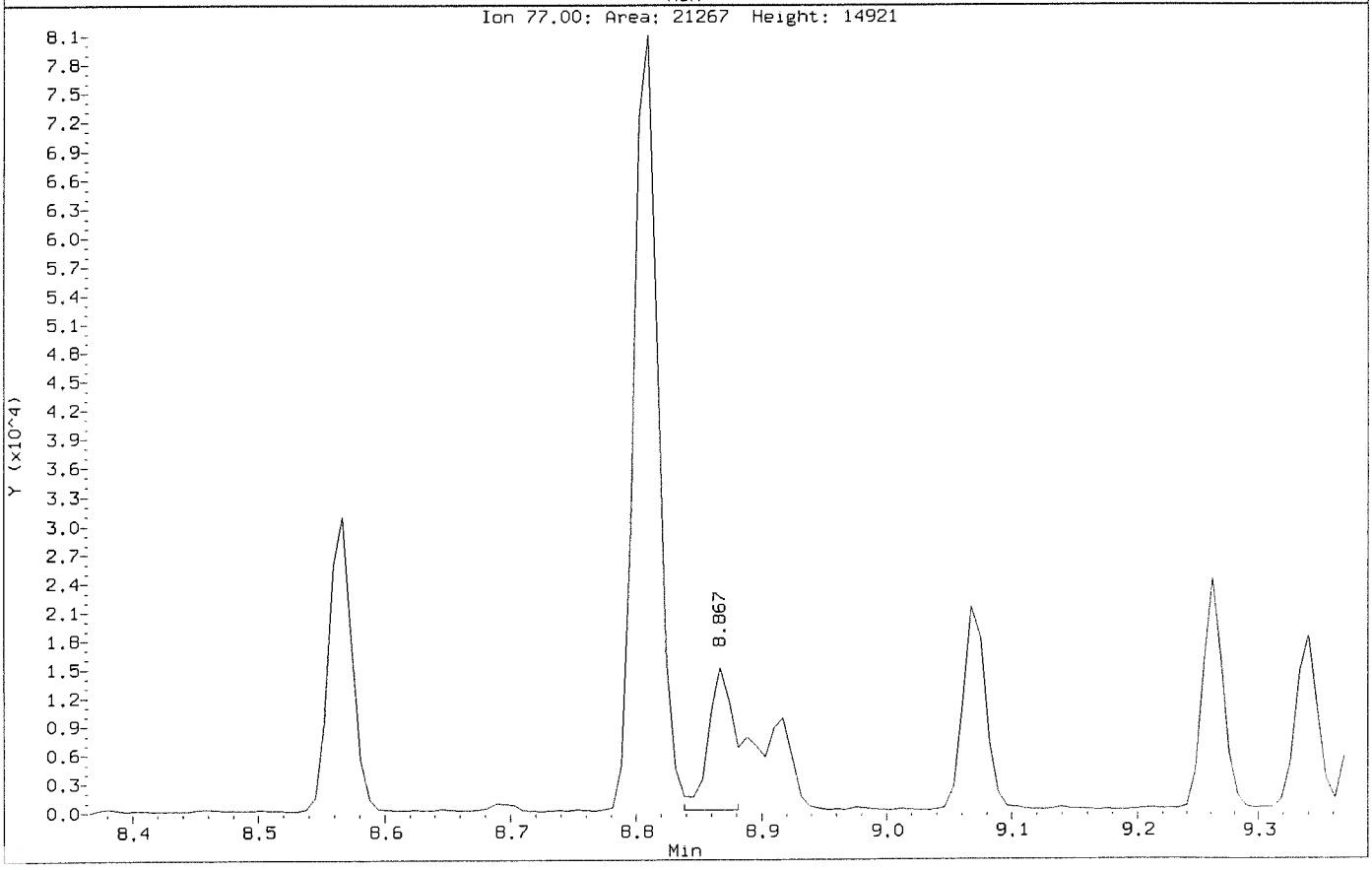




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Injection Date: 13-JUL-2020 20:54
Instrument: voa6.i
Client Sample ID: HS20070043-19MSD

Compound: 1,2,3-Trichloropropane
CAS Number: 96-18-4





ALS Laboratory Group

Data file : \\nahstws005\Target\chem\voa6.i\X200713.b\Y071321.D
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Inj Date : 14-JUL-2020 00:06
Operator : PC Inst ID: voa6.i
Smp Info : CCV-END;CCV-END;2;;;
Misc Info : HS18090001;WATER;0;1;
Comment :
Method : \\nahstws005\Target\chem\voa6.i\X200713.b\8260W.m
Meth Date : 18-Aug-2020 13:32 voa6.i Quant Type: ISTD
Cal Date : 13-JUL-2020 14:30 Cal File: X071311.D
Als bottle: 35 Continuing Calibration Sample
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: bhate.sub
Target Version: 4.14
Processing Host: NAHSTW7056

Concentration Formula: Amt * DF * (Uf/Vo)*1 * CpndVariable

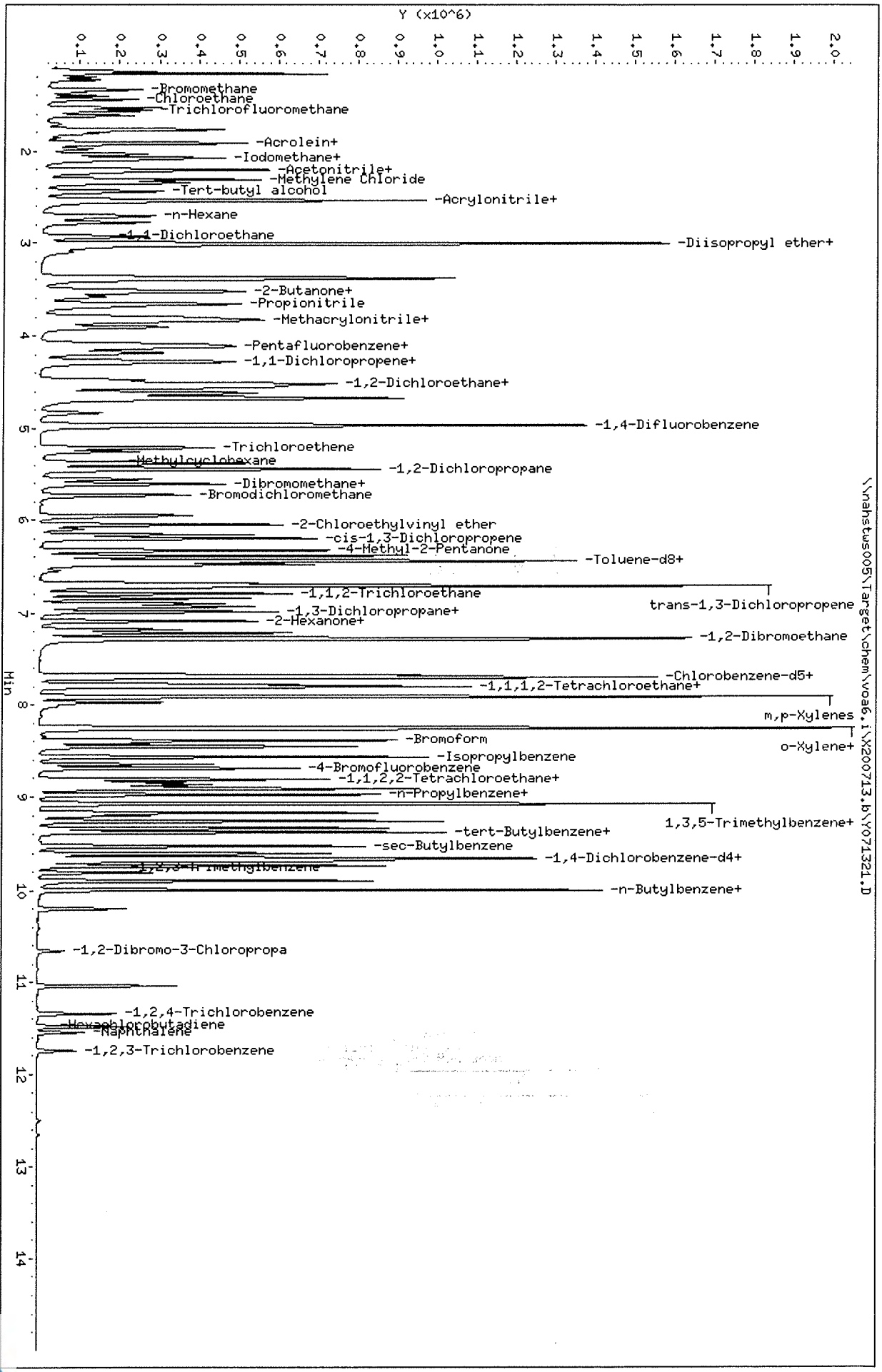
Name	Value	Description
DF	1.000	Dilution Factor
Uf	5.000	ng unit correction factor
Vo	5.000	sample purged
Cpnd Variable		Local Compound Variable

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/l)	AMOUNTS ON-COL (ug/l)
*	1 Pentafluorobenzene	168	4.189	4.189	(1.000)	234496	50.0000	
*	36 1,4-Difluorobenzene	114	4.970	4.970	(1.000)	407726	50.0000	
*	47 Chlorobenzene-d5	117	7.671	7.671	(1.000)	371552	50.0000	
*	70 1,4-Dichlorobenzene-d4	152	9.669	9.669	(1.000)	171139	50.0000	
$	30 Dibromofluoromethane	113	4.103	4.103	(0.979)	140349	50.0000	53.71
$	35 1,2-Dichloroethane-d4	65	4.476	4.476	(1.068)	186918	50.0000	52.74
$	48 Toluene-d8	98	6.388	6.388	(0.833)	475461	50.0000	48.85
$	69 4-Bromofluorobenzene	95	8.695	8.695	(1.134)	180801	50.0000	50.29
	60 1,1,1,2-Tetrachloroethane	131	7.778	7.778	(1.014)	137917	50.0000	48.05
	31 1,1,1-Trichloroethane	97	4.089	4.089	(0.976)	209351	50.0000	49.00
	68 1,1,2,2-Tetrachloroethane	83	8.838	8.838	(0.914)	150614	50.0000	47.66
	53 1,1,2-Trichloroethane	83	6.840	6.840	(0.892)	112519	50.0000	49.45
	22 1,1-Dichloroethane	63	2.929	2.929	(0.699)	305444	50.0000	46.48
	11 1,1-Dichloroethene	96	1.919	1.919	(0.458)	88882	50.0000	43.32
	32 1,1-Dichloropropene	75	4.282	4.282	(0.862)	170098	50.0000	44.52
	93 1,2,3-Trichlorobenzene	180	11.746	11.746	(1.215)	24781	50.0000	42.80
	71 1,2,3-Trichloropropane	75	8.867	8.867	(0.917)	134196	50.0000	48.26(M)
	90 1,2,4-Trichlorobenzene	180	11.338	11.338	(1.173)	51475	50.0000	46.89
	79 1,2,4-Trimethylbenzene	105	9.383	9.383	(0.970)	431446	50.0000	45.84
	89 1,2-Dibromo-3-Chloropropane	155	10.658	10.658	(1.102)	11852	50.0000	41.27
	57 1,2-Dibromoethane	107	7.262	7.262	(0.947)	138320	50.0000	50.56
	88 1,2-Dichlorobenzene	146	9.999	9.999	(1.034)	219712	50.0000	46.04

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/l)	AMOUNTS ON-COL (ug/l)
33	1,2-Dichloroethane	62	4.562	4.562	(0.918)	250160	50.0000	51.56
42	1,2-Dichloropropane	63	5.443	5.443	(1.095)	187291	50.0000	49.74
75	1,3,5-Trimethylbenzene	105	9.067	9.067	(0.938)	413208	50.0000	44.43
83	1,3-Dichlorobenzene	146	9.605	9.605	(0.993)	241837	50.0000	46.09
54	1,3-Dichloropropane	76	6.983	6.983	(0.910)	234849	50.0000	48.29
84	1,4-Dichlorobenzene	146	9.683	9.683	(1.001)	243110	50.0000	45.49
26	2,2-Dichloropropane	77	3.516	3.516	(0.839)	170291	50.0000	41.03
24	2-Butanone	43	3.580	3.580	(0.855)	206167	100.000	101.28
76	2-Chlorotoluene	91	8.974	8.974	(0.928)	378024	50.0000	46.37
52	2-Hexanone	43	7.090	7.090	(0.924)	331854	100.000	94.28
77	4-Chlorotoluene	91	9.075	9.075	(0.939)	429566	50.0000	45.04
82	p-Isopropyltoluene	119	9.655	9.655	(0.999)	390516	50.0000	42.87
45	4-Methyl-2-Pentanone	43	6.324	6.324	(0.824)	493942	100.000	97.42
10	Acetone	43	1.976	1.976	(0.472)	112721	100.000	73.98
37	Benzene	78	4.519	4.519	(0.909)	564869	50.0000	51.03
74	Bromobenzene	156	8.810	8.810	(0.911)	153730	50.0000	49.04
29	Bromochloromethane	128	3.803	3.803	(0.908)	80887	50.0000	48.80
39	Bromodichloromethane	83	5.729	5.729	(1.153)	199740	50.0000	48.68
66	Bromoform	173	8.416	8.416	(1.097)	97749	50.0000	47.56
6	Bromomethane	94	1.338	1.338	(0.320)	76815	50.0000	46.82
19	Carbon Disulfide	76	2.069	2.069	(0.494)	528114	100.000	81.71
34	Carbon Tetrachloride	117	4.268	4.268	(0.859)	168595	50.0000	43.97
59	Chlorobenzene	112	7.699	7.699	(1.004)	354375	50.0000	47.91
7	Chloroethane	64	1.403	1.403	(0.335)	92581	50.0000	44.91
28	Chloroform	83	3.910	3.910	(0.933)	264701	50.0000	51.41
3	Chloromethane	50	1.081	1.081	(0.258)	274572	50.0000	55.92
27	cis-1,2-Dichloroethene	96	3.530	3.530	(0.843)	156520	50.0000	52.03
46	cis-1,3-Dichloropropene	75	6.159	6.159	(1.239)	229686	50.0000	48.35
55	Dibromochloromethane	129	7.176	7.176	(0.936)	148736	50.0000	49.20
44	Dibromomethane	93	5.557	5.557	(1.118)	98136	50.0000	48.78
2	Dichlorodifluoromethane	85	0.973	0.973	(0.232)	121660	50.0000	49.13
61	Ethylbenzene	106	7.800	7.800	(1.017)	177267	50.0000	45.94
91	Hexachlorobutadiene	225	11.481	11.481	(1.187)	35288	50.0000	41.62
67	Isopropylbenzene	105	8.566	8.566	(1.117)	496558	50.0000	42.96
62	m,p-Xylenes	106	7.907	7.907	(1.031)	428671	100.000	92.76
17	Methylene Chloride	84	2.305	2.305	(0.550)	126237	50.0000	45.65
87	n-Butylbenzene	91	9.999	9.999	(1.034)	338268	50.0000	42.31
73	n-Propylbenzene	91	8.917	8.917	(0.922)	580132	50.0000	44.48
92	Naphthalene	128	11.546	11.546	(1.194)	75121	50.0000	43.07
63	o-Xylene	106	8.244	8.244	(1.075)	216989	50.0000	46.47
81	sec-Butylbenzene	105	9.526	9.526	(0.985)	445849	50.0000	42.06
64	Styrene	104	8.258	8.258	(1.077)	392066	50.0000	48.52
78	tert-Butylbenzene	119	9.340	9.340	(0.966)	324133	50.0000	43.68
56	Tetrachloroethene	164	6.933	6.933	(0.904)	95493	50.0000	41.98
50	Toluene	91	6.446	6.446	(0.840)	557692	50.0000	47.90
20	trans-1,2-Dichloroethene	96	2.535	2.535	(0.605)	102643	50.0000	40.63
51	trans-1,3-Dichloropropene	75	6.682	6.682	(1.344)	212041	50.0000	48.40
38	Trichloroethene	130	5.214	5.214	(1.049)	137595	50.0000	46.88
8	Trichlorofluoromethane	101	1.561	1.561	(0.373)	168957	50.0000	43.58
5	Vinyl Chloride	62	1.145	1.145	(0.273)	184164	50.0000	47.76

QC Flag Legend

M - Compound response manually integrated.

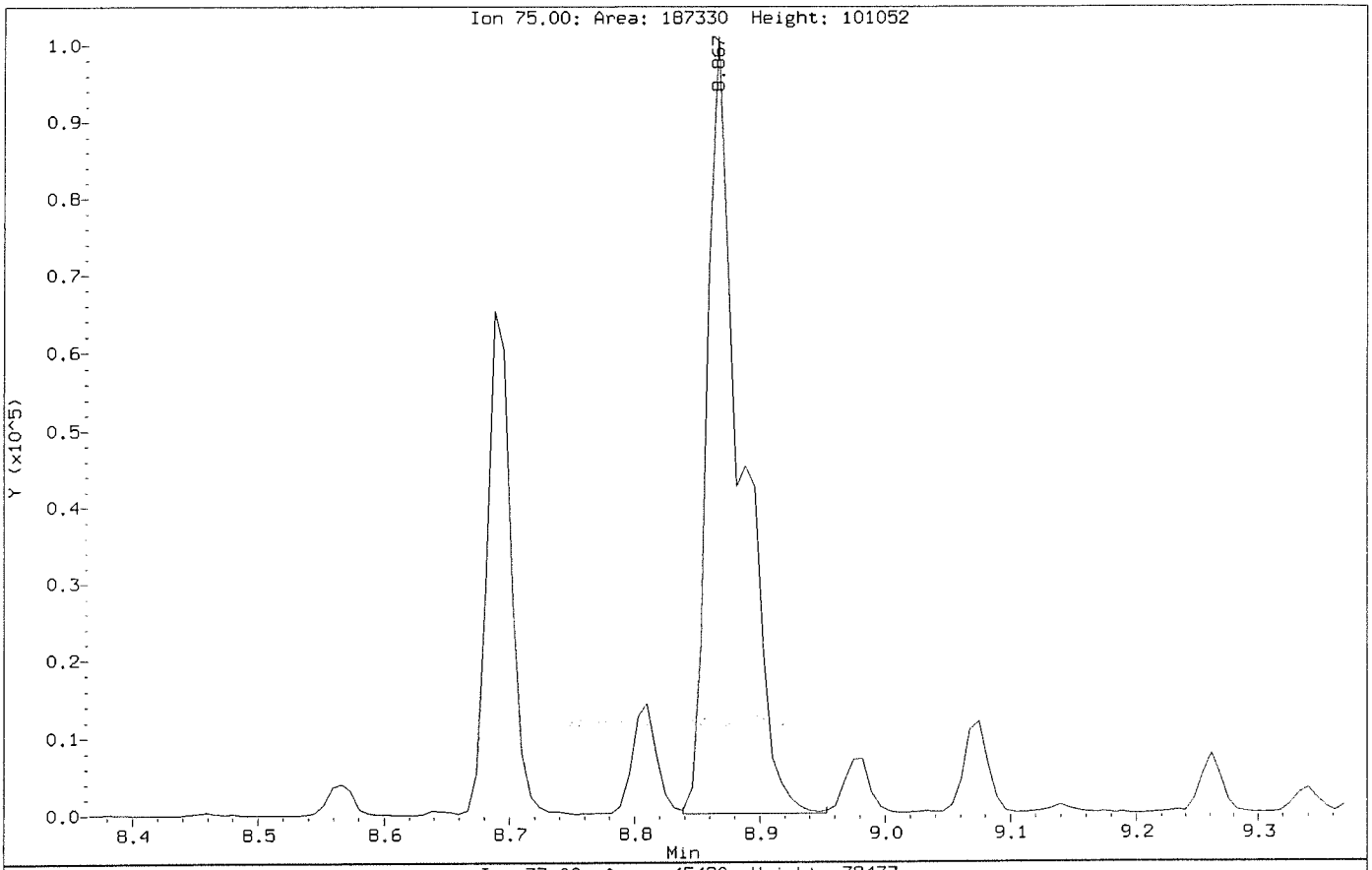


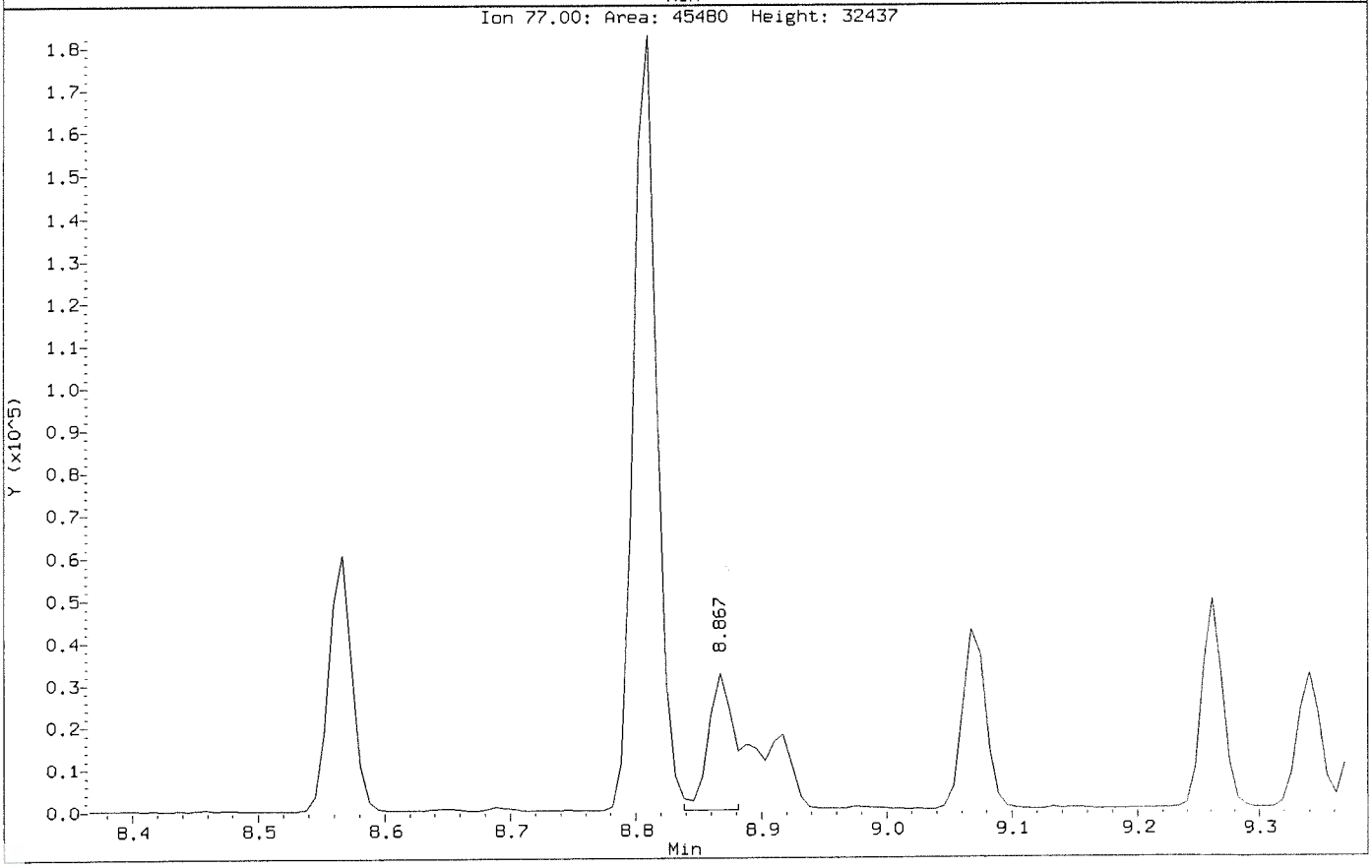
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Sample Info: CCV-END;CCV-END;2;;;
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Column phase: DB624

Instrument: voa6.i
Operator: PC
Column diameter: 0.18

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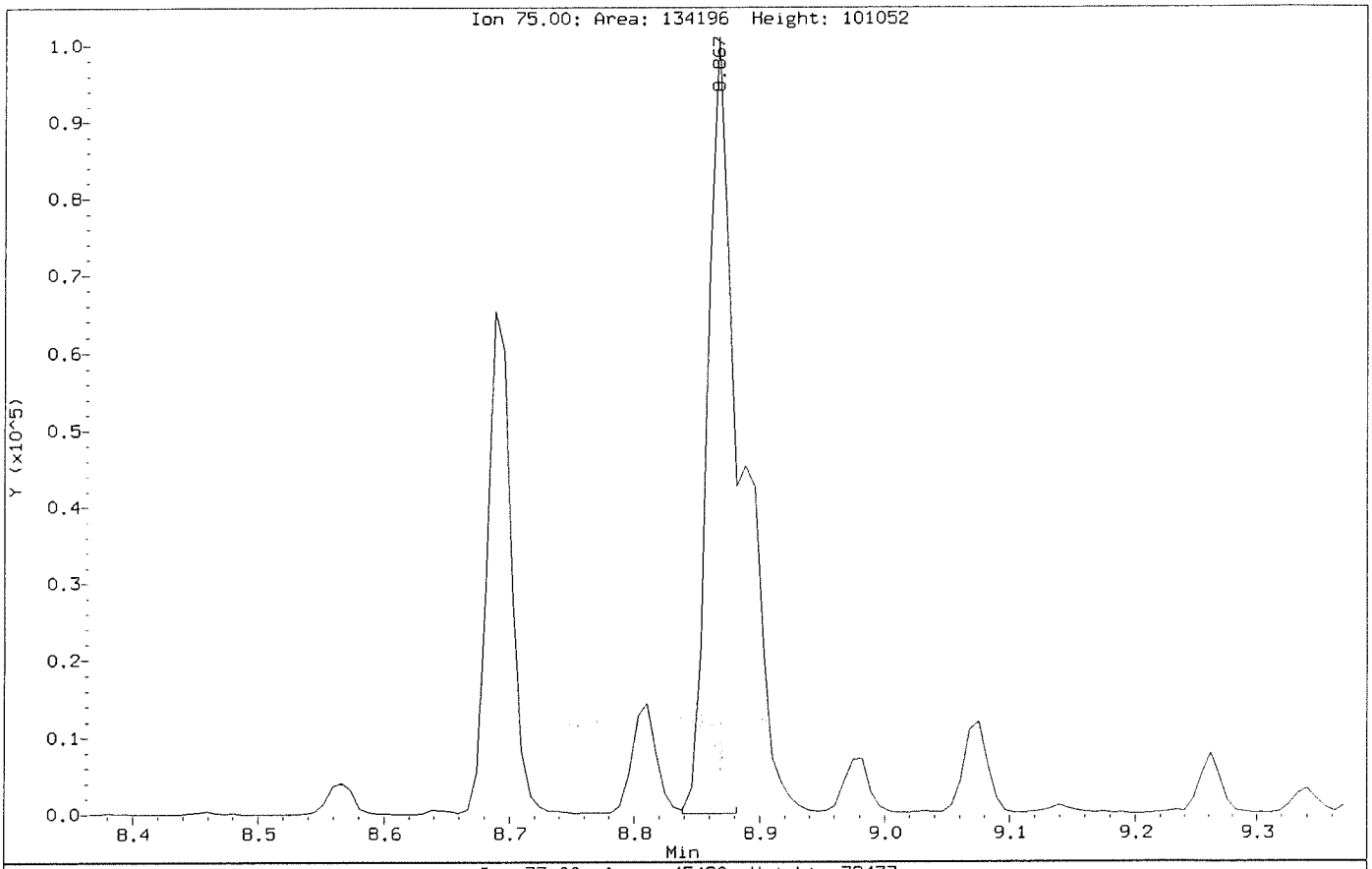
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CAS Number: 96-18-4

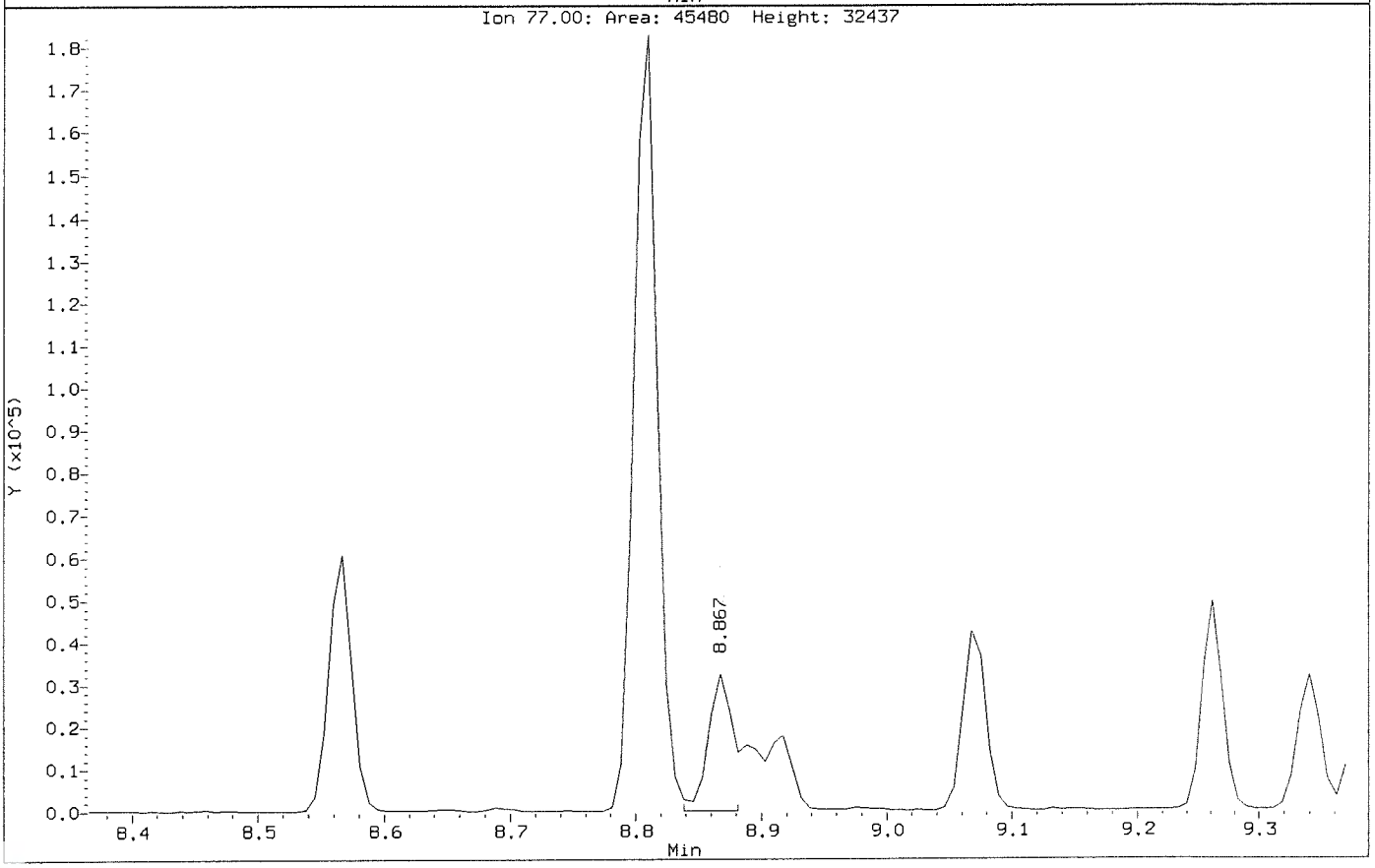




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Compound: 1,2,3-Trichloropropane
CAS Number: 96-18-4

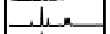
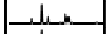
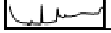




HS20070399 Wet Chem Raw Data (IC)

ALS WO# HS20070399

Sequence: 071020
Last Update Operator: alshs.nouser

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	STD2		Calibration	GB2	1.00	2	Anions Program 06022020.1	Anions Processing Method	5.0	Finished
	STD3		Calibration	GB3	1.00	3	Anions Program 06022020.1	Anions Processing Method	5.0	Finished
	STD4		Calibration	GB4	1.00	4	Anions Program 06022020.1	Anions Processing Method	5.0	Finished
	STD5		Calibration	GB5	1.00	5	Anions Program 06022020.1	Anions Processing Method	5.0	Finished
	STD6		Calibration	GB6	1.00	6	Anions Program 06022020.1	Anions Processing Method	5.0	Finished
	ICV		Unknown	GB7	1.00		Anions Program 06022020.1	Anions Processing Method	5.0	Finished
	ICB		Unknown	BA3	1.00		Anions Program 06022020.1	Anions Processing Method	5.0	Finished
	CCV1		Unknown	BA4	1.00		Anions Program 06022020.1	Anions Processing Method	5.0	Finished
	CCB		Unknown	BA5	1.00		Anions Program 06022020.1	Anions Processing Method	5.0	Finished
	HS20070399-01	9056_W	Unknown	GB7	1.00		Anions Program 06022020.1	Anions Processing Method	5.0	Finished
	HS20070399-01DF10	9056_W	Unknown	GB8	10.00		Anions Program 06022020.1	Anions Processing Method	5.0	Finished
	HS20070399-01MSDF10	9056_W	Unknown	GC1	10.00		Anions Program 06022020.1	Anions Processing Method	5.0	Finished
	HS20070399-01MSDDF10	9056_W	Unknown	GC2	10.00		Anions Program 06022020.1	Anions Processing Method	5.0	Finished
	MBLK-071020	9056_W	Unknown	BB7	1.00		Anions Program 06022020.1	Anions Processing Method	5.0	Finished
	LCS-071020	9056_W	Unknown	BB2	1.00		Anions Program 06022020.1	Anions Processing Method	5.0	Finished
	CCV		Unknown	BA2	1.00		Anions Program 06022020.1	Anions Processing Method	5.0	Finished
	CCB		Unknown	BA3	1.00		Anions Program 06022020.1	Anions Processing Method	5.0	Finished

Sequence: 071020
Last Update Operator: alshs.nouser

Inject Time
6/2/2020 11:02:48 AM -05:00
6/2/2020 11:20:59 AM -05:00
6/2/2020 11:39:04 AM -05:00
6/2/2020 11:57:10 AM -05:00
6/2/2020 12:15:18 PM -05:00
6/2/2020 12:33:22 PM -05:00
6/2/2020 12:51:27 PM -05:00
6/2/2020 1:45:50 PM -05:00
7/12/2020 12:07:22 PM -05:00
7/12/2020 12:25:30 PM -05:00
7/12/2020 12:43:36 PM -05:00
7/12/2020 1:01:42 PM -05:00
7/12/2020 1:19:48 PM -05:00
7/12/2020 1:37:55 PM -05:00
7/12/2020 2:14:07 PM -05:00
7/12/2020 2:32:15 PM -05:00
7/12/2020 3:26:36 PM -05:00
7/12/2020 3:44:41 PM -05:00

Sequence: 071020
Injection #6: STD6

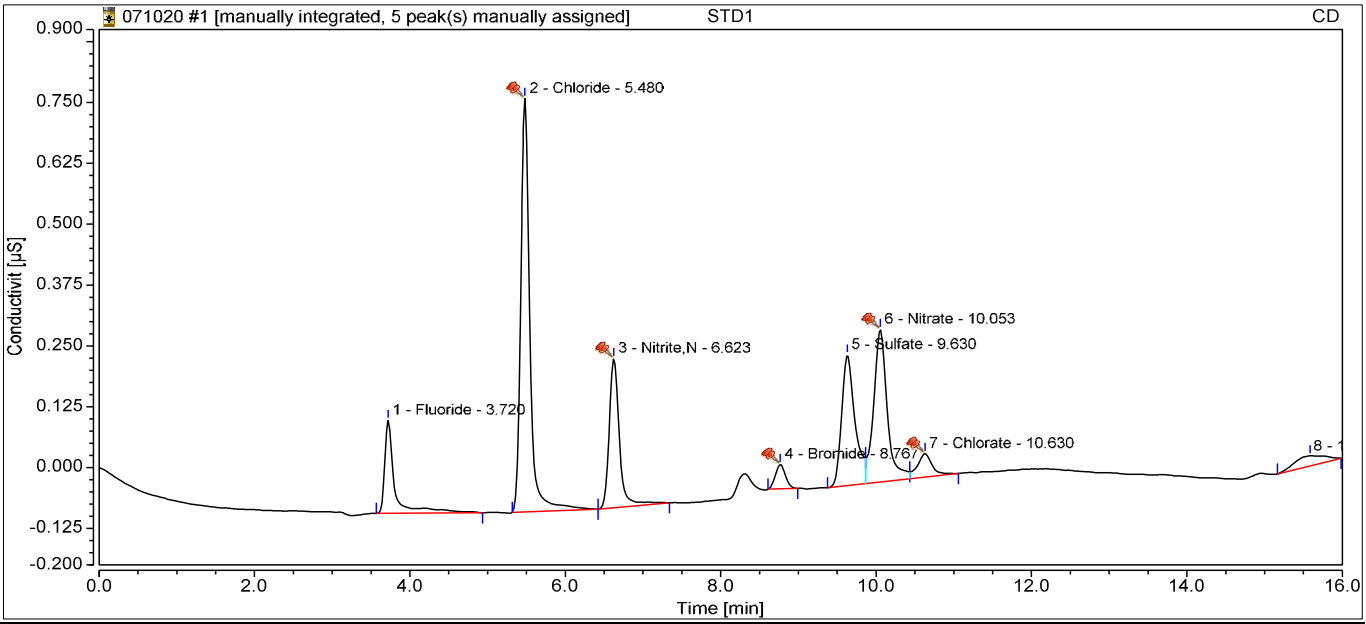
Calibration

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*	*10.8139*	*0.99942*	*-0.0046*	*0.3376*	*0.0000*
2	Chloride	Lin, WithOffset, 1/	Area	6	3.4292	0.99994	0.0066	0.2216	0.0000
3	Nitrite,N	Lin, WithOffset, 1/	Area	6	25.3231	0.99619	0.0124	0.4569	0.0000
4	Bromide	Lin, WithOffset, 1/	Area	6	11.6783	0.99936	-0.0023	0.0890	0.0000
5	Sulfate	Lin, WithOffset, 1/	Area	6	4.6337	0.99991	-0.0317	0.1582	0.0000
6	Nitrate	Lin, WithOffset, 1/	Area	6	5.8899	0.99981	0.0058	0.5970	0.0000
7	Chlorate	Lin, WithOffset, 1/	Area	6	15.6369	0.99851	0.0032	0.0971	0.0000
8	Phosphate	Lin, WithOffset, 1/	Area	5	24.1443	0.99440	-0.0555	0.1862	0.0000
Maximum					**25.3231**	0.99994			
Minimum					3.4292	**0.99440**			

1 STD1

Sample Name:	**STD1**	*Injection Volume:*	**5.00**
Vial Number:	**GB1**	*Channel:*	**CD**
Sample Type:	**Calibration Standard**	*Wavelength:*	**210**
Control Program:	**Anions Program 06022020.1**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Anions Processing Method**	*Dilution Factor:*	**1.0000**
Recording Time:	**06/02/2020 11:02**	*Sample Weight:*	**1.0000**

Run Time:



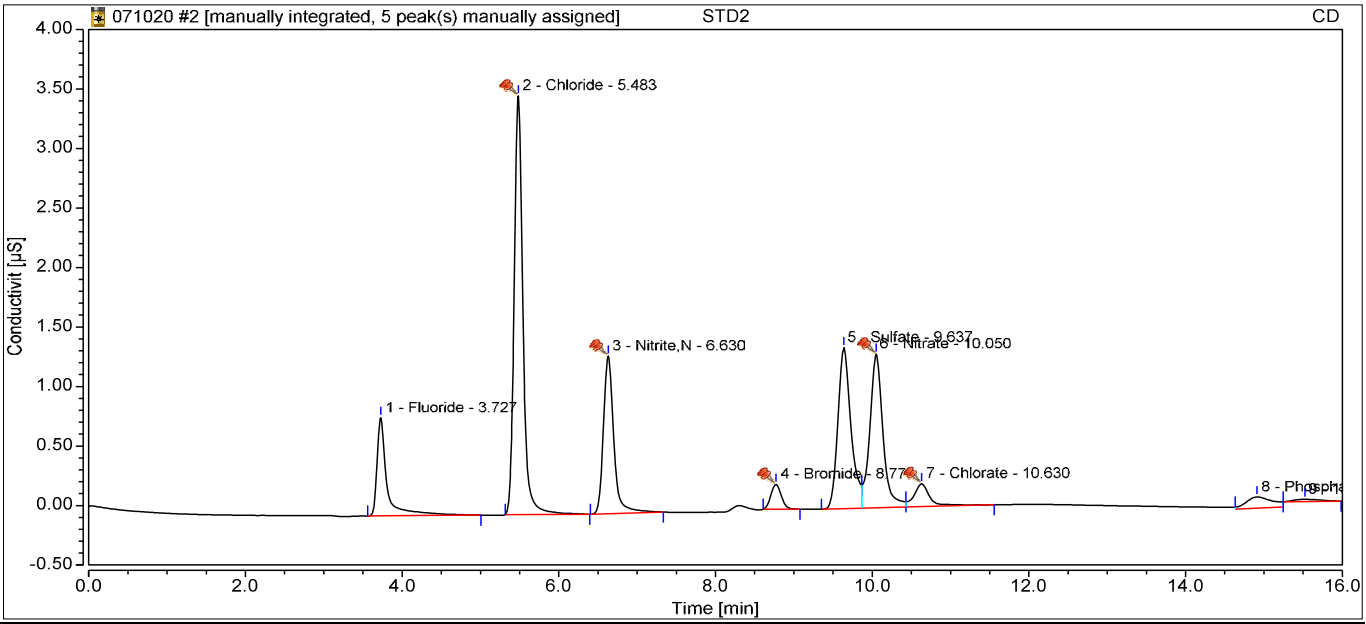
Integration Results

No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
1	3.72	Fluoride	BMB	0.029	0.0982	0.0982	1.0000
2	5.48	Chloride	BMB^	0.115	0.4904	0.4904	1.0000
3	6.62	Nitrite,N	BMB*^	0.046	0.0745	0.0745	1.0000
4	8.77	Bromide	BMB^	0.007	0.1093	0.1093	1.0000
5	9.63	Sulfate	BM	0.053	0.5374	0.5374	1.0000
6	10.05	Nitrate	M ^	0.064	0.0969	0.0969	1.0000
7	10.63	Chlorate	MB^	0.011	0.0775	0.0775	1.0000
n.a.	n.a.	Phosphate	n.a.	n.a.	n.a.	n.a.	1.0000
Total:			**0.000**	**0.325**		**1.48**	

2 STD2

Sample Name:	**STD2**	*Injection Volume:*	**5.00**
Vial Number:	**GB2**	*Channel:*	**CD**
Sample Type:	**Calibration Standard**	*Wavelength:*	**210**
Control Program:	**Anions Program 06022020.1**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Anions Processing Method**	*Dilution Factor:*	**1.0000**
Recording Time:	**06/02/2020 11:20**	*Sample Weight:*	**1.0000**

Run Time:



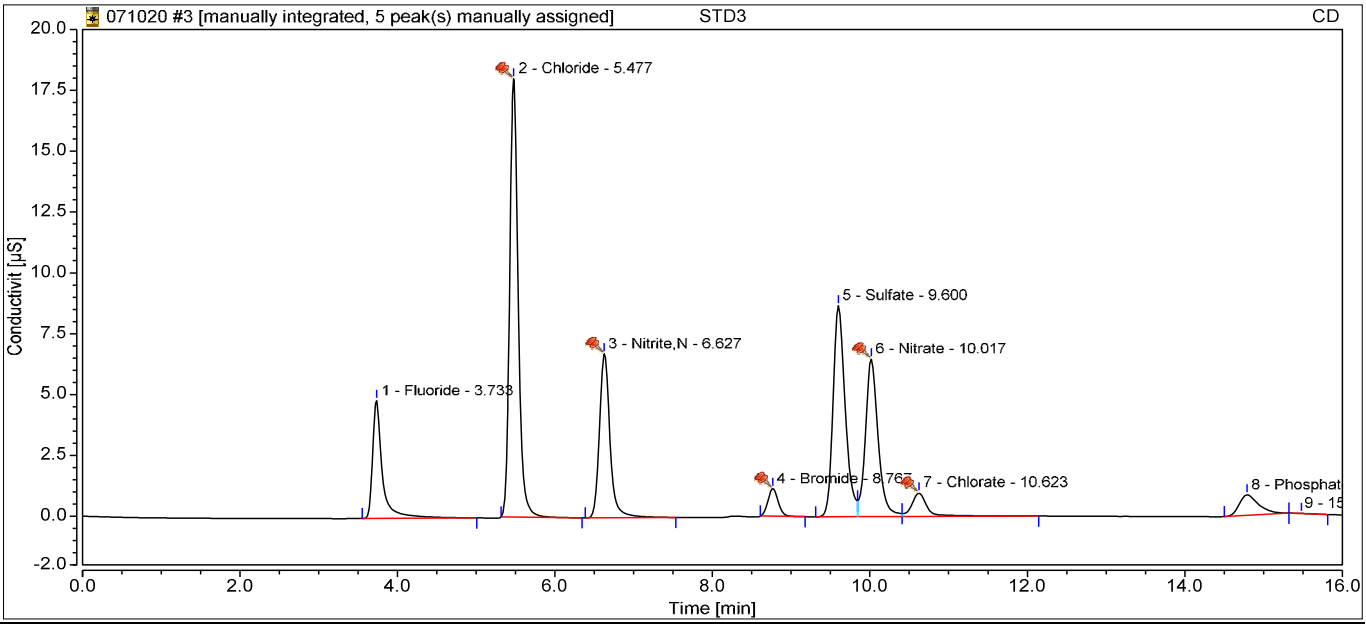
Integration Results

No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
1	3.73	Fluoride	BMB	0.122	0.3761	0.3761	1.0000
2	5.48	Chloride	BMB^	0.452	2.0081	2.0081	1.0000
3	6.63	Nitrite,N	BMB*^	0.202	0.4159	0.4159	1.0000
4	8.77	Bromide	BMB^	0.032	0.3810	0.3810	1.0000
5	9.64	Sulfate	BM	0.263	1.8631	1.8631	1.0000
6	10.05	Nitrate	M ^	0.253	0.4135	0.4135	1.0000
7	10.63	Chlorate	MB^	0.046	0.4359	0.4359	1.0000
8	14.91	Phosphate	M *	0.037	0.4982	0.4982	1.0000
Total:			**0.000**	**1.407**		**6.39**	

3 STD3

Sample Name:	**STD3**	*Injection Volume:*	**5.00**
Vial Number:	**GB3**	*Channel:*	**CD**
Sample Type:	**Calibration Standard**	*Wavelength:*	**210**
Control Program:	**Anions Program 06022020.1**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Anions Processing Method**	*Dilution Factor:*	**1.0000**
Recording Time:	**06/02/2020 11:39**	*Sample Weight:*	**1.0000**

Run Time:



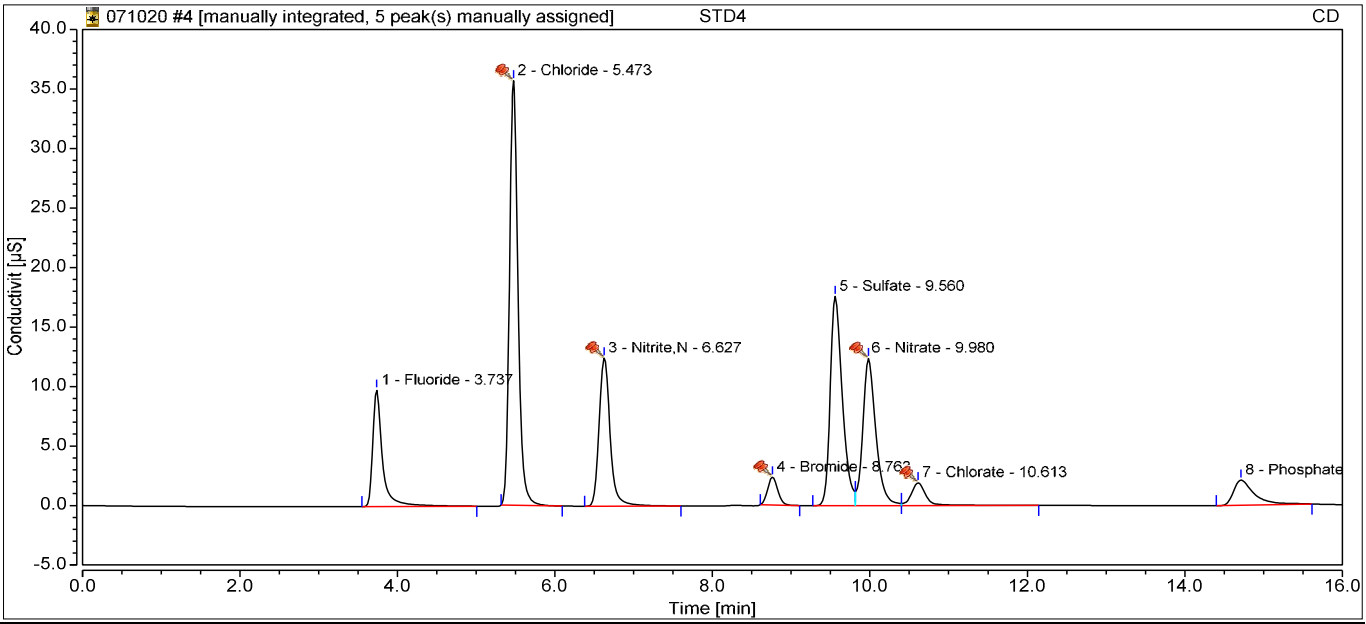
Integration Results

No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
1	3.73	Fluoride	BMB	0.697	2.0782	2.0782	1.0000
2	5.48	Chloride	BMB^	2.257	10.1575	10.1575	1.0000
3	6.63	Nitrite,N	BMB*^	1.049	2.2692	2.2692	1.0000
4	8.77	Bromide	BMB^	0.172	1.9524	1.9524	1.0000
5	9.60	Sulfate	BM	1.543	9.9532	9.9532	1.0000
6	10.02	Nitrate	M ^	1.213	2.0220	2.0220	1.0000
7	10.62	Chlorate	MB^	0.220	2.2332	2.2332	1.0000
8	14.79	Phosphate	BMB	0.243	1.6042	1.6042	1.0000
Total:			**0.000**	**7.394**		**32.27**	

4 STD4

Sample Name:	**STD4**	*Injection Volume:*	**5.00**
Vial Number:	**GB4**	*Channel:*	**CD**
Sample Type:	**Calibration Standard**	*Wavelength:*	**210**
Control Program:	**Anions Program 06022020.1**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Anions Processing Method**	*Dilution Factor:*	**1.0000**
Recording Time:	**06/02/2020 11:57**	*Sample Weight:*	**1.0000**

Run Time:



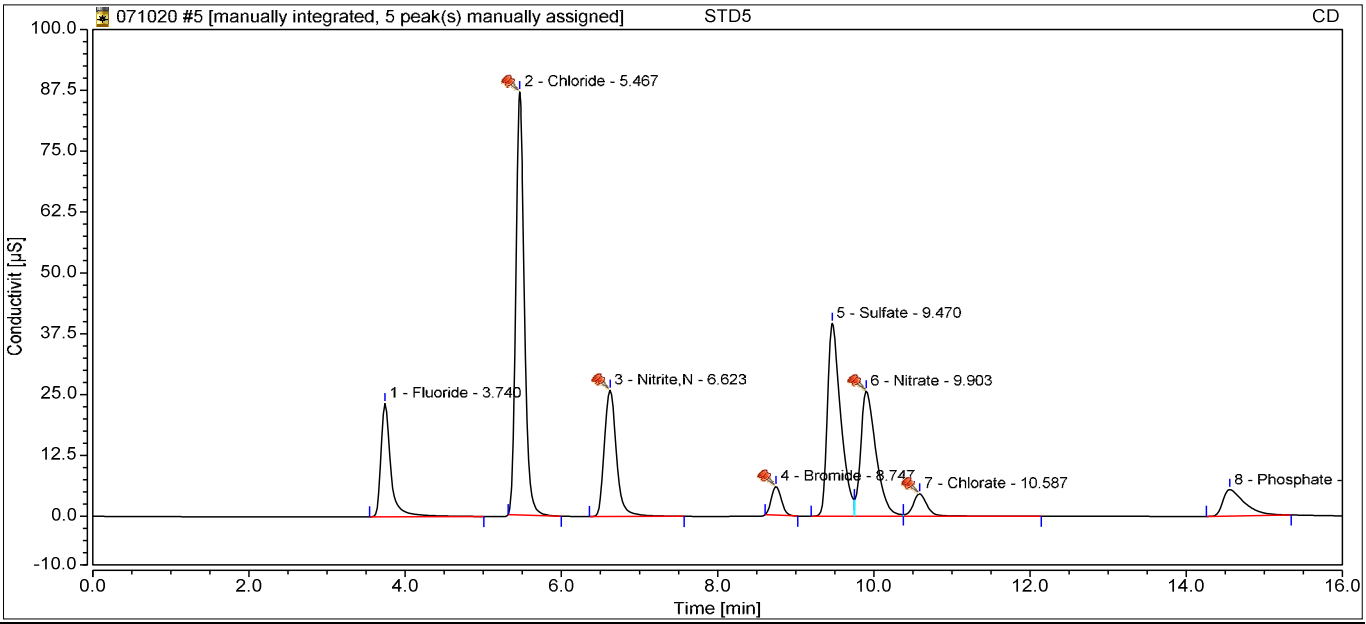
Integration Results

No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
1	3.74	Fluoride	BMB	1.406	4.1793	4.1793	1.0000
2	5.47	Chloride	BMB^	4.475	20.1656	20.1656	1.0000
3	6.63	Nitrite,N	BMB*^	2.031	4.4170	4.4170	1.0000
4	8.76	Bromide	BMB^	0.350	3.9560	3.9560	1.0000
5	9.56	Sulfate	BM	3.131	19.9943	19.9943	1.0000
6	9.98	Nitrate	M ^	2.388	3.9909	3.9909	1.0000
7	10.61	Chlorate	MB^	0.410	4.1864	4.1864	1.0000
8	14.71	Phosphate	BMB*	0.647	3.7708	3.7708	1.0000
Total:			**0.000**	**14.837**		**64.66**	

5 STD5

Sample Name:	**STD5**	*Injection Volume:*	**5.00**
Vial Number:	**GB5**	*Channel:*	**CD**
Sample Type:	**Calibration Standard**	*Wavelength:*	**210**
Control Program:	**Anions Program 06022020.1**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Anions Processing Method**	*Dilution Factor:*	**1.0000**
Recording Time:	**06/02/2020 12:15**	*Sample Weight:*	**1.0000**

Run Time:



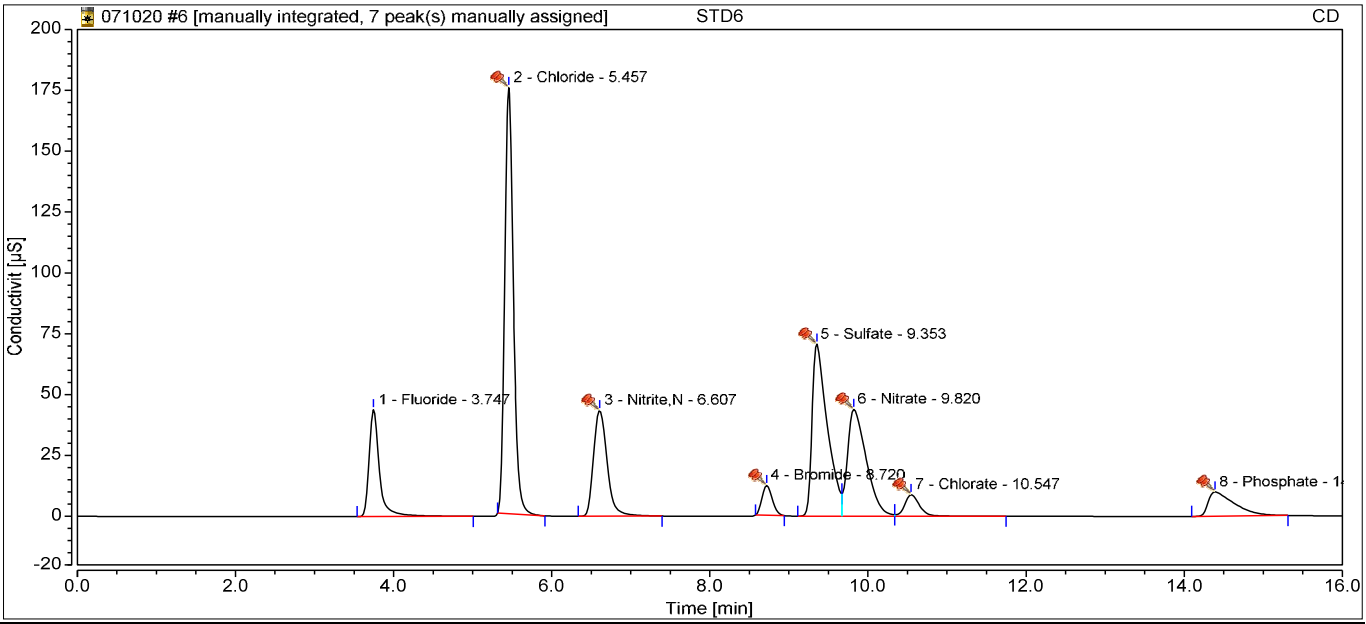
Integration Results

No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
1	3.74	Fluoride	BMB	3.409	10.1112	10.1112	1.0000
2	5.47	Chloride	BMB^	10.962	49.4436	49.4436	1.0000
3	6.62	Nitrite,N	BMB*^	4.673	10.1996	10.1996	1.0000
4	8.75	Bromide	BMB^	0.860	9.6874	9.6874	1.0000
5	9.47	Sulfate	BM	7.832	49.7141	49.7141	1.0000
6	9.90	Nitrate	M ^	5.855	9.7981	9.7981	1.0000
7	10.59	Chlorate	MB^	0.963	9.8794	9.8794	1.0000
8	14.56	Phosphate	BMB*	1.744	9.6675	9.6675	1.0000
Total:			**0.000**	**36.299**		**158.50**	

6 STD6

Sample Name:	**STD6**	*Injection Volume:*	**5.00**
Vial Number:	**GB6**	*Channel:*	**CD**
Sample Type:	**Calibration Standard**	*Wavelength:*	**210**
Control Program:	**Anions Program 06022020.1**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Anions Processing Method**	*Dilution Factor:*	**1.0000**
Recording Time:	**06/02/2020 12:33**	*Sample Weight:*	**1.0000**

Run Time:



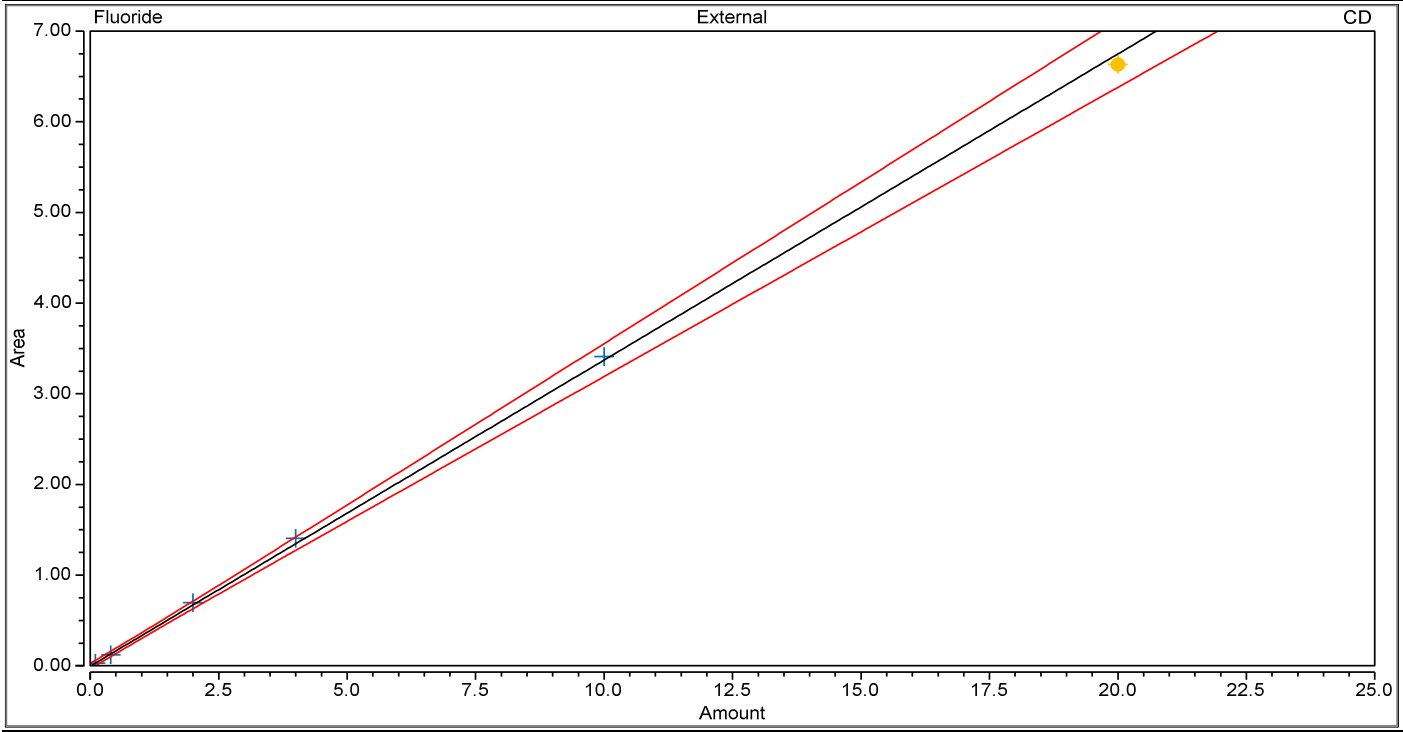
Integration Results

No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
1	3.75	Fluoride	BMB	6.632	19.6569	19.6569	1.0000
2	5.46	Chloride	BMB^	22.217	100.2349	100.2349	1.0000
3	6.61	Nitrite,N	BMB*^	8.750	19.1238	19.1238	1.0000
4	8.72	Bromide	BMB*^	1.815	20.4140	20.4140	1.0000
5	9.35	Sulfate	BM ^	15.855	100.4380	100.4380	1.0000
6	9.82	Nitrate	M ^	12.052	20.1786	20.1786	1.0000
7	10.55	Chlorate	MB^	1.916	19.6877	19.6877	1.0000
8	14.39	Phosphate	BMB*^	3.828	20.8593	20.8593	1.0000
Total:			**0.000**	**73.065**		**320.59**	

Calibration

Calibration Details	Fluoride		
Calibration Type	Lin, WithOffset, 1/A	*Offset (C0)*	-0.0046
Evaluation Type	Area	*Slope (C1)*	0.3376
Number of Calibration Points	6	*Curve (C2)*	0.0000
Number of disabled Calibration Points	0	*R-Square*	0.9994

Calibration Plot **Fluoride**



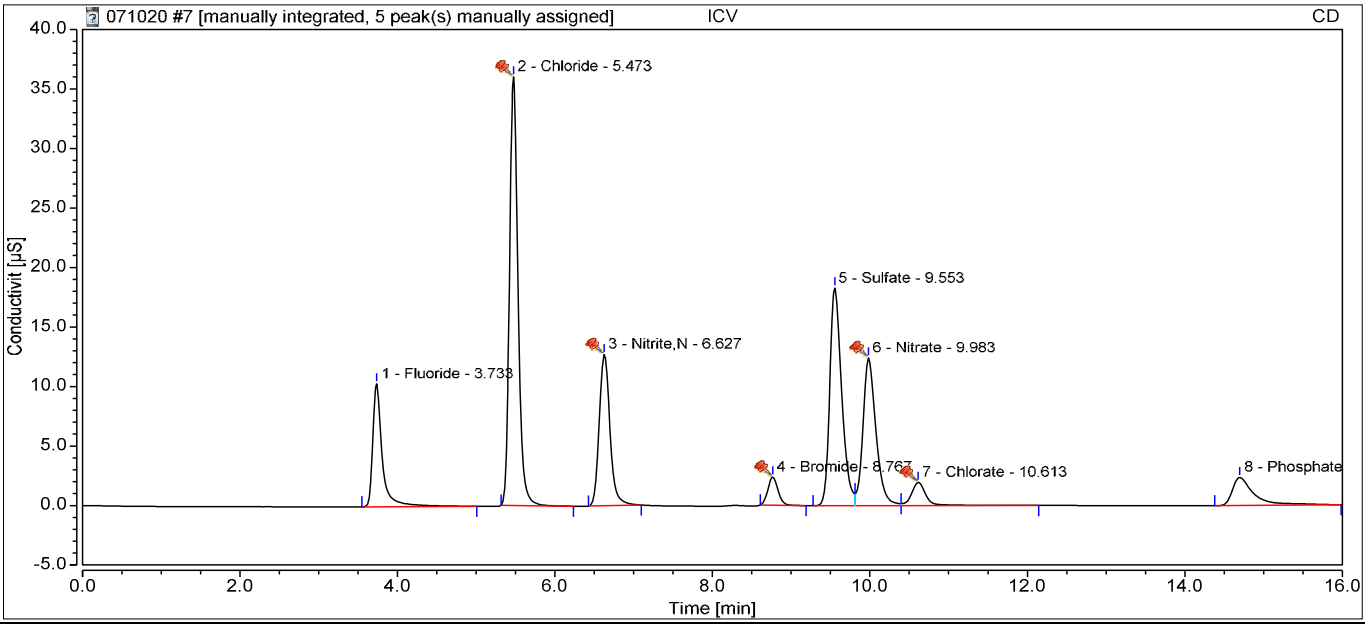
Calibration Results **Fluoride**

No.	Injection Name	Calibration Level	X Value CD Fluoride	Y Value CD Fluoride	Y Value CD Fluoride	Area µS*min CD Fluoride	Height µS CD Fluoride
1	STD1	1	0.1000	0.0285	0.0285	0.029	0.191
2	STD2	2	0.4000	0.1224	0.1224	0.122	0.826
3	STD3	3	2.0000	0.6970	0.6970	0.697	4.841
4	STD4	4	4.0000	1.4064	1.4064	1.406	9.790
5	STD5	5	10.0000	3.4092	3.4092	3.409	23.253
6	STD6	6	20.0000	6.6320	6.6320	6.632	43.889

7 ICV

Sample Name:	**ICV**	*Injection Volume:*	**5.00**
Vial Number:	**GB7**	*Channel:*	**CD**
Sample Type:	**Unknown**	*Wavelength:*	**210**
Control Program:	**Anions Program 06022020.1**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Anions Processing Method**	*Dilution Factor:*	**1.0000**
Recording Time:	**06/02/2020 12:51**	*Sample Weight:*	**1.0000**

Run Time:



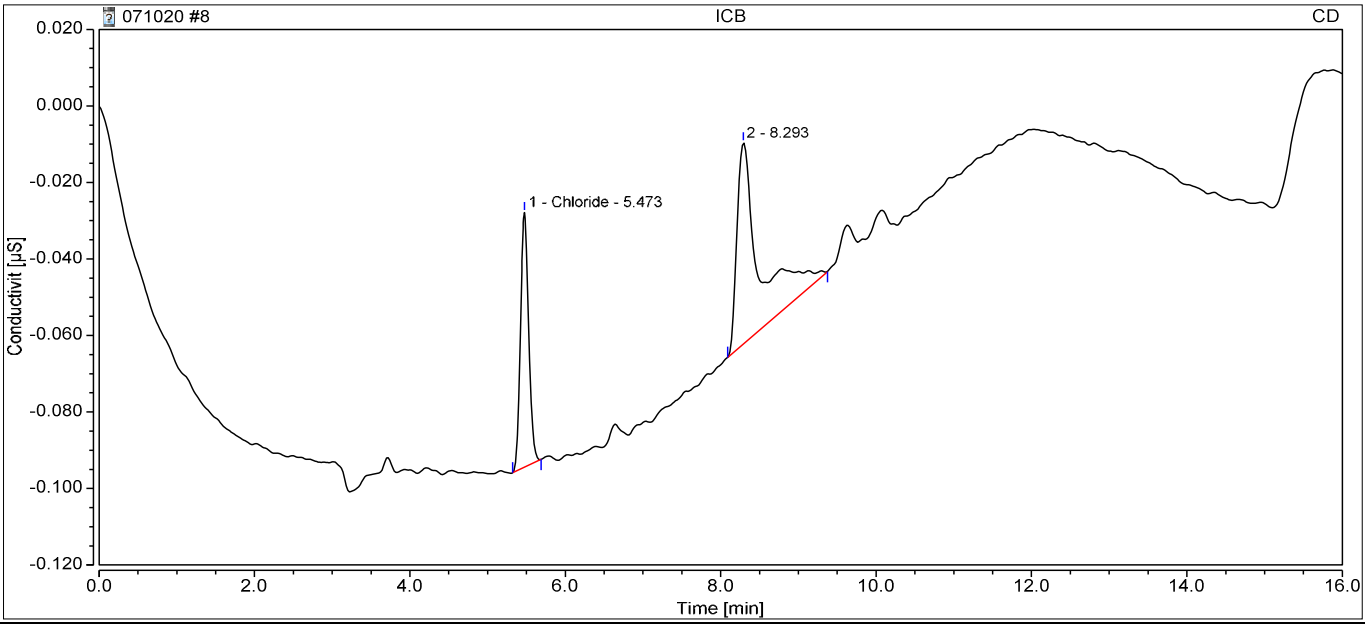
Integration Results

No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
1	3.73	Fluoride	BMB	1.442	4.2839	4.2839	1.0000
2	5.47	Chloride	BMB^	4.508	20.3168	20.3168	1.0000
3	6.63	Nitrite,N	BMB*^	2.013	4.3785	4.3785	1.0000
4	8.77	Bromide	BMB^	0.352	3.9794	3.9794	1.0000
5	9.55	Sulfate	BM	3.208	20.4827	20.4827	1.0000
6	9.98	Nitrate	M ^	2.387	3.9894	3.9894	1.0000
7	10.61	Chlorate	MB^	0.412	4.2081	4.2081	1.0000
8	14.70	Phosphate	BMB	0.762	4.3926	4.3926	1.0000
Total:			**0.000**	**15.085**		**66.03**	

8 ICB

Sample Name:	**ICB**	*Injection Volume:*	**5.00**
Vial Number:	**BA3**	*Channel:*	**CD**
Sample Type:	**Unknown**	*Wavelength:*	**210**
Control Program:	**Anions Program 06022020.1**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Anions Processing Method**	*Dilution Factor:*	**1.0000**
Recording Time:	**06/02/2020 13:45**	*Sample Weight:*	**1.0000**

Run Time:



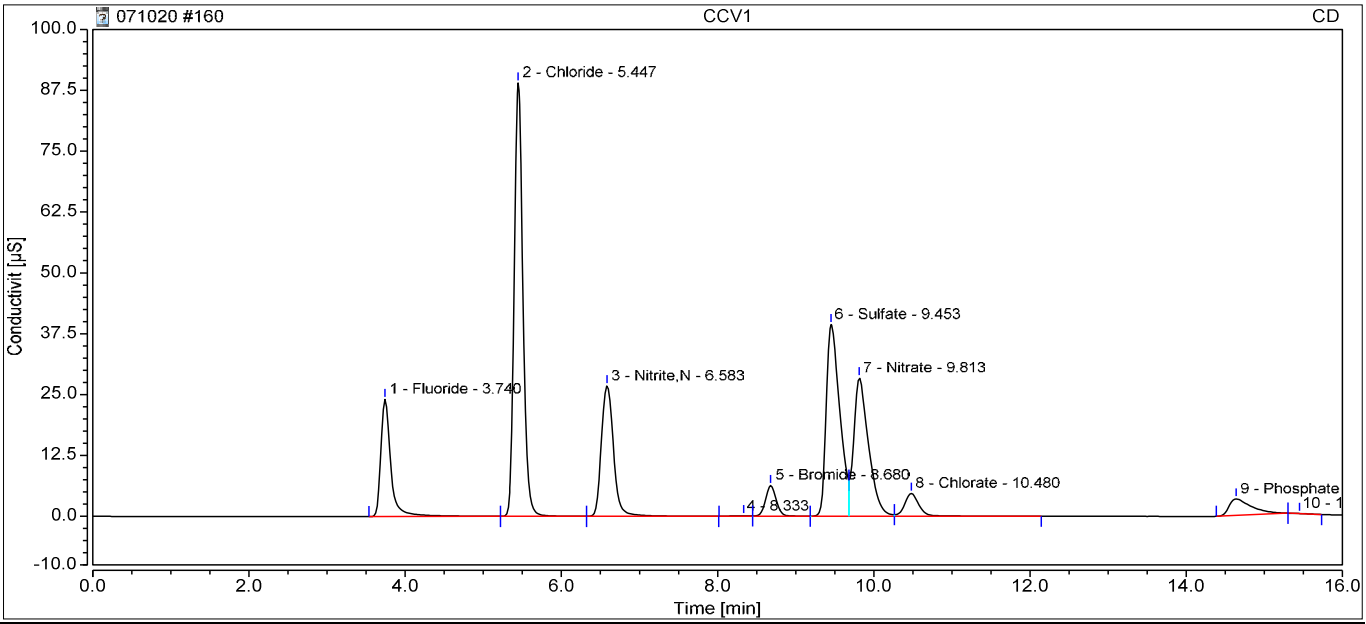
Integration Results

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	5.47	Chloride	BMB	0.008	0.0067	0.0067	1.0000
n.a.	n.a.	Nitrite,N	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.	Sulfate	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**	**0.008**		**0.01**	

160 CCV1

Sample Name:	**CCV1**	*Injection Volume:*	**5.00**
Vial Number:	**BA4**	*Channel:*	**CD**
Sample Type:	**Unknown**	*Wavelength:*	**210**
Control Program:	**Anions Program 06022020.1**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Anions Processing Method**	*Dilution Factor:*	**1.0000**
Recording Time:	**07/12/2020 12:07**	*Sample Weight:*	**1.0000**

Run Time:



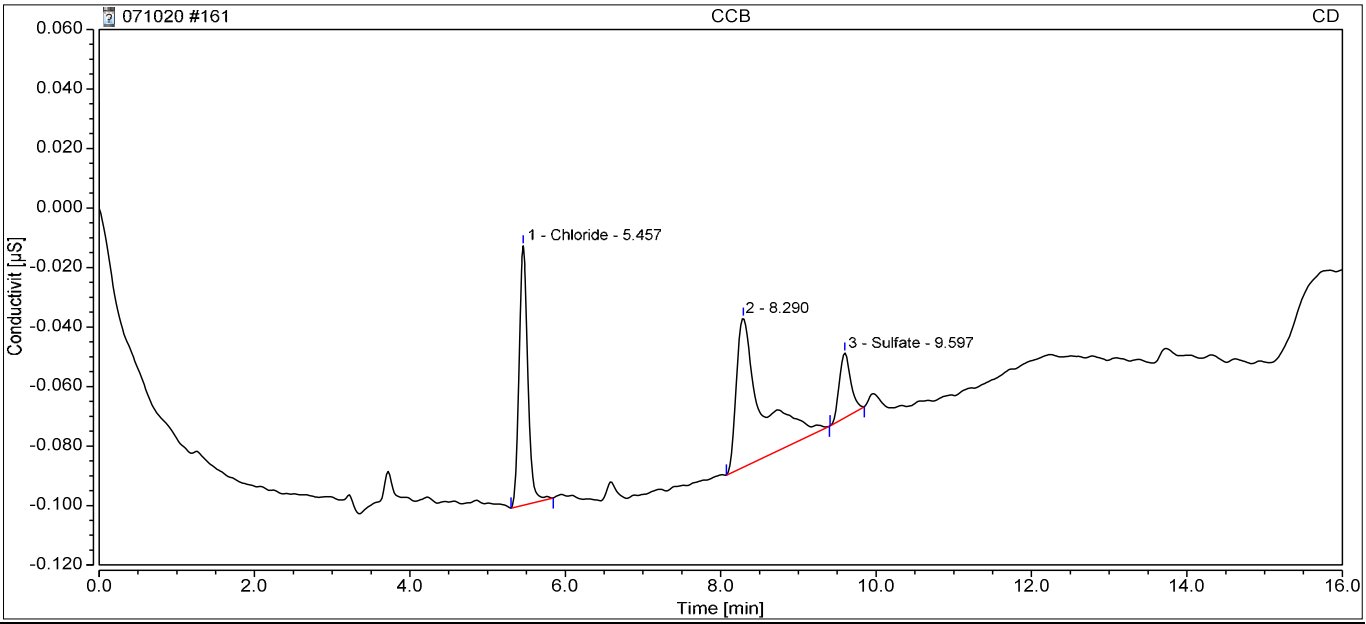
Integration Results

No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
1	3.74	Fluoride	BMB	3.561	10.5601	10.5601	1.0000
2	5.45	Chloride	BMB	11.506	51.8961	51.8961	1.0000
3	6.58	Nitrite,N	BMB	4.836	10.5578	10.5578	1.0000
5	8.68	Bromide	M	1.016	11.4303	11.4303	1.0000
6	9.45	Sulfate	M	7.919	50.2682	50.2682	1.0000
7	9.81	Nitrate	M	6.267	10.4874	10.4874	1.0000
8	10.48	Chlorate	MB	1.013	10.4000	10.4000	1.0000
9	14.64	Phosphate	BMB	1.135	6.3928	6.3928	1.0000
Total:			**0.000**	**37.253**		**161.99**	

161 CCB

Sample Name:	**CCB**	*Injection Volume:*	**5.00**
Vial Number:	**BA5**	*Channel:*	**CD**
Sample Type:	**Unknown**	*Wavelength:*	**210**
Control Program:	**Anions Program 06022020.1**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Anions Processing Method**	*Dilution Factor:*	**1.0000**
Recording Time:	**07/12/2020 12:25**	*Sample Weight:*	**1.0000**

Run Time:



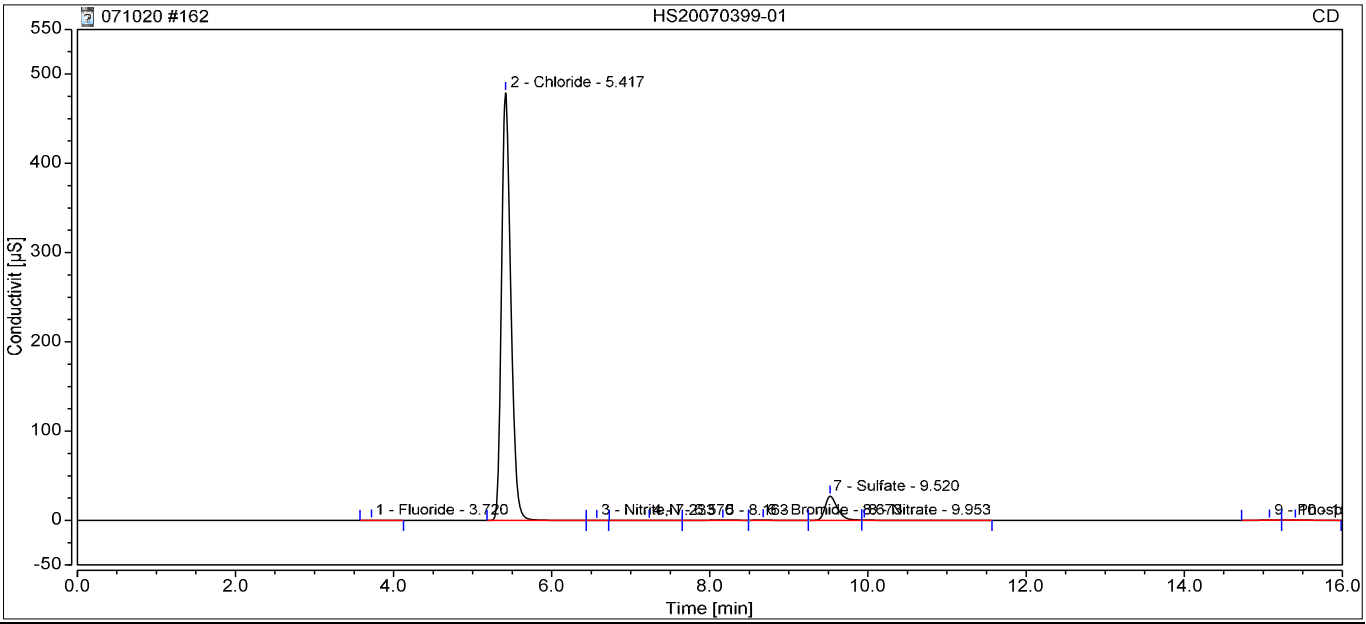
Integration Results

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	5.46	Chloride	BMB	0.011	0.0211	0.0211	1.0000
n.a.	n.a.	Nitrite,N	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
3	9.60	Sulfate	BMB	0.004	0.2237	0.2237	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**	**0.015**		**0.24**	

162 HS20070399-01

Sample Name:	**HS20070399-01**	*Injection Volume:*	**5.00**
Vial Number:	**GB7**	*Channel:*	**CD**
Sample Type:	**Unknown**	*Wavelength:*	**210**
Control Program:	**Anions Program 06022020.1**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Anions Processing Method**	*Dilution Factor:*	**1.0000**
Recording Time:	**07/12/2020 12:43**	*Sample Weight:*	**1.0000**

Run Time:



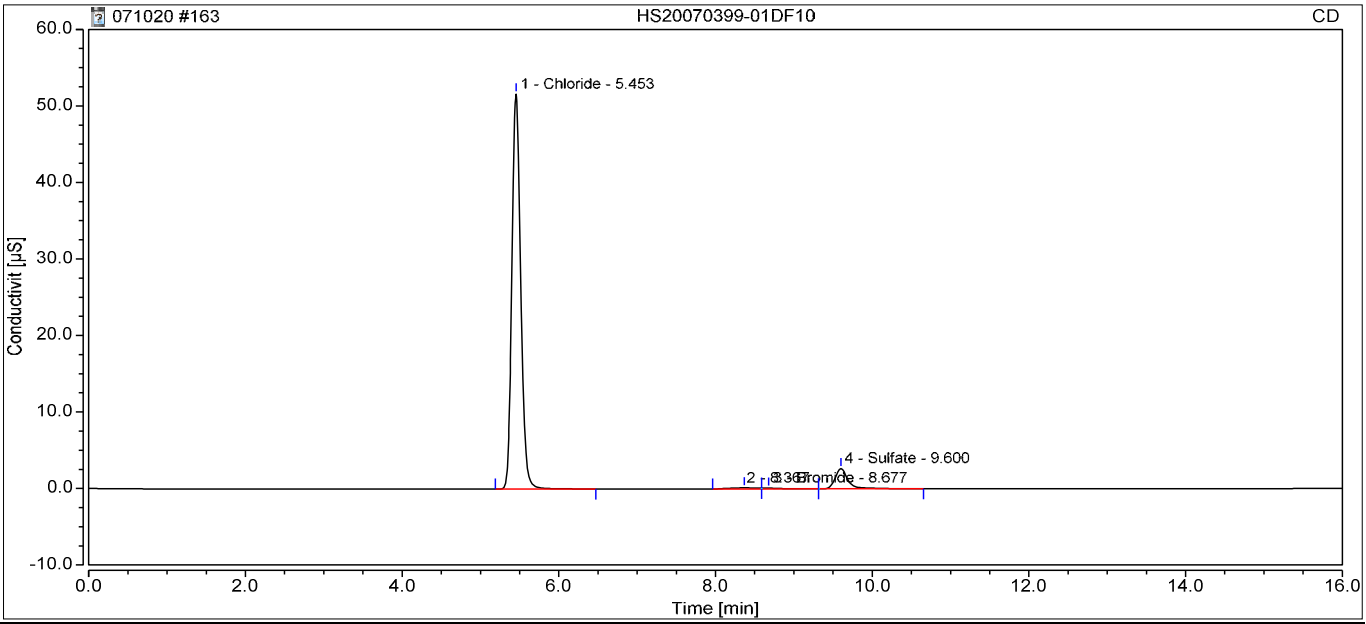
Integration Results

No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
1	3.72	Fluoride	BMB	0.027	0.0924	0.0924	1.0000
2	5.42	Chloride	BMB	64.906	292.8940	292.8940	1.0000
3	6.57	Nitrite,N	BMB	0.006	n.a.	n.a.	1.0000
6	8.67	Bromide	M	0.121	1.3793	1.3793	1.0000
7	9.52	Sulfate	M	4.932	31.3843	31.3843	1.0000
8	9.95	Nitrate	MB	0.105	0.1656	0.1656	1.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	1.0000
9	15.08	Phosphate	BMB	0.023	0.4222	0.4222	1.0000
Total:			**0.000**	**70.120**		**326.34**	

163 HS20070399-01DF10

Sample Name:	**HS20070399-01DF10**	*Injection Volume:*	**5.00**
Vial Number:	**GB8**	*Channel:*	**CD**
Sample Type:	**Unknown**	*Wavelength:*	**210**
Control Program:	**Anions Program 06022020.1**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Anions Processing Method**	*Dilution Factor:*	**10.0000**
Recording Time:	**07/12/2020 13:01**	*Sample Weight:*	**1.0000**

Run Time:



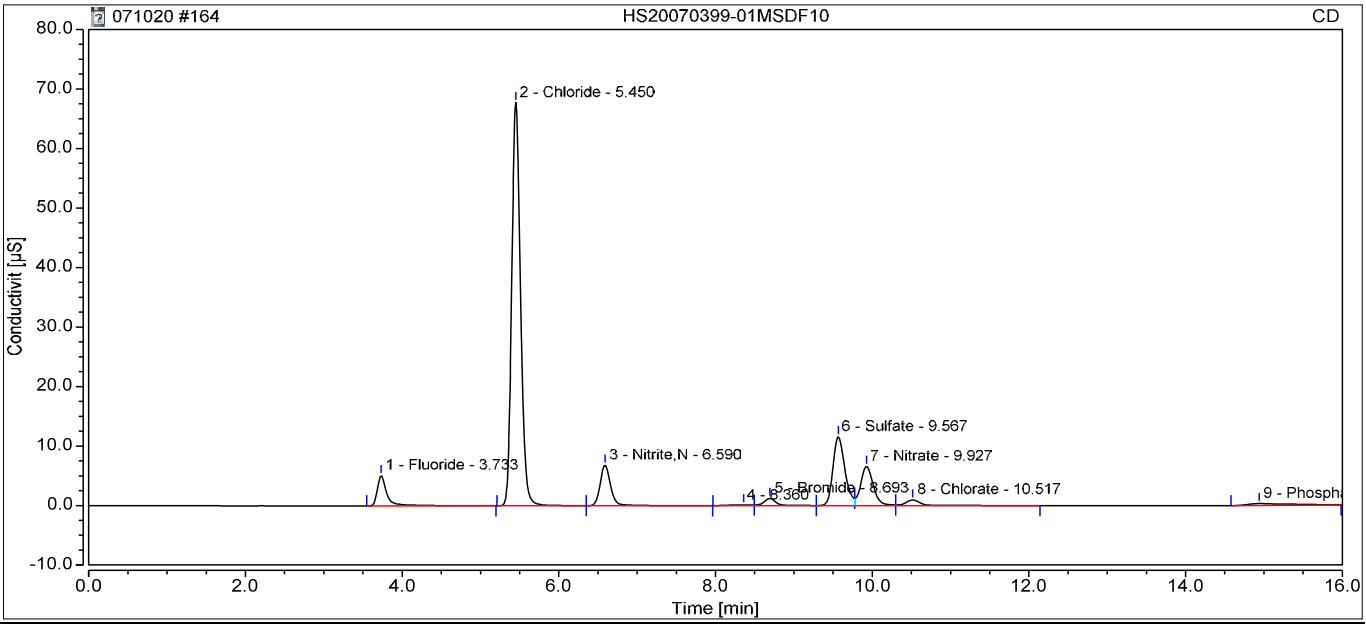
Integration Results

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.	10.0000
1	5.45	Chloride	BMB	6.666	30.0528	300.5280	10.0000
n.a.	n.a.	Nitrite,N	n.a.	n.a.	n.a.	n.a.	10.0000
3	8.68	Bromide	M	0.033	0.3913	3.9129	10.0000
4	9.60	Sulfate	MB	0.505	3.3941	33.9412	10.0000
n.a.	n.a.	Nitrate	n.a.	n.a.	n.a.	n.a.	10.0000
n.a.	n.a.	Chlorate	n.a.	n.a.	n.a.	n.a.	10.0000
n.a.	n.a.	Phosphate	n.a.	n.a.	n.a.	n.a.	10.0000
Total:			**0.000**	**7.203**		**338.38**	

164 HS20070399-01MSDF10

Sample Name:	**HS20070399-01MSDF10**	*Injection Volume:*	**5.00**
Vial Number:	**GC1**	*Channel:*	**CD**
Sample Type:	**Unknown**	*Wavelength:*	**210**
Control Program:	**Anions Program 06022020.1**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Anions Processing Method**	*Dilution Factor:*	**10.0000**
Recording Time:	**07/12/2020 13:19**	*Sample Weight:*	**1.0000**

Run Time:



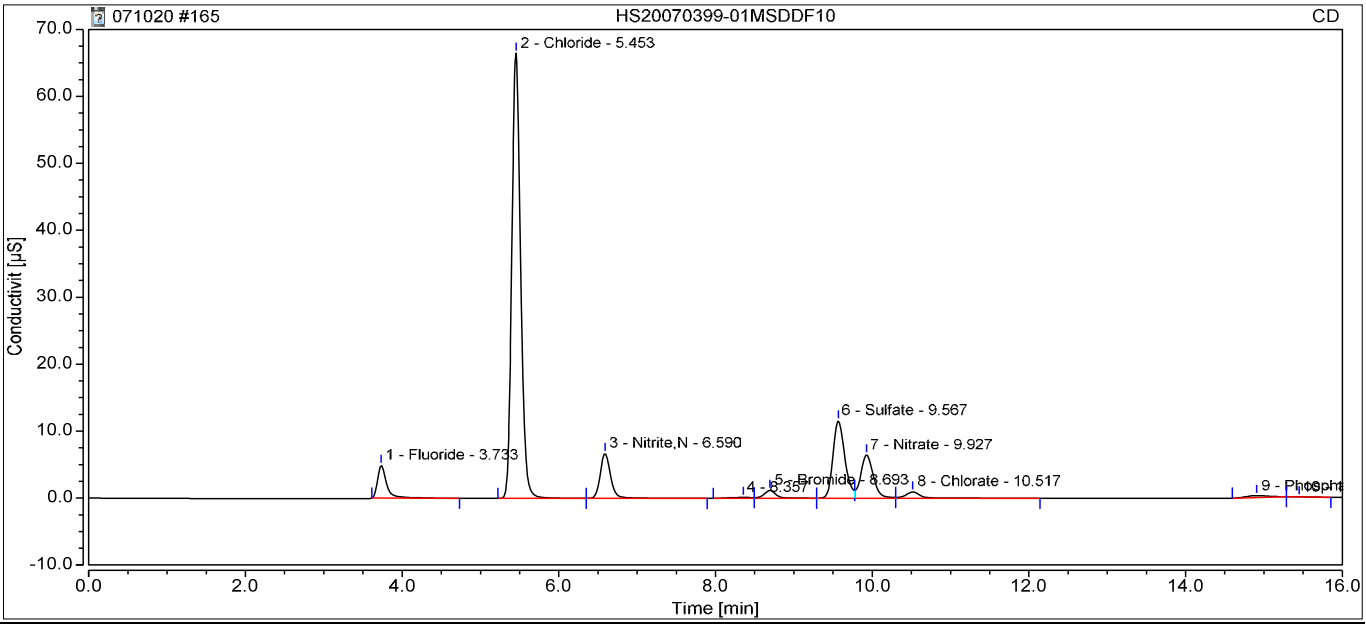
Integration Results

No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
1	3.73	Fluoride	BMB	0.721	2.1494	21.4942	10.0000
2	5.45	Chloride	BMB	8.755	39.4828	394.8277	10.0000
3	6.59	Nitrite,N	BMB	1.060	2.2929	22.9285	10.0000
5	8.69	Bromide	M	0.226	2.5629	25.6293	10.0000
6	9.57	Sulfate	M	2.037	13.0811	130.8110	10.0000
7	9.93	Nitrate	M	1.232	2.0539	20.5393	10.0000
8	10.52	Chlorate	MB	0.218	2.2149	22.1492	10.0000
9	14.94	Phosphate	BMB	0.203	1.3877	13.8774	10.0000
Total:			**0.000**	**14.453**		**652.26**	

165 HS20070399-01MSDDF10

Sample Name:	**HS20070399-01MSDDF10**	*Injection Volume:*	**5.00**
Vial Number:	**GC2**	*Channel:*	**CD**
Sample Type:	**Unknown**	*Wavelength:*	**210**
Control Program:	**Anions Program 06022020.1**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Anions Processing Method**	*Dilution Factor:*	**10.0000**
Recording Time:	**07/12/2020 13:37**	*Sample Weight:*	**1.0000**

Run Time:



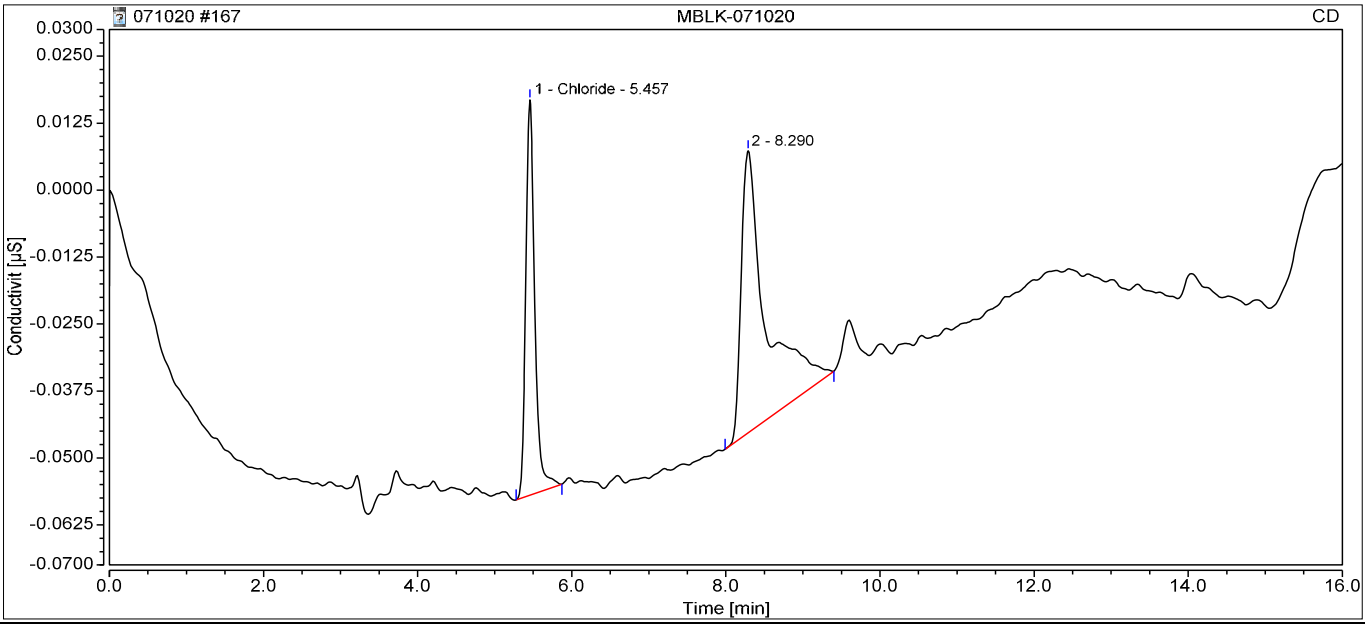
Integration Results

No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
1	3.73	Fluoride	BMB	0.648	1.9329	19.3290	10.0000
2	5.45	Chloride	BMB	8.590	38.7356	387.3560	10.0000
3	6.59	Nitrite,N	BMB	1.038	2.2439	22.4395	10.0000
5	8.69	Bromide	M	0.222	2.5132	25.1319	10.0000
6	9.57	Sulfate	M	2.028	13.0205	130.2053	10.0000
7	9.93	Nitrate	M	1.208	2.0130	20.1301	10.0000
8	10.52	Chlorate	MB	0.216	2.1909	21.9093	10.0000
9	14.91	Phosphate	BMB	0.094	0.8004	8.0039	10.0000
Total:			**0.000**	**14.042**		**634.50**	

167 MBLK-071020

Sample Name:	**MBLK-071020**	*Injection Volume:*	**5.00**
Vial Number:	**BB7**	*Channel:*	**CD**
Sample Type:	**Unknown**	*Wavelength:*	**210**
Control Program:	**Anions Program 06022020.1**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Anions Processing Method**	*Dilution Factor:*	**1.0000**
Recording Time:	**07/12/2020 14:14**	*Sample Weight:*	**1.0000**

Run Time:



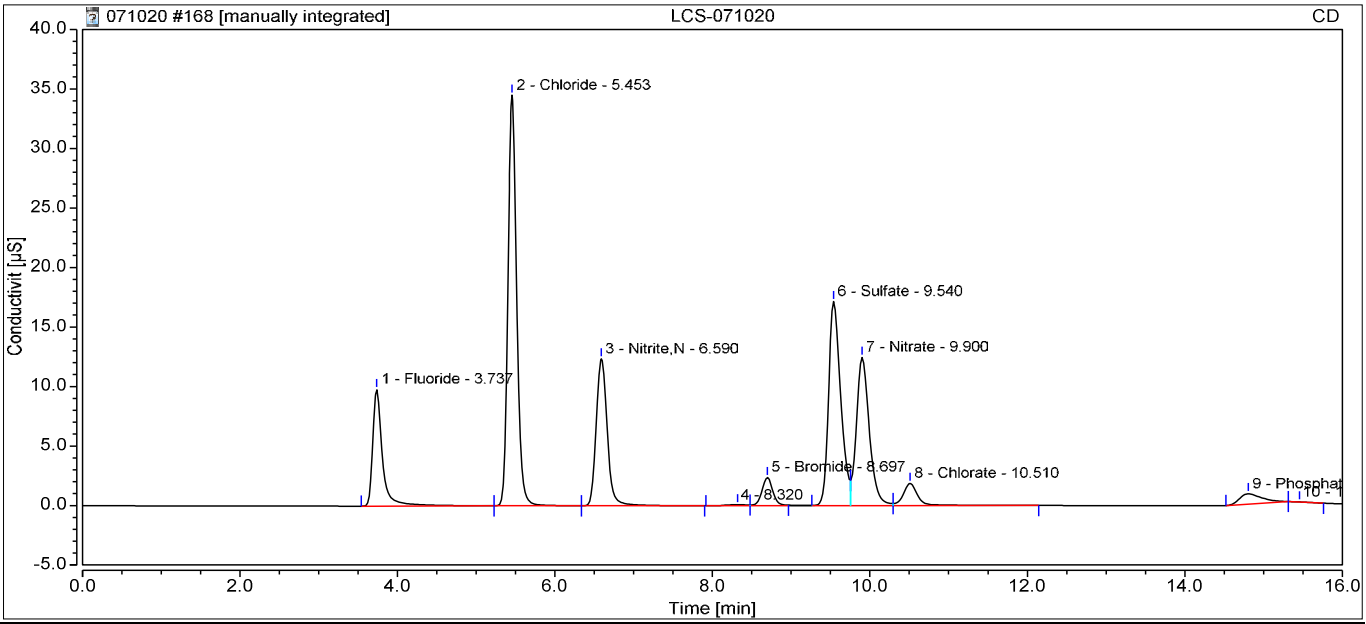
Integration Results

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	5.46	Chloride	BMB	0.010	0.0151	0.0151	1.0000
n.a.	n.a.	Nitrite,N	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.	Sulfate	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**	**0.010**		**0.02**	

168 LCS-071020

Sample Name:	**LCS-071020**	*Injection Volume:*	**5.00**
Vial Number:	**BB2**	*Channel:*	**CD**
Sample Type:	**Unknown**	*Wavelength:*	**210**
Control Program:	**Anions Program 06022020.1**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Anions Processing Method**	*Dilution Factor:*	**1.0000**
Recording Time:	**07/12/2020 14:32**	*Sample Weight:*	**1.0000**

Run Time:



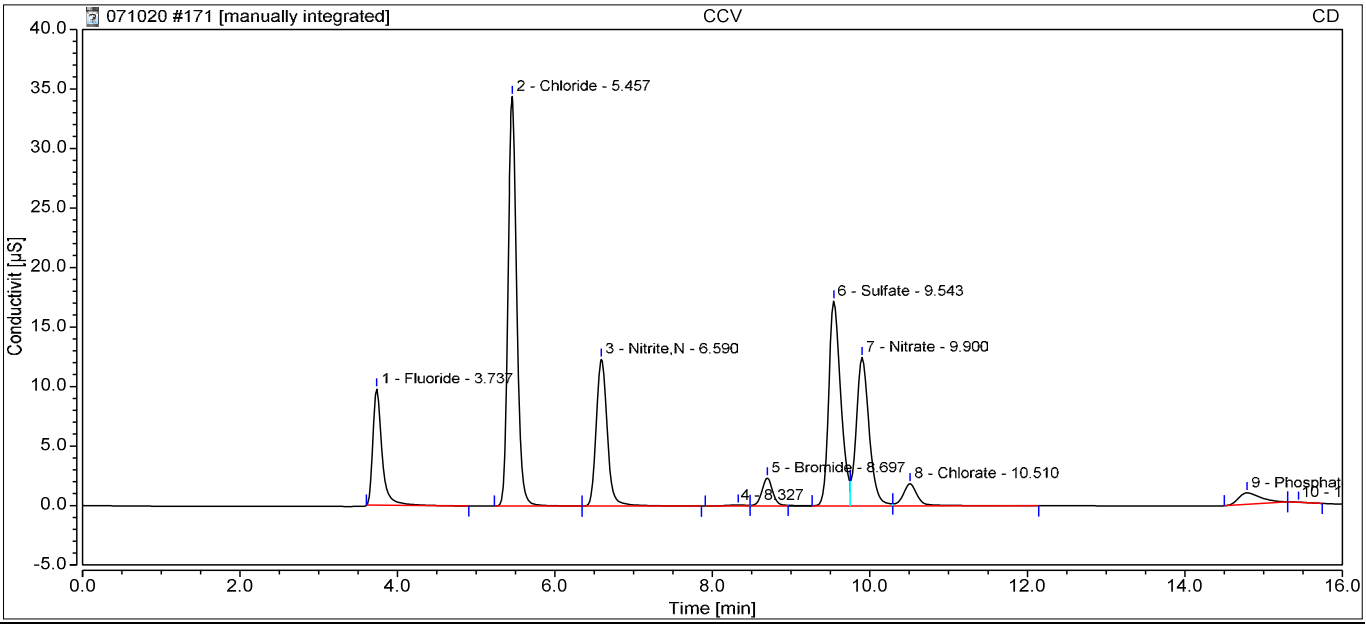
Integration Results

No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
1	3.74	Fluoride	BMB	1.402	4.1655	4.1655	1.0000
2	5.45	Chloride	BMB	4.451	20.0562	20.0562	1.0000
3	6.59	Nitrite,N	BMB	2.007	4.3654	4.3654	1.0000
5	8.70	Bromide	M *	0.382	4.3172	4.3172	1.0000
6	9.54	Sulfate	M	3.073	19.6317	19.6317	1.0000
7	9.90	Nitrate	M	2.371	3.9619	3.9619	1.0000
8	10.51	Chlorate	MB	0.405	4.1387	4.1387	1.0000
9	14.81	Phosphate	BMB	0.287	1.8378	1.8378	1.0000
Total:			**0.000**	**14.378**		**62.47**	

171 CCV

Sample Name:	**CCV**	*Injection Volume:*	**5.00**
Vial Number:	**BA2**	*Channel:*	**CD**
Sample Type:	**Unknown**	*Wavelength:*	**210**
Control Program:	**Anions Program 06022020.1**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Anions Processing Method**	*Dilution Factor:*	**1.0000**
Recording Time:	**07/12/2020 15:26**	*Sample Weight:*	**1.0000**

Run Time:



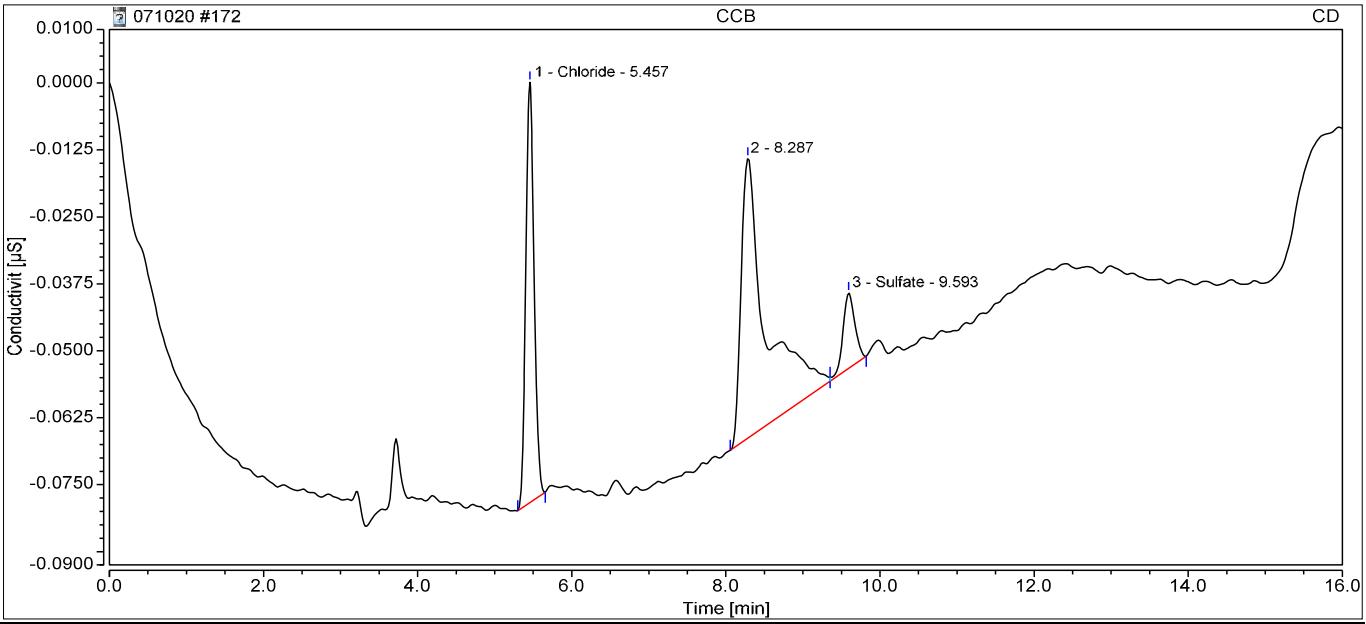
Integration Results

No.	Retention min	Peak Name	Peak Type	Area µS*min	Amount ppm	Concentration ppm	Dilution
1	3.74	Fluoride	BMB	1.316	3.9130	3.9130	1.0000
2	5.46	Chloride	BMB	4.443	20.0226	20.0226	1.0000
3	6.59	Nitrite,N	BMB	2.001	4.3515	4.3515	1.0000
5	8.70	Bromide	M *	0.381	4.3006	4.3006	1.0000
6	9.54	Sulfate	M	3.064	19.5727	19.5727	1.0000
7	9.90	Nitrate	M	2.366	3.9540	3.9540	1.0000
8	10.51	Chlorate	MB	0.402	4.1069	4.1069	1.0000
9	14.79	Phosphate	BMB	0.317	2.0025	2.0025	1.0000
Total:			**0.000**	**14.291**		**62.22**	

172 CCB

Sample Name:	**CCB**	*Injection Volume:*	**5.00**
Vial Number:	**BA3**	*Channel:*	**CD**
Sample Type:	**Unknown**	*Wavelength:*	**210**
Control Program:	**Anions Program 06022020.1**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Anions Processing Method**	*Dilution Factor:*	**1.0000**
Recording Time:	**07/12/2020 15:44**	*Sample Weight:*	**1.0000**

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	5.46	Chloride	BMB	0.010	0.0144	0.0144	1.0000
n.a.	n.a.	Nitrite,N	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
3	9.59	Sulfate	MB	0.003	0.2162	0.2162	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**	**0.012**		**0.23**	

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

WorkOrder: HS20070615

Longhorn GW Treatment Plant Weekly Samples

Bhate Environmental Associates, Inc.

Marcia Olive
445 Union Blvd Ste 129
Lakewood CO 80228

10-Aug-2020

ALS Environmental
ALS Group USA, Corp
1317 South 13th Avenue
Kelso, WA 98626
T : +1 360 577 7222
F : +1 360 636 1068
www.alsglobal.com

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- HS20070615 Wet Chem Raw Data (P_ORTHO)

HS20070615 Longhorn GW Treatment Plant Weekly Samples Final

ALS WO# HS20070615

10450 Stancliff Rd. Suite 210
Houston, TX 77099
T: +1 281 530 5656
F: +1 281 530 5887

August 07, 2020

Marcia Olive
Bhate Environmental Associates, Inc.
445 Union Blvd Ste 129
Lakewood, CO 80228

Work Order: **HS20070615**

Laboratory Results for: **Longhorn GW Treatment Plant Weekly Samples**

Dear Marcia Olive,

ALS Environmental received 2 sample(s) on Jul 15, 2020 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
RJ Modashia
Project Manager

ALS Houston, US Date: 07-Aug-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Weekly Samples
Work Order: HS20070615

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS20070615-01	LH18/24-SP650_071420	Water		14-Jul-2020 14:00	15-Jul-2020 09:05	☐
HS20070615-02	LH18/24-SP650_071420-BIX	Water		14-Jul-2020 14:00	15-Jul-2020 09:05	☐

ALS Houston, US Date: 07-Aug-20

Client: Bhate Environmental Associates, Inc. **CASE NARRATIVE**
Project: Longhorn GW Treatment Plant Weekly Samples
Work Order: HS20070615

Work Order Comments

• Analysis of Perchlorate was performed by ALS Houston TX, High Resolution. Laboratory. Final report attached.

The analysis for TOC was subcontracted to ALS Environmental in Kelso WA. Final report attached.

WetChemistry by Method E350.3

Batch ID: R365365

• The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

WetChemistry by Method E365.3

Batch ID: R365163

• The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

ALS Houston, US Date: 07-Aug-20

Client: Bhate Environmental Associates, Inc. **ANALYTICAL REPORT**
Project: Longhorn GW Treatment Plant Weekly Samples WorkOrder:HS20070615
Sample ID: LH18/24-SP650_071420 Lab ID:HS20070615-01
Collection Date: 14-Jul-2020 14:00 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
AMMONIA AS N BY E350.3(ISE)		**Method:E350.3**						Analyst: KVL
Nitrogen, Ammonia (As N)	**12**	a	**0.20**	**0.20**	**0.20**	**mg/L**	1	21-Jul-2020 09:30
ORTHO PHOSPHATE (PO4) AS P BY E365.3		**Method:E365.3**						Analyst: MZD
Phosphorus, Total Orthophosphate (As P)	**1.87**	a	**0.100**	**0.250**	**0.250**	**mg/L**	10	16-Jul-2020 11:28
SUBCONTRACT ANALYSIS - TOC ANALYSIS		**Method:NA**						Analyst: SUBK
Subcontract Analysis	See Attached		0	0		NA	1	07-Aug-2020 09:33

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

ALS Houston, US Date: 07-Aug-20

Client: Bhate Environmental Associates, Inc. **ANALYTICAL REPORT**

Project: Longhorn GW Treatment Plant Weekly Samples WorkOrder:HS20070615

Sample ID: LH18/24-SP650_071420-BIX Lab ID:HS20070615-02

Collection Date: 14-Jul-2020 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	29-Jul-2020 12:01

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

ALS Houston, US Date: 07-Aug-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS20070615

DATES REPORT

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
Batch ID: R365163 (0)	**Test Name :** ORTHO PHOSPHATE (PO4) AS P BY E365.3				**Matrix:** Water	
HS20070615-01	LH18/24-SP650_071420	14 Jul 2020 14:00			16 Jul 2020 11:28	10
Batch ID: R365365 (0)	**Test Name :** AMMONIA AS N BY E350.3(ISE)				**Matrix:** Water	
HS20070615-01	LH18/24-SP650_071420	14 Jul 2020 14:00			21 Jul 2020 09:30	1
Batch ID: R365837 (0)	**Test Name :** SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)				**Matrix:** Water	
HS20070615-02	LH18/24-SP650_071420-BIX	14 Jul 2020 14:00			29 Jul 2020 12:01	1
Batch ID: R366343 (0)	**Test Name :** SUBCONTRACT ANALYSIS - TOC ANALYSIS				**Matrix:** Water	
HS20070615-01	LH18/24-SP650_071420	14 Jul 2020 14:00			07 Aug 2020 09:33	1

ALS Houston, US Date: 07-Aug-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS20070615

QC BATCH REPORT

Batch ID: R365163 (0) **Instrument:** UV-2450 **Method:** ORTHO PHOSPHATE (PO4) AS P BY E365.3

MBLK Sample ID: **MBLK-365163** Units: **mg/L** Analysis Date: **16-Jul-2020 11:28**
Client ID: Run ID: **UV-2450_365163** SeqNo: **5663965** 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)	0.0250	0.0250								U

LCS Sample ID: **LCS-365163** Units: **mg/L** Analysis Date: **16-Jul-2020 11:28**
Client ID: Run ID: **UV-2450_365163** SeqNo: **5663966** 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)	0.261	0.0250	0.25	0	104	85 - 115				

MS Sample ID: **HS20070615-01MS** Units: **mg/L** Analysis Date: **16-Jul-2020 11:28**
Client ID: **LH18/24-SP650_071420** Run ID: **UV-2450_365163** SeqNo: **5663968** 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)	4.41	0.250	2.5	1.87	102	80 - 120				

MSD Sample ID: **HS20070615-01MSD** Units: **mg/L** Analysis Date: **16-Jul-2020 11:28**
Client ID: **LH18/24-SP650_071420** Run ID: **UV-2450_365163** SeqNo: **5663969** 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)	4.47	0.250	2.5	1.87	104	80 - 120	4.41	1.35	20	

The following samples were analyzed in this batch: HS20070615-01

ALS Houston, US Date: 07-Aug-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS20070615

QC BATCH REPORT

Batch ID: R365365 (0) **Instrument: WetChem_HS** **Method: AMMONIA AS N BY E350.3(ISE)**

MBLK Sample ID: **MBLK-R365365** Units: **mg/L** Analysis Date: **21-Jul-2020 09:30**
Client ID: Run ID: **WetChem_HS_365365** SeqNo: **5668034** 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)	0.20	0.20								U

LCS Sample ID: **LCS-R365365** Units: **mg/L** Analysis Date: **21-Jul-2020 09:30**
Client ID: Run ID: **WetChem_HS_365365** SeqNo: **5668033** 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)	9.857	0.20	10	0	98.6	80 - 120				

MS Sample ID: **HS20070560-01MS** Units: **mg/L** Analysis Date: **21-Jul-2020 09:30**
Client ID: Run ID: **WetChem_HS_365365** SeqNo: **5668039** 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)	10.46	0.20	10	0.13	103	80 - 120				

MSD Sample ID: **HS20070560-01MSD** Units: **mg/L** Analysis Date: **21-Jul-2020 09:30**
Client ID: Run ID: **WetChem_HS_365365** SeqNo: **5668038** 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)	10.22	0.20	10	0.13	101	80 - 120	10.46	2.3	20	

The following samples were analyzed in this batch: HS20070615-01

ALS Houston, US Date: 07-Aug-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Weekly Samples
WorkOrder: **HS20070615**

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	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

Acronym	Description
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 Quantitaion Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Arkansas	20-030-0	26-Mar-2021
California	2919, 2020-2021	30-Apr-2021
Dept of Defense	ANAB L2231 V009	22-Dec-2021
Florida	E87611-30-07/01/2020	30-Jun-2021
Illinois	2000322020-4	09-May-2021
Kentucky	123043, 2020-2021	30-Apr-2021
Louisiana	03087, 2020-2021	30-Jun-2021
Maryland	343, 2019-2020	30-Sep-2020
North Carolina	624-2020	31-Dec-2020
North Dakota	R-193 2020-2021	30-Apr-2021
Oklahoma	2019-141	31-Aug-2020
Texas	T104704231-20-26	30-Apr-2021

ALS Houston, US Date: 07-Aug-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Weekly Samples
Work Order: HS20070615

SAMPLE TRACKING

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS20070615-01	LH18/24-SP650_071420	Login	7/15/2020 11:24:24 AM	PMG	WET005
HS20070615-01	LH18/24-SP650_071420	Login	7/15/2020 11:24:24 AM	PMG	WET005
HS20070615-01	LH18/24-SP650_071420	Login	7/15/2020 11:24:24 AM	PMG	Sub
HS20070615-02	LH18/24-SP650_071420-BIX	Login	7/15/2020 11:24:24 AM	PMG	Sub

ALS Houston, US Date: 07-Aug-20

Sample Receipt Checklist

Work Order ID: HS20070615 **Date/Time Received:** **15-Jul-2020 09:05**

Client Name: Bhate Environmental **Received by:** **Paresh M. Giga**

Completed By:	/S/ Paresh M. Giga	15-Jul-2020 11:25	**Reviewed by:**	/S/ RJ Modashia	15-Jul-2020 21:37
	eSignature	Date/Time		eSignature	Date/Time

Matrices: **Water** Carrier 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 ☐	COC IDs:None	
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):	0.5C U/c	IR25		
Cooler(s)/Kit(s):	46127			
Date/Time sample(s) sent to storage:	7/15/2020 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: R.J Modashia

Project: BHATE
LONGHORN ARMY AMMN. PLANT (LHAAP)
GROUNDWATER TREATMENT PLANT (GWTP)
KARNACK, TEXAS

Project No. NWO1312.0150.0 16.0001

Job: GROUNDWATER TREATMENT PLANT WEEKLY SAMPLES

Prepared By: Scott Beesinger

P.O. Number

HS20070615
Bhate Environmental Associates, Inc.
Longhorn GW Treatment Plant Weekly Samples

Field Sample I.D.	Sample Matrix	Date / Time	MS / MSD	No. OF CONTAINERS	Analyses: AMMONIA-N	TOTAL ORGANIC CARBON	ORTHO-PHOSPHATE	PERCHLORATE							Remarks (Preservatives, etc.)	Lab I.D.#
LH18/24-SP650_071420	Water	07/14/20 / 14:00		3	X	X									H2SO4	
LH18/24-SP650_071420	Water	07/14/20 / 14:00		1			X								NONE	
LH18/24–SP650_071420_BIX	Water	07/14/20 / 14:00		1				X							NONE	

Additional Remarks: **Standard TAT on all parameters**

Relinquished By:	Date	Time	Received By:	Date	Time	Relinquished By:	Date	Time	Received By:	Date	Time
Scott Beesinger	07/14/20	14:30		7/15/20	0730						

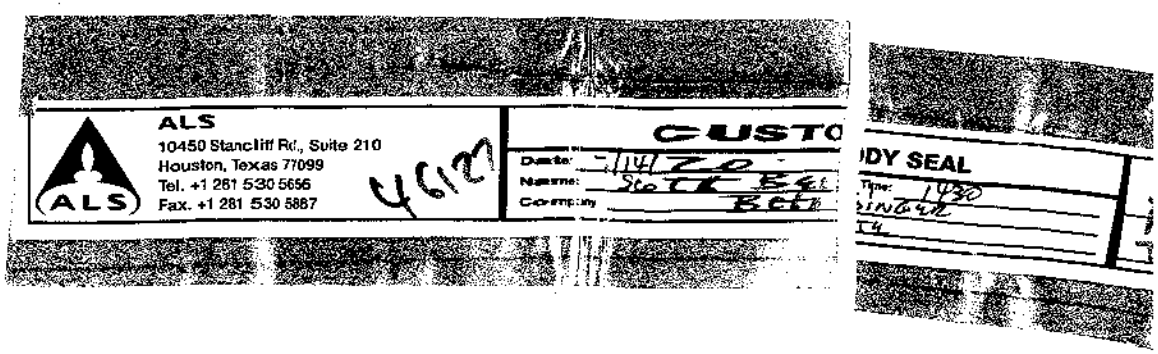
For Lab Use Only

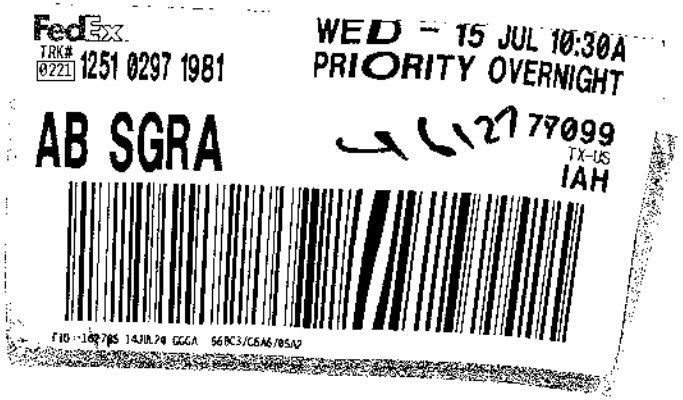
Received At Lab By:	Date	Time	Airbill No.	Opened By:	Date	Time	Temp of Container	Seal No.	Condition

Remarks:

46127 0.5° Ulc.
+2.1°
Cl² 0.0

(Word) S:\I-ces\Forms\Chain of Custody - BiWeekly


ALS
10450 Stancliff Rd., Suite 210
Houston, Texas 77099
Tel. +1 281 530 5656
Fax. +1 281 530 5887
4612
CUSTO
DY SEAL


FedEx
TRK# 0221 1251 0297 1981
WED - 15 JUL 10:30A
PRIORITY OVERNIGHT
AB SGRA
4612
77099
TX-US
IAH

July 29, 2020 Service Request No:E2000638

RJ Modashia
ALS Laboratory Group
10450 Stancliff Road
Suite 210
Houston, TX 77099-4338

Laboratory Results for: HS20070615

Dear RJ,

Enclosed are the results of the sample(s) submitted to our laboratory July 15, 2020
For your reference, these analyses have been assigned our service request number **E2000638.**

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

ALS Environmental

Client:	ALS Houston	**Service Request No.:**	E2000638
Project:	HS20070615	**Date Received:**	07/15/20
Sample Matrix:	W		

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 07/15/20.

The sample was received in good condition and are 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:

EQ2000302: Laboratory Control Spike/Duplicate Laboratory Control Spike (LCS/DLCS) samples were analyzed and reported in addition to a MS/MSD for this extraction batch. MS and MSD was performed on an unrelated sample, LCS/LCSD recoveries are within QC limits.

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 **Service Request:**E2000638
Project: HS20070615

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
E2000638-001	LH18/24-SP650_071420-BIX	7/14/2020	1400

Service Request Summary

Folder #: **E2000638**
Client Name: ALS Environmental - US
Project Name: HS20070615
Project Number:

Report To: RJ Modashia
ALS Laboratory Group
10450 Stancliff Road
Houston, TX 77099-4338
USA
Phone Number: 281-530-5656
Cell Number:
Fax Number: 281-530-5887
E-mail: rj.modashia@alsglobal.com

Project Chemist: Corey Grandits
Originating Lab: HOUSTON
Logged By: CGRANDITS
Date Received: 07/15/20
Internal Due Date: 7/29/2020
QAP: LAB QAP
Qualifier Set: Lab Standard
Formset: Lab Standard
Merged?: Y
Report to MDL?: Y
P.O. Number: HS20070615
EDD: No EDD Specified

1 250 mL-Plastic Bottle HDPE WM CLEAR Unpreserved
Location: EHRMS-WIC 5C
Pressure Gas:

Lab Samp No.	Client Samp No	Matrix	Collected	HOUSTON ClO4 DOD/6850
E2000638-001	LH18/24-SP650_071420-BIX	Ground Water	07/14/20 1400	**IV**

Service Request Summary

Folder #: **E2000638**
Client Name: ALS Environmental - US
Project Name: HS20070615
Project Number:

Report To: RJ Modashia
ALS Laboratory Group
10450 Stancliff Road
Houston, TX 77099-4338
USA
Phone Number: 281-530-5656
Cell Number:
Fax Number: 281-530-5887
E-mail: rj.modashia@alsglobal.com

Project Chemist: Corey Grandits
Originating Lab: HOUSTON
Logged By: CGRANDITS
Date Received: 07/15/20
Internal Due Date: 7/29/2020
QAP: LAB QAP
Qualifier Set: Lab Standard
Formset: Lab Standard
Merged?: Y
Report to MDL?: Y
P.O. Number: HS20070615
EDD: No EDD Specified

1 250 mL-Plastic Bottle HDPE WM CLEAR Unpreserved
Location: EHRMS-WIC 5C
Pressure Gas:

Test Comments:

Group	Test/Method	Samples	Comments
Semivoa GCMS	ClO4 DOD/6850	1	Level II due 7/29,level IV 8/5

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 >=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.
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.
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.
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.

Data Qualifiers

Lab Standard

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

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

10450 Stancliff Rd, Houston, TX 77099 | 281-530-5656 | www.alsglobal.com

ALS Environmental

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	20-030-0	3/26/2021
Department of Defense	A2LA 2897.01	11/30/2021
Hawaii Department of Health	2020	4/30/2021
Illinois Environmental Protection Agency	2000322020-4	5/9/2021
Kansas Department of Health and Environment	E-10352	7/31/2020
Louisiana Department of Health and Hospitals	LA028-2020	12/31/2020
Maine Department of Health and Human Services	2020016	6/5/2022
Minnesota Department of Health	1785988	12/31/2020
Nebraska Department of Health and Human Services	NE-OS-25-13 (2020)	4/30/2021
Nevada Department of Concervation and Natural Resources	TX026932019-1	7/31/2020
New Hampshire Environmental Laboratory Accreditation Program	209420	4/24/2021
New York Department of Health	11707	3/31/2021
Oklahoma Department of Environmental Quality	2019-067	8/31/2020
Tennessee Department of Environment and Concervation	04016-2020	4/30/2021
Texas Commision on Environmental Quality	T104704231-20-26	4/30/2021
United States Department of Agriculture	P330-19-00299	10/10/2022
Utah Department of Health Environmental Laboratory Certification	TX026932019-9	7/31/2020
Washington Department of Health	C819	11/14/2020

ALS

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

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:** **14286**

SUBCONTRACT TO:

ALS Environmental
10450 Stancliff RoadSuite 210
Houston, TX 77084

Phone: +1 281 530 5656

E2000638 5
ALS Laboratory Group
HS20070615

CUSTOMER INFORMATION:

Company:	ALS Houston
Contact:	RJ Modashia
Address:	10450 Stancliff Rd, Ste 210
Phone:	+1 281 530 5656
Email:	RJ.Modashia@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:	HS20070615
TSR:	Danielle Winnings

	LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
	ANALYSIS REQUESTED			DUE DATE
1.	**HS20070615-02**	**LH18/24-SP650_071420-BIX**	**Water**	**14 Jul 2020 14:00**
	SUB_Perch-6850			29 Jul 2020

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

QC Level: DOD IV (DoD Data Package)

Relinquished By: J. Magann Date/Time: 7/15/20 12:45

Received By: CH Date/Time: 7/15/20 12:45

Cooler ID(s): Temperature(s):

Cooler Receipt Form

ALS Environmental

Project Chemist CH

Client/Project ALS-H

Thermometer ID 5M04/11231

Date/Time Received: 7/14/20 Initials: CH Date/Time Logged in: 7/14/20 Initials CH

1. Method of delivery: ○ US Mail ○ Fed Ex ○ UPS ○ DHL ✓ ALS 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?
-		7/14/20	1245	CH	3.8	☒
						☐
						☐
						☐

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, & Resolutions:

Service request Label: **E2000638** 5
ALS Laboratory Group
HS20070815

10450 Stancliff Rd., Suite 210
Houston, TX 77099
T: +1 713 266 1599
F: +1 713 266 1599
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 sampleThe 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 6ºC.
- ✓ Tissue samples must be shipped and stored frozen, at -20 to -10ºC.
- ✓ Air samples are shipped and stored cold, at 0 to 6ºC
- ✓ 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

Preparation Information Benchsheet

Prep Run#: 361870 **Prep WorkFlow:** GenExt28Day **Status:** Prepped
Team: Semivoa GCMS/GRIVERA **Prep Method:** Method **Prep Date/Time:** 7/20/20 10:39

#	Lab Code	Client ID	B#	Method /Test	pH	Cl	Matrix	Amt. Ext.	Sample Description
1	E2000626-001	LH18/24-SP650_070920-BIX	.01	6850/ClO4 DOD			Water	10mL	
2	E2000627-001	50WW08-200708	.01	6850/ClO4 DOD			Ground Water	10mL	
3	E2000627-002	50WW29-200708	.01	6850/ClO4 DOD			Ground Water	10mL	
4	E2000627-003	50WW05-200708	.01	6850/ClO4 DOD			Ground Water	10mL	
5	E2000627-004	50WW14-200709	.01	6850/ClO4 DOD			Ground Water	10mL	
6	E2000627-005	50WW13-200709	.01	6850/ClO4 DOD			Ground Water	10mL	
7	E2000627-006	50WW11-200709	.01	6850/ClO4 DOD			Ground Water	10mL	
8	E2000627-007	50WW11-200709-FD	.01	6850/ClO4 DOD			Ground Water	10mL	
9	E2000627-008	50WW06-200709	.01	6850/ClO4 DOD			Ground Water	10mL	
10	E2000627-009	50WW12-200709	.01	6850/ClO4 DOD			Ground Water	10mL	
11	E2000638-001	LH18/24-SP650_071420-BIX	.01	6850/ClO4 DOD			Ground Water	10mL	
12	E2000639-001	LH18/24-SP650_071420-BIX	.01	6850/ClO4 DOD			Ground Water	10mL	
13	E2000640-001	LH18/24-SP140_071420	.01	6850/ClO4 DOD			Ground Water	10mL	
14	E2000660-001	16EW01-200716	.01	6850/ClO4 DOD			Ground Water	10mL	
15	E2000660-003	16EW02-200716	.01	6850/ClO4 DOD			Ground Water	10mL	
16	E2000660-004	16EW02-200716-FD	.01	6850/ClO4 DOD			Ground Water	10mL	
17	E2000660-005	16IW09-200716	.01	6850/ClO4 DOD			Ground Water	10mL	
18	E2000660-006	16RW05-200716	.01	6850/ClO4 DOD			Ground Water	10mL	
19	EQ2000302-01	MB		6850/ClO4 DOD			Liquid	10mL	
20	EQ2000302-02	LCS		6850/ClO4 DOD			Liquid	10mL	
21	EQ2000302-03	DLCS		6850/ClO4 DOD			Liquid	10mL	
22	EQ2000302-04	50WW14-200709 MS	.01	6850/ClO4 DOD			Liquid	10mL	
23	EQ2000302-05	50WW14-200709 DMS	.01	6850/ClO4 DOD			Liquid	10mL	

Spiking Solutions

Name: Sodium Perchlorate 1 ug/mL (IS) (18-O) as CLO4 Inventory ID 202037 Logbook Ref: Sodium Perchlorate Expires On: 05/22/2021

E2000626-001	100.00µL	E2000627-001	100.00µL	E2000627-002	100.00µL	E2000627-003	100.00µL	E2000627-004	100.00µL	E2000627-005	100.00µL
E2000627-006	100.00µL	E2000627-007	100.00µL	E2000627-008	100.00µL	E2000627-009	100.00µL	E2000638-001	100.00µL	E2000639-001	100.00µL
E2000640-001	100.00µL	E2000660-001	100.00µL	E2000660-003	100.00µL	E2000660-004	100.00µL	E2000660-005	100.00µL	E2000660-006	100.00µL
EQ2000302-02	100.00µL	EQ2000302-03	100.00µL	EQ2000302-04	100.00µL	EQ2000302-05	100.00µL				

Name: Perchlorate Intermediate Stock1 Inventory ID 209764 Logbook Ref: Perchlorate Int. Stock1 51820 Expires On: 11/18/2020

EQ2000302-02	1.00µL	EQ2000302-03	1.00µL	EQ2000302-04	10.00µL	EQ2000302-05	10.00µL

Preparation Information Benchsheet

Prep Run#: 361870 **Prep WorkFlow:** GenExt28Day **Status:** Prepped
Team: Semivoa GCMS/GRIVERA **Prep Method:** Method **Prep Date/Time:** 7/20/20 10:39

Preparation Steps

Step: Preparation
Started: 7/20/20 10:39
Finished: 7/20/20 14:00
By: GRIVERA
Comments

Comments: _____

Reviewed By: _____ Date: _____

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

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	ALS Environmental - US	**Service Request:**	E2000638
Project:	HS20070615	**Date Collected:**	7/14/20 1400
Sample Matrix:	Ground Water	**Date Received:**	7/15/20
Sample Name:	LH18/24-SP650_071420-BIX	**Units:**	µg/L
Lab Code:	E2000638-001	**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	**1.08**		1.00	0.500	0.250	10	7/20/20	7/23/20 12:44	361870	688323	

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	ALS Environmental - US	**Service Request:**	E2000638
Project:	HS20070615	**Date Collected:**	NA
Sample Matrix:	Ground Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	µg/L
Lab Code:	EQ2000302-01	**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	7/20/20	7/20/20 13:47	361870	688323	

Accuracy & Precision

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www.alsglobal.com

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070615
Sample Matrix: Ground Water

Service Request: E2000638
Date Analyzed: 7/20/20

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: 361870

	Lab Control Sample EQ2000302-02			Duplicate Lab Control Sample EQ2000302-03					
Analyte Name	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Perchlorate	0.102	0.100	102	0.117	0.100	117	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	**Service Request:**	E2000638
Project:	HS20070615	**Date Collected:**	NA
Sample Matrix:	Ground Water	**Date Received:**	NA
Sample Name:	Lab Control Sample	**Units:**	µg/L
Lab Code:	EQ2000302-02	**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	**0.102**		0.100	0.0500	0.0250	1	7/20/20	7/20/20 13:55	361870	688323	

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	ALS Environmental - US	**Service Request:**	E2000638
Project:	HS20070615	**Date Collected:**	NA
Sample Matrix:	Ground Water	**Date Received:**	NA
Sample Name:	Duplicate Lab Control Sample	**Units:**	µg/L
Lab Code:	EQ2000302-03	**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	7/20/20	7/20/20 14:03	361870	688323	

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000638
Project:	HS20070615	**Date Collected:**	NA
Sample Matrix:	Ground Water	**Date Received:**	NA
		Date Analyzed:	7/24/20

Matrix Spike Summary

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

Sample Name:	Batch QC	**Units:**	µg/L
Lab Code:	E2000627-004	**Basis:**	NA

Analytical Method: 6850
Prep Method: Method

		Batch QCMS Matrix Spike EQ2000302-04			Batch QCDMS Duplicate Matrix Spike EQ2000302-05					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Perchlorate	3.69	4.69	1.00	99	4.79	1.00	110	84 - 119	2	15

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

Results flagged with a pound (#) indicate the control criteria is not applicable.

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	**Service Request:**	E2000638
Project:	HS20070615	**Date Collected:**	NA
Sample Matrix:	Ground Water	**Date Received:**	NA
Sample Name:	Batch QC	**Units:**	µg/L
Lab Code:	EQ2000302-04	**Basis:**	NA
Run Type:	Matrix Spike		

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	**4.69**		1.00	0.500	0.250	10	7/20/20	7/24/20 14:07	361870	688371	

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	ALS Environmental - US	**Service Request:**	E2000638
Project:	HS20070615	**Date Collected:**	NA
Sample Matrix:	Ground Water	**Date Received:**	NA
Sample Name:	Batch QC	**Units:**	µg/L
Lab Code:	EQ2000302-05	**Basis:**	NA
Run Type:	Duplicate Matrix Spike		

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	**4.79**		1.00	0.500	0.250	10	7/20/20	7/24/20 15:45	361870	688371	

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

20200720

ALS Environmental

1st Review: Kneir
2nd Review: Hvan

Injection Log
LCMS01 -Shimadzu 8050

ICAL Date: 7/20/2020
Cal. Std. xp: 11/18/2020
ICAL ID: EC2000014

Mobile Phases **A:** 0.75% Formic Acid/Water 3100807-09 **B:** MeOH 3100802-01

			File Name	Acquisition Method	Dilution	R	Comments
1	PERCHLORATE1		20200720_006	Perchlorate6850b.lcm	1x	☒	3100806-05
2	PERCHLORATE2		20200720_007	Perchlorate6850b.lcm	1x	☒	3100806-06
3	PERCHLORATE3		20200720_008	Perchlorate6850b.lcm	1x	☒	3100806-07
4	PERCHLORATE4		20200720_009	Perchlorate6850b.lcm	1x	☒	3100807-01
5	PERCHLORATE5		20200720_016	Perchlorate6850b.lcm	1x	☒	3100807-02
6	PERCHLORATE6		20200720_011	Perchlorate6850b.lcm	1x	☒	3100807-03
7	PERCHLORATE7		20200720_012	Perchlorate6850b.lcm	1x	☒	3100807-04
8	PERCHLORATE8		20200720_013	Perchlorate6850b.lcm	1x	☒	3100807-05
9	PERCHLORATE9		20200720_014	Perchlorate6850b.lcm	1x	☒	3100807-06
10	PERCHLORATE10		20200720_015	Perchlorate6850b.lcm	1x	☒	3100807-07
11	PERCHLORATEICV		20200720_017	Perchlorate6850b.lcm	1x	☒	3100807-08
12	IB		20200720_018	Perchlorate6850b.lcm	1x	☒	
13	IB		20200720_019	Perchlorate6850b.lcm	1x	☒	
14	LODV		20200720_020	Perchlorate6850b.lcm	1x	☒	
15	ICS		20200720_021	Perchlorate6850b.lcm	1x	☒	
16	PERCHLORATE7		20200720_022	Perchlorate6850b.lcm	1x	☒	3100807-04
17	EQ2000302-01		20200720_023	Perchlorate6850b.lcm	1x	☒	
18	EQ2000302-02		20200720_024	Perchlorate6850b.lcm	1x	☒	
19	EQ2000302-03		20200720_025	Perchlorate6850b.lcm	1x	☒	
20	EQ2000302-04		20200720_026	Perchlorate6850b.lcm	1x	☒	
21	EQ2000302-05		20200720_027	Perchlorate6850b.lcm	1x	☒	
22	E2000626-001		20200720_028	Perchlorate6850b.lcm	1x	☒	
23	E2000627-001		20200720_029	Perchlorate6850b.lcm	1x	☒	
24	E2000627-002		20200720_030	Perchlorate6850b.lcm	1x	☒	
25	E2000627-003		20200720_031	Perchlorate6850b.lcm	1x	☒	
26	E2000627-004		20200720_032	Perchlorate6850b.lcm	1x	☒	
27	PERCHLORATE7		20200720_033	Perchlorate6850b.lcm	1x	☒	3100807-04
28	E2000627-005		20200720_034	Perchlorate6850b.lcm	1x	☒	
29	E2000627-006		20200720_035	Perchlorate6850b.lcm	1x	☒	
30	E2000627-007		20200720_036	Perchlorate6850b.lcm	1x	☒	
31	E2000627-008		20200720_037	Perchlorate6850b.lcm	1x	☒	
32	E2000627-009		20200720_038	Perchlorate6850b.lcm	1x	☒	
33	E2000638-001		20200720_039	Perchlorate6850b.lcm	1x	☒	
34	E2000639-001		20200720_040	Perchlorate6850b.lcm	1x	☒	
35	E2000640-001		20200720_041	Perchlorate6850b.lcm	1x	☒	
36	PERCHLORATE7		20200720_042	Perchlorate6850b.lcm	1x	☒	3100807-04
37	EQ2000303-01		20200720_043	Perchlorate6850b.lcm	1x	☒	
38	EQ2000303-02		20200720_044	Perchlorate6850b.lcm	1x	☒	
39	EQ2000303-03		20200720_045	Perchlorate6850b.lcm	1x	☒	
40	E2000641-001		20200720_046	Perchlorate6850b.lcm	1x	☒	
41	E2000641-002		20200720_047	Perchlorate6850b.lcm	1x	☒	
42	E2000641-003		20200720_048	Perchlorate6850b.lcm	1x	☒	
43	E2000641-004		20200720_049	Perchlorate6850b.lcm	1x	☒	
44	E2000641-005		20200720_050	Perchlorate6850b.lcm	1x	☒	
45	E2000641-006		20200720_051	Perchlorate6850b.lcm	1x	☒	
46	E2000641-007		20200720_052	Perchlorate6850b.lcm	1x	☒	
47	PERCHLORATE7		20200720_053	Perchlorate6850b.lcm	1x	☒	3100807-04
48	E2000641-008		20200720_054	Perchlorate6850b.lcm	1x	☒	
49	E2000641-009		20200720_055	Perchlorate6850b.lcm	1x	☒	
50	E2000648-001		20200720_056	Perchlorate6850b.lcm	1x	☒	
51	E2000648-002		20200720_057	Perchlorate6850b.lcm	1x	☒	
52	E2000648-003		20200720_058	Perchlorate6850b.lcm	1x	☒	

Initial Calibration - Detailed Report

Calibration ID: EC2000014 **Instrument ID:** E-LCMS-01
Column Name: 1

#	Lab Code	Sample Name	File Location	Aquisition Date
01	EC2000014-01	PERCHLORATE1	20200720_006	07/20/2020 10:09
02	EC2000014-02	PERCHLORATE2	20200720_007	07/20/2020 10:17
03	EC2000014-03	PERCHLORATE3	20200720_008	07/20/2020 10:24
04	EC2000014-04	PERCHLORATE4	20200720_009	07/20/2020 10:32
06	EC2000014-06	PERCHLORATE6	20200720_011	07/20/2020 10:48
07	EC2000014-07	PERCHLORATE7	20200720_012	07/20/2020 10:56
08	EC2000014-08	PERCHLORATE8	20200720_013	07/20/2020 11:04
09	EC2000014-09	PERCHLORATE9	20200720_014	07/20/2020 11:12
10	EC2000014-10	PERCHLORATE10	20200720_015	07/20/2020 11:20
05	EC2000014-05	PERCHLORATE5	20200720_016	07/20/2020 12:28

Analyte **Curve Fit** **Weighting**

Perchlorate **Average RF** **RSD = 3.545** **Average RF = 0.121**

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.1000	0.1239	02	0.5000	0.1227	03	0.7000	0.1244	04	1.0000	0.1237
05	2.0000	0.1208	06	5.0000	0.1169	07	10.0000	0.1279	08	20.0000	0.1185
09	30.0000	0.1182	10	50.0000	0.1134						

Analyte

Perchlorate

#	Amount	Calculated Conc	%D	#	Amount	Calculated Conc	%D	#	Amount	Calculated Conc	%D
01	0.1000	0.102	2.3	02	0.5000	0.507	1.4	03	0.7000	0.719	2.7
04	1.0000	1.02	2.2	05	2.0000	2.00	-0.2	06	5.0000	4.83	-3.4
07	10.0000	10.6	5.7	08	20.0000	19.6	-2.1	09	30.0000	29.3	-2.3
10	50.0000	46.8	-6.3								

Initial Calibration Verification Summary Report

Calibration ID:	EC2000014	**Instrument ID:**	E-LCMS-01
Datafile ID:	20200720_017	**Column Name:**	1

Analyte	Lab Code	Type	Curve Fit	True Value	Calc Conc	Units	Result	Criteria
Perchlorate	EC2000014-11	T	Average RF	10	10.475	ng/mL	4.8	<= 15

ALS Group Houston

PERCHLORATE1

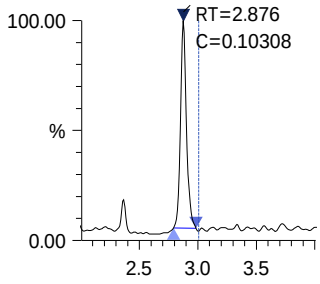
Date acquired: 7/20/2020 10:09:08 AM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_006.lcd
Vial: 5 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE1	7/20/2020 10:09:08 AM	5665	0.10308	20200720_006	2.876	25.0000	1.0000	5
Sodium Perchlorate-18O4_IS	PERCHLORATE1	7/20/2020 10:09:08 AM	457293	1.00000	20200720_006	2.874	25.0000	1.0000	5

Perchlorate

Conc 0.10308
Area 5665

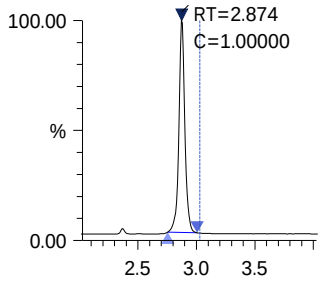
Q 99.00>83.00 (-) 1.65e3



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 457293

ISTD 107.00>89.00 (-) 1.28e5



ALS Group Houston

PERCHLORATE2

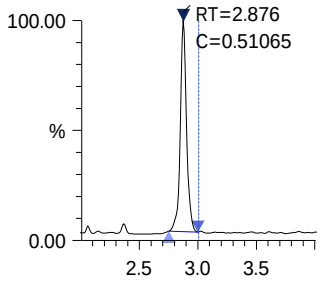
Date acquired: 7/20/2020 10:17:03 AM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_007.lcd
Vial: 6 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE2	7/20/2020 10:17:03 AM	28211	0.51065	20200720_007	2.876	25.0000	1.0000	6
Sodium Perchlorate-18O4_IS	PERCHLORATE2	7/20/2020 10:17:03 AM	459674	1.00000	20200720_007	2.873	25.0000	1.0000	6

Perchlorate

Conc 0.51065
Area 28211

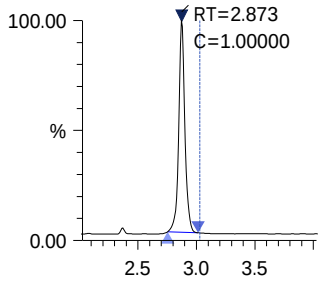
Q 99.00>83.00 (-) 7.64e3



Sodium Perchlorate-18O4 _IS

Conc 1.00000
Area 459674

ISTD 107.00>89.00 (-) 1.26e5



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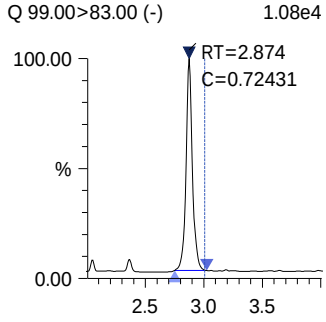
PERCHLORATE3

Date acquired: 7/20/2020 10:24:56 AM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_008.lcd
Vial: 7 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE3	7/20/2020 10:24:56 AM	40510	0.72431	20200720_008	2.874	25.0000	1.0000	7
Sodium Perchlorate-18O4_IS	PERCHLORATE3	7/20/2020 10:24:56 AM	465371	1.00000	20200720_008	2.874	25.0000	1.0000	7

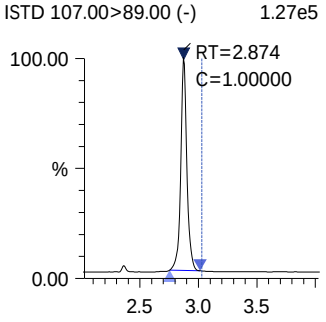
Perchlorate

Conc 0.72431
Area 40510



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 465371



ALS Group Houston

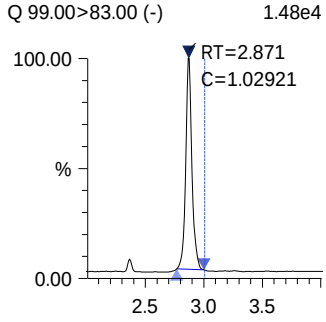
PERCHLORATE4

Date acquired: 7/20/2020 10:32:48 AM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_009.lcd
Vial: 8 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE4	7/20/2020 10:32:48 AM	54285	1.02921	20200720_009	2.871	25.0000	1.0000	8
Sodium Perchlorate-18O4_IS	PERCHLORATE4	7/20/2020 10:32:48 AM	438869	1.00000	20200720_009	2.869	25.0000	1.0000	8

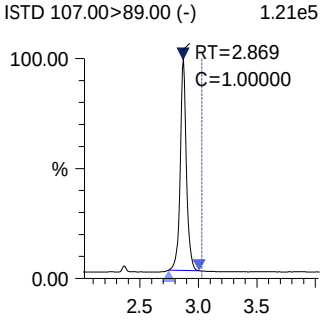
Perchlorate

Conc 1.02921
Area 54285



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 438869



ALS Group Houston

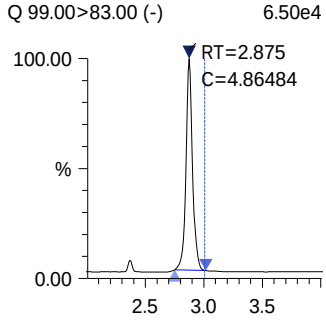
PERCHLORATE6

Date acquired: 7/20/2020 10:48:37 AM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_011.lcd
Vial: 10 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE6	7/20/2020 10:48:37 AM	249126	4.86484	20200720_011	2.875	25.0000	1.0000	10
Sodium Perchlorate-18O4_IS	PERCHLORATE6	7/20/2020 10:48:37 AM	426098	1.00000	20200720_011	2.873	25.0000	1.0000	10

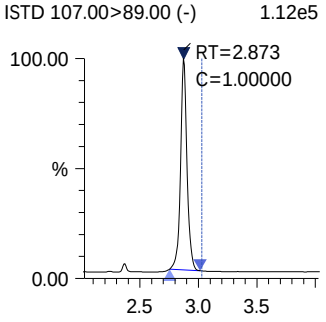
Perchlorate

Conc 4.86484
Area 249126



Sodium Perchlorate-18O4 _IS

Conc 1.00000
Area 426098



ALS Group Houston

PERCHLORATE7

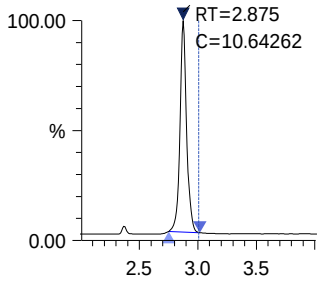
Date acquired: 7/20/2020 10:56:33 AM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_012.lcd
Vial: 4 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE7	7/20/2020 10:56:33 AM	453181	10.64262	20200720_012	2.875	25.0000	1.0000	4
Sodium Perchlorate-18O4_IS	PERCHLORATE7	7/20/2020 10:56:33 AM	354309	1.00000	20200720_012	2.873	25.0000	1.0000	4

Perchlorate

Conc 10.64262
Area 453181

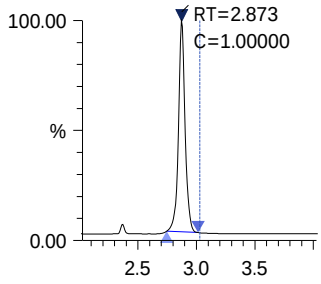
Q 99.00>83.00 (-) 1.16e5



Sodium Perchlorate-18O4 _IS

Conc 1.00000
Area 354309

ISTD 107.00>89.00 (-) 9.03e4



ALS Group Houston

PERCHLORATE8

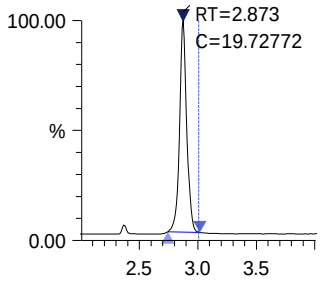
Date acquired: 7/20/2020 11:04:29 AM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_013.lcd
Vial: 11 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE8	7/20/2020 11:04:29 AM	811652	19.72772	20200720_013	2.873	25.0000	1.0000	11
Sodium Perchlorate-18O4_IS	PERCHLORATE8	7/20/2020 11:04:29 AM	342336	1.00000	20200720_013	2.872	25.0000	1.0000	11

Perchlorate

Conc 19.72772
Area 811652

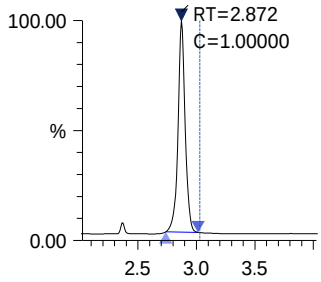
Q 99.00>83.00 (-) 1.93e5



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 342336

ISTD 107.00>89.00 (-) 8.10e4



ALS Group Houston

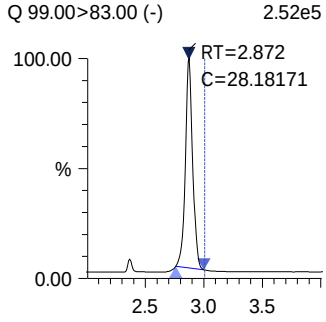
PERCHLORATE9

Date acquired: 7/20/2020 11:12:22 AM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_014.lcd
Vial: 12 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE9	7/20/2020 11:12:22 AM	1067782	28.18171	20200720_014	2.872	25.0000	1.0000	12
Sodium Perchlorate-18O4_IS	PERCHLORATE9	7/20/2020 11:12:22 AM	315264	1.00000	20200720_014	2.871	25.0000	1.0000	12

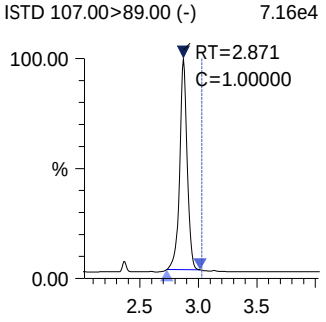
Perchlorate

Conc 28.18171
Area 1067782



Sodium Perchlorate-18O4 _IS

Conc 1.00000
Area 315264



ALS Group Houston

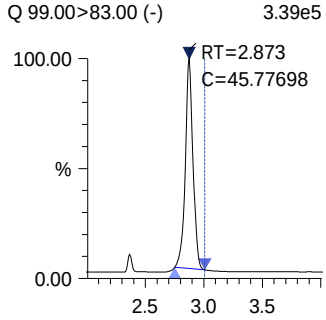
PERCHLORATE10

Date acquired: 7/20/2020 11:20:14 AM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_015.lcd
Vial: 13 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE10	7/20/2020 11:20:14 AM	1515028	45.77698	20200720_015	2.873	25.0000	1.0000	13
Sodium Perchlorate-18O4_IS	PERCHLORATE10	7/20/2020 11:20:14 AM	275380	1.00000	20200720_015	2.872	25.0000	1.0000	13

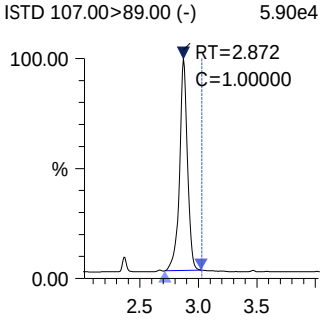
Perchlorate

Conc 45.77698
Area 1515028



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 275380



ALS Group Houston

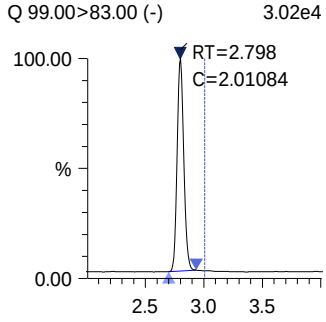
PERCHLORATE5

Date acquired: 7/20/2020 12:28:05 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_016.lcd
Vial: 9 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE5	7/20/2020 12:28:05 PM	119859	2.01084	20200720_016	2.798	25.0000	1.0000	9
Sodium Perchlorate-18O4_IS	PERCHLORATE5	7/20/2020 12:28:05 PM	495966	1.00000	20200720_016	2.795	25.0000	1.0000	9

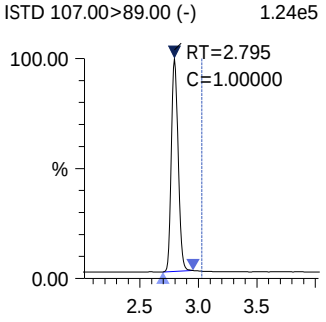
Perchlorate

Conc 2.01084
Area 119859



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 495966



ALS Group Houston

PERCHLORATEICV

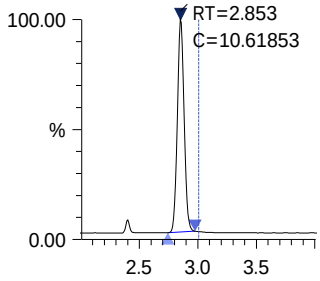
Date acquired: 7/20/2020 12:52:26 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_017.lcd
Vial: 14 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATEICV	7/20/2020 12:52:26 PM	490921	10.61853	20200720_017	2.853	25.0000	1.0000	14
Sodium Perchlorate-18O4_IS	PERCHLORATEICV	7/20/2020 12:52:26 PM	384686	1.00000	20200720_017	2.851	25.0000	1.0000	14

Perchlorate

Conc 10.61853
Area 490921

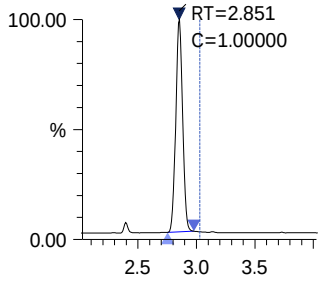
Q 99.00>83.00 (-) 1.21e5



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 384686

ISTD 107.00>89.00 (-) 9.52e4



20200724

ALS Environmental

1st Review: Kneir
2nd Review: Hvan

Injection Log
LCMS01 -Shimadzu 8050

ICAL Date: 7/24/2020
Cal. Std. xp: 11/18/2020
ICAL ID: EC2000016

Mobile Phases **A:** 0.75% Formic Acid/Water 3100807-09 **B:** MeOH 3100802-01

			File Name	Acquisition Method	Dilution	R	Comments
1	PERCHLORATE1		20200724_005	Perchlorate6850b.lcm	1x	☒	3100806-05
2	PERCHLORATE2		20200724_006	Perchlorate6850b.lcm	1x	☒	3100806-06
3	PERCHLORATE3		20200724_007	Perchlorate6850b.lcm	1x	☒	3100806-07
4	PERCHLORATE4		20200724_008	Perchlorate6850b.lcm	1x	☒	3100807-01
5	PERCHLORATE5		20200724_009	Perchlorate6850b.lcm	1x	☒	3100807-02
6	PERCHLORATE6		20200724_010	Perchlorate6850b.lcm	1x	☒	3100807-03
7	PERCHLORATE7		20200724_011	Perchlorate6850b.lcm	1x	☒	3100807-04
8	PERCHLORATE8		20200724_012	Perchlorate6850b.lcm	1x	☒	3100807-05
9	PERCHLORATE9		20200724_013	Perchlorate6850b.lcm	1x	☒	3100807-06
10	PERCHLORATE10		20200724_014	Perchlorate6850b.lcm	1x	☒	3100807-07
11	IB		20200724_015	Perchlorate6850b.lcm	1x	☒	
12	PERCHLORATEICV		20200724_016	Perchlorate6850b.lcm	1x	☒	3100807-08
13	IB		20200724_017	Perchlorate6850b.lcm	1x	☒	
14	LODV		20200724_018	Perchlorate6850b.lcm	1x	☒	
15	ICS		20200724_019	Perchlorate6850b.lcm	1x	☒	
16	PERCHLORATE7		20200724_020	Perchlorate6850b.lcm	1x	☒	3100807-04
17	EQ2000302-04X10		20200724_021	Perchlorate6850b.lcm	10x	☒	
18	EQ2000302-05X10DNU		20200724_022	Perchlorate6850b.lcm	10x	☒	
19	E2000626-001X2		20200724_023	Perchlorate6850b.lcm	2x	☒	
20	E2000627-001X10		20200724_024	Perchlorate6850b.lcm	10x	☒	
21	E2000627-005X100		20200724_025	Perchlorate6850b.lcm	100x	☒	
22	E2000627-006X100		20200724_026	Perchlorate6850b.lcm	100x	☒	
23	E2000627-009X1000		20200724_027	Perchlorate6850b.lcm	1000x	☒	
24	E2000640-001X200		20200724_028	Perchlorate6850b.lcm	200x	☒	
25	PERCHLORATE7		20200724_029	Perchlorate6850b.lcm	1x	☒	3100807-04
26	E2000660-001X10		20200724_030	Perchlorate6850b.lcm	10x	☒	
27	E2000627-004X10		20200724_031	Perchlorate6850b.lcm	10x	☒	
28	PERCHLORATE7		20200724_032	Perchlorate6850b.lcm	1x	☒	3100807-04
29	EQ2000302-05X10		20200724_033	Perchlorate6850b.lcm	10x	☒	
30	PERCHLORATE7		20200724_034	Perchlorate6850b.lcm	1x	☒	3100807-04
31	E2000660-003X10		20200724_035	Perchlorate6850b.lcm	10x	☒	
32	E2000660-004X10		20200724_036	Perchlorate6850b.lcm	10x	☒	
33	E2000660-005X2		20200724_037	Perchlorate6850b.lcm	2x	☒	
34	E2000660-006X10		20200724_038	Perchlorate6850b.lcm	10x	☒	
35	PERCHLORATE7		20200724_039	Perchlorate6850b.lcm	1x	☒	3100807-04
36	EQ2000303-01		20200724_040	Perchlorate6850b.lcm	1x	☒	
37	EQ2000303-02		20200724_041	Perchlorate6850b.lcm	1x	☒	
38	EQ2000303-03		20200724_042	Perchlorate6850b.lcm	1x	☒	
39	E2000641-001X20		20200724_043	Perchlorate6850b.lcm	20x	☒	
40	E2000641-002X20		20200724_044	Perchlorate6850b.lcm	20x	☒	
41	E2000641-003X10		20200724_045	Perchlorate6850b.lcm	10x	☒	
42	E2000641-004X20		20200724_046	Perchlorate6850b.lcm	20x	☒	
43	E2000641-005X10		20200724_047	Perchlorate6850b.lcm	10x	☒	
44	E2000641-006X10		20200724_048	Perchlorate6850b.lcm	10x	☒	
45	E2000641-007X10		20200724_049	Perchlorate6850b.lcm	10x	☒	
46	PERCHLORATE7		20200724_050	Perchlorate6850b.lcm	1x	☒	3100807-04
47	E2000641-008X10		20200724_051	Perchlorate6850b.lcm	10x	☒	
48	E2000641-009X10		20200724_052	Perchlorate6850b.lcm	10x	☒	
49	E2000648-001X10		20200724_053	Perchlorate6850b.lcm	10x	☒	
50	E2000648-002X10		20200724_054	Perchlorate6850b.lcm	10x	☒	
51	E2000648-003X20		20200724_055	Perchlorate6850b.lcm	20x	☒	
52	E2000648-005X10		20200724_056	Perchlorate6850b.lcm	10x	☒	

Initial Calibration - Detailed Report

Calibration ID: EC2000016 **Instrument ID:** E-LCMS-01
Column Name: 1

#	Lab Code	Sample Name	File Location	Aquisition Date
01	EC2000016-01	PERCHLORATE1	20200724_005	07/24/2020 11:48
02	EC2000016-02	PERCHLORATE2	20200724_006	07/24/2020 11:56
03	EC2000016-03	PERCHLORATE3	20200724_007	07/24/2020 12:04
04	EC2000016-04	PERCHLORATE4	20200724_008	07/24/2020 12:11
05	EC2000016-05	PERCHLORATE5	20200724_009	07/24/2020 12:19
06	EC2000016-06	PERCHLORATE6	20200724_010	07/24/2020 12:27
07	EC2000016-07	PERCHLORATE7	20200724_011	07/24/2020 12:35
08	EC2000016-08	PERCHLORATE8	20200724_012	07/24/2020 12:43
09	EC2000016-09	PERCHLORATE9	20200724_013	07/24/2020 12:51
10	EC2000016-10	PERCHLORATE10	20200724_014	07/24/2020 12:59

Analyte **Curve Fit** **Weighting**

Perchlorate **Average RF** **RSD = 4.659** **Average RF = 0.121**

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.1000	0.1283	02	0.5000	0.13	03	0.7000	0.1207	04	1.0000	0.1251
05	2.0000	0.1211	06	5.0000	0.1202	07	10.0000	0.1211	08	20.0000	0.1168
09	30.0000	0.1121	10	50.0000	0.1148						

Analyte

Perchlorate

#	Amount	Calculated Conc	%D	#	Amount	Calculated Conc	%D	#	Amount	Calculated Conc	%D
01	0.1000	0.106	6.0	02	0.5000	0.537	7.4	03	0.7000	0.698	-0.3
04	1.0000	1.03	3.4	05	2.0000	2.00	0.1	06	5.0000	4.97	-0.7
07	10.0000	10.0	0.1	08	20.0000	19.3	-3.5	09	30.0000	27.8	-7.3
10	50.0000	47.4	-5.1								

Initial Calibration Verification Summary Report

Calibration ID:	EC2000016	**Instrument ID:**	E-LCMS-01
Datafile ID:	20200724_016	**Column Name:**	1

Analyte	Lab Code	Type	Curve Fit	True Value	Calc Conc	Units	Result	Criteria
Perchlorate	EC2000016-11	T	Average RF	10	9.867	ng/mL	-1.3	<= 15

ALS Group Houston

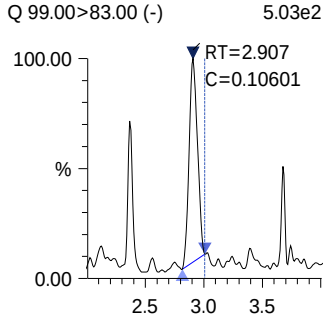
PERCHLORATE1

Date acquired: 7/24/2020 11:48:19 AM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_005.lcd
Vial: 5 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE1	7/24/2020 11:48:19 AM	2348	0.10601	20200724_005	2.907	25.0000	1.0000	5
Sodium Perchlorate-18O4_IS	PERCHLORATE1	7/24/2020 11:48:19 AM	183001	1.00000	20200724_005	2.903	25.0000	1.0000	5

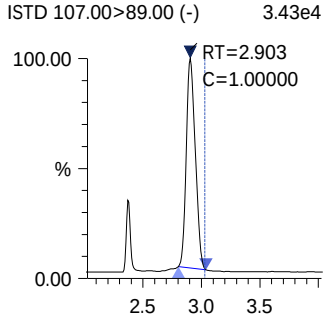
Perchlorate

Conc 0.10601
Area 2348



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 183001



ALS Group Houston

PERCHLORATE2

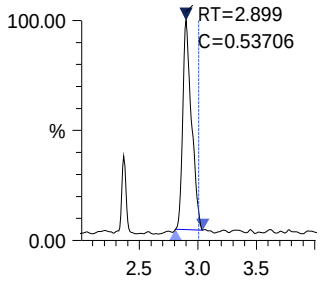
Date acquired: 7/24/2020 11:56:11 AM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_006.lcd
Vial: 6 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE2	7/24/2020 11:56:11 AM	11773	0.53706	20200724_006	2.899	25.0000	1.0000	6
Sodium Perchlorate-18O4_IS	PERCHLORATE2	7/24/2020 11:56:11 AM	181125	1.00000	20200724_006	2.898	25.0000	1.0000	6

Perchlorate

Conc 0.53706
Area 11773

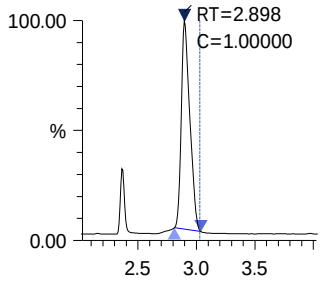
Q 99.00>83.00 (-) 2.32e3



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 181125

ISTD 107.00>89.00 (-) 3.62e4



ALS Group Houston

PERCHLORATE3

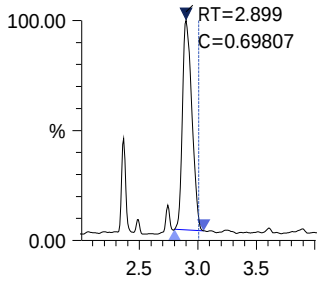
Date acquired: 7/24/2020 12:04:05 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_007.lcd
Vial: 7 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE3	7/24/2020 12:04:05 PM	15258	0.69807	20200724_007	2.899	25.0000	1.0000	7
Sodium Perchlorate-18O4_IS	PERCHLORATE3	7/24/2020 12:04:05 PM	180602	1.00000	20200724_007	2.896	25.0000	1.0000	7

Perchlorate

Conc 0.69807
Area 15258

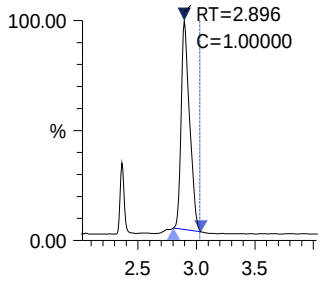
Q 99.00>83.00 (-) 2.79e3



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 180602

ISTD 107.00>89.00 (-) 3.65e4



ALS Group Houston

PERCHLORATE4

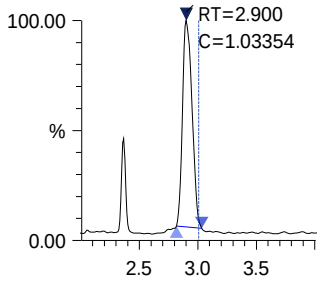
Date acquired: 7/24/2020 12:11:58 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_008.lcd
Vial: 8 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE4	7/24/2020 12:11:58 PM	20922	1.03354	20200724_008	2.900	25.0000	1.0000	8
Sodium Perchlorate-18O4_IS	PERCHLORATE4	7/24/2020 12:11:58 PM	167260	1.00000	20200724_008	2.902	25.0000	1.0000	8

Perchlorate

Conc 1.03354
Area 20922

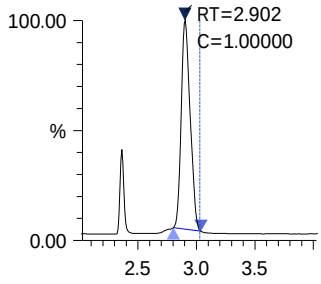
Q 99.00>83.00 (-) 3.87e3



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 167260

ISTD 107.00>89.00 (-) 3.17e4



ALS Group Houston

PERCHLORATE5

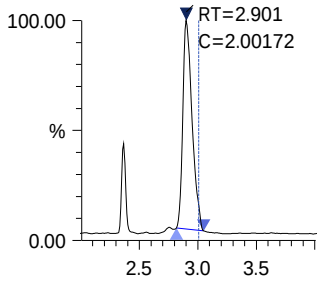
Date acquired: 7/24/2020 12:19:50 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_009.lcd
Vial: 9 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE5	7/24/2020 12:19:50 PM	39343	2.00172	20200724_009	2.901	25.0000	1.0000	9
Sodium Perchlorate-18O4_IS	PERCHLORATE5	7/24/2020 12:19:50 PM	162397	1.00000	20200724_009	2.899	25.0000	1.0000	9

Perchlorate

Conc 2.00172
Area 39343

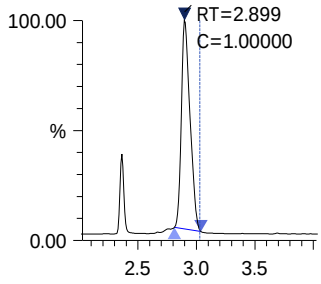
Q 99.00>83.00 (-) 7.39e3



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 162397

ISTD 107.00>89.00 (-) 3.19e4



ALS Group Houston

PERCHLORATE6

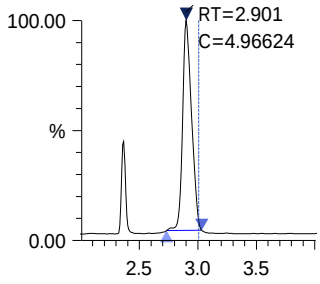
Date acquired: 7/24/2020 12:27:42 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_010.lcd
Vial: 10 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE6	7/24/2020 12:27:42 PM	102216	4.96624	20200724_010	2.901	25.0000	1.0000	10
Sodium Perchlorate-18O4_IS	PERCHLORATE6	7/24/2020 12:27:42 PM	170060	1.00000	20200724_010	2.900	25.0000	1.0000	10

Perchlorate

Conc 4.96624
Area 102216

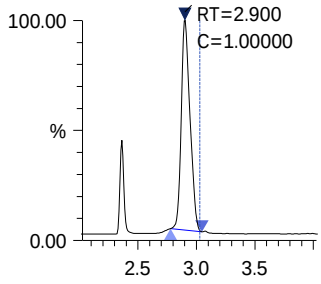
Q 99.00>83.00 (-) 1.97e4



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 170060

ISTD 107.00>89.00 (-) 3.28e4



ALS Group Houston

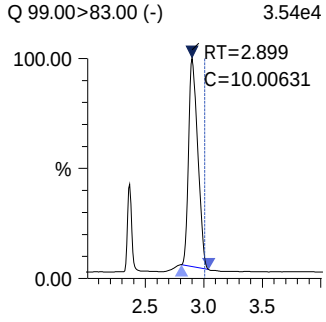
PERCHLORATE7

Date acquired: 7/24/2020 12:35:33 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_011.lcd
Vial: 4 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE7	7/24/2020 12:35:33 PM	187110	10.00631	20200724_011	2.899	25.0000	1.0000	4
Sodium Perchlorate-18O4_IS	PERCHLORATE7	7/24/2020 12:35:33 PM	154502	1.00000	20200724_011	2.897	25.0000	1.0000	4

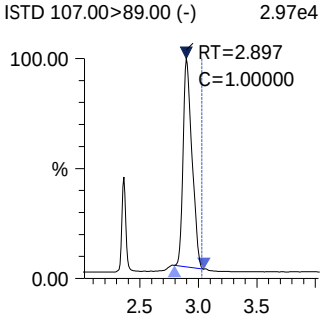
Perchlorate

Conc 10.00631
Area 187110



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 154502



ALS Group Houston

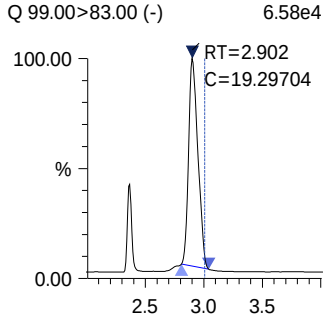
PERCHLORATE8

Date acquired: 7/24/2020 12:43:26 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_012.lcd
Vial: 11 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE8	7/24/2020 12:43:26 PM	349524	19.29704	20200724_012	2.902	25.0000	1.0000	11
Sodium Perchlorate-18O4_IS	PERCHLORATE8	7/24/2020 12:43:26 PM	149657	1.00000	20200724_012	2.900	25.0000	1.0000	11

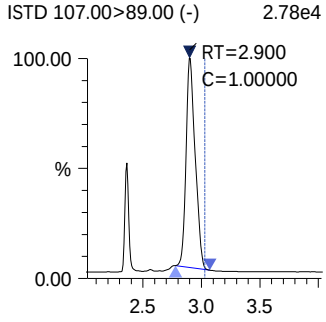
Perchlorate

Conc 19.29704
Area 349524



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 149657



ALS Group Houston

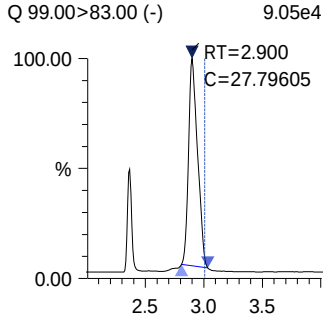
PERCHLORATE9

Date acquired: 7/24/2020 12:51:22 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_013.lcd
Vial: 12 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE9	7/24/2020 12:51:22 PM	465757	27.79605	20200724_013	2.900	25.0000	1.0000	12
Sodium Perchlorate-18O4_IS	PERCHLORATE9	7/24/2020 12:51:22 PM	138448	1.00000	20200724_013	2.898	25.0000	1.0000	12

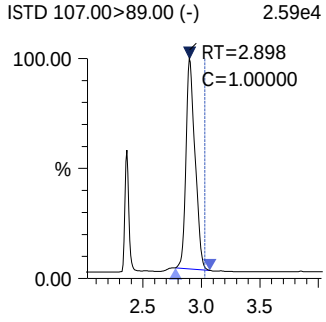
Perchlorate

Conc 27.79605
Area 465757



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 138448



ALS Group Houston

PERCHLORATE10

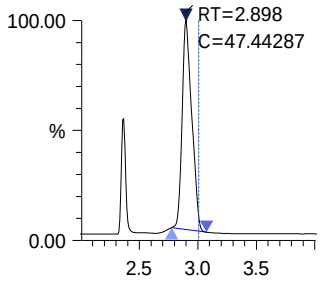
Date acquired: 7/24/2020 12:59:14 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_014.lcd
Vial: 13 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE10	7/24/2020 12:59:14 PM	708682	47.44287	20200724_014	2.898	25.0000	1.0000	13
Sodium Perchlorate-18O4_IS	PERCHLORATE10	7/24/2020 12:59:14 PM	123422	1.00000	20200724_014	2.896	25.0000	1.0000	13

Perchlorate

Conc 47.44287
Area 708682

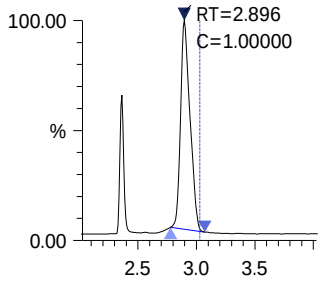
Q 99.00>83.00 (-) 1.28e5



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 123422

ISTD 107.00>89.00 (-) 2.23e4



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PERCHLORATEICV

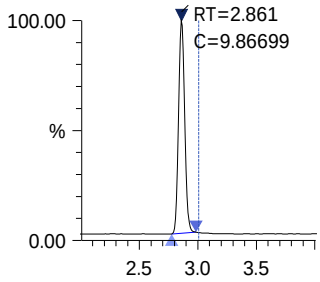
Date acquired: 7/24/2020 1:28:19 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_016.lcd
Vial: 14 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATEICV	7/24/2020 1:28:19 PM	231631	9.86699	20200724_016	2.861	25.0000	1.0000	14
Sodium Perchlorate-18O4_IS	PERCHLORATEICV	7/24/2020 1:28:19 PM	193964	1.00000	20200724_016	2.859	25.0000	1.0000	14

Perchlorate

Conc 9.86699
Area 231631

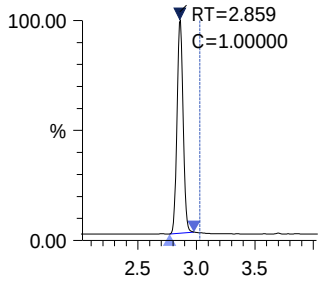
Q 99.00>83.00 (-) 6.30e4



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 193964

ISTD 107.00>89.00 (-) 5.33e4



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

20200720

ALS Environmental

1st Review: Kneir
2nd Review: Hvan

Injection Log
LCMS01 -Shimadzu 8050

ICAL Date: 7/20/2020
Cal. Std. xp: 11/18/2020
ICAL ID: EC2000014

Mobile Phases **A:** 0.75% Formic Acid/Water 3100807-09 **B:** MeOH 3100802-01

			File Name	Acquisition Method	Dilution	R	Comments
1	PERCHLORATE1		20200720_006	Perchlorate6850b.lcm	1x	☒	3100806-05
2	PERCHLORATE2		20200720_007	Perchlorate6850b.lcm	1x	☒	3100806-06
3	PERCHLORATE3		20200720_008	Perchlorate6850b.lcm	1x	☒	3100806-07
4	PERCHLORATE4		20200720_009	Perchlorate6850b.lcm	1x	☒	3100807-01
5	PERCHLORATE5		20200720_016	Perchlorate6850b.lcm	1x	☒	3100807-02
6	PERCHLORATE6		20200720_011	Perchlorate6850b.lcm	1x	☒	3100807-03
7	PERCHLORATE7		20200720_012	Perchlorate6850b.lcm	1x	☒	3100807-04
8	PERCHLORATE8		20200720_013	Perchlorate6850b.lcm	1x	☒	3100807-05
9	PERCHLORATE9		20200720_014	Perchlorate6850b.lcm	1x	☒	3100807-06
10	PERCHLORATE10		20200720_015	Perchlorate6850b.lcm	1x	☒	3100807-07
11	PERCHLORATEICV		20200720_017	Perchlorate6850b.lcm	1x	☒	3100807-08
12	IB		20200720_018	Perchlorate6850b.lcm	1x	☒	
13	IB		20200720_019	Perchlorate6850b.lcm	1x	☒	
14	LODV		20200720_020	Perchlorate6850b.lcm	1x	☒	
15	ICS		20200720_021	Perchlorate6850b.lcm	1x	☒	
16	PERCHLORATE7		20200720_022	Perchlorate6850b.lcm	1x	☒	3100807-04
17	EQ2000302-01		20200720_023	Perchlorate6850b.lcm	1x	☒	
18	EQ2000302-02		20200720_024	Perchlorate6850b.lcm	1x	☒	
19	EQ2000302-03		20200720_025	Perchlorate6850b.lcm	1x	☒	
20	EQ2000302-04		20200720_026	Perchlorate6850b.lcm	1x	☒	
21	EQ2000302-05		20200720_027	Perchlorate6850b.lcm	1x	☒	
22	E2000626-001		20200720_028	Perchlorate6850b.lcm	1x	☒	
23	E2000627-001		20200720_029	Perchlorate6850b.lcm	1x	☒	
24	E2000627-002		20200720_030	Perchlorate6850b.lcm	1x	☒	
25	E2000627-003		20200720_031	Perchlorate6850b.lcm	1x	☒	
26	E2000627-004		20200720_032	Perchlorate6850b.lcm	1x	☒	
27	PERCHLORATE7		20200720_033	Perchlorate6850b.lcm	1x	☒	3100807-04
28	E2000627-005		20200720_034	Perchlorate6850b.lcm	1x	☒	
29	E2000627-006		20200720_035	Perchlorate6850b.lcm	1x	☒	
30	E2000627-007		20200720_036	Perchlorate6850b.lcm	1x	☒	
31	E2000627-008		20200720_037	Perchlorate6850b.lcm	1x	☒	
32	E2000627-009		20200720_038	Perchlorate6850b.lcm	1x	☒	
33	E2000638-001		20200720_039	Perchlorate6850b.lcm	1x	☒	
34	E2000639-001		20200720_040	Perchlorate6850b.lcm	1x	☒	
35	E2000640-001		20200720_041	Perchlorate6850b.lcm	1x	☒	
36	PERCHLORATE7		20200720_042	Perchlorate6850b.lcm	1x	☒	3100807-04
37	EQ2000303-01		20200720_043	Perchlorate6850b.lcm	1x	☒	
38	EQ2000303-02		20200720_044	Perchlorate6850b.lcm	1x	☒	
39	EQ2000303-03		20200720_045	Perchlorate6850b.lcm	1x	☒	
40	E2000641-001		20200720_046	Perchlorate6850b.lcm	1x	☒	
41	E2000641-002		20200720_047	Perchlorate6850b.lcm	1x	☒	
42	E2000641-003		20200720_048	Perchlorate6850b.lcm	1x	☒	
43	E2000641-004		20200720_049	Perchlorate6850b.lcm	1x	☒	
44	E2000641-005		20200720_050	Perchlorate6850b.lcm	1x	☒	
45	E2000641-006		20200720_051	Perchlorate6850b.lcm	1x	☒	
46	E2000641-007		20200720_052	Perchlorate6850b.lcm	1x	☒	
47	PERCHLORATE7		20200720_053	Perchlorate6850b.lcm	1x	☒	3100807-04
48	E2000641-008		20200720_054	Perchlorate6850b.lcm	1x	☒	
49	E2000641-009		20200720_055	Perchlorate6850b.lcm	1x	☒	
50	E2000648-001		20200720_056	Perchlorate6850b.lcm	1x	☒	
51	E2000648-002		20200720_057	Perchlorate6850b.lcm	1x	☒	
52	E2000648-003		20200720_058	Perchlorate6850b.lcm	1x	☒	

20200723

ALS Environmental

1st Review: Kneir
2nd Review: Hvan

Injection Log
LCMS01 -Shimadzu 8050

ICAL Date: 7/20/2020
Cal. Std. xp: 11/18/2020
ICAL ID: EC2000014

Mobile Phases **A:** 0.75% Formic Acid/Water 3100807-09 **B:** MeOH 3100802-01

			File Name	Acquisition Method	Dilution	R	Comments
1	null		20200723_001	Perchlorate6850b.lcm	1x	☒	
2	null		20200723_002	Perchlorate6850b.lcm	1x	☒	
3	IB		20200723_003	Perchlorate6850b.lcm	1x	☒	
4	IB		20200723_004	Perchlorate6850b.lcm	1x	☒	
5	LODV		20200723_005	Perchlorate6850b.lcm	1x	☒	
6	ICS		20200723_006	Perchlorate6850b.lcm	1x	☒	
7	PERCHLORATE7		20200723_007	Perchlorate6850b.lcm	1x	☒	3100807-04
8	EQ2000302-04X2		20200723_008	Perchlorate6850b.lcm	1x	☒	
9	EQ2000302-05X2		20200723_009	Perchlorate6850b.lcm	1x	☒	
10	E2000626-001X2		20200723_010	Perchlorate6850b.lcm	1x	☒	
11	E2000627-001X10		20200723_011	Perchlorate6850b.lcm	1x	☒	
12	E2000627-002X10		20200723_012	Perchlorate6850b.lcm	2x	☒	
13	E2000627-003X10		20200723_013	Perchlorate6850b.lcm	1x	☒	
14	E2000627-004X10		20200723_014	Perchlorate6850b.lcm	1x	☒	
15	E2000638-001X10		20200723_015	Perchlorate6850b.lcm	1x	☒	
16	E2000639-001X10		20200723_016	Perchlorate6850b.lcm	1x	☒	
17	PERCHLORATE7		20200723_017	Perchlorate6850b.lcm	100x	☒	3100807-04
18	E2000649-001X10		20200723_018	Perchlorate6850b.lcm	100x	☒	
19	E2000649-003X10		20200723_019	Perchlorate6850b.lcm	200x	☒	
20	E2000649-004X10		20200723_020	Perchlorate6850b.lcm	1000x	☒	
21	E2000649-005X2		20200723_021	Perchlorate6850b.lcm	1x	☒	
22	E2000649-006X10		20200723_022	Perchlorate6850b.lcm	1x	☒	
23	PERCHLORATE7		20200723_023	Perchlorate6850b.lcm	200x	☒	3100807-04
24	E2000641-001X20		20200723_024	Perchlorate6850b.lcm	1x	☒	
25	E2000641-002X20		20200723_025	Perchlorate6850b.lcm	1x	☒	
26	E2000641-003X10		20200723_026	Perchlorate6850b.lcm	1x	☒	
27	E2000641-004X20		20200723_027	Perchlorate6850b.lcm	1x	☒	
28	E2000641-005X10		20200723_028	Perchlorate6850b.lcm	1x	☒	
29	E2000641-006X10		20200723_029	Perchlorate6850b.lcm	1x	☒	
30	E2000641-007X10		20200723_030	Perchlorate6850b.lcm	1x	☒	
31	E2000641-008X10		20200723_031	Perchlorate6850b.lcm	1x	☒	
32	E2000641-009X10		20200723_032	Perchlorate6850b.lcm	1x	☒	
33	PERCHLORATE7		20200723_033	Perchlorate6850b.lcm	1x	☒	3100807-04
34	E2000648-001X10		20200723_034	Perchlorate6850b.lcm	1x	☒	
35	E2000648-002X10		20200723_035	Perchlorate6850b.lcm	1x	☒	
36	E2000648-003X20		20200723_036	Perchlorate6850b.lcm	1x	☒	
37	E2000648-005X10		20200723_037	Perchlorate6850b.lcm	1x	☒	
38	E2000648-006X10		20200723_038	Perchlorate6850b.lcm	1x	☒	
39	E2000648-007X10		20200723_039	Perchlorate6850b.lcm	1x	☒	
40	E2000648-008X20		20200723_040	Perchlorate6850b.lcm	1x	☒	
41	E2000649-005X10		20200723_041	Perchlorate6850b.lcm	1x	☒	
42	EQ2000302-04X10		20200723_042	Perchlorate6850b.lcm	1x	☒	
43	EQ2000302-05X10		20200723_043	Perchlorate6850b.lcm	1x	☒	
44	E2000626-001X10		20200723_044	Perchlorate6850b.lcm	1x	☒	
45	PERCHLORATE7		20200723_045	Perchlorate6850b.lcm	1x	☒	3100807-04
46							
47							
48							
49							
50							
51							
52							

20200724

ALS Environmental

1st Review: Kneir
2nd Review: Hvan

Injection Log
LCMS01 -Shimadzu 8050

ICAL Date: 7/24/2020
Cal. Std. xp: 11/18/2020
ICAL ID: EC2000016

Mobile Phases **A:** 0.75% Formic Acid/Water 3100807-09 **B:** MeOH 3100802-01

			File Name	Acquisition Method	Dilution	R	Comments
1	PERCHLORATE1		20200724_005	Perchlorate6850b.lcm	1x	☒	3100806-05
2	PERCHLORATE2		20200724_006	Perchlorate6850b.lcm	1x	☒	3100806-06
3	PERCHLORATE3		20200724_007	Perchlorate6850b.lcm	1x	☒	3100806-07
4	PERCHLORATE4		20200724_008	Perchlorate6850b.lcm	1x	☒	3100807-01
5	PERCHLORATE5		20200724_009	Perchlorate6850b.lcm	1x	☒	3100807-02
6	PERCHLORATE6		20200724_010	Perchlorate6850b.lcm	1x	☒	3100807-03
7	PERCHLORATE7		20200724_011	Perchlorate6850b.lcm	1x	☒	3100807-04
8	PERCHLORATE8		20200724_012	Perchlorate6850b.lcm	1x	☒	3100807-05
9	PERCHLORATE9		20200724_013	Perchlorate6850b.lcm	1x	☒	3100807-06
10	PERCHLORATE10		20200724_014	Perchlorate6850b.lcm	1x	☒	3100807-07
11	IB		20200724_015	Perchlorate6850b.lcm	1x	☒	
12	PERCHLORATEICV		20200724_016	Perchlorate6850b.lcm	1x	☒	3100807-08
13	IB		20200724_017	Perchlorate6850b.lcm	1x	☒	
14	LODV		20200724_018	Perchlorate6850b.lcm	1x	☒	
15	ICS		20200724_019	Perchlorate6850b.lcm	1x	☒	
16	PERCHLORATE7		20200724_020	Perchlorate6850b.lcm	1x	☒	3100807-04
17	EQ2000302-04X10		20200724_021	Perchlorate6850b.lcm	10x	☒	
18	EQ2000302-05X10DNU		20200724_022	Perchlorate6850b.lcm	10x	☒	
19	E2000626-001X2		20200724_023	Perchlorate6850b.lcm	2x	☒	
20	E2000627-001X10		20200724_024	Perchlorate6850b.lcm	10x	☒	
21	E2000627-005X100		20200724_025	Perchlorate6850b.lcm	100x	☒	
22	E2000627-006X100		20200724_026	Perchlorate6850b.lcm	100x	☒	
23	E2000627-009X1000		20200724_027	Perchlorate6850b.lcm	1000x	☒	
24	E2000640-001X200		20200724_028	Perchlorate6850b.lcm	200x	☒	
25	PERCHLORATE7		20200724_029	Perchlorate6850b.lcm	1x	☒	3100807-04
26	E2000660-001X10		20200724_030	Perchlorate6850b.lcm	10x	☒	
27	E2000627-004X10		20200724_031	Perchlorate6850b.lcm	10x	☒	
28	PERCHLORATE7		20200724_032	Perchlorate6850b.lcm	1x	☒	3100807-04
29	EQ2000302-05X10		20200724_033	Perchlorate6850b.lcm	10x	☒	
30	PERCHLORATE7		20200724_034	Perchlorate6850b.lcm	1x	☒	3100807-04
31	E2000660-003X10		20200724_035	Perchlorate6850b.lcm	10x	☒	
32	E2000660-004X10		20200724_036	Perchlorate6850b.lcm	10x	☒	
33	E2000660-005X2		20200724_037	Perchlorate6850b.lcm	2x	☒	
34	E2000660-006X10		20200724_038	Perchlorate6850b.lcm	10x	☒	
35	PERCHLORATE7		20200724_039	Perchlorate6850b.lcm	1x	☒	3100807-04
36	EQ2000303-01		20200724_040	Perchlorate6850b.lcm	1x	☒	
37	EQ2000303-02		20200724_041	Perchlorate6850b.lcm	1x	☒	
38	EQ2000303-03		20200724_042	Perchlorate6850b.lcm	1x	☒	
39	E2000641-001X20		20200724_043	Perchlorate6850b.lcm	20x	☒	
40	E2000641-002X20		20200724_044	Perchlorate6850b.lcm	20x	☒	
41	E2000641-003X10		20200724_045	Perchlorate6850b.lcm	10x	☒	
42	E2000641-004X20		20200724_046	Perchlorate6850b.lcm	20x	☒	
43	E2000641-005X10		20200724_047	Perchlorate6850b.lcm	10x	☒	
44	E2000641-006X10		20200724_048	Perchlorate6850b.lcm	10x	☒	
45	E2000641-007X10		20200724_049	Perchlorate6850b.lcm	10x	☒	
46	PERCHLORATE7		20200724_050	Perchlorate6850b.lcm	1x	☒	3100807-04
47	E2000641-008X10		20200724_051	Perchlorate6850b.lcm	10x	☒	
48	E2000641-009X10		20200724_052	Perchlorate6850b.lcm	10x	☒	
49	E2000648-001X10		20200724_053	Perchlorate6850b.lcm	10x	☒	
50	E2000648-002X10		20200724_054	Perchlorate6850b.lcm	10x	☒	
51	E2000648-003X20		20200724_055	Perchlorate6850b.lcm	20x	☒	
52	E2000648-005X10		20200724_056	Perchlorate6850b.lcm	10x	☒	

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070615

Service Request: E2000638
Date Analyzed: 7/20/20

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\20200720\20200720_022

Calibration Date: 7/20/20
Calibration ID: EC2000014
Analysis Lot: 688323
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	10.7	0.1210	0.1285	6.2	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070615

Service Request: E2000638
Date Analyzed: 7/20/20

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\20200720\20200720_033

Calibration Date: 7/20/20
Calibration ID: EC2000014
Analysis Lot: 688323
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	10.1	0.1210	0.1212	0.1	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070615

Service Request: E2000638
Date Analyzed: 7/20/20

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\20200720\20200720_042

Calibration Date: 7/20/20
Calibration ID: EC2000014
Analysis Lot: 688323
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	10.4	0.1210	0.1247	3.0	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070615

Service Request: E2000638
Date Analyzed: 7/22/20

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\20200722\20200722_016

Calibration Date: 7/20/20
Calibration ID: EC2000014
Analysis Lot: 688323
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	10.1	0.1210	0.1215	0.4	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070615

Service Request: E2000638
Date Analyzed: 7/22/20

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\20200722\20200722_024

Calibration Date: 7/20/20
Calibration ID: EC2000014
Analysis Lot: 688323
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	9.89	0.1210	0.1189	-1.8	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070615

Service Request: E2000638
Date Analyzed: 7/23/20

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\20200723\20200723_007

Calibration Date: 7/20/20
Calibration ID: EC2000014
Analysis Lot: 688323
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	10.1	0.1210	0.1214	0.3	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070615

Service Request: E2000638
Date Analyzed: 7/23/20

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\20200723\20200723_017

Calibration Date: 7/20/20
Calibration ID: EC2000014
Analysis Lot: 688323
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	9.34	0.1210	0.1122	-7.3	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070615

Service Request: E2000638
Date Analyzed: 7/24/20

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\20200724\20200724_020

Calibration Date: 7/24/20
Calibration ID: EC2000016
Analysis Lot: 688371
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	10.0	0.1210	0.1213	0.2	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070615

Service Request: E2000638
Date Analyzed: 7/24/20

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\20200724\20200724_029

Calibration Date: 7/24/20
Calibration ID: EC2000016
Analysis Lot: 688371
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	9.86	0.1210	0.1193	-1.4	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070615

Service Request: E2000638
Date Analyzed: 7/24/20

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\20200724\20200724_032

Calibration Date: 7/24/20
Calibration ID: EC2000016
Analysis Lot: 688371
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	9.75	0.1210	0.1180	-2.5	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070615

Service Request: E2000638
Date Analyzed: 7/24/20

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\20200724\20200724_034

Calibration Date: 7/24/20
Calibration ID: EC2000016
Analysis Lot: 688371
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	10.1	0.1210	0.1220	0.8	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070615

Service Request: E2000638
Date Analyzed: 7/24/20

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\20200724\20200724_039

Calibration Date: 7/24/20
Calibration ID: EC2000016
Analysis Lot: 688371
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	10.0	0.1210	0.1214	0.3	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070615

Service Request: E2000638
Date Analyzed: 7/24/20

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\20200724\20200724_050

Calibration Date: 7/24/20
Calibration ID: EC2000016
Analysis Lot: 688371
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	9.68	0.1210	0.1172	-3.2	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070615

Service Request: E2000638
Date Analyzed: 7/24/20

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\20200724\20200724_060

Calibration Date: 7/24/20
Calibration ID: EC2000016
Analysis Lot: 688371
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	10.1	0.1210	0.1226	1.3	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070615

Service Request: E2000638
Date Analyzed: 7/20/20 13:39

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

File ID: I:\LCMS01\DATA\20200720\20200720_022
Instrument ID: E-LCMS-01
Analytical Method: 6850

Lab Code: EQ2000310-01
Analysis Lot: 688323
Signal ID: 1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	403,151	2.86
	Upper Limit ==>	604,727	4.86
	Lower Limit ==>	201,576	0.86
Associated Analyses			
Continuing Calibration Verification	EQ2000310-01	380,500	2.80
Method Blank	EQ2000302-01	475,788	2.87
Lab Control Sample	EQ2000302-02	485,348	2.87
Duplicate Lab Control Sample	EQ2000302-03	485,451	2.87

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000638
Project:	HS20070615	**Date Analyzed:**	7/20/20 15:22

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

File ID:	I:\LCMS01\DATA\20200720\20200720_033	**Lab Code:**	EQ2000310-02
Instrument ID:	E-LCMS-01	**Analysis Lot:**	688323
Analytical Method:	6850	**Signal ID:**	1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	403,151	2.86
	Upper Limit ==>	604,727	4.86
	Lower Limit ==>	201,576	0.86
Associated Analyses			
Continuing Calibration Verification	EQ2000310-02	373,864	2.79

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: HS20070615

Service Request: E2000638
Date Analyzed: 7/20/20 16:55

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

File ID: I:\LCMS01\DATA\20200720\20200720_042
Instrument ID: E-LCMS-01
Analytical Method: 6850

Lab Code: EQ2000310-03
Analysis Lot: 688323
Signal ID: 1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	403,151	2.86
	Upper Limit ==>	604,727	4.86
	Lower Limit ==>	201,576	0.86
Associated Analyses			
Continuing Calibration Verification	EQ2000310-03	224,958	2.91

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000638
Project:	HS20070615	**Date Analyzed:**	7/22/20 19:13

Internal Standard Area and RT Summary

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

File ID:	I:\LCMS01\DATA\20200722\20200722_016	**Lab Code:**	EQ2000310-04
Instrument ID:	E-LCMS-01	**Analysis Lot:**	688323
Analytical Method:	6850	**Signal ID:**	1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	403,151	2.86
	Upper Limit ==>	604,727	4.86
	Lower Limit ==>	201,576	0.86
Associated Analyses			
Continuing Calibration Verification	EQ2000310-04	223,422	2.95

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000638
Project:	HS20070615	**Date Analyzed:**	7/22/20 20:16

Internal Standard Area and RT Summary

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

File ID:	I:\LCMS01\DATA\20200722\20200722_024	**Lab Code:**	EQ2000310-05
Instrument ID:	E-LCMS-01	**Analysis Lot:**	688323
Analytical Method:	6850	**Signal ID:**	1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	403,151	2.86
	Upper Limit ==>	604,727	4.86
	Lower Limit ==>	201,576	0.86
Associated Analyses			
Continuing Calibration Verification	EQ2000310-05	232,812	2.95

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000638
Project:	HS20070615	**Date Analyzed:**	7/23/20 11:41

Internal Standard Area and RT Summary

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

File ID:	I:\LCMS01\DATA\20200723\20200723_007	**Lab Code:**	EQ2000310-06
Instrument ID:	E-LCMS-01	**Analysis Lot:**	688323
Analytical Method:	6850	**Signal ID:**	1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	403,151	2.86
	Upper Limit ==>	604,727	4.86
	Lower Limit ==>	201,576	0.86
Associated Analyses			
Continuing Calibration Verification	EQ2000310-06	202,016	2.92
LH18/24-SP650_071420-BIX	E2000638-001	219,267	2.91

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: HS20070615

Service Request: E2000638
Date Analyzed: 7/23/20 13:00

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

File ID: I:\LCMS01\DATA\20200723\20200723_017
Instrument ID: E-LCMS-01
Analytical Method: 6850

Lab Code: EQ2000310-07
Analysis Lot: 688323
Signal ID: 1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	403,151	2.86
	Upper Limit ==>	604,727	4.86
	Lower Limit ==>	201,576	0.86
Associated Analyses			
Continuing Calibration Verification	EQ2000310-07	202,415	2.91

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000638
Project:	HS20070615	**Date Analyzed:**	7/24/20 13:59

Internal Standard Area and RT Summary

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

File ID:	I:\LCMS01\DATA\20200724\20200724_020	**Lab Code:**	EQ2000311-01
Instrument ID:	E-LCMS-01	**Analysis Lot:**	688371
Analytical Method:	6850	**Signal ID:**	1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	161,047	2.90
	Upper Limit ==>	241,571	4.90
	Lower Limit ==>	80,524	0.90
Associated Analyses			
Continuing Calibration Verification	EQ2000311-01	149,874	2.90
Batch QCMS	EQ2000302-04	80,779	2.90

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000638
Project:	HS20070615	**Date Analyzed:**	7/24/20 15:11

Internal Standard Area and RT Summary

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

File ID:	I:\LCMS01\DATA\20200724\20200724_029	**Lab Code:**	EQ2000311-02
Instrument ID:	E-LCMS-01	**Analysis Lot:**	688371
Analytical Method:	6850	**Signal ID:**	1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	161,047	2.90
	Upper Limit ==>	241,571	4.90
	Lower Limit ==>	80,524	0.90
Associated Analyses			
Continuing Calibration Verification	EQ2000311-02	142,468	2.90
Batch QC	E2000627-004	214,190	2.85

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000638
Project:	HS20070615	**Date Analyzed:**	7/24/20 15:37

Internal Standard Area and RT Summary

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

File ID:	I:\LCMS01\DATA\20200724\20200724_032	**Lab Code:**	EQ2000311-03
Instrument ID:	E-LCMS-01	**Analysis Lot:**	688371
Analytical Method:	6850	**Signal ID:**	1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	161,047	2.90
	Upper Limit ==>	241,571	4.90
	Lower Limit ==>	80,524	0.90
Associated Analyses			
Continuing Calibration Verification	EQ2000311-03	143,487	2.90
Batch QCDMS	EQ2000302-05	121,804	2.85

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000638
Project:	HS20070615	**Date Analyzed:**	7/24/20 15:53

Internal Standard Area and RT Summary

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

File ID:	I:\LCMS01\DATA\20200724\20200724_034	**Lab Code:**	EQ2000311-04
Instrument ID:	E-LCMS-01	**Analysis Lot:**	688371
Analytical Method:	6850	**Signal ID:**	1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	161,047	2.90
	Upper Limit ==>	241,571	4.90
	Lower Limit ==>	80,524	0.90
Associated Analyses			
Continuing Calibration Verification	EQ2000311-04	142,073	2.90

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000638
Project:	HS20070615	**Date Analyzed:**	7/24/20 16:33

Internal Standard Area and RT Summary

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

File ID:	I:\LCMS01\DATA\20200724\20200724_039	**Lab Code:**	EQ2000311-05
Instrument ID:	E-LCMS-01	**Analysis Lot:**	688371
Analytical Method:	6850	**Signal ID:**	1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	161,047	2.90
	Upper Limit ==>	241,571	4.90
	Lower Limit ==>	80,524	0.90
Associated Analyses			
Continuing Calibration Verification	EQ2000311-05	142,477	2.90

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000638
Project:	HS20070615	**Date Analyzed:**	7/24/20 17:59

Internal Standard Area and RT Summary

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

File ID:	I:\LCMS01\DATA\20200724\20200724_050	**Lab Code:**	EQ2000311-06
Instrument ID:	E-LCMS-01	**Analysis Lot:**	688371
Analytical Method:	6850	**Signal ID:**	1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	161,047	2.90
	Upper Limit ==>	241,571	4.90
	Lower Limit ==>	80,524	0.90
Associated Analyses			
Continuing Calibration Verification	EQ2000311-06	128,840	2.90

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000638
Project:	HS20070615	**Date Analyzed:**	7/24/20 19:18

Internal Standard Area and RT Summary

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

File ID:	I:\LCMS01\DATA\20200724\20200724_060	**Lab Code:**	EQ2000311-07
Instrument ID:	E-LCMS-01	**Analysis Lot:**	688371
Analytical Method:	6850	**Signal ID:**	1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	161,047	2.90
	Upper Limit ==>	241,571	4.90
	Lower Limit ==>	80,524	0.90
Associated Analyses			
Continuing Calibration Verification	EQ2000311-07	129,501	2.90

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

ALS Group Houston

PERCHLORATE7

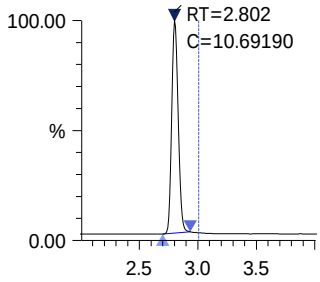
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Vial: 4 | Inj. Volume: 25.0000uL | Tray: 1

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Perchlorate	PERCHLORATE7	7/20/2020 1:39:32 PM	488934	10.69190	20200720_022	2.802	25.0000	1.0000	4
Sodium Perchlorate-18O4_IS	PERCHLORATE7	7/20/2020 1:39:32 PM	380500	1.00000	20200720_022	2.800	25.0000	1.0000	4

Perchlorate

Conc 10.69190
Area 488934

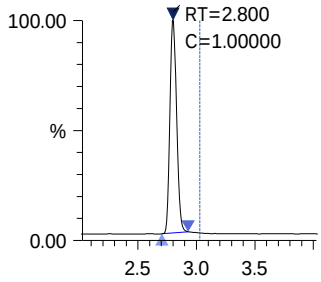
Q 99.00>83.00 (-) 1.26e5



Sodium Perchlorate-18O4 _IS

Conc 1.00000
Area 380500

ISTD 107.00>89.00 (-) 9.71e4



ALS Group Houston

EQ2000302-01

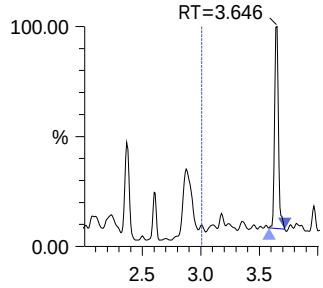
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Data File: I:\LCMS01\DATA\20200720\20200720_023.lcd
Vial: 1 | Inj. Volume: 25.0000uL | Tray: 3

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	EQ2000302-01	7/20/2020 1:47:28 PM	----	----	20200720_023	----	25.0000	1.0000	1
Sodium Perchlorate-18O4_IS	EQ2000302-01	7/20/2020 1:47:28 PM	475788	1.00000	20200720_023	2.866	25.0000	1.0000	1

Perchlorate

Conc ----
Area ----

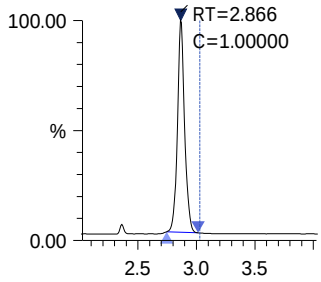
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Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 475788

ISTD 107.00>89.00 (-) 1.12e5



ALS Group Houston

EQ2000302-02

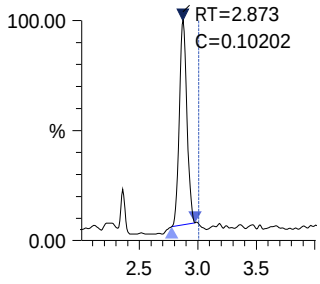
Date acquired: 7/20/2020 1:55:23 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_024.lcd
Vial: 2 | Inj. Volume: 25.0000uL | Tray: 3

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	EQ2000302-02	7/20/2020 1:55:23 PM	5951	0.10202	20200720_024	2.873	25.0000	1.0000	2
Sodium Perchlorate-18O4_IS	EQ2000302-02	7/20/2020 1:55:23 PM	485348	1.00000	20200720_024	2.868	25.0000	1.0000	2

Perchlorate

Conc 0.10202
Area 5951

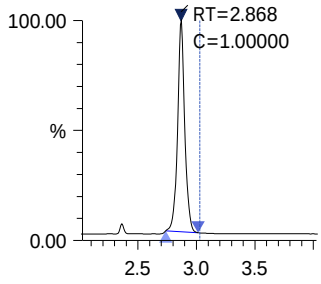
Q 99.00>83.00 (-) 1.38e3



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 485348

ISTD 107.00>89.00 (-) 1.15e5



ALS Group Houston

EQ2000302-03

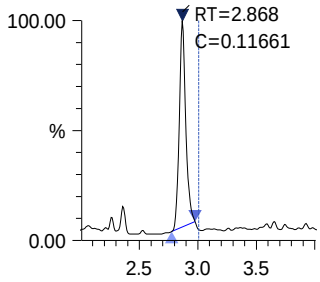
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Vial: 3 | Inj. Volume: 25.0000uL | Tray: 3

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Perchlorate	EQ2000302-03	7/20/2020 2:03:16 PM	6802	0.11661	20200720_025	2.868	25.0000	1.0000	3
Sodium Perchlorate-18O4_IS	EQ2000302-03	7/20/2020 2:03:16 PM	485451	1.00000	20200720_025	2.866	25.0000	1.0000	3

Perchlorate

Conc 0.11661
Area 6802

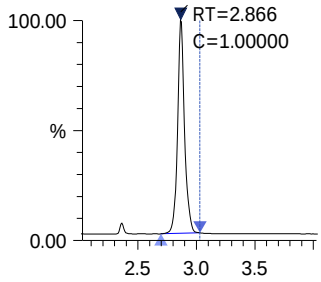
Q 99.00>83.00 (-) 1.83e3



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 485451

ISTD 107.00>89.00 (-) 1.17e5



ALS Group Houston

PERCHLORATE7

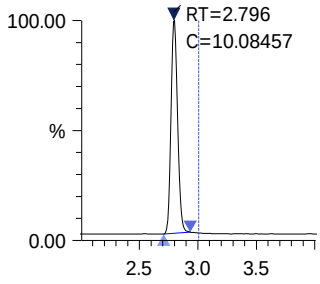
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Data File: I:\LCMS01\DATA\20200720\20200720_033.lcd
Vial: 4 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE7	7/20/2020 3:22:41 PM	453118	10.08457	20200720_033	2.796	25.0000	1.0000	4
Sodium Perchlorate-18O4_IS	PERCHLORATE7	7/20/2020 3:22:41 PM	373864	1.00000	20200720_033	2.794	25.0000	1.0000	4

Perchlorate

Conc 10.08457
Area 453118

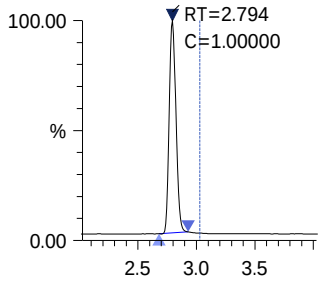
Q 99.00>83.00 (-) 1.14e5



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 373864

ISTD 107.00>89.00 (-) 9.49e4



ALS Group Houston

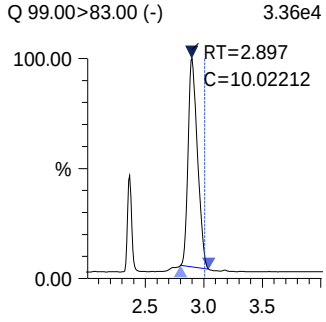
PERCHLORATE7

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Vial: 4 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE7	7/24/2020 1:59:53 PM	181792	10.02212	20200724_020	2.897	25.0000	1.0000	4
Sodium Perchlorate-18O4_IS	PERCHLORATE7	7/24/2020 1:59:53 PM	149874	1.00000	20200724_020	2.897	25.0000	1.0000	4

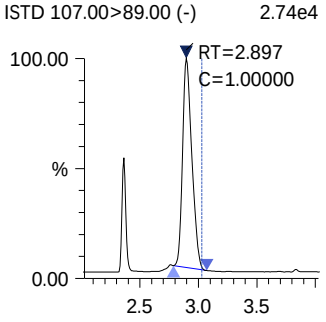
Perchlorate

Conc 10.02212
Area 181792



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 149874



ALS Group Houston

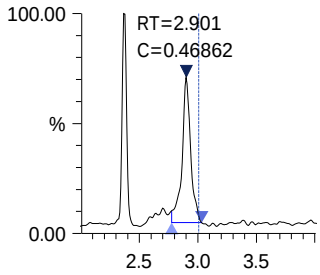
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Acquired by: System Administrator
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Vial: 16 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	EQ2000302-04X10	7/24/2020 2:07:48 PM	4582	0.46862	20200724_021	2.901	25.0000	1.0000	16
Sodium Perchlorate-18O4_IS	EQ2000302-04X10	7/24/2020 2:07:48 PM	80779	1.00000	20200724_021	2.897	25.0000	1.0000	16

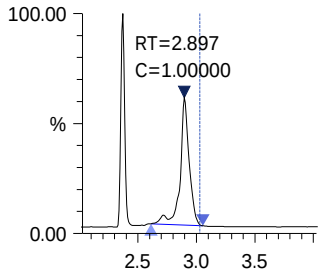
Perchlorate

Conc 0.46862
Area 4582
Q 99.00>83.00 (-) 1.33e3



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 80779
ISTD 107.00>89.00 (-) 2.49e4



ALS Group Houston

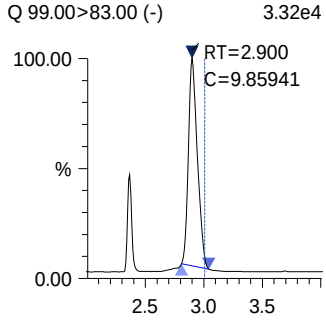
PERCHLORATE7

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Vial: 4 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE7	7/24/2020 3:11:02 PM	170004	9.85941	20200724_029	2.900	25.0000	1.0000	4
Sodium Perchlorate-18O4_IS	PERCHLORATE7	7/24/2020 3:11:02 PM	142468	1.00000	20200724_029	2.899	25.0000	1.0000	4

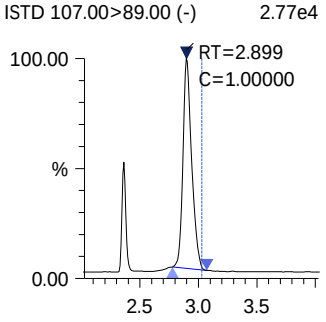
Perchlorate

Conc 9.85941
Area 170004



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 142468



ALS Group Houston

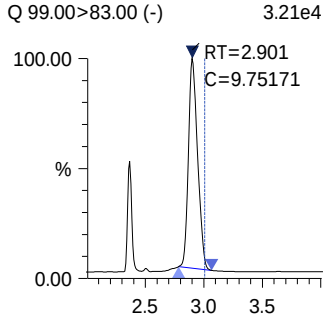
PERCHLORATE7

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Vial: 4 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE7	7/24/2020 3:37:07 PM	169350	9.75171	20200724_032	2.901	25.0000	1.0000	4
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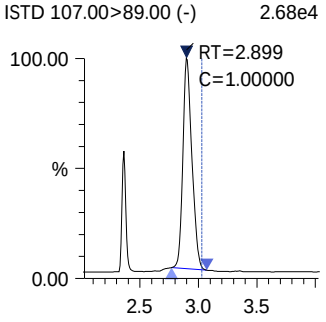
Perchlorate

Conc 9.75171
Area 169350



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 143487



ALS Group Houston

EQ2000302-05X10

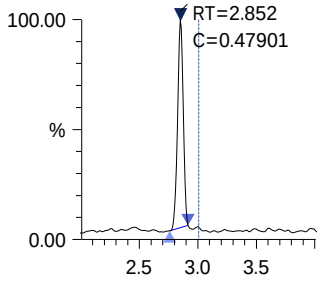
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Vial: 17 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	EQ2000302-05X10	7/24/2020 3:45:36 PM	7062	0.47901	20200724_033	2.852	25.0000	1.0000	17
Sodium Perchlorate-18O4_IS	EQ2000302-05X10	7/24/2020 3:45:36 PM	121804	1.00000	20200724_033	2.850	25.0000	1.0000	17

Perchlorate

Conc 0.47901
Area 7062

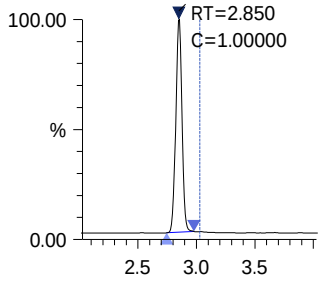
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Sodium Perchlorate-18O4_IS

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ISTD 107.00>89.00 (-) 3.33e4



ALS Group Houston

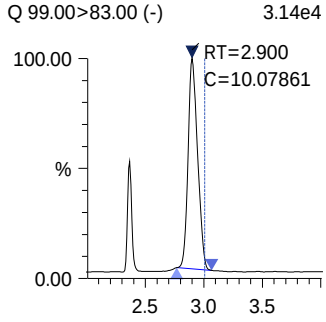
PERCHLORATE7

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Vial: 4 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE7	7/24/2020 3:53:29 PM	173301	10.07861	20200724_034	2.900	25.0000	1.0000	4
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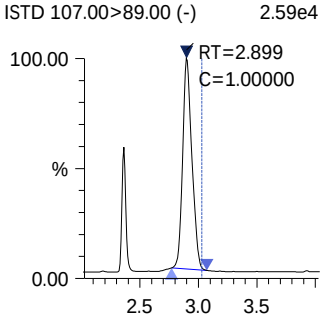
Perchlorate

Conc 10.07861
Area 173301



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 142073



ALS Environmental
ALS Group USA, Corp
1317 South 13th Avenue
Kelso, WA 98626
T : +1 360 577 7222
F : +1 360 636 1068
www.alsglobal.com

August 07, 2020

Analytical Report for Service Request No: K2006036

RJ Modashia
ALS Laboratory Group
10450 Stancliff Road
Suite 210
Houston, TX 77099-4338

RE: HS20070615

Dear RJ,

Enclosed are the results of the sample(s) submitted to our laboratory July 17, 2020
For your reference, these analyses have been assigned our service request number **K2006036.**

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3350. You may also contact me via email at Kelley.Lovejoy@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Kelley Lovejoy

Kelley Lovejoy
Project Manager

RIGHT SOLUTIONS | RIGHT PARTNER

ALS Environmental
ALS Group USA, Corp
1317 South 13th Avenue
Kelso, WA 98626
T : +1 360 577 7222
F : +1 360 636 1068
www.alsglobal.com

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Acronyms
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State Certifications, Accreditations, And Licenses
Case Narrative
Chain of Custody
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Raw Data
    General Chemistry

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimated value.
J	The result is an estimated value.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
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.
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.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L16-58-R4
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjlabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water-	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

Case Narrative

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

1317 South 13th Ave, Kelso, WA 98626 | 1-360-577-7222 | www.alsglobal.com

Client: ALS Environmental - US
Project: HS20070615
Sample Matrix: Water

Service Request: K2006036
Date Received: 07/17/2020

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier level IV requested by the client.

Sample Receipt:

One water sample was received for analysis at ALS Environmental on 07/17/2020. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The sample was stored at minimum in accordance with the analytical method requirements.

General Chemistry:

No significant anomalies were noted with this analysis.

Approved by Kelley Lovejoy Date 08/07/2020

Chain of Custody

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

L200403G

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:** **14285**

SUBCONTRACT TO:

ALS Environmental Kelso
1317 S. 13th Avenue
Kelso, WA 98626

Phone: +1 360 501 3312

CUSTOMER INFORMATION:

Company:	ALS Houston
Contact:	RJ Modashia
Address:	10450 Stancliff Rd, Ste 210
Phone:	+1 281 530 5656
Email:	RJ.Modashia@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:	HS20070615
TSR:	Danielle Winnings

	LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
	ANALYSIS REQUESTED			DUE DATE
1.	**HS20070615-01**	**LH18/24-SP650_071420**	**Water**	**14 Jul 2020 14:00**
	TOC Analysis for DOD Level IV			29 Jul 2020

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

QC Level: DOD IV (DoD Data Package)

Relinquished By: J. Modashia Date/Time: 7/16/20 18:00

Received By: Date/Time: 7/17/20 0930

Cooler ID(s): Temperature(s):

PC KL

Cooler Receipt and Preservation Form

Client ALS/Houston Service Request K20 610036

Received: 7/17/20 Opened: 7/17/20 By: [signature] Unloaded: 7/17/20 By: [signature]

1. Samples were received via? *USPS* (*Fed Ex*) *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) (*Cooler*) *Box* *Envelope* *Other* _____ *NA*
3. Were custody seals on coolers? NA (Y) N If yes, how many and where? 2, front
   If present, were custody seals intact? (Y) N If present, were they signed and dated? (Y) N

Temp Blank	Sample 1	Sample 2	Sample 3	Sample 4	IR GUN	Cooler / COC ID NA	Tracking Number NA	Filed
1.5	—	—	—	—	IR02	14285	1891 8878 4191	

4. Packing material: *Inserts* (*Baggies*) (*Bubble Wrap*) *Gel Packs* (*Wet Ice*) *Dry Ice* *Sleeves* _____
5. Were custody papers properly filled out (ink, signed, etc.)? NA (Y) N
6. Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.* NA (Y) N
   If applicable, tissue samples were received: *Frozen* *Partially Thawed* *Thawed*
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA (Y) N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA (Y) N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA (Y) N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA (Y) N
11. Were VOA vials received without headspace? *Indicate in the table below.* (NA) Y N
12. Was C12/Res negative? (NA) Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

General Chemistry

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www.alsglobal.com

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	ALS Environmental - US	**Service Request:**	K2006036
Project:	HS20070615	**Date Collected:**	07/14/20
Sample Matrix:	Water	**Date Received:**	07/17/20
Analysis Method:	SM 5310 C	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA

Carbon, Total Organic

Sample Name	Lab Code	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
LH18/24-SP650_071420	K2006036-001	**2.13**	0.50	0.20	0.07	1	08/05/20 17:56	
Method Blank	K2006036-MB	ND U	0.50	0.20	0.07	1	08/05/20 17:56	

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	K2006036
Project:	HS20070615	**Date Analyzed:**	08/05/20
Sample Matrix:	Water	**Date Extracted:**	NA

Lab Control Sample Summary
Carbon, Total Organic

Analysis Method:	SM 5310 C	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	689991

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K2006036-LCS	26.2	25.0	105	83-117

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US **Service Request:** K2006036
Project: HS20070615

Continuing Calibration Verification (CCV) Summary

Carbon, Total Organic

Analysis Method: SM 5310 C **Units:** mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance Limits
CCV1	689991	KQ2010844-05	08/05/20 17:56	25.0	25.5	102	90-110
CCV2	689991	KQ2010844-06	08/05/20 17:56	25.0	25.8	103	90-110
CCV3	689991	KQ2010844-07	08/05/20 17:56	25.0	25.3	101	90-110

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US **Service Request:**K2006036
Project: HS20070615

Continuing Calibration Blank (CCB) Summary
Carbon, Total Organic

Analysis Method: SM 5310 C **Units:**mg/L

	Analysis Lot	Lab Code	Date Analyzed	LOQ	LOD	MDL	Result	Q
CCB1	689991	KQ2010844-08	08/05/20 17:56	0.50	0.20	0.07	ND	U
CCB2	689991	KQ2010844-09	08/05/20 17:56	0.50	0.20	0.07	ND	U
CCB3	689991	KQ2010844-10	08/05/20 17:56	0.50	0.20	0.07	ND	U

Raw Data

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

General Chemistry

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

Work Request # Original (5714) 6036 6044 6221 6224 6047

Tier: 1 IV IV IV IV IV

Date Analyzed: 8/5/20

Analyst: MK Run # 690001 | 689791

Analysis: TDC

DATA QUALITY REPORT
INORGANICS

Explain any "no" responses to questions below, and any corrective actions in the comments section below.

1.	Is the method name and number correct and appropriate?	yes/no/NA
2.	Holding times met for all analyses and for all samples?	yes/no/NA
3.	Are calculations correct?	yes/no/NA
4.	Is the reporting basis correct? (Dry Weight)	yes/no/NA
5.	All quality control criteria met?	yes/no
6.	Is the calibration curve correlation coefficient ≥ 0.995?	yes/no/NA
7.	MBs, CCVs, CCBs, LCSs, Dups, and Spikes, analyzed at proper frequency?	yes/no/NA
8.	Are ICVs, CCVs, and CCBs all within acceptance limits?	yes/no/NA
9.	Are results for methods blanks all ND?	yes/no/NA
10.	Are all QC samples within acceptance criteria? (LCS % rec, MS/DMS % rec, DUP or MS/DMS RPDs, etc.)	yes/no/NA
11.	Are all exceptions explained?	yes/no/NA
12.	Have all applicable service requests been reviewed?	yes/no/NA
13.	Are all samples labeled correctly?	yes/no/NA
14.	Have all instructions on the service request been followed? (e.g. Special MRLs, QC on a specific sample, Form V)	yes/no/NA
15.	Are detection limits and units reported correctly?	yes/no/NA
16.	Is the unused space on the benchsheet crossed out?	yes/no/NA
17.	Was analysis turned in by the due date? (n-2) (If not record SR#)	yes/no/NA

COMMENTS:

6047 - 2, 5, 6 need to be reanalyzed samples were above curve
1, 3, 4 and 2, 5, 6, will be reanalyzed Due to failing CCB

Final Approved by: _____ Date: 8/6/20

DQREPORT

Analytical Results Summary

Instrument Name: K-TOC-01 **Analyst:** MKANALY **Analysis Lot:** 689991 **Method/Testcode:** SM 5310 C/TOC T

Lab Code	Target Analytes	QC	Parent Sample	Matrix	Raw Result	Sample Amt.	Final Result	Dil	MDL	PQL	% Rec	% RSD	Date Analyzed	QC?	Tier
K2005714-002	Carbon, Total Organic	N/A		Water	7.88 mg/L	10 mL	78.8 mg/L	10	0.7	5.0			8/5/20 17:56:00	N	I
K2006036-001	Carbon, Total Organic	N/A		Water	2.13 mg/L	10 mL	2.13 mg/L	1	0.07	0.50			8/5/20 17:56:00	N	IV
K2006044-001	Carbon, Total Organic	N/A		Water	0.93 mg/L	10 mL	0.93 mg/L	1	0.07	0.50			8/5/20 17:56:00	N	IV
K2006044-002	Carbon, Total Organic	N/A		Water	1.23 mg/L	10 mL	1.23 mg/L	1	0.07	0.50			8/5/20 17:56:00	N	IV
K2006044-003	Carbon, Total Organic	N/A		Water	41.98 mg/L	10 mL	42.0 mg/L	1	0.07	0.50			8/5/20 17:56:00	N	IV
K2006044-004	Carbon, Total Organic	N/A		Water	0.89 mg/L	10 mL	0.89 mg/L	1	0.07	0.50			8/5/20 17:56:00	N	IV
K2006044-005	Carbon, Total Organic	N/A		Water	2.61 mg/L	10 mL	2.61 mg/L	1	0.07	0.50			8/5/20 17:56:00	N	IV
K2006044-006	Carbon, Total Organic	N/A		Water	2.35 mg/L	10 mL	2.35 mg/L	1	0.07	0.50			8/5/20 17:56:00	N	IV
K2006044-007	Carbon, Total Organic	N/A		Water	15.29 mg/L	10 mL	15.3 mg/L	1	0.07	0.50			8/5/20 17:56:00	N	IV
K2006044-008	Carbon, Total Organic	N/A		Water	8.90 mg/L	10 mL	8.90 mg/L	1	0.07	0.50			8/5/20 17:56:00	N	IV
K2006221-002	Carbon, Total Organic	N/A		Ground Water	8.66 mg/L	10 mL	8.66 mg/L	1	0.07	0.50			8/5/20 17:56:00	N	IV
K2006221-003	Carbon, Total Organic	N/A		Ground Water	8.72 mg/L	10 mL	8.72 mg/L	1	0.07	0.50			8/5/20 17:56:00	N	IV
K2006221-004	Carbon, Total Organic	N/A		Ground Water	27.89 mg/L	10 mL	27.9 mg/L	1	0.07	0.50			8/5/20 17:56:00	N	IV
K2006221-005	Carbon, Total Organic	N/A		Ground Water	3.05 mg/L	10 mL	3.05 mg/L	1	0.07	0.50			8/5/20 17:56:00	N	IV
K2006224-001	Carbon, Total Organic	N/A		Water		10 mL		1					8/5/20 17:56:00	N	IV
KQ2010844-01	Carbon, Total Organic	DUP	K2006044-001	Water	0.97 mg/L	10 mL	0.97 mg/L	1	0.07	0.50		4	8/5/20 17:56:00	N	IV
KQ2010844-02	Carbon, Total Organic	MS	K2006044-001	Water	25.60 mg/L	10 mL	25.6 mg/L	1	0.07	0.50	99		8/5/20 17:56:00	N	IV
KQ2010844-03	Carbon, Total Organic	MB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/5/20 17:56:00	N	I
KQ2010844-04	Carbon, Total Organic	LCS		Water	26.18 mg/L	10 mL	26.2 mg/L	1	0.07	0.50	105		8/5/20 17:56:00	N	I
KQ2010844-05	Carbon, Total Organic	CCV		Water	25.48 mg/L	10 mL	25.5 mg/L	1					8/5/20 17:56:00	N	I
KQ2010844-06	Carbon, Total Organic	CCV		Water	25.83 mg/L	10 mL	25.8 mg/L	1					8/5/20 17:56:00	N	I
KQ2010844-07	Carbon, Total Organic	CCV		Water	25.31 mg/L	10 mL	25.3 mg/L	1					8/5/20 17:56:00	N	I
KQ2010844-08	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/5/20 17:56:00	N	I
KQ2010844-09	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/5/20 17:56:00	N	I
KQ2010844-10	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/5/20 17:56:00	N	I

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

Analytical Results Summary

Instrument Name: K-TOC-01 **Analyst:** MKANALY **Analysis Lot:** 690001 **Method/Testcode:** SM 5310 C/TOC T

Lab Code	Target Analytes	QC	Parent Sample	Matrix	Raw Result	Sample Amt.	Final Result	Dil	MDL	PQL	% Rec	% RSD	Date Analyzed	QC?	Tier
K2006047-001	Carbon, Total Organic	N/A		Water	3.58 mg/L	10 mL	3.58 mg/L	1	0.07	0.50			8/5/20 17:56:00	N	IV
K2006047-002.R01	Carbon, Total Organic	N/A		Water	53.68 mg/L	10 mL	53.7 mg/L	1	0.07	0.50			8/5/20 17:56:00	N	IV
K2006047-003	Carbon, Total Organic	N/A		Water	18.64 mg/L	10 mL	18.6 mg/L	1	0.07	0.50			8/5/20 17:56:00	N	IV
K2006047-004	Carbon, Total Organic	N/A		Water	5.60 mg/L	10 mL	5.60 mg/L	1	0.07	0.50			8/5/20 17:56:00	N	IV
K2006047-005.R01	Carbon, Total Organic	N/A		Water	86.41 mg/L	10 mL	86.4 mg/L	1	0.07	0.50			8/5/20 17:56:00	N	IV
K2006047-006.R01	Carbon, Total Organic	N/A		Water	19.58 mg/L	10 mL	19.6 mg/L	1	0.07	0.50			8/5/20 17:56:00	N	IV
K2006224-001	Carbon, Total Organic	N/A		Water	2.02 mg/L	10 mL	2.02 mg/L	1	0.07	0.50			8/5/20 17:56:00	N	IV
KQ2010845-01	Carbon, Total Organic	DUP	K2006224-001	Water	2.22 mg/L	10 mL	2.22 mg/L	1	0.07	0.50		10	8/5/20 17:56:00	N	IV
KQ2010845-02	Carbon, Total Organic	MS	K2006224-001	Water	29.24 mg/L	10 mL	29.2 mg/L	1	0.07	0.50	109		8/5/20 17:56:00	N	IV
KQ2010845-03	Carbon, Total Organic	CCV		Water	25.83 mg/L	10 mL	25.8 mg/L	1					8/5/20 17:56:00	N	IV
KQ2010845-04	Carbon, Total Organic	CCV		Water	25.31 mg/L	10 mL	25.3 mg/L	1					8/5/20 17:56:00	N	IV
KQ2010845-05	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/5/20 17:56:00	N	IV
KQ2010845-06	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/5/20 17:56:00	N	IV
KQ2010845-07	Carbon, Total Organic	CCB		Water	1.08 mg/L	10 mL	1.08 mg/L	1	0.07	0.50			8/5/20 17:56:00	N	IV
KQ2010845-08	Carbon, Total Organic	MB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/5/20 17:56:00	N	IV
KQ2010845-09	Carbon, Total Organic	LCS		Water	25.67 mg/L	10 mL	25.7 mg/L	1	0.07	0.50	103		8/5/20 17:56:00	N	IV
KQ2010845-10	Carbon, Total Organic	CCV		Water	27.16 mg/L	10 mL	27.2 mg/L	1					8/5/20 17:56:00	N	IV

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

Schedule: 080520

Version: 10
Instrument: Fusion1
Last Saved by: Fusion1 (Fusion1)
Last Saved on: 2020/08/06 10:08 - Thursday

Position	Sample Type	Sample ID	Method ID (Calibration ID)	Reps	Use	State
(Blank)	Blank	Reagent/Acid Blank		1	True	Ready
D	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
1	Sample	MB1	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
C	Check Standard	[TOC] LCS [24.0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
2	Sample	ICS	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
3	Sample	k2005714-002 10x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
4	Sample	K2006221-002	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
5	Sample	K2006221-003	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
6	Sample	K2006221-004	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
7	Sample	K2006221-005	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
8	Sample	K2006044-001	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
9	Sample	K2006044-001D	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
10	Sample	K2006044-001MS	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
11	Sample	K2006044-002	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
12	Sample	K2006044-003	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
13	Sample	K2006044-004	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
14	Sample	K2006044-005	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
15	Sample	K2006044-006	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
16	Sample	K2006044-007	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
17	Sample	K2006044-008	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
18	Sample	K2006036-001	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
19	Sample	K2006224-001	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
20	Sample	MB2	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
C	Check Standard	[TOC] LCS [24.0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
21	Sample	K2006224-001D	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
22	Sample	K2006224-001MS	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
23	Sample	K2006047-001	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
24	Sample	K2006047-002	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
25	Sample	K2006047-003	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
26	Sample	K2006047-004	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
27	Sample	K2006047-005	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
28	Sample	K2006047-006	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
29	Sample	K2006047-002 5X	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
30	Sample	K2006047-5 10X	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
31	Sample	K2006047-6 5X	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
B	Check Standard	[TOC] CCV 25ppm_salt [25ppm salt]	CAS_salt (CAS_salt_0811a)	1	True	Ready
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
					False	

NR

Fusion Report - 080520
Wednesday, August 05, 2020 05:56 PM

(View - Reps, Unused Reps, Meta-Data, Signature, History)
Printed on 2020/08/06 10:34 - Thursday

Report Summary Information

Company Location:	Gen Chem Lab		
Schedule Name:	080520	Engine Version:	1.1.5.1
Instrument Name:	Fusion1	Firmware Version:	1.2.0696
Report Version:	1 of 1	Connection:	RS232 COM1
Report Creation by Operators (schedule version):	Fusion1 (Fusion1) (v1) Fusion1 (Fusion1) (v5) Fusion1 (Fusion1) (v6) Fusion1 (Fusion1) (v7) Fusion1 (Fusion1) (v9) Fusion1 (Fusion1) (v10)		
Comment:			

Report Results

Sample Type: Blank (Creating v1429) From Schedule Version 1

	Pos	Analysis Type	Sample ID	Start Time
◆	(blank)		Reagent/Acid Blank	2020/08/05 17:56

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	11.67	24.90	13.23	49.97	08:00
2	TC Clean	4.10	17.23	13.13	49.90	07:16
3	TC Clean	0.50	13.74	13.25	49.85	07:02
4	TC Clean	0.04	13.30	13.26	49.94	07:03
5	Reagent Blank	4.01	17.27	13.26	50.00	08:10
6	Acid Blank	0.37	13.64	13.28	49.61	05:34

Sample Type: Sample From Schedule Version 5

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	D	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2020/08/05 18:45

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	9.17	22.40	13.24	50.09	10:31

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.1702 (IC) (v1429)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

Sample Type: Check Standard --> CCV 25 ppm From Schedule Version 5

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆	B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	25.4763 ppm (PASS)	0.0000 ppm	0%	2020/08/05 18:59

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	25.4763	254.7632	188.60	201.77	13.17	50.11	10:32

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)	50 ppmC

Sample Type: Check Standard --> CCB From Schedule Version 5

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆	D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2020/08/05 19:14

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	9.03	22.40	13.36	50.16	10:32

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)	0 ppmC

Sample Type: Sample From Schedule Version 5

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	1	TOC	MB1	0.0000 ppm	0.0000 ppm	0.0000%	2020/08/05 19:29

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.40	21.66	13.26	50.19	10:34

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.1702 (IC) (v1429)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

Sample Type: Check Standard --> LCS From Schedule Version 5

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆	C	TOC	25.0000	1:1	[TOC] LCS [24.0 ppm]	0 / infinity (NA / NA)	26.1783 ppm (PASS)	0.0000 ppm	0%	2020/08/05 19:43

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	26.1783	261.7826	193.53	206.65	13.12	50.17	10:30

Completion State	Success Action	Method	Calibration	STD Conc - Pos C
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)	25 ppmC

Sample Type: Sample From Schedule Version 5

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	2	TOC	ICS	0.3474 ppm	0.0000 ppm	0.0000%	2020/08/05 19:58

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.3474	3.4737	11.61	25.12	13.51	50.18	10:31

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.1702 (IC) (v1429)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	3	TOC	k2005714-002 10x	7.8756 ppm	0.0371 ppm	0.4700%	2020/08/05 20:13

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	7.8493	78.4934	64.23	77.66	13.43	50.18	10:29
2	TOC	7.9018	79.0180	64.60	78.25	13.65	50.16	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.1702 (IC) (v1429)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	4	TOC	K2006221-002	8.6645 ppm	0.2369 ppm	2.7300%	2020/08/05 20:41

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	8.8320	88.3197	71.12	84.56	13.44	50.20	10:28
2	TOC	8.4970	84.9697	68.78	82.43	13.65	50.24	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.1702 (IC) (v1429)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	5	TOC	K2006221-003	8.7199 ppm	0.1460 ppm	1.6700%	2020/08/05 21:09

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	8.8231	88.2313	71.06	84.45	13.39	50.18	10:28
2	TOC	8.6167	86.1671	69.62	83.04	13.42	50.20	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.1702 (IC) (v1429)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	6	TOC	K2006221-004	27.8920 ppm	0.9180 ppm	3.2900%	2020/08/05 21:37

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	28.5411	285.4108	209.38	222.93	13.55	50.20	10:26
2	TOC	27.2428	272.4283	200.27	213.61	13.33	50.17	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.1702 (IC) (v1429)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	7	TOC	K2006221-005	3.0464 ppm	0.0680 ppm	2.2300%	2020/08/05 22:05

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.0946	30.9455	30.88	44.37	13.49	50.19	10:25
2	TOC	2.9983	29.9833	30.20	43.71	13.51	50.17	10:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.1702 (IC) (v1429)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	8	TOC	K2006044-001	0.9314 ppm	0.0448 ppm	4.8100%	2020/08/05 22:33

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.9631	9.6307	15.93	29.52	13.59	50.20	10:26
2	TOC	0.8998	8.9977	15.48	29.21	13.73	50.18	10:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.1702 (IC) (v1429)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	9	TOC	K2006044-001D	0.9707 ppm	0.0489 ppm	5.0400%	2020/08/05 23:01

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.0053	10.0526	16.22	29.64	13.42	50.18	10:26

2	TOC	0.9361	9.3612	15.74	29.22	13.48	50.17	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.1702 (IC) (v1429)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

Sample Type: Check Standard --> CCV 25 ppm From Schedule Version 5

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◉	B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	25.8333 ppm (PASS)	0.0000 ppm	0%	2020/08/05 23:29

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	25.8333	258.3328	191.11	204.62	13.52	50.18	10:29

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)	50 ppmC

Sample Type: Check Standard --> CCB From Schedule Version 5

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◉	D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2020/08/05 23:44

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	8.95	22.27	13.32	50.19	10:30

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)	0 ppmC

Sample Type: Sample From Schedule Version 5

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◉	10	TOC	K2006044-001MS	25.5979 ppm	0.1718 ppm	0.6700%	2020/08/05 23:59

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	25.4764	254.7643	187.88	201.34	13.46	50.21	10:27
2	TOC	25.7193	257.1935	189.59	203.16	13.58	50.29	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.1702 (IC) (v1429)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

		Analysis			Std. Dev.		

	Pos	Type	Sample ID	Result (ppmC)	(ppmC)	RSD	Start Time
◆	11	TOC	K2006044-002	1.2344 ppm	0.0396 ppm	3.2100%	2020/08/06 00:27

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.2624	12.6243	18.03	31.57	13.54	50.24	10:30
2	TOC	1.2064	12.0641	17.63	31.12	13.48	50.23	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.1702 (IC) (v1429)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	12	TOC	K2006044-003	41.9765 ppm	0.4087 ppm	0.9700%	2020/08/06 00:55

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	41.6875	416.8752	301.60	315.16	13.56	50.22	10:29
2	TOC	42.2654	422.6544	305.66	319.18	13.53	50.23	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.1702 (IC) (v1429)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	13	TOC	K2006044-004	0.8868 ppm	0.1462 ppm	16.4800%	2020/08/06 01:23

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.9902	9.9015	16.12	29.44	13.32	50.21	10:27
2	TOC	0.7834	7.8345	14.67	28.15	13.48	50.22	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.1702 (IC) (v1429)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	14	TOC	K2006044-005	2.6089 ppm	0.0248 ppm	0.9500%	2020/08/06 01:51

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.5913	25.9133	27.35	40.71	13.36	50.24	10:26
2	TOC	2.6264	26.2640	27.59	41.09	13.49	50.26	10:24

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.1702 (IC) (v1429)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	15	TOC	K2006044-006	2.3500 ppm	0.0145 ppm	0.6200%	2020/08/06 02:19

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.3603	23.6025	25.73	39.21	13.48	50.23	10:27
2	TOC	2.3397	23.3972	25.58	39.06	13.47	50.22	10:26

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	16	TOC	K2006044-007	15.2921 ppm	0.0945 ppm	0.6200%	2020/08/06 02:47

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	15.2253	152.2529	115.97	129.45	13.48	50.22	10:30
2	TOC	15.3589	153.5886	116.91	130.40	13.49	50.21	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.1702 (IC) (v1429)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	17	TOC	K2006044-008	8.9005 ppm	0.0962 ppm	1.0800%	2020/08/06 03:15

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	8.9685	89.6854	72.08	85.57	13.49	50.29	10:26
2	TOC	8.8325	88.3254	71.13	84.67	13.54	50.21	10:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.1702 (IC) (v1429)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	18	TOC	K2006036-001	2.1285 ppm	0.0291 ppm	1.3700%	2020/08/06 03:43

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.1079	21.0793	23.96	37.42	13.46	50.19	10:26
2	TOC	2.1491	21.4913	24.25	37.74	13.50	50.26	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.1702 (IC) (v1429)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	19	TOC	K2006224-001	2.0213 ppm	0.0465 ppm	2.3000%	2020/08/06 04:11

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.9885	19.8847	23.12	36.65	13.53	50.23	10:25
2	TOC	2.0542	20.5419	23.58	36.98	13.40	50.19	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.1702 (IC) (v1429)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

Sample Type: Check Standard --> CCV 25 ppm From Schedule Version 5

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆	B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	25.3087 ppm (PASS)	0.0000 ppm	0%	2020/08/06 04:39

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	25.3087	253.0867	187.43	200.85	13.42	50.19	10:31

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)	50 ppmC

Sample Type: Check Standard --> CCB From Schedule Version 5

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆	D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2020/08/06 04:54

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	9.64	23.04	13.40	50.18	10:30

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)	0 ppmC

Sample Type: Sample From Schedule Version 5

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	20	TOC	MB2	0.0000 ppm	0.0000 ppm	0.0000%	2020/08/06 05:08

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.24	21.72	13.49	50.25	10:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.1702 (IC) (v1429)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

Sample Type: Check Standard --> LCS From Schedule Version 5

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆	C	TOC	25.0000	1:1	[TOC] LCS [24.0 ppm]	0 / infinity (NA / NA)	25.6691 ppm (PASS)	0.0000 ppm	0%	2020/08/06 05:23

Pos	Base Analysis	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time

	Type									
C	TOC	25.0 ppm	1	25.6691	256.6905	189.96	203.52	13.56	50.18	10:30

Completion State	Success Action	Method	Calibration	STD Conc - Pos C
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)	25 ppmC

Sample Type: Sample From Schedule Version 5

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	21	TOC	K2006224-001D	2.2243 ppm	0.0695 ppm	3.1200%	2020/08/06 05:37

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.2734	22.7343	25.12	38.38	13.27	50.19	10:26
2	TOC	2.1752	21.7521	24.43	37.73	13.30	50.17	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.1702 (IC) (v1429)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	22	TOC	K2006224-001MS	29.2402 ppm	0.0525 ppm	0.1800%	2020/08/06 06:05

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	29.2031	292.0311	214.02	227.38	13.36	50.16	10:28
2	TOC	29.2774	292.7738	214.55	227.96	13.41	50.22	10:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.1702 (IC) (v1429)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	23	TOC	K2006047-001	3.5809 ppm	0.0408 ppm	1.1400%	2020/08/06 06:34

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.6097	36.0975	34.49	48.21	13.72	50.18	10:25
2	TOC	3.5520	35.5201	34.09	47.55	13.46	50.20	10:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.1702 (IC) (v1429)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	24	TOC	K2006047-002	53.6821 ppm	0.7354 ppm	1.3700%	2020/08/06 07:02

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	54.2022	542.0216	389.39	402.93	13.54	50.17	10:27
2	TOC	53.1621	531.6208	382.09	395.92	13.83	50.17	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.1702 (IC) (v1429)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	25	TOC	K2006047-003	18.6374 ppm	0.2652 ppm	1.4200%	2020/08/06 07:30

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	18.8249	188.2495	141.22	154.86	13.63	50.19	10:29
2	TOC	18.4499	184.4989	138.59	152.24	13.65	50.15	10:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.1702 (IC) (v1429)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	26	TOC	K2006047-004	5.5994 ppm	0.0964 ppm	1.7200%	2020/08/06 07:58

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.6675	56.6753	48.93	62.18	13.25	50.14	10:27
2	TOC	5.5312	55.3125	47.97	61.53	13.56	50.14	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.1702 (IC) (v1429)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

Sample Type: Sample From Schedule Version 6

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	27	TOC	K2006047-005	86.4136 ppm	4.0529 ppm	4.6900%	2020/08/06 08:26

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	83.5477	835.4772	595.24	608.81	13.57	50.11	10:24
2	TOC	89.2794	892.7944	635.45	649.95	14.50	50.10	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.1702 (IC) (v1429)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

Sample Type: Sample From Schedule Version 7

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	28	TOC	K2006047-006	18.8920 ppm	19.5781 ppm	103.6300%	2020/08/06 08:54

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	32.7358	327.3577	238.81	252.98	14.18	50.08	10:31
2	TOC	5.0481	50.4813	44.58	57.85	13.27	50.09	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.1702 (IC) (v1429)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	29	TOC	K2006047-002 5X	16.5885 ppm	0.8324 ppm	5.0200%	2020/08/06 09:22

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	17.1772	171.7715	129.67	142.98	13.32	50.08	10:26
2	TOC	15.9999	159.9993	121.41	134.63	13.22	50.07	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.1702 (IC) (v1429)	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)

Sample Type: Check Standard --> CCV 25 ppm From Schedule Version 7

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆	B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	27.1565 ppm (PASS)	0.0000 ppm	0%	2020/08/06 09:50

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	27.1565	271.5647	200.39	213.65	13.26	50.06	10:33

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)	50 ppmC

Sample Type: Check Standard --> CCB From Schedule Version 9

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆	D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	1.0759 ppm (PASS)	0.0000 ppm	0%	2020/08/06 10:06

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	1.0759	10.7586	17.44	30.42	12.98	50.06	10:29

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v38)	0 ppmC

Sample Type: Sample From Schedule Version 10

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time

•	30	TOC	K2006047-5 10X	NaN	NaN	NaN%	2020/08/06 10:21

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time

Dilution: 1:10 **Method**: CAS_salt_010711 (v4) **Calibration**: CAS_salt_010711 (v38)

Meta Data Used in this Report

Blanks

Version	Reagent (Abs)	Acid (Abs)	DI IC (Abs)	DI TC (Abs)	DI TOC (Abs)	Save Time	Operator
v1428	2.0260	0.3900	0.0000	0.0000	0.0000	2020/08/05 11:39	Fusion1 (Fusion1)
v1429	1.3370	0.3660	0.0000	0.0000	0.0000	2020/08/05 18:45	Fusion1 (Fusion1)

Calibrations

Name: CAS_salt_010711 (TOC)

Version: v38
Calibration curve formula: TOC: y = 7.015x + 9.892
Ver Creation: 2020/06/13 16:40
r^2 value: TOC: r^2 = 0.99974
Comment:
Operator: Fusion1 (Fusion1)
Basic Analysis Type: TOC

Basic Analysis Type: TOC

Sample ID	Y Raw Value	X Expected	Message	End Time
DI Water	9.5750	0.0000		2020/06/13 15:13
0.500 ppm	12.9010	0.5000		2020/06/13 15:28
1.0 ppm	15.6320	1.0000		2020/06/13 15:42
5.0 ppm	43.2510	5.0000		2020/06/13 15:56
10 ppm	82.4040	10.0000		2020/06/13 16:11
25 ppm	188.6880	25.0000		2020/06/13 16:25
50 ppm	358.6500	50.0000		2020/06/13 16:39

Methods

Name: CAS_salt_010711 (TOC)

Version: v4 Operator: Fusion1 (Fusion1)
Ver Creation: 2019/02/21 17:57
Comment:

Parameter	Value
SampleVolume	10.0 mL
Dilution	1:10
AcidVolume	0.5 ml
ReagentVolume	2.0 ml
UVReactorPrerinse	Off
UVReactorPrerinseVolume	5.0
NumberOfUVReactorPrerinses	1
ICSpargeTime	1.00 mins
DetectorSweepFlow	500 ml/min
PreSpargeTime	2.00 mins
SystemFlow	500 ml/min

Advanced Parameter	Value
NeedleRinseVolume	5.0 ml
VialPrimeVolume	2.0 ml
ICSamplePrimeVolume	2.0 ml
ICSpargeRinseVolume	12.0 ml
BaselineStabilizeTime	0.70 min
DetectorPressureFlow	150 ml/min
SyringeSpeedWaste	10
SyringeSpeedAcid	7
SyringeSpeedReagent	7
SyringeSpeedDIWater	7
NDIRPressurization	60 psig
SyringeSpeedSampleDispense	5
SyringeSpeedSampleAspirate	4
SyringeSpeedUVDispense	5
SyringeSpeedUVAspirate	5
SyringeSpeedICDispense	5
SyringeSpeedICAspirate	5
NDIRPressureStabilize	1.75 min
SampleMixing	Off
SampleMixingCycles	1
SampleMixingVolume	10.0
LowLevelFilterNDIR	Off

Acceptance / Approval

Electronic Signatures

Report Version	User Name	Acceptance	Reason	Date

Report History

Report History

Report Version	User Name	System Reason	User Reason	Date
1	Fusion1 (Fusion1)	Schedule completed	Schedule completed	2020/08/06 10:31

ALS Environmental

StarLIMS Run: 689991/6900001

Analysis: DOC/TOC

Method: SM 5310 C, 9060A, 415.1, 9060

CCV: 19-GEN-8-15-C 50 ppm LCS: 19-GEN-8-31I 25.0 ppm

ICAL Date: 6/16/2020

ICAL ID: 19-GEN-8-22-G

ICS ID: 19-GEN-8-4-G

ICS TV: 25.0 ppm ICS % R < 1

Spike ID: 19-GEN-8-15-B 0.05 ml of 5000 ppm stock ---> 10.0 ml = 25.0 ppm x dilution factor

Sodium Persulfate: 19-GEN-08-32J

21 % H3PO4: 19-GEN-08-32I

Equipment ID: K-TOC-03

PIPETTE ID: 124276B, 129001F, N11314F, Marge

FILTER ID: 16967789

Analyzed By: MC	Date Analyzed: 8/6/20
Reviewed By:	Date Reviewed: 8/6/20

HS20070615 Wet Chem Raw Data (NIT-AMM_W ISE)

ALS WO# HS20070615

NH3-N mm-W-ISE E350.3

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Logbook **31220**

Ion Selective Electrode Logbook

Analyst: MD/KL	Date: 7/21/20 9:25AM
Method: SM4500NH3-D/EPA 350.3 or SM4500 NH3 B-F	

Probe Calibration Date: 7/21/20	Cal Std ID: 3140616 (02-06)		Probe ID: X01-11806
Std Level		mV	Conc., mg/L:
STD 1 (mg/L):	0.2	180.4	0.202
STD 2 (mg/L):	1	93.4	1.003
STD 3 (mg/L):	5	53.1	5.012
LSC / MS Spike ID: 3100601709			
ICV Cal STD ID: 31406160 1			
DPD Reagent ID: 3100601521			

Sodium Thiosulfate ID:		
Std Level	mV	Conc., mg/L:
STD 4 (mg/L):	36.5	10.016
STD 5 (mg/L):	-5.9	49.941

ICAL Date & Slope: 93.1 / -58.3mV

WO # / SX #	Bottle #	Initial g or ml	Final Vol. ml	Dilution Factor	Initial Conc. mg/L	Final Conc. mg/L	Chlorine Check (+/-)	Comments
ICAL		50ml	50ml		10.523			
CCB					0.010			
HS2007058001					0.130			
HS2007056201					0.212			
HS2007075201					5.594			
HS2007055001					0.453			
HS2007061501					11.960			CI+VE Rechecked
HS2007058001 MS					10.457			
HS2007058001 MSD					10.219			
CCV					10.514			
CCB		↓	↓		0.012			
MBLK					0.010			
LCS					9.857			
CCV					10.233			
CCB					0.011			

Batch ID:	Reported By	Reviewed By:
365361 / 365365	KL	MD

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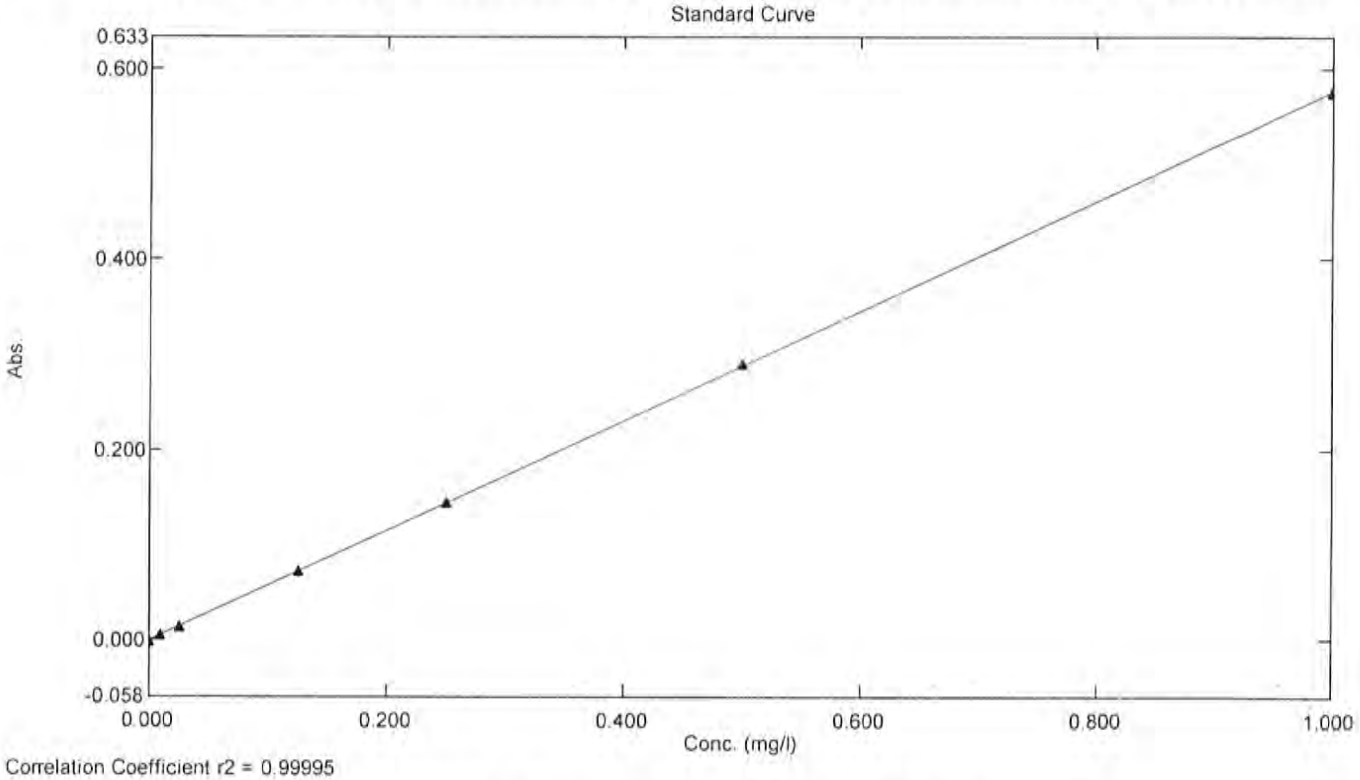
HS20070615 Wet Chem Raw Data (P_ORTHO)

ALS WO# HS20070615

Standard Table Report

07/30/2020 01:18:30 PM

File Name: C:\Program Files (x86)\Shimadzu\UVProbe\Data\O_PO4_UNKNOWN\2020\071620_P_ORTHO.pho..p



Correlation Coefficient r2 = 0.99995

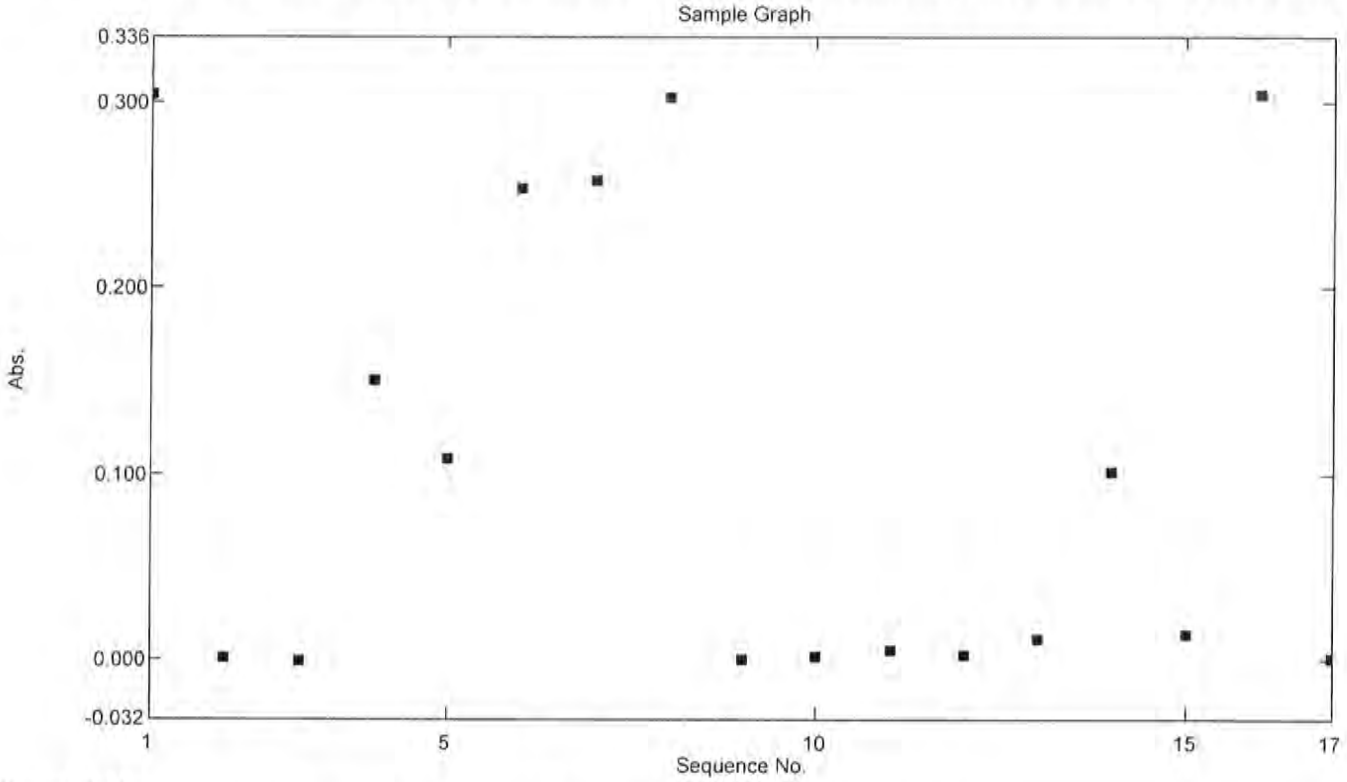
Standard Table

	Sample	Type	Ex	Conc	WL880.0	Wgt.Facto	Comments
1	STD1	Standard		0.000	-0.001	1.000	
2	STD2	Standard		0.010	0.005	1.000	
3	STD3	Standard		0.025	0.013	1.000	
4	STD4	Standard		0.125	0.073	1.000	
5	STD5	Standard		0.250	0.145	1.000	
6	STD6	Standard		0.500	0.290	1.000	
7	STD7	Standard		1.000	0.575	1.000	
8							

Sample Table Report

07/30/2020 01:18:39 PM

File Name: C:\Program Files (x86)\Shimadzu\UVProbe\Data\O_PO4_UNKNOWN\2020\071620_P_ORTHO.pho..p



Sample Table

	Sample ID	Type	Ex	Conc	WL880.0	Comments
1	CCV	Unknown		0.529	0.305	313107109 WC-14
2	CCB	Unknown		0.000	0.000	
3	MBLK	Unknown		-0.003	-0.002	
4	LCS	Unknown		0.261	0.150	313107108 WC-14
5	HS20070615.01	Unknown		0.187	0.108	PF:10X,11:28AM
6	HS20070615.01MS	Unknown		0.441	0.254	PF:10X,11:29AM
7	HS20070615.01MS	Unknown		0.447	0.258	PF:10X,11:29AM
8	CCV2	Unknown		0.526	0.303	
9	CCB2	Unknown		-0.001	-0.001	C-314061209 UV-11
10	HS20070669.01	Unknown		0.003	0.002	12:04PM
11	HS20070669.04	Unknown		0.008	0.005	12:05PM
12	HS20070669.05	Unknown		0.003	0.002	12:07PM
13	HS20070669.06	Unknown		0.018	0.011	12:08PM
14	HS20070669.07	Unknown		0.176	0.102	
15	HS20070521.16	Unknown		0.023	0.014	
16	CCV3	Unknown		0.529	0.305	
17	CCB3	Unknown		0.000	0.000	
18						

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

WorkOrder: HS20070621

Longhorn GW Treatment Plant Monthly Influent Samples

Bhate Environmental Associates, Inc.

Marcia Olive
445 Union Blvd Ste 129
Lakewood CO 80228

31-Jul-2020

ALS Environmental
ALS Group USA, Corp
1317 South 13th Avenue
Kelso, WA 98626
T : +1 360 577 7222
F : +1 360 636 1068
www.alsglobal.com

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HS20070621 Wet Chem Raw Data (CR_6)

HS20070621 Longhorn GW Treatment Plant Monthly Influent Samples Final

ALS WO# HS20070621

10450 Stancliff Rd. Suite 210
Houston, TX 77099
T: +1 281 530 5656
F: +1 281 530 5887

July 29, 2020

Marcia Olive
Bhate Environmental Associates, Inc.
445 Union Blvd Ste 129
Lakewood, CO 80228

Work Order: **HS20070621**

Laboratory Results for: **Longhorn GW Treatment Plant Monthly Influent Samples**

Dear Marcia Olive,

ALS Environmental received 1 sample(s) on Jul 15, 2020 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
RJ Modashia
Project Manager

ALS Houston, US Date: 29-Jul-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Monthly Influent Samples
Work Order: HS20070621

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS20070621-01	LH18/24-SP140_071420	Water		14-Jul-2020 14:00	15-Jul-2020 09:05	☐

ALS Houston, US Date: 29-Jul-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Monthly Influent Samples
Work Order: HS20070621

CASE NARRATIVE

Work Order Comments

• Analysis of Perchlorate was performed by ALS Houston TX, High Resolution. Laboratory. Final report attached.

Metals by Method SW6020

Batch ID: 155817

• The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

WetChemistry by Method SW7196

Batch ID: R365072

• The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

ALS Houston, US Date: 29-Jul-20

Client: Bhate Environmental Associates, Inc.
ANALYTICAL REPORT
Project: Longhorn GW Treatment Plant Monthly Influent Samples WorkOrder:HS20070621
Sample ID: LH18/24-SP140_071420 Lab ID:HS20070621-01
Collection Date: 14-Jul-2020 14:00 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
METALS BY ICPMS BY SW6020A		**Method:SW6020**				Prep:SW3010A / 27-Jul-2020		Analyst: JHD
Selenium	0.00250	U	0.00110	0.00250	0.00500	mg/L	1	28-Jul-2020 16:08
Silver	0.000500	U	0.000200	0.000500	0.00500	mg/L	1	28-Jul-2020 16:08
HEXAVALENT CHROMIUM BY SW7196A		**Method:SW7196**						Analyst: KVL
Chromium, Hexavalent	0.0100	U	0.00600	0.0100	0.0100	mg/L	1	15-Jul-2020 12:40
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		**Method:NA**						Analyst: GR
Subcontract Analysis	See Attached		0	0		NA	1	29-Jul-2020 12:01

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

ALS Houston, US Date: 29-Jul-20

Weight / Prep Log

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Monthly Influent Samples
WorkOrder: HS20070621

Batch ID: 155817 **Start Date:** 27 Jul 2020 14:30 **End Date:** 27 Jul 2020 18:30
Method: WATER - SW3010A **Prep Code:** 3010A

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS20070621-01		10 (mL)	10 (mL)	1

ALS Houston, US Date: 29-Jul-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Monthly Influent Samples
WorkOrder: HS20070621

DATES REPORT

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
Batch ID: 155817 (0)	**Test Name :** METALS BY ICPMS BY SW6020A				**Matrix:** Water	
HS20070621-01	LH18/24-SP140_071420	14 Jul 2020 14:00		27 Jul 2020 18:30	28 Jul 2020 16:08	1
Batch ID: R365072 (0)	**Test Name :** HEXAVALENT CHROMIUM BY SW7196A				**Matrix:** Water	
HS20070621-01	LH18/24-SP140_071420	14 Jul 2020 14:00			15 Jul 2020 12:40	1
Batch ID: R365837 (0)	**Test Name :** SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)				**Matrix:** Water	
HS20070621-01	LH18/24-SP140_071420	14 Jul 2020 14:00			29 Jul 2020 12:01	1

ALS Houston, US Date: 29-Jul-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Monthly Influent Samples
WorkOrder: HS20070621

QC BATCH REPORT

Batch ID: 155817 (0) **Instrument: ICPMS06** **Method: METALS BY ICPMS BY SW6020A**

MBLK Sample ID: **MBLK-155817** Units: **mg/L** Analysis Date: **28-Jul-2020 16:05**
Client ID: Run ID: **ICPMS06_365787** SeqNo: **5677311** PrepDate: **27-Jul-2020** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Selenium	0.00250	0.00500								U
Silver	0.000500	0.00500								U

LCS Sample ID: **LCS-155817** Units: **mg/L** Analysis Date: **28-Jul-2020 16:07**
Client ID: Run ID: **ICPMS06_365787** SeqNo: **5677312** PrepDate: **27-Jul-2020** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Selenium	0.04814	0.00500	0.05	0	96.3	80 - 120				
Silver	0.04443	0.00500	0.05	0	88.9	85 - 116				

MS Sample ID: **HS20070621-01MS** Units: **mg/L** Analysis Date: **28-Jul-2020 16:12**
Client ID: **LH18/24-SP140_071420** Run ID: **ICPMS06_365787** SeqNo: **5677315** PrepDate: **27-Jul-2020** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Selenium	0.04979	0.00500	0.05	0.000575	98.4	80 - 120				
Silver	0.04591	0.00500	0.05	0.000021	91.8	85 - 116				

MSD Sample ID: **HS20070621-01MSD** Units: **mg/L** Analysis Date: **28-Jul-2020 16:14**
Client ID: **LH18/24-SP140_071420** Run ID: **ICPMS06_365787** SeqNo: **5677316** PrepDate: **27-Jul-2020** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Selenium	0.04705	0.00500	0.05	0.000575	92.9	80 - 120	0.04979	5.67	20	
Silver	0.04309	0.00500	0.05	0.000021	86.1	85 - 116	0.04591	6.35	20	

PDS Sample ID: **HS20070621-01PDS** Units: **mg/L** Analysis Date: **28-Jul-2020 16:16**
Client ID: **LH18/24-SP140_071420** Run ID: **ICPMS06_365787** SeqNo: **5677317** PrepDate: **27-Jul-2020** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Selenium	0.1036	0.00500	0.1	0.000575	103	80 - 120				
Silver	0.095	0.00500	0.1	0.000021	95.0	80 - 120				

ALS Houston, US Date: 29-Jul-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Monthly Influent Samples
WorkOrder: HS20070621

QC BATCH REPORT

Batch ID: 155817 (0) **Instrument:** ICPMS06 **Method:** METALS BY ICPMS BY SW6020A

SD Sample ID: **HS20070621-01SD** Units: **mg/L** Analysis Date: **28-Jul-2020 16:10**
Client ID: **LH18/24-SP140_071420** Run ID: **ICPMS06_365787** SeqNo: **5677314** PrepDate: **27-Jul-2020** 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					0.000575	0	10	U
Silver	0.00250	0.0250					0.000021	0	10	U

The following samples were analyzed in this batch: HS20070621-01

ALS Houston, US Date: 29-Jul-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Monthly Influent Samples
WorkOrder: HS20070621

QC BATCH REPORT

Batch ID: R365072 (0) **Instrument: UV-2450** **Method: HEXAVALENT CHROMIUM BY SW7196A**

MBLK Sample ID: **MBLK-R365072** Units: **mg/L** Analysis Date: **15-Jul-2020 12:40**
Client ID: Run ID: **UV-2450_365072** SeqNo: **5662660** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.0100	0.0100								U

LCS Sample ID: **LCS-R365072** Units: **mg/L** Analysis Date: **15-Jul-2020 12:40**
Client ID: Run ID: **UV-2450_365072** SeqNo: **5662659** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.25	0.0100	0.25	0	100	90 - 111				

LCSD Sample ID: **LCSD-R365072** Units: **mg/L** Analysis Date: **15-Jul-2020 12:40**
Client ID: Run ID: **UV-2450_365072** SeqNo: **5663323** 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	0.25	3.15	20	

MS Sample ID: **HS20070636-01MS** Units: **mg/L** Analysis Date: **15-Jul-2020 12:40**
Client ID: Run ID: **UV-2450_365072** SeqNo: **5663325** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.244	0.0100	0.25	0	97.6	90 - 111				

MSD Sample ID: **HS20070636-01MSD** Units: **mg/L** Analysis Date: **15-Jul-2020 12:40**
Client ID: Run ID: **UV-2450_365072** SeqNo: **5663324** 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	0.244	0.816	20	

The following samples were analyzed in this batch: HS20070621-01

ALS Houston, US Date: 29-Jul-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Monthly Influent Samples
WorkOrder: **HS20070621**

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	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

Acronym	Description
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 Quantitaion Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Arkansas	20-030-0	26-Mar-2021
California	2919, 2020-2021	30-Apr-2021
Dept of Defense	ANAB L2231 V009	22-Dec-2021
Florida	E87611-30-07/01/2020	30-Jun-2021
Illinois	2000322020-4	09-May-2021
Kansas	E-10352 2019-2020	31-Jul-2020
Kentucky	123043, 2020-2021	30-Apr-2021
Louisiana	03087, 2020-2021	30-Jun-2021
Maryland	343, 2019-2020	30-Sep-2020
North Carolina	624-2020	31-Dec-2020
North Dakota	R-193 2020-2021	30-Apr-2021
Oklahoma	2019-141	31-Aug-2020
Texas	T104704231-20-26	30-Apr-2021

ALS Houston, US Date: 29-Jul-20

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Monthly Influent Samples
Work Order: HS20070621

SAMPLE TRACKING

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS20070621-01	LH18/24-SP140_071420	Login	7/15/2020 11:44:34 AM	PMG	MET066
HS20070621-01	LH18/24-SP140_071420	Login	7/15/2020 11:44:34 AM	PMG	Sub
HS20070621-01	LH18/24-SP140_071420	Login	7/15/2020 11:44:34 AM	PMG	WET073

ALS Houston, US Date: 29-Jul-20

Sample Receipt Checklist

Work Order ID: HS20070621 **Date/Time Received:** **15-Jul-2020 09:05**

Client Name: Bhate Environmental **Received by:** **Paresh M. Giga**

Completed By:	/S/ Paresh M. Giga	15-Jul-2020 11:45	**Reviewed by:**	/S/ RJ Modashia	15-Jul-2020 21:40
	eSignature	Date/Time		eSignature	Date/Time

Matrices: **Water** Carrier 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 ☐	COC IDs:None
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):	0.5C U/c	IR25	
Cooler(s)/Kit(s):	46127		
Date/Time sample(s) sent to storage:	7/15/2020 12:05		
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: RJ Modashia

Project: BHATE
LONGHORN ARMY AMMN. PLANT (LHAAP)
GROUNDWATER TREATMENT PLANT (GWTP)
KARNACK, TEXAS

Project No.
NWO1312.0150.0
16.0001

Job:
GROUNDWATER TREATMENT PLANT MONTHLY INFLUENT SAMPLES

Prepared By:
Scott Beesinger

P.O. Number

HS20070621
Bhate Environmental Associates, Inc.
Longhorn GW Treatment Plant Monthly Influent Sample

Field Sample I.D.	Sample Matrix	Date / Time	MS / MSD	No. OF CONTAINERS	Analyses: SILVER & SELENIUM	HEXAVALENT CHROMIUM	PERCHLORATE	Remarks (Preservatives, etc.)	Lab I.D.#
LH18/24-SP140_071420	Water	07/14/20 / 14:00		1	X			HNO3	
LH18/24-SP140_071420	Water	07/14/20 / 14:00		2		X	X	NONE	

Additional Remarks: **STANDARD TURN AROUND TIME**

Relinquished By:	Date	Time	Received By:	Date	Time	Relinquished By:	Date	Time	Received By:	Date	Time
	07/14/20	14:30									

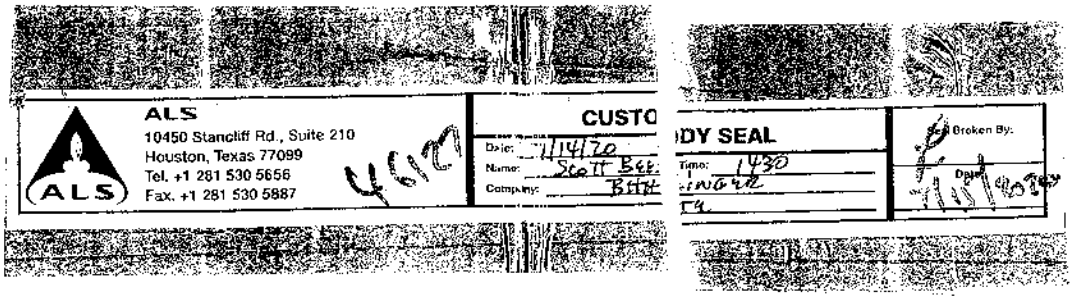
For Lab Use Only

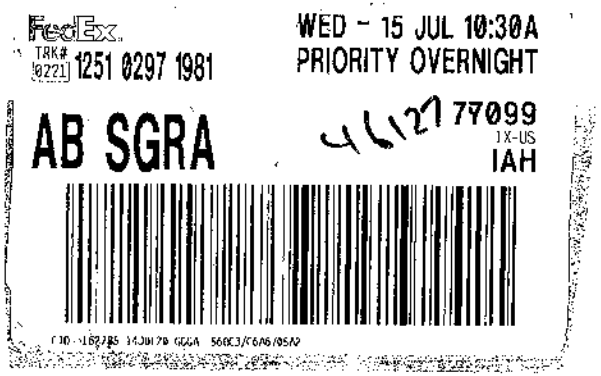
Received At Lab By:	Date	Time	Airbill No.	Opened By:	Date	Time	Temp of Container	Seal No.	Condition

Remarks:

46127

(Word) S:\Forms\Chain of Custody - BiWeekly


ALS
10450 Stancliff Rd., Suite 210
Houston, Texas 77099
Tel. +1 281 530 5656
Fax. +1 281 530 5887
4612
CUSTO
DY SEAL
Broken By:


FedEx
TRK# 0221 1251 0297 1981
WED - 15 JUL 10:30A
PRIORITY OVERNIGHT
AB SGRA
4612
77099
TX-US
IAH

July 29, 2020 Service Request No:E2000640

RJ Modashia
ALS Laboratory Group
10450 Stancliff Road
Suite 210
Houston, TX 77099-4338

Laboratory Results for: HS20070621

Dear RJ,

Enclosed are the results of the sample(s) submitted to our laboratory July 15, 2020
For your reference, these analyses have been assigned our service request number **E2000640.**

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

ALS Environmental

Client:	ALS Houston	**Service Request No.:**	E2000640
Project:	HS20070621	**Date Received:**	07/15/20
Sample Matrix:	W		

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 07/15/20.

The sample was received in good condition and are 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:

EQ2000302: Laboratory Control Spike/Duplicate Laboratory Control Spike (LCS/DLCS) samples were analyzed and reported in addition to a MS/MSD for this extraction batch. MS and MSD was performed on an unrelated sample, LCS/LCSD recoveries are within QC limits.

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: HS20070621

Service Request:E2000640

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
E2000640-001	LH18/24-SP140_071420	7/14/2020	1400

Service Request Summary

Folder #: **E2000640**
Client Name: ALS Environmental - US
Project Name: HS20070621
Project Number:

Report To: RJ Modashia
ALS Laboratory Group
10450 Stancliff Road
Houston, TX 77099-4338
USA
Phone Number: 281-530-5656
Cell Number:
Fax Number: 281-530-5887
E-mail: rj.modashia@alsglobal.com

Project Chemist: Corey Grandits
Originating Lab: HOUSTON
Logged By: CGRANDITS
Date Received: 07/15/20
Internal Due Date: 7/29/2020
QAP: LAB QAP
Qualifier Set: Lab Standard
Formset: Lab Standard
Merged?: Y
Report to MDL?: Y
P.O. Number: HS20070621
EDD: No EDD Specified

1 250 mL-Plastic Bottle HDPE WM CLEAR Unpreserved
Location: EHRMS-WIC 5C
Pressure Gas:

Lab Samp No.	Client Samp No	Matrix	Collected	HOUSTON ClO4 DOD/6850
E2000640-001	LH18/24-SP140_071420	Ground Water	07/14/20 1400	**IV**

Service Request Summary

Folder #: **E2000640**
Client Name: ALS Environmental - US
Project Name: HS20070621
Project Number:

Report To: RJ Modashia
ALS Laboratory Group
10450 Stancliff Road
Houston, TX 77099-4338
USA
Phone Number: 281-530-5656
Cell Number:
Fax Number: 281-530-5887
E-mail: rj.modashia@alsglobal.com

Project Chemist: Corey Grandits
Originating Lab: HOUSTON
Logged By: CGRANDITS
Date Received: 07/15/20
Internal Due Date: 7/29/2020
QAP: LAB QAP
Qualifier Set: Lab Standard
Formset: Lab Standard
Merged?: Y
Report to MDL?: Y
P.O. Number: HS20070621
EDD: No EDD Specified

1 250 mL-Plastic Bottle HDPE WM CLEAR Unpreserved
Location: EHRMS-WIC 5C
Pressure Gas:

Test Comments:

Group	Test/Method	Samples	Comments
Semivoa GCMS	ClO4 DOD/6850	1	Level II due 7/29,level IV 8/5

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 >=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.
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.
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.
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.

Data Qualifiers

Lab Standard

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

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

10450 Stancliff Rd, Houston, TX 77099 | 281-530-5656 | www.alsglobal.com

ALS Environmental

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	20-030-0	3/26/2021
Department of Defense	A2LA 2897.01	11/30/2021
Hawaii Department of Health	2020	4/30/2021
Illinois Environmental Protection Agency	2000322020-4	5/9/2021
Kansas Department of Health and Environment	E-10352	7/31/2020
Louisiana Department of Health and Hospitals	LA028-2020	12/31/2020
Maine Department of Health and Human Services	2020016	6/5/2022
Minnesota Department of Health	1785988	12/31/2020
Nebraska Department of Health and Human Services	NE-OS-25-13 (2020)	4/30/2021
Nevada Department of Concervation and Natural Resources	TX026932019-1	7/31/2020
New Hampshire Environmental Laboratory Accreditation Program	209420	4/24/2021
New York Department of Health	11707	3/31/2021
Oklahoma Department of Environmental Quality	2019-067	8/31/2020
Tennessee Department of Environment and Concervation	04016-2020	4/30/2021
Texas Commision on Environmental Quality	T104704231-20-26	4/30/2021
United States Department of Agriculture	P330-19-00299	10/10/2022
Utah Department of Health Environmental Laboratory Certification	TX026932019-9	7/31/2020
Washington Department of Health	C819	11/14/2020

ALS

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

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:** **14287**

SUBCONTRACT TO:

ALS Environmental
10450 Stancliff RoadSuite 210
Houston, TX 77084

Phone: +1 281 530 5656

E2000640 5
ALS Laboratory Group
HS20070621

CUSTOMER INFORMATION:

Company:	ALS Houston
Contact:	RJ Modashia
Address:	10450 Stancliff Rd, Ste 210
Phone:	+1 281 530 5656
Email:	RJ.Modashia@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:	HS20070621
TSR:	Danielle Winnings

	LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
	ANALYSIS REQUESTED			DUE DATE
1.	**HS20070621-01**	**LH18/24-SP140_071420**	**Water**	**14 Jul 2020 14:00**
	SUB_Perch-6850			29 Jul 2020

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

QC Level: DOD IV (DoD Data Package)

Relinquished By: J. Modashia Date/Time: 7/15/20 12:45

Received By: CL Date/Time: 7/15/20 12:45

Cooler ID(s): Temperature(s):

ALS Environmental

Cooler Receipt Form

Project Chemist CH

Client/Project ALS-H1

Thermometer ID SM04/IR21

Date/Time Received: 7/15/20 Initials: CH

Date/Time Logged in: 7/16/20 Initials CH

1. Method of delivery: ○ US Mail ○ Fed Ex ○ UPS ○ DHL ✓ ALS 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?
–		7/16/20	1245	CH	3.8	☒
						☐
						☐
						☐

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, & Resolutions:

Service request Label: E2000640 5

ALS Laboratory Group HS20070621

10450 Stancliff Rd., Suite 210
Houston, TX 77099
T: +1 713 266 1599
F: +1 713 266 1599
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 sampleThe 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 6ºC.
- ✓ Tissue samples must be shipped and stored frozen, at -20 to -10ºC.
- ✓ Air samples are shipped and stored cold, at 0 to 6ºC
- ✓ 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
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Preparation Information Benchsheet

Prep Run#: 361870 **Prep WorkFlow:** GenExt28Day **Status:** Prepped
Team: Semivoa GCMS/GRIVERA **Prep Method:** Method **Prep Date/Time:** 7/20/20 10:39

#	Lab Code	Client ID	B#	Method /Test	pH	Cl	Matrix	Amt. Ext.	Sample Description
1	E2000626-001	LH18/24-SP650_070920-BIX	.01	6850/ClO4 DOD			Water	10mL	
2	E2000627-001	50WW08-200708	.01	6850/ClO4 DOD			Ground Water	10mL	
3	E2000627-002	50WW29-200708	.01	6850/ClO4 DOD			Ground Water	10mL	
4	E2000627-003	50WW05-200708	.01	6850/ClO4 DOD			Ground Water	10mL	
5	E2000627-004	50WW14-200709	.01	6850/ClO4 DOD			Ground Water	10mL	
6	E2000627-005	50WW13-200709	.01	6850/ClO4 DOD			Ground Water	10mL	
7	E2000627-006	50WW11-200709	.01	6850/ClO4 DOD			Ground Water	10mL	
8	E2000627-007	50WW11-200709-FD	.01	6850/ClO4 DOD			Ground Water	10mL	
9	E2000627-008	50WW06-200709	.01	6850/ClO4 DOD			Ground Water	10mL	
10	E2000627-009	50WW12-200709	.01	6850/ClO4 DOD			Ground Water	10mL	
11	E2000638-001	LH18/24-SP650_071420-BIX	.01	6850/ClO4 DOD			Ground Water	10mL	
12	E2000639-001	LH18/24-SP650_071420-BIX	.01	6850/ClO4 DOD			Ground Water	10mL	
13	E2000640-001	LH18/24-SP140_071420	.01	6850/ClO4 DOD			Ground Water	10mL	
14	E2000660-001	16EW01-200716	.01	6850/ClO4 DOD			Ground Water	10mL	
15	E2000660-003	16EW02-200716	.01	6850/ClO4 DOD			Ground Water	10mL	
16	E2000660-004	16EW02-200716-FD	.01	6850/ClO4 DOD			Ground Water	10mL	
17	E2000660-005	16IW09-200716	.01	6850/ClO4 DOD			Ground Water	10mL	
18	E2000660-006	16RW05-200716	.01	6850/ClO4 DOD			Ground Water	10mL	
19	EQ2000302-01	MB		6850/ClO4 DOD			Liquid	10mL	
20	EQ2000302-02	LCS		6850/ClO4 DOD			Liquid	10mL	
21	EQ2000302-03	DLCS		6850/ClO4 DOD			Liquid	10mL	
22	EQ2000302-04	50WW14-200709 MS	.01	6850/ClO4 DOD			Liquid	10mL	
23	EQ2000302-05	50WW14-200709 DMS	.01	6850/ClO4 DOD			Liquid	10mL	

Spiking Solutions

Name: Sodium Perchlorate 1 ug/mL (IS) (18-O) as CLO4 Inventory ID 202037 Logbook Ref: Sodium Perchlorate Expires On: 05/22/2021

E2000626-001	100.00µL	E2000627-001	100.00µL	E2000627-002	100.00µL	E2000627-003	100.00µL	E2000627-004	100.00µL	E2000627-005	100.00µL
E2000627-006	100.00µL	E2000627-007	100.00µL	E2000627-008	100.00µL	E2000627-009	100.00µL	E2000638-001	100.00µL	E2000639-001	100.00µL
E2000640-001	100.00µL	E2000660-001	100.00µL	E2000660-003	100.00µL	E2000660-004	100.00µL	E2000660-005	100.00µL	E2000660-006	100.00µL
EQ2000302-02	100.00µL	EQ2000302-03	100.00µL	EQ2000302-04	100.00µL	EQ2000302-05	100.00µL				

Name: Perchlorate Intermediate Stock1 Inventory ID 209764 Logbook Ref: Perchlorate Int. Stock1 51820 Expires On: 11/18/2020

EQ2000302-02	1.00µL	EQ2000302-03	1.00µL	EQ2000302-04	10.00µL	EQ2000302-05	10.00µL

Preparation Information Benchsheet

Prep Run#: 361870 **Prep WorkFlow:** GenExt28Day **Status:** Prepped
Team: Semivoa GCMS/GRIVERA **Prep Method:** Method **Prep Date/Time:** 7/20/20 10:39

Preparation Steps

Step: Preparation
Started: 7/20/20 10:39
Finished: 7/20/20 14:00
By: GRIVERA
Comments

Comments: _____

Reviewed By: _____ Date: _____

Chain of Custody

Relinquished By: _____ Date: _____ Extracts Examined

Received By: _____ Date: _____ Yes No

Analytical Results

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ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	ALS Environmental - US	**Service Request:**	E2000640
Project:	HS20070621	**Date Collected:**	7/14/20 1400
Sample Matrix:	Ground Water	**Date Received:**	7/15/20
Sample Name:	LH18/24-SP140_071420	**Units:**	µg/L
Lab Code:	E2000640-001	**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	**6780**		20.0	10.0	5.00	200	7/20/20	7/24/20 15:03	361870	688371	

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	ALS Environmental - US	**Service Request:**	E2000640
Project:	HS20070621	**Date Collected:**	NA
Sample Matrix:	Ground Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	µg/L
Lab Code:	EQ2000302-01	**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	7/20/20	7/20/20 13:47	361870	688323	

Accuracy & Precision

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ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070621
Sample Matrix: Ground Water

Service Request: E2000640
Date Analyzed: 7/20/20

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: 361870

	Lab Control Sample EQ2000302-02			Duplicate Lab Control Sample EQ2000302-03					
Analyte Name	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Perchlorate	0.102	0.100	102	0.117	0.100	117	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	**Service Request:**	E2000640
Project:	HS20070621	**Date Collected:**	NA
Sample Matrix:	Ground Water	**Date Received:**	NA
Sample Name:	Lab Control Sample	**Units:**	µg/L
Lab Code:	EQ2000302-02	**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	**0.102**		0.100	0.0500	0.0250	1	7/20/20	7/20/20 13:55	361870	688323	

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	ALS Environmental - US	**Service Request:**	E2000640
Project:	HS20070621	**Date Collected:**	NA
Sample Matrix:	Ground Water	**Date Received:**	NA
Sample Name:	Duplicate Lab Control Sample	**Units:**	µg/L
Lab Code:	EQ2000302-03	**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	7/20/20	7/20/20 14:03	361870	688323	

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000640
Project:	HS20070621	**Date Collected:**	NA
Sample Matrix:	Ground Water	**Date Received:**	NA
		Date Analyzed:	7/24/20

Matrix Spike Summary
Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

Sample Name:	Batch QC	**Units:**	µg/L
Lab Code:	E2000627-004	**Basis:**	NA

Analytical Method: 6850
Prep Method: Method

		Batch QCMS Matrix Spike EQ2000302-04			Batch QCDMS Duplicate Matrix Spike EQ2000302-05					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Perchlorate	3.69	4.69	1.00	99	4.79	1.00	110	84 - 119	2	15

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

Results flagged with a pound (#) indicate the control criteria is not applicable.

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	**Service Request:**	E2000640
Project:	HS20070621	**Date Collected:**	NA
Sample Matrix:	Ground Water	**Date Received:**	NA
Sample Name:	Batch QC	**Units:**	µg/L
Lab Code:	EQ2000302-04	**Basis:**	NA
Run Type:	Matrix Spike		

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	**4.69**		1.00	0.500	0.250	10	7/20/20	7/24/20 14:07	361870	688371	

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	ALS Environmental - US	**Service Request:**	E2000640
Project:	HS20070621	**Date Collected:**	NA
Sample Matrix:	Ground Water	**Date Received:**	NA
Sample Name:	Batch QC	**Units:**	µg/L
Lab Code:	EQ2000302-05	**Basis:**	NA
Run Type:	Duplicate Matrix Spike		

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	**4.79**		1.00	0.500	0.250	10	7/20/20	7/24/20 15:45	361870	688371	

Initial Calibration

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Phone (713)266-1599 Fax (713)266-0130
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20200720

ALS Environmental

1st Review: Kneir
2nd Review: Hvan

Injection Log
LCMS01 -Shimadzu 8050

ICAL Date: 7/20/2020
Cal. Std. xp: 11/18/2020
ICAL ID: EC2000014

Mobile Phases **A:** 0.75% Formic Acid/Water 3100807-09 **B:** MeOH 3100802-01

			File Name	Acquisition Method	Dilution	R	Comments
1	PERCHLORATE1		20200720_006	Perchlorate6850b.lcm	1x	☒	3100806-05
2	PERCHLORATE2		20200720_007	Perchlorate6850b.lcm	1x	☒	3100806-06
3	PERCHLORATE3		20200720_008	Perchlorate6850b.lcm	1x	☒	3100806-07
4	PERCHLORATE4		20200720_009	Perchlorate6850b.lcm	1x	☒	3100807-01
5	PERCHLORATE5		20200720_016	Perchlorate6850b.lcm	1x	☒	3100807-02
6	PERCHLORATE6		20200720_011	Perchlorate6850b.lcm	1x	☒	3100807-03
7	PERCHLORATE7		20200720_012	Perchlorate6850b.lcm	1x	☒	3100807-04
8	PERCHLORATE8		20200720_013	Perchlorate6850b.lcm	1x	☒	3100807-05
9	PERCHLORATE9		20200720_014	Perchlorate6850b.lcm	1x	☒	3100807-06
10	PERCHLORATE10		20200720_015	Perchlorate6850b.lcm	1x	☒	3100807-07
11	PERCHLORATEICV		20200720_017	Perchlorate6850b.lcm	1x	☒	3100807-08
12	IB		20200720_018	Perchlorate6850b.lcm	1x	☒	
13	IB		20200720_019	Perchlorate6850b.lcm	1x	☒	
14	LODV		20200720_020	Perchlorate6850b.lcm	1x	☒	
15	ICS		20200720_021	Perchlorate6850b.lcm	1x	☒	
16	PERCHLORATE7		20200720_022	Perchlorate6850b.lcm	1x	☒	3100807-04
17	EQ2000302-01		20200720_023	Perchlorate6850b.lcm	1x	☒	
18	EQ2000302-02		20200720_024	Perchlorate6850b.lcm	1x	☒	
19	EQ2000302-03		20200720_025	Perchlorate6850b.lcm	1x	☒	
20	EQ2000302-04		20200720_026	Perchlorate6850b.lcm	1x	☒	
21	EQ2000302-05		20200720_027	Perchlorate6850b.lcm	1x	☒	
22	E2000626-001		20200720_028	Perchlorate6850b.lcm	1x	☒	
23	E2000627-001		20200720_029	Perchlorate6850b.lcm	1x	☒	
24	E2000627-002		20200720_030	Perchlorate6850b.lcm	1x	☒	
25	E2000627-003		20200720_031	Perchlorate6850b.lcm	1x	☒	
26	E2000627-004		20200720_032	Perchlorate6850b.lcm	1x	☒	
27	PERCHLORATE7		20200720_033	Perchlorate6850b.lcm	1x	☒	3100807-04
28	E2000627-005		20200720_034	Perchlorate6850b.lcm	1x	☒	
29	E2000627-006		20200720_035	Perchlorate6850b.lcm	1x	☒	
30	E2000627-007		20200720_036	Perchlorate6850b.lcm	1x	☒	
31	E2000627-008		20200720_037	Perchlorate6850b.lcm	1x	☒	
32	E2000627-009		20200720_038	Perchlorate6850b.lcm	1x	☒	
33	E2000638-001		20200720_039	Perchlorate6850b.lcm	1x	☒	
34	E2000639-001		20200720_040	Perchlorate6850b.lcm	1x	☒	
35	E2000640-001		20200720_041	Perchlorate6850b.lcm	1x	☒	
36	PERCHLORATE7		20200720_042	Perchlorate6850b.lcm	1x	☒	3100807-04
37	EQ2000303-01		20200720_043	Perchlorate6850b.lcm	1x	☒	
38	EQ2000303-02		20200720_044	Perchlorate6850b.lcm	1x	☒	
39	EQ2000303-03		20200720_045	Perchlorate6850b.lcm	1x	☒	
40	E2000641-001		20200720_046	Perchlorate6850b.lcm	1x	☒	
41	E2000641-002		20200720_047	Perchlorate6850b.lcm	1x	☒	
42	E2000641-003		20200720_048	Perchlorate6850b.lcm	1x	☒	
43	E2000641-004		20200720_049	Perchlorate6850b.lcm	1x	☒	
44	E2000641-005		20200720_050	Perchlorate6850b.lcm	1x	☒	
45	E2000641-006		20200720_051	Perchlorate6850b.lcm	1x	☒	
46	E2000641-007		20200720_052	Perchlorate6850b.lcm	1x	☒	
47	PERCHLORATE7		20200720_053	Perchlorate6850b.lcm	1x	☒	3100807-04
48	E2000641-008		20200720_054	Perchlorate6850b.lcm	1x	☒	
49	E2000641-009		20200720_055	Perchlorate6850b.lcm	1x	☒	
50	E2000648-001		20200720_056	Perchlorate6850b.lcm	1x	☒	
51	E2000648-002		20200720_057	Perchlorate6850b.lcm	1x	☒	
52	E2000648-003		20200720_058	Perchlorate6850b.lcm	1x	☒	

Initial Calibration - Detailed Report

Calibration ID: EC2000014 **Instrument ID:** E-LCMS-01
Column Name: 1

#	Lab Code	Sample Name	File Location	Aquisition Date
01	EC2000014-01	PERCHLORATE1	20200720_006	07/20/2020 10:09
02	EC2000014-02	PERCHLORATE2	20200720_007	07/20/2020 10:17
03	EC2000014-03	PERCHLORATE3	20200720_008	07/20/2020 10:24
04	EC2000014-04	PERCHLORATE4	20200720_009	07/20/2020 10:32
06	EC2000014-06	PERCHLORATE6	20200720_011	07/20/2020 10:48
07	EC2000014-07	PERCHLORATE7	20200720_012	07/20/2020 10:56
08	EC2000014-08	PERCHLORATE8	20200720_013	07/20/2020 11:04
09	EC2000014-09	PERCHLORATE9	20200720_014	07/20/2020 11:12
10	EC2000014-10	PERCHLORATE10	20200720_015	07/20/2020 11:20
05	EC2000014-05	PERCHLORATE5	20200720_016	07/20/2020 12:28

Analyte **Curve Fit** **Weighting**

Perchlorate **Average RF** **RSD = 3.545** **Average RF = 0.121**

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.1000	0.1239	02	0.5000	0.1227	03	0.7000	0.1244	04	1.0000	0.1237
05	2.0000	0.1208	06	5.0000	0.1169	07	10.0000	0.1279	08	20.0000	0.1185
09	30.0000	0.1182	10	50.0000	0.1134						

Analyte

Perchlorate

#	Amount	Calculated Conc	%D	#	Amount	Calculated Conc	%D	#	Amount	Calculated Conc	%D
01	0.1000	0.102	2.3	02	0.5000	0.507	1.4	03	0.7000	0.719	2.7
04	1.0000	1.02	2.2	05	2.0000	2.00	-0.2	06	5.0000	4.83	-3.4
07	10.0000	10.6	5.7	08	20.0000	19.6	-2.1	09	30.0000	29.3	-2.3
10	50.0000	46.8	-6.3								

Initial Calibration Verification Summary Report

Calibration ID:	EC2000014	**Instrument ID:**	E-LCMS-01
Datafile ID:	20200720_017	**Column Name:**	1

Analyte	Lab Code	Type	Curve Fit	True Value	Calc Conc	Units	Result	Criteria
Perchlorate	EC2000014-11	T	Average RF	10	10.475	ng/mL	4.8	<= 15

ALS Group Houston

PERCHLORATE1

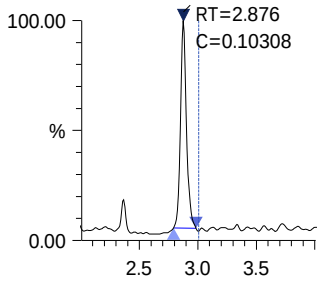
Date acquired: 7/20/2020 10:09:08 AM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_006.lcd
Vial: 5 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE1	7/20/2020 10:09:08 AM	5665	0.10308	20200720_006	2.876	25.0000	1.0000	5
Sodium Perchlorate-18O4_IS	PERCHLORATE1	7/20/2020 10:09:08 AM	457293	1.00000	20200720_006	2.874	25.0000	1.0000	5

Perchlorate

Conc 0.10308
Area 5665

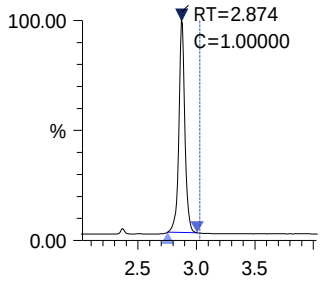
Q 99.00>83.00 (-) 1.65e3



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 457293

ISTD 107.00>89.00 (-) 1.28e5



ALS Group Houston

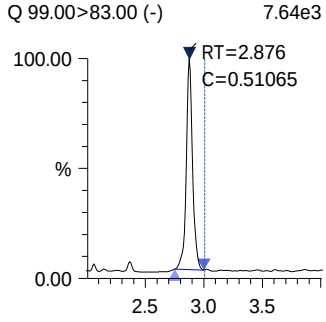
PERCHLORATE2

Date acquired: 7/20/2020 10:17:03 AM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_007.lcd
Vial: 6 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE2	7/20/2020 10:17:03 AM	28211	0.51065	20200720_007	2.876	25.0000	1.0000	6
Sodium Perchlorate-18O4_IS	PERCHLORATE2	7/20/2020 10:17:03 AM	459674	1.00000	20200720_007	2.873	25.0000	1.0000	6

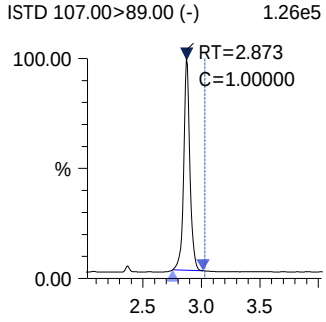
Perchlorate

Conc 0.51065
Area 28211



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 459674



ALS Group Houston

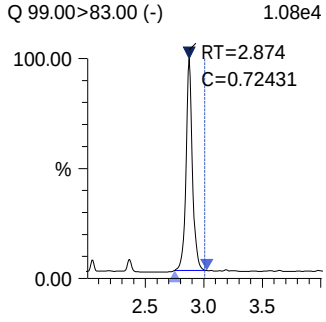
PERCHLORATE3

Date acquired: 7/20/2020 10:24:56 AM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_008.lcd
Vial: 7 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE3	7/20/2020 10:24:56 AM	40510	0.72431	20200720_008	2.874	25.0000	1.0000	7
Sodium Perchlorate-18O4_IS	PERCHLORATE3	7/20/2020 10:24:56 AM	465371	1.00000	20200720_008	2.874	25.0000	1.0000	7

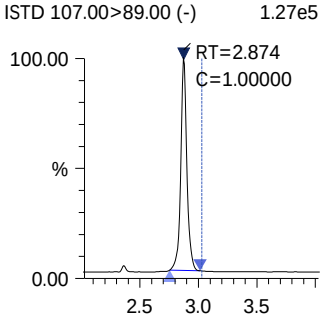
Perchlorate

Conc 0.72431
Area 40510



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 465371



ALS Group Houston

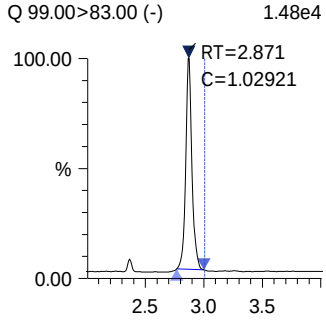
PERCHLORATE4

Date acquired: 7/20/2020 10:32:48 AM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_009.lcd
Vial: 8 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE4	7/20/2020 10:32:48 AM	54285	1.02921	20200720_009	2.871	25.0000	1.0000	8
Sodium Perchlorate-18O4_IS	PERCHLORATE4	7/20/2020 10:32:48 AM	438869	1.00000	20200720_009	2.869	25.0000	1.0000	8

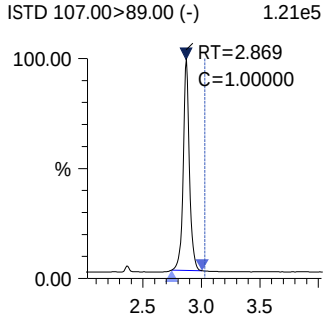
Perchlorate

Conc 1.02921
Area 54285



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 438869



ALS Group Houston

PERCHLORATE6

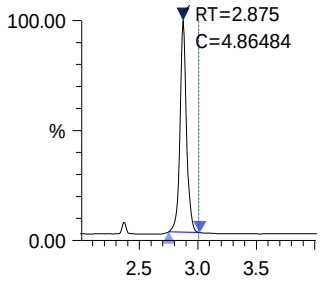
Date acquired: 7/20/2020 10:48:37 AM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_011.lcd
Vial: 10 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE6	7/20/2020 10:48:37 AM	249126	4.86484	20200720_011	2.875	25.0000	1.0000	10
Sodium Perchlorate-18O4_IS	PERCHLORATE6	7/20/2020 10:48:37 AM	426098	1.00000	20200720_011	2.873	25.0000	1.0000	10

Perchlorate

Conc 4.86484
Area 249126

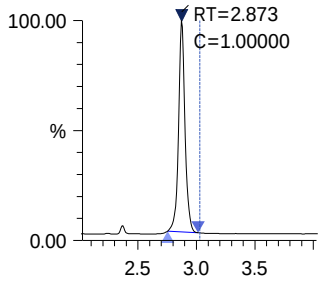
Q 99.00>83.00 (-) 6.50e4



Sodium Perchlorate-18O4 _IS

Conc 1.00000
Area 426098

ISTD 107.00>89.00 (-) 1.12e5



ALS Group Houston

PERCHLORATE7

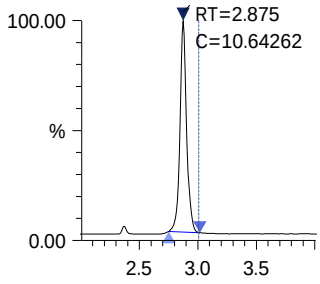
Date acquired: 7/20/2020 10:56:33 AM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_012.lcd
Vial: 4 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE7	7/20/2020 10:56:33 AM	453181	10.64262	20200720_012	2.875	25.0000	1.0000	4
Sodium Perchlorate-18O4_IS	PERCHLORATE7	7/20/2020 10:56:33 AM	354309	1.00000	20200720_012	2.873	25.0000	1.0000	4

Perchlorate

Conc 10.64262
Area 453181

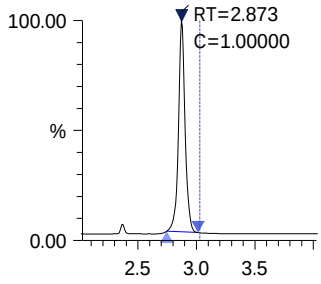
Q 99.00>83.00 (-) 1.16e5



Sodium Perchlorate-18O4 _IS

Conc 1.00000
Area 354309

ISTD 107.00>89.00 (-) 9.03e4



ALS Group Houston

PERCHLORATE8

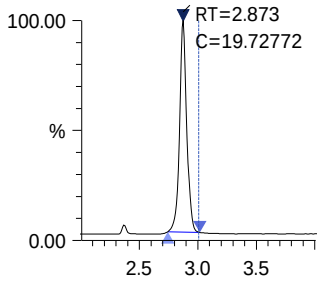
Date acquired: 7/20/2020 11:04:29 AM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_013.lcd
Vial: 11 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE8	7/20/2020 11:04:29 AM	811652	19.72772	20200720_013	2.873	25.0000	1.0000	11
Sodium Perchlorate-18O4_IS	PERCHLORATE8	7/20/2020 11:04:29 AM	342336	1.00000	20200720_013	2.872	25.0000	1.0000	11

Perchlorate

Conc 19.72772
Area 811652

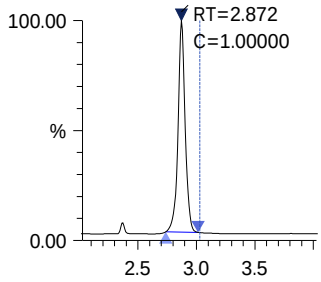
Q 99.00>83.00 (-) 1.93e5



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 342336

ISTD 107.00>89.00 (-) 8.10e4



ALS Group Houston

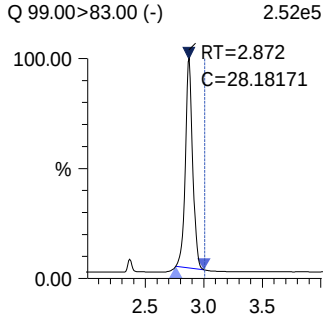
PERCHLORATE9

Date acquired: 7/20/2020 11:12:22 AM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_014.lcd
Vial: 12 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE9	7/20/2020 11:12:22 AM	1067782	28.18171	20200720_014	2.872	25.0000	1.0000	12
Sodium Perchlorate-18O4_IS	PERCHLORATE9	7/20/2020 11:12:22 AM	315264	1.00000	20200720_014	2.871	25.0000	1.0000	12

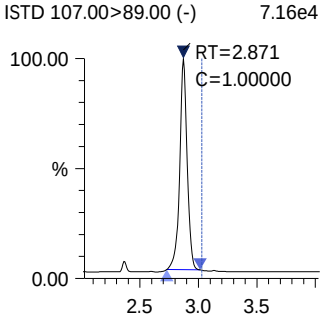
Perchlorate

Conc 28.18171
Area 1067782



Sodium Perchlorate-18O4 _IS

Conc 1.00000
Area 315264



ALS Group Houston

PERCHLORATE10

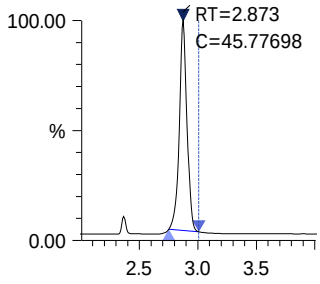
Date acquired: 7/20/2020 11:20:14 AM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_015.lcd
Vial: 13 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE10	7/20/2020 11:20:14 AM	1515028	45.77698	20200720_015	2.873	25.0000	1.0000	13
Sodium Perchlorate-18O4_IS	PERCHLORATE10	7/20/2020 11:20:14 AM	275380	1.00000	20200720_015	2.872	25.0000	1.0000	13

Perchlorate

Conc 45.77698
Area 1515028

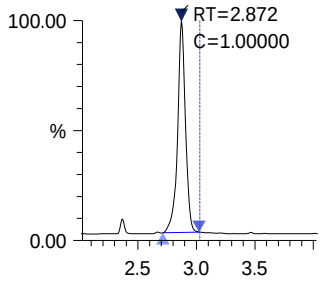
Q 99.00>83.00 (-) 3.39e5



Sodium Perchlorate-18O4 _IS

Conc 1.00000
Area 275380

ISTD 107.00>89.00 (-) 5.90e4



ALS Group Houston

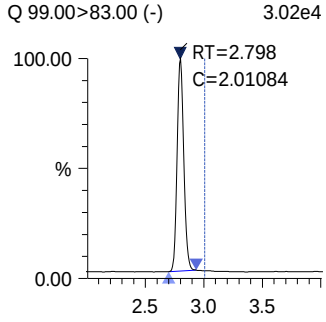
PERCHLORATE5

Date acquired: 7/20/2020 12:28:05 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_016.lcd
Vial: 9 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE5	7/20/2020 12:28:05 PM	119859	2.01084	20200720_016	2.798	25.0000	1.0000	9
Sodium Perchlorate-18O4_IS	PERCHLORATE5	7/20/2020 12:28:05 PM	495966	1.00000	20200720_016	2.795	25.0000	1.0000	9

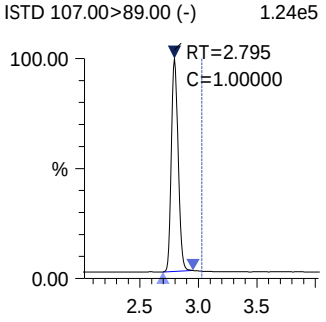
Perchlorate

Conc 2.01084
Area 119859



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 495966



ALS Group Houston

PERCHLORATEICV

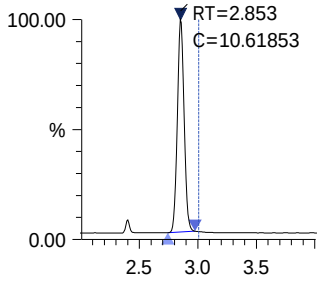
Date acquired: 7/20/2020 12:52:26 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_017.lcd
Vial: 14 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATEICV	7/20/2020 12:52:26 PM	490921	10.61853	20200720_017	2.853	25.0000	1.0000	14
Sodium Perchlorate-18O4_IS	PERCHLORATEICV	7/20/2020 12:52:26 PM	384686	1.00000	20200720_017	2.851	25.0000	1.0000	14

Perchlorate

Conc 10.61853
Area 490921

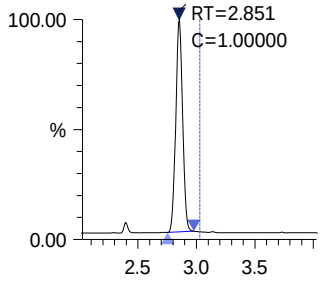
Q 99.00>83.00 (-) 1.21e5



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 384686

ISTD 107.00>89.00 (-) 9.52e4



20200724

ALS Environmental

1st Review: Kneir
2nd Review: Hvan

Injection Log
LCMS01 -Shimadzu 8050

ICAL Date: 7/24/2020
Cal. Std. xp: 11/18/2020
ICAL ID: EC2000016

Mobile Phases **A:** 0.75% Formic Acid/Water 3100807-09 **B:** MeOH 3100802-01

			File Name	Acquisition Method	Dilution	R	Comments
1	PERCHLORATE1		20200724_005	Perchlorate6850b.lcm	1x	☒	3100806-05
2	PERCHLORATE2		20200724_006	Perchlorate6850b.lcm	1x	☒	3100806-06
3	PERCHLORATE3		20200724_007	Perchlorate6850b.lcm	1x	☒	3100806-07
4	PERCHLORATE4		20200724_008	Perchlorate6850b.lcm	1x	☒	3100807-01
5	PERCHLORATE5		20200724_009	Perchlorate6850b.lcm	1x	☒	3100807-02
6	PERCHLORATE6		20200724_010	Perchlorate6850b.lcm	1x	☒	3100807-03
7	PERCHLORATE7		20200724_011	Perchlorate6850b.lcm	1x	☒	3100807-04
8	PERCHLORATE8		20200724_012	Perchlorate6850b.lcm	1x	☒	3100807-05
9	PERCHLORATE9		20200724_013	Perchlorate6850b.lcm	1x	☒	3100807-06
10	PERCHLORATE10		20200724_014	Perchlorate6850b.lcm	1x	☒	3100807-07
11	IB		20200724_015	Perchlorate6850b.lcm	1x	☒	
12	PERCHLORATEICV		20200724_016	Perchlorate6850b.lcm	1x	☒	3100807-08
13	IB		20200724_017	Perchlorate6850b.lcm	1x	☒	
14	LODV		20200724_018	Perchlorate6850b.lcm	1x	☒	
15	ICS		20200724_019	Perchlorate6850b.lcm	1x	☒	
16	PERCHLORATE7		20200724_020	Perchlorate6850b.lcm	1x	☒	3100807-04
17	EQ2000302-04X10		20200724_021	Perchlorate6850b.lcm	10x	☒	
18	EQ2000302-05X10DNU		20200724_022	Perchlorate6850b.lcm	10x	☒	
19	E2000626-001X2		20200724_023	Perchlorate6850b.lcm	2x	☒	
20	E2000627-001X10		20200724_024	Perchlorate6850b.lcm	10x	☒	
21	E2000627-005X100		20200724_025	Perchlorate6850b.lcm	100x	☒	
22	E2000627-006X100		20200724_026	Perchlorate6850b.lcm	100x	☒	
23	E2000627-009X1000		20200724_027	Perchlorate6850b.lcm	1000x	☒	
24	E2000640-001X200		20200724_028	Perchlorate6850b.lcm	200x	☒	
25	PERCHLORATE7		20200724_029	Perchlorate6850b.lcm	1x	☒	3100807-04
26	E2000660-001X10		20200724_030	Perchlorate6850b.lcm	10x	☒	
27	E2000627-004X10		20200724_031	Perchlorate6850b.lcm	10x	☒	
28	PERCHLORATE7		20200724_032	Perchlorate6850b.lcm	1x	☒	3100807-04
29	EQ2000302-05X10		20200724_033	Perchlorate6850b.lcm	10x	☒	
30	PERCHLORATE7		20200724_034	Perchlorate6850b.lcm	1x	☒	3100807-04
31	E2000660-003X10		20200724_035	Perchlorate6850b.lcm	10x	☒	
32	E2000660-004X10		20200724_036	Perchlorate6850b.lcm	10x	☒	
33	E2000660-005X2		20200724_037	Perchlorate6850b.lcm	2x	☒	
34	E2000660-006X10		20200724_038	Perchlorate6850b.lcm	10x	☒	
35	PERCHLORATE7		20200724_039	Perchlorate6850b.lcm	1x	☒	3100807-04
36	EQ2000303-01		20200724_040	Perchlorate6850b.lcm	1x	☒	
37	EQ2000303-02		20200724_041	Perchlorate6850b.lcm	1x	☒	
38	EQ2000303-03		20200724_042	Perchlorate6850b.lcm	1x	☒	
39	E2000641-001X20		20200724_043	Perchlorate6850b.lcm	20x	☒	
40	E2000641-002X20		20200724_044	Perchlorate6850b.lcm	20x	☒	
41	E2000641-003X10		20200724_045	Perchlorate6850b.lcm	10x	☒	
42	E2000641-004X20		20200724_046	Perchlorate6850b.lcm	20x	☒	
43	E2000641-005X10		20200724_047	Perchlorate6850b.lcm	10x	☒	
44	E2000641-006X10		20200724_048	Perchlorate6850b.lcm	10x	☒	
45	E2000641-007X10		20200724_049	Perchlorate6850b.lcm	10x	☒	
46	PERCHLORATE7		20200724_050	Perchlorate6850b.lcm	1x	☒	3100807-04
47	E2000641-008X10		20200724_051	Perchlorate6850b.lcm	10x	☒	
48	E2000641-009X10		20200724_052	Perchlorate6850b.lcm	10x	☒	
49	E2000648-001X10		20200724_053	Perchlorate6850b.lcm	10x	☒	
50	E2000648-002X10		20200724_054	Perchlorate6850b.lcm	10x	☒	
51	E2000648-003X20		20200724_055	Perchlorate6850b.lcm	20x	☒	
52	E2000648-005X10		20200724_056	Perchlorate6850b.lcm	10x	☒	

Initial Calibration - Detailed Report

Calibration ID: EC2000016 **Instrument ID:** E-LCMS-01
Column Name: 1

#	Lab Code	Sample Name	File Location	Aquisition Date
01	EC2000016-01	PERCHLORATE1	20200724_005	07/24/2020 11:48
02	EC2000016-02	PERCHLORATE2	20200724_006	07/24/2020 11:56
03	EC2000016-03	PERCHLORATE3	20200724_007	07/24/2020 12:04
04	EC2000016-04	PERCHLORATE4	20200724_008	07/24/2020 12:11
05	EC2000016-05	PERCHLORATE5	20200724_009	07/24/2020 12:19
06	EC2000016-06	PERCHLORATE6	20200724_010	07/24/2020 12:27
07	EC2000016-07	PERCHLORATE7	20200724_011	07/24/2020 12:35
08	EC2000016-08	PERCHLORATE8	20200724_012	07/24/2020 12:43
09	EC2000016-09	PERCHLORATE9	20200724_013	07/24/2020 12:51
10	EC2000016-10	PERCHLORATE10	20200724_014	07/24/2020 12:59

Analyte **Curve Fit** **Weighting**

Perchlorate **Average RF** **RSD = 4.659** **Average RF = 0.121**

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.1000	0.1283	02	0.5000	0.13	03	0.7000	0.1207	04	1.0000	0.1251
05	2.0000	0.1211	06	5.0000	0.1202	07	10.0000	0.1211	08	20.0000	0.1168
09	30.0000	0.1121	10	50.0000	0.1148						

Analyte

Perchlorate

#	Amount	Calculated Conc	%D	#	Amount	Calculated Conc	%D	#	Amount	Calculated Conc	%D
01	0.1000	0.106	6.0	02	0.5000	0.537	7.4	03	0.7000	0.698	-0.3
04	1.0000	1.03	3.4	05	2.0000	2.00	0.1	06	5.0000	4.97	-0.7
07	10.0000	10.0	0.1	08	20.0000	19.3	-3.5	09	30.0000	27.8	-7.3
10	50.0000	47.4	-5.1								

Initial Calibration Verification Summary Report

Calibration ID:	EC2000016	**Instrument ID:**	E-LCMS-01
Datafile ID:	20200724_016	**Column Name:**	1

Analyte	Lab Code	Type	Curve Fit	True Value	Calc Conc	Units	Result	Criteria
Perchlorate	EC2000016-11	T	Average RF	10	9.867	ng/mL	-1.3	<= 15

ALS Group Houston

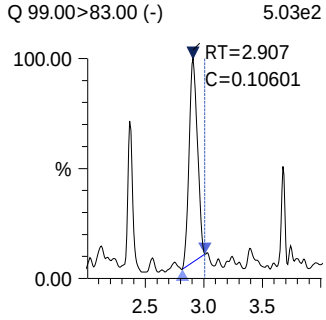
PERCHLORATE1

Date acquired: 7/24/2020 11:48:19 AM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_005.lcd
Vial: 5 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE1	7/24/2020 11:48:19 AM	2348	0.10601	20200724_005	2.907	25.0000	1.0000	5
Sodium Perchlorate-18O4_IS	PERCHLORATE1	7/24/2020 11:48:19 AM	183001	1.00000	20200724_005	2.903	25.0000	1.0000	5

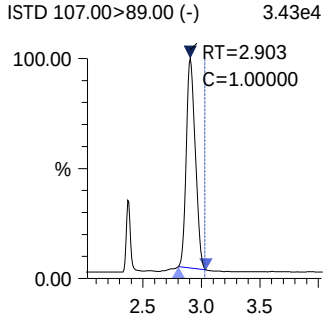
Perchlorate

Conc 0.10601
Area 2348



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 183001



ALS Group Houston

PERCHLORATE2

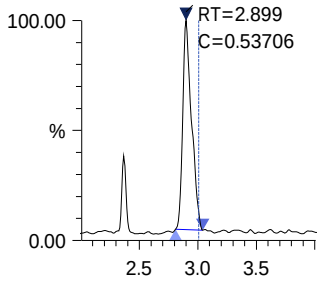
Date acquired: 7/24/2020 11:56:11 AM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_006.lcd
Vial: 6 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE2	7/24/2020 11:56:11 AM	11773	0.53706	20200724_006	2.899	25.0000	1.0000	6
Sodium Perchlorate-18O4_IS	PERCHLORATE2	7/24/2020 11:56:11 AM	181125	1.00000	20200724_006	2.898	25.0000	1.0000	6

Perchlorate

Conc 0.53706
Area 11773

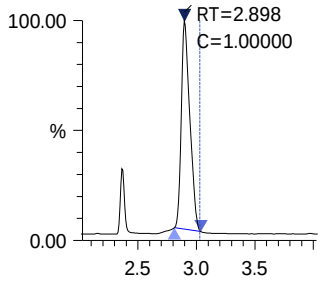
Q 99.00>83.00 (-) 2.32e3



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 181125

ISTD 107.00>89.00 (-) 3.62e4



ALS Group Houston

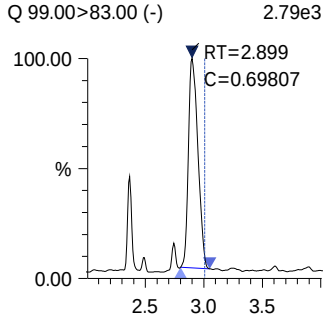
PERCHLORATE3

Date acquired: 7/24/2020 12:04:05 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_007.lcd
Vial: 7 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE3	7/24/2020 12:04:05 PM	15258	0.69807	20200724_007	2.899	25.0000	1.0000	7
Sodium Perchlorate-18O4_IS	PERCHLORATE3	7/24/2020 12:04:05 PM	180602	1.00000	20200724_007	2.896	25.0000	1.0000	7

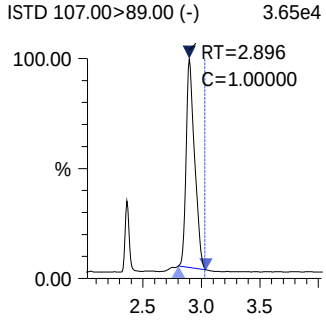
Perchlorate

Conc 0.69807
Area 15258



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 180602



ALS Group Houston

PERCHLORATE4

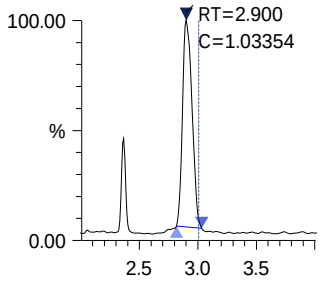
Date acquired: 7/24/2020 12:11:58 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_008.lcd
Vial: 8 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE4	7/24/2020 12:11:58 PM	20922	1.03354	20200724_008	2.900	25.0000	1.0000	8
Sodium Perchlorate-18O4_IS	PERCHLORATE4	7/24/2020 12:11:58 PM	167260	1.00000	20200724_008	2.902	25.0000	1.0000	8

Perchlorate

Conc 1.03354
Area 20922

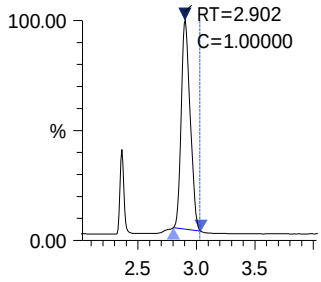
Q 99.00>83.00 (-) 3.87e3



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 167260

ISTD 107.00>89.00 (-) 3.17e4



ALS Group Houston

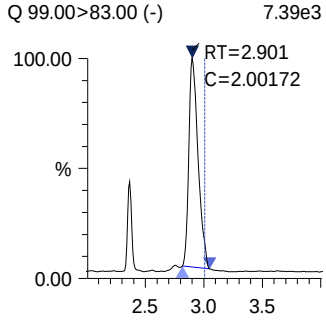
PERCHLORATE5

Date acquired: 7/24/2020 12:19:50 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_009.lcd
Vial: 9 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE5	7/24/2020 12:19:50 PM	39343	2.00172	20200724_009	2.901	25.0000	1.0000	9
Sodium Perchlorate-18O4_IS	PERCHLORATE5	7/24/2020 12:19:50 PM	162397	1.00000	20200724_009	2.899	25.0000	1.0000	9

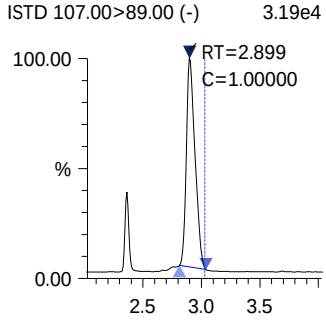
Perchlorate

Conc 2.00172
Area 39343



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 162397



ALS Group Houston

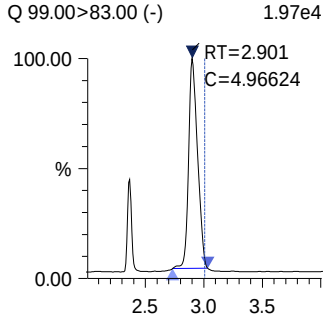
PERCHLORATE6

Date acquired: 7/24/2020 12:27:42 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_010.lcd
Vial: 10 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE6	7/24/2020 12:27:42 PM	102216	4.96624	20200724_010	2.901	25.0000	1.0000	10
Sodium Perchlorate-18O4_IS	PERCHLORATE6	7/24/2020 12:27:42 PM	170060	1.00000	20200724_010	2.900	25.0000	1.0000	10

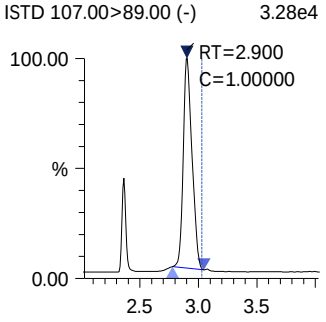
Perchlorate

Conc 4.96624
Area 102216



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 170060



ALS Group Houston

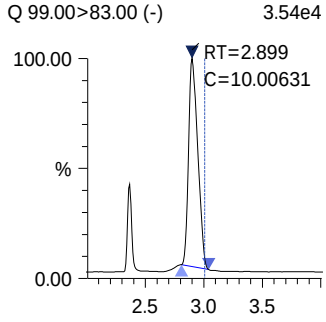
PERCHLORATE7

Date acquired: 7/24/2020 12:35:33 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_011.lcd
Vial: 4 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE7	7/24/2020 12:35:33 PM	187110	10.00631	20200724_011	2.899	25.0000	1.0000	4
Sodium Perchlorate-18O4_IS	PERCHLORATE7	7/24/2020 12:35:33 PM	154502	1.00000	20200724_011	2.897	25.0000	1.0000	4

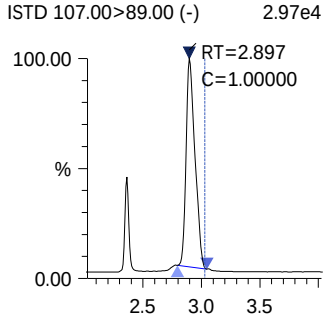
Perchlorate

Conc 10.00631
Area 187110



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 154502



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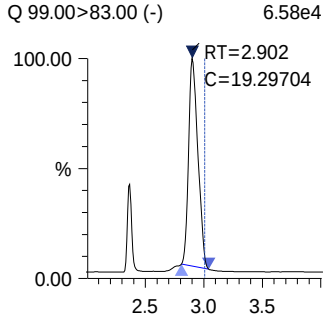
PERCHLORATE8

Date acquired: 7/24/2020 12:43:26 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_012.lcd
Vial: 11 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE8	7/24/2020 12:43:26 PM	349524	19.29704	20200724_012	2.902	25.0000	1.0000	11
Sodium Perchlorate-18O4_IS	PERCHLORATE8	7/24/2020 12:43:26 PM	149657	1.00000	20200724_012	2.900	25.0000	1.0000	11

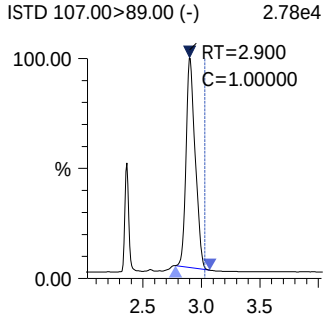
Perchlorate

Conc 19.29704
Area 349524



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 149657



ALS Group Houston

PERCHLORATE9

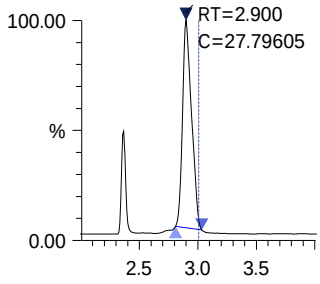
Date acquired: 7/24/2020 12:51:22 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_013.lcd
Vial: 12 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE9	7/24/2020 12:51:22 PM	465757	27.79605	20200724_013	2.900	25.0000	1.0000	12
Sodium Perchlorate-18O4_IS	PERCHLORATE9	7/24/2020 12:51:22 PM	138448	1.00000	20200724_013	2.898	25.0000	1.0000	12

Perchlorate

Conc 27.79605
Area 465757

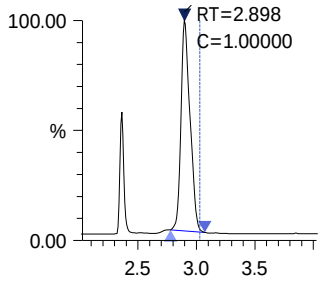
Q 99.00>83.00 (-) 9.05e4



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 138448

ISTD 107.00>89.00 (-) 2.59e4



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PERCHLORATE10

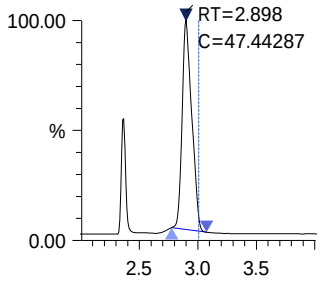
Date acquired: 7/24/2020 12:59:14 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_014.lcd
Vial: 13 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE10	7/24/2020 12:59:14 PM	708682	47.44287	20200724_014	2.898	25.0000	1.0000	13
Sodium Perchlorate-18O4_IS	PERCHLORATE10	7/24/2020 12:59:14 PM	123422	1.00000	20200724_014	2.896	25.0000	1.0000	13

Perchlorate

Conc 47.44287
Area 708682

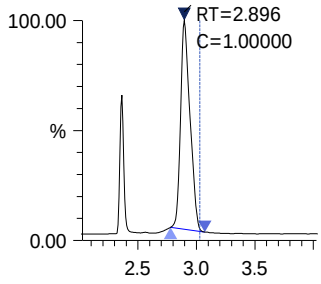
Q 99.00>83.00 (-) 1.28e5



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 123422

ISTD 107.00>89.00 (-) 2.23e4



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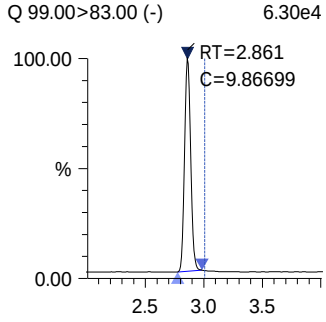
PERCHLORATEICV

Date acquired: 7/24/2020 1:28:19 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200724\20200724_016.lcd
Vial: 14 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATEICV	7/24/2020 1:28:19 PM	231631	9.86699	20200724_016	2.861	25.0000	1.0000	14
Sodium Perchlorate-18O4_IS	PERCHLORATEICV	7/24/2020 1:28:19 PM	193964	1.00000	20200724_016	2.859	25.0000	1.0000	14

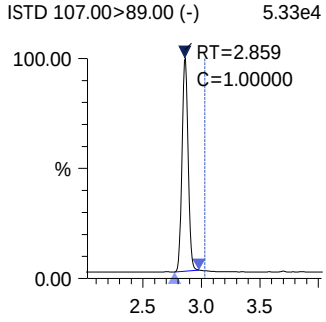
Perchlorate

Conc 9.86699
Area 231631



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 193964



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

20200720

ALS Environmental

1st Review: Kneir
2nd Review: Hvan

Injection Log
LCMS01 -Shimadzu 8050

ICAL Date: 7/20/2020
Cal. Std. xp: 11/18/2020
ICAL ID: EC2000014

Mobile Phases **A:** 0.75% Formic Acid/Water 3100807-09 **B:** MeOH 3100802-01

			File Name	Acquisition Method	Dilution	R	Comments
1	PERCHLORATE1		20200720_006	Perchlorate6850b.lcm	1x	☒	3100806-05
2	PERCHLORATE2		20200720_007	Perchlorate6850b.lcm	1x	☒	3100806-06
3	PERCHLORATE3		20200720_008	Perchlorate6850b.lcm	1x	☒	3100806-07
4	PERCHLORATE4		20200720_009	Perchlorate6850b.lcm	1x	☒	3100807-01
5	PERCHLORATE5		20200720_016	Perchlorate6850b.lcm	1x	☒	3100807-02
6	PERCHLORATE6		20200720_011	Perchlorate6850b.lcm	1x	☒	3100807-03
7	PERCHLORATE7		20200720_012	Perchlorate6850b.lcm	1x	☒	3100807-04
8	PERCHLORATE8		20200720_013	Perchlorate6850b.lcm	1x	☒	3100807-05
9	PERCHLORATE9		20200720_014	Perchlorate6850b.lcm	1x	☒	3100807-06
10	PERCHLORATE10		20200720_015	Perchlorate6850b.lcm	1x	☒	3100807-07
11	PERCHLORATEICV		20200720_017	Perchlorate6850b.lcm	1x	☒	3100807-08
12	IB		20200720_018	Perchlorate6850b.lcm	1x	☒	
13	IB		20200720_019	Perchlorate6850b.lcm	1x	☒	
14	LODV		20200720_020	Perchlorate6850b.lcm	1x	☒	
15	ICS		20200720_021	Perchlorate6850b.lcm	1x	☒	
16	PERCHLORATE7		20200720_022	Perchlorate6850b.lcm	1x	☒	3100807-04
17	EQ2000302-01		20200720_023	Perchlorate6850b.lcm	1x	☒	
18	EQ2000302-02		20200720_024	Perchlorate6850b.lcm	1x	☒	
19	EQ2000302-03		20200720_025	Perchlorate6850b.lcm	1x	☒	
20	EQ2000302-04		20200720_026	Perchlorate6850b.lcm	1x	☒	
21	EQ2000302-05		20200720_027	Perchlorate6850b.lcm	1x	☒	
22	E2000626-001		20200720_028	Perchlorate6850b.lcm	1x	☒	
23	E2000627-001		20200720_029	Perchlorate6850b.lcm	1x	☒	
24	E2000627-002		20200720_030	Perchlorate6850b.lcm	1x	☒	
25	E2000627-003		20200720_031	Perchlorate6850b.lcm	1x	☒	
26	E2000627-004		20200720_032	Perchlorate6850b.lcm	1x	☒	
27	PERCHLORATE7		20200720_033	Perchlorate6850b.lcm	1x	☒	3100807-04
28	E2000627-005		20200720_034	Perchlorate6850b.lcm	1x	☒	
29	E2000627-006		20200720_035	Perchlorate6850b.lcm	1x	☒	
30	E2000627-007		20200720_036	Perchlorate6850b.lcm	1x	☒	
31	E2000627-008		20200720_037	Perchlorate6850b.lcm	1x	☒	
32	E2000627-009		20200720_038	Perchlorate6850b.lcm	1x	☒	
33	E2000638-001		20200720_039	Perchlorate6850b.lcm	1x	☒	
34	E2000639-001		20200720_040	Perchlorate6850b.lcm	1x	☒	
35	E2000640-001		20200720_041	Perchlorate6850b.lcm	1x	☒	
36	PERCHLORATE7		20200720_042	Perchlorate6850b.lcm	1x	☒	3100807-04
37	EQ2000303-01		20200720_043	Perchlorate6850b.lcm	1x	☒	
38	EQ2000303-02		20200720_044	Perchlorate6850b.lcm	1x	☒	
39	EQ2000303-03		20200720_045	Perchlorate6850b.lcm	1x	☒	
40	E2000641-001		20200720_046	Perchlorate6850b.lcm	1x	☒	
41	E2000641-002		20200720_047	Perchlorate6850b.lcm	1x	☒	
42	E2000641-003		20200720_048	Perchlorate6850b.lcm	1x	☒	
43	E2000641-004		20200720_049	Perchlorate6850b.lcm	1x	☒	
44	E2000641-005		20200720_050	Perchlorate6850b.lcm	1x	☒	
45	E2000641-006		20200720_051	Perchlorate6850b.lcm	1x	☒	
46	E2000641-007		20200720_052	Perchlorate6850b.lcm	1x	☒	
47	PERCHLORATE7		20200720_053	Perchlorate6850b.lcm	1x	☒	3100807-04
48	E2000641-008		20200720_054	Perchlorate6850b.lcm	1x	☒	
49	E2000641-009		20200720_055	Perchlorate6850b.lcm	1x	☒	
50	E2000648-001		20200720_056	Perchlorate6850b.lcm	1x	☒	
51	E2000648-002		20200720_057	Perchlorate6850b.lcm	1x	☒	
52	E2000648-003		20200720_058	Perchlorate6850b.lcm	1x	☒	

20200724

ALS Environmental

1st Review: Kneir
2nd Review: Hvan

Injection Log
LCMS01 -Shimadzu 8050

ICAL Date: 7/24/2020
Cal. Std. xp: 11/18/2020
ICAL ID: EC2000016

Mobile Phases **A:** 0.75% Formic Acid/Water 3100807-09 **B:** MeOH 3100802-01

			File Name	Acquisition Method	Dilution	R	Comments
1	PERCHLORATE1		20200724_005	Perchlorate6850b.lcm	1x	☒	3100806-05
2	PERCHLORATE2		20200724_006	Perchlorate6850b.lcm	1x	☒	3100806-06
3	PERCHLORATE3		20200724_007	Perchlorate6850b.lcm	1x	☒	3100806-07
4	PERCHLORATE4		20200724_008	Perchlorate6850b.lcm	1x	☒	3100807-01
5	PERCHLORATE5		20200724_009	Perchlorate6850b.lcm	1x	☒	3100807-02
6	PERCHLORATE6		20200724_010	Perchlorate6850b.lcm	1x	☒	3100807-03
7	PERCHLORATE7		20200724_011	Perchlorate6850b.lcm	1x	☒	3100807-04
8	PERCHLORATE8		20200724_012	Perchlorate6850b.lcm	1x	☒	3100807-05
9	PERCHLORATE9		20200724_013	Perchlorate6850b.lcm	1x	☒	3100807-06
10	PERCHLORATE10		20200724_014	Perchlorate6850b.lcm	1x	☒	3100807-07
11	IB		20200724_015	Perchlorate6850b.lcm	1x	☒	
12	PERCHLORATEICV		20200724_016	Perchlorate6850b.lcm	1x	☒	3100807-08
13	IB		20200724_017	Perchlorate6850b.lcm	1x	☒	
14	LODV		20200724_018	Perchlorate6850b.lcm	1x	☒	
15	ICS		20200724_019	Perchlorate6850b.lcm	1x	☒	
16	PERCHLORATE7		20200724_020	Perchlorate6850b.lcm	1x	☒	3100807-04
17	EQ2000302-04X10		20200724_021	Perchlorate6850b.lcm	10x	☒	
18	EQ2000302-05X10DNU		20200724_022	Perchlorate6850b.lcm	10x	☒	
19	E2000626-001X2		20200724_023	Perchlorate6850b.lcm	2x	☒	
20	E2000627-001X10		20200724_024	Perchlorate6850b.lcm	10x	☒	
21	E2000627-005X100		20200724_025	Perchlorate6850b.lcm	100x	☒	
22	E2000627-006X100		20200724_026	Perchlorate6850b.lcm	100x	☒	
23	E2000627-009X1000		20200724_027	Perchlorate6850b.lcm	1000x	☒	
24	E2000640-001X200		20200724_028	Perchlorate6850b.lcm	200x	☒	
25	PERCHLORATE7		20200724_029	Perchlorate6850b.lcm	1x	☒	3100807-04
26	E2000660-001X10		20200724_030	Perchlorate6850b.lcm	10x	☒	
27	E2000627-004X10		20200724_031	Perchlorate6850b.lcm	10x	☒	
28	PERCHLORATE7		20200724_032	Perchlorate6850b.lcm	1x	☒	3100807-04
29	EQ2000302-05X10		20200724_033	Perchlorate6850b.lcm	10x	☒	
30	PERCHLORATE7		20200724_034	Perchlorate6850b.lcm	1x	☒	3100807-04
31	E2000660-003X10		20200724_035	Perchlorate6850b.lcm	10x	☒	
32	E2000660-004X10		20200724_036	Perchlorate6850b.lcm	10x	☒	
33	E2000660-005X2		20200724_037	Perchlorate6850b.lcm	2x	☒	
34	E2000660-006X10		20200724_038	Perchlorate6850b.lcm	10x	☒	
35	PERCHLORATE7		20200724_039	Perchlorate6850b.lcm	1x	☒	3100807-04
36	EQ2000303-01		20200724_040	Perchlorate6850b.lcm	1x	☒	
37	EQ2000303-02		20200724_041	Perchlorate6850b.lcm	1x	☒	
38	EQ2000303-03		20200724_042	Perchlorate6850b.lcm	1x	☒	
39	E2000641-001X20		20200724_043	Perchlorate6850b.lcm	20x	☒	
40	E2000641-002X20		20200724_044	Perchlorate6850b.lcm	20x	☒	
41	E2000641-003X10		20200724_045	Perchlorate6850b.lcm	10x	☒	
42	E2000641-004X20		20200724_046	Perchlorate6850b.lcm	20x	☒	
43	E2000641-005X10		20200724_047	Perchlorate6850b.lcm	10x	☒	
44	E2000641-006X10		20200724_048	Perchlorate6850b.lcm	10x	☒	
45	E2000641-007X10		20200724_049	Perchlorate6850b.lcm	10x	☒	
46	PERCHLORATE7		20200724_050	Perchlorate6850b.lcm	1x	☒	3100807-04
47	E2000641-008X10		20200724_051	Perchlorate6850b.lcm	10x	☒	
48	E2000641-009X10		20200724_052	Perchlorate6850b.lcm	10x	☒	
49	E2000648-001X10		20200724_053	Perchlorate6850b.lcm	10x	☒	
50	E2000648-002X10		20200724_054	Perchlorate6850b.lcm	10x	☒	
51	E2000648-003X20		20200724_055	Perchlorate6850b.lcm	20x	☒	
52	E2000648-005X10		20200724_056	Perchlorate6850b.lcm	10x	☒	

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070621

Service Request: E2000640
Date Analyzed: 7/20/20

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\20200720\20200720_022

Calibration Date: 7/20/20
Calibration ID: EC2000014
Analysis Lot: 688323
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	10.7	0.1210	0.1285	6.2	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070621

Service Request: E2000640
Date Analyzed: 7/20/20

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\20200720\20200720_033

Calibration Date: 7/20/20
Calibration ID: EC2000014
Analysis Lot: 688323
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	10.1	0.1210	0.1212	0.1	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070621

Service Request: E2000640
Date Analyzed: 7/20/20

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\20200720\20200720_042

Calibration Date: 7/20/20
Calibration ID: EC2000014
Analysis Lot: 688323
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	10.4	0.1210	0.1247	3.0	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070621

Service Request: E2000640
Date Analyzed: 7/22/20

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\20200722\20200722_016

Calibration Date: 7/20/20
Calibration ID: EC2000014
Analysis Lot: 688323
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	10.1	0.1210	0.1215	0.4	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070621

Service Request: E2000640
Date Analyzed: 7/22/20

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\20200722\20200722_024

Calibration Date: 7/20/20
Calibration ID: EC2000014
Analysis Lot: 688323
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	9.89	0.1210	0.1189	-1.8	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070621

Service Request: E2000640
Date Analyzed: 7/23/20

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\20200723\20200723_007

Calibration Date: 7/20/20
Calibration ID: EC2000014
Analysis Lot: 688323
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	10.1	0.1210	0.1214	0.3	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070621

Service Request: E2000640
Date Analyzed: 7/23/20

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\20200723\20200723_017

Calibration Date: 7/20/20
Calibration ID: EC2000014
Analysis Lot: 688323
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	9.34	0.1210	0.1122	-7.3	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070621

Service Request: E2000640
Date Analyzed: 7/24/20

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\20200724\20200724_020

Calibration Date: 7/24/20
Calibration ID: EC2000016
Analysis Lot: 688371
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	10.0	0.1210	0.1213	0.2	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070621

Service Request: E2000640
Date Analyzed: 7/24/20

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\20200724\20200724_029

Calibration Date: 7/24/20
Calibration ID: EC2000016
Analysis Lot: 688371
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	9.86	0.1210	0.1193	-1.4	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070621

Service Request: E2000640
Date Analyzed: 7/24/20

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\20200724\20200724_032

Calibration Date: 7/24/20
Calibration ID: EC2000016
Analysis Lot: 688371
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	9.75	0.1210	0.1180	-2.5	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070621

Service Request: E2000640
Date Analyzed: 7/24/20

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\20200724\20200724_034

Calibration Date: 7/24/20
Calibration ID: EC2000016
Analysis Lot: 688371
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	10.1	0.1210	0.1220	0.8	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070621

Service Request: E2000640
Date Analyzed: 7/24/20

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\20200724\20200724_039

Calibration Date: 7/24/20
Calibration ID: EC2000016
Analysis Lot: 688371
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	10.0	0.1210	0.1214	0.3	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070621

Service Request: E2000640
Date Analyzed: 7/24/20

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\20200724\20200724_050

Calibration Date: 7/24/20
Calibration ID: EC2000016
Analysis Lot: 688371
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	9.68	0.1210	0.1172	-3.2	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070621

Service Request: E2000640
Date Analyzed: 7/24/20

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\20200724\20200724_060

Calibration Date: 7/24/20
Calibration ID: EC2000016
Analysis Lot: 688371
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perchlorate	10.0	10.1	0.1210	0.1226	1.3	NA	± 15 %	Average RF

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS20070621

Service Request: E2000640
Date Analyzed: 7/20/20 13:39

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

File ID: I:\LCMS01\DATA\20200720\20200720_022
Instrument ID: E-LCMS-01
Analytical Method: 6850

Lab Code: EQ2000310-01
Analysis Lot: 688323
Signal ID: 1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	403,151	2.86
	Upper Limit ==>	604,727	4.86
	Lower Limit ==>	201,576	0.86
Associated Analyses			
Continuing Calibration Verification	EQ2000310-01	380,500	2.80
Method Blank	EQ2000302-01	475,788	2.87
Lab Control Sample	EQ2000302-02	485,348	2.87
Duplicate Lab Control Sample	EQ2000302-03	485,451	2.87

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000640
Project:	HS20070621	**Date Analyzed:**	7/20/20 15:22

Internal Standard Area and RT Summary

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

File ID:	I:\LCMS01\DATA\20200720\20200720_033	**Lab Code:**	EQ2000310-02
Instrument ID:	E-LCMS-01	**Analysis Lot:**	688323
Analytical Method:	6850	**Signal ID:**	1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	403,151	2.86
	Upper Limit ==>	604,727	4.86
	Lower Limit ==>	201,576	0.86
Associated Analyses			
Continuing Calibration Verification	EQ2000310-02	373,864	2.79

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000640
Project:	HS20070621	**Date Analyzed:**	7/20/20 16:55

Internal Standard Area and RT Summary

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

File ID:	I:\LCMS01\DATA\20200720\20200720_042	**Lab Code:**	EQ2000310-03
Instrument ID:	E-LCMS-01	**Analysis Lot:**	688323
Analytical Method:	6850	**Signal ID:**	1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	403,151	2.86
	Upper Limit ==>	604,727	4.86
	Lower Limit ==>	201,576	0.86
Associated Analyses			
Continuing Calibration Verification	EQ2000310-03	224,958	2.91

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: HS20070621

Service Request: E2000640
Date Analyzed: 7/22/20 19:13

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

File ID: I:\LCMS01\DATA\20200722\20200722_016
Instrument ID: E-LCMS-01
Analytical Method: 6850

Lab Code: EQ2000310-04
Analysis Lot: 688323
Signal ID: 1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	403,151	2.86
	Upper Limit ==>	604,727	4.86
	Lower Limit ==>	201,576	0.86
Associated Analyses			
Continuing Calibration Verification	EQ2000310-04	223,422	2.95

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000640
Project:	HS20070621	**Date Analyzed:**	7/22/20 20:16

Internal Standard Area and RT Summary

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

File ID:	I:\LCMS01\DATA\20200722\20200722_024	**Lab Code:**	EQ2000310-05
Instrument ID:	E-LCMS-01	**Analysis Lot:**	688323
Analytical Method:	6850	**Signal ID:**	1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	403,151	2.86
	Upper Limit ==>	604,727	4.86
	Lower Limit ==>	201,576	0.86
Associated Analyses			
Continuing Calibration Verification	EQ2000310-05	232,812	2.95

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000640
Project:	HS20070621	**Date Analyzed:**	7/23/20 11:41

Internal Standard Area and RT Summary

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

File ID:	I:\LCMS01\DATA\20200723\20200723_007	**Lab Code:**	EQ2000310-06
Instrument ID:	E-LCMS-01	**Analysis Lot:**	688323
Analytical Method:	6850	**Signal ID:**	1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	403,151	2.86
	Upper Limit ==>	604,727	4.86
	Lower Limit ==>	201,576	0.86
Associated Analyses			
Continuing Calibration Verification	EQ2000310-06	202,016	2.92

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000640
Project:	HS20070621	**Date Analyzed:**	7/23/20 13:00

Internal Standard Area and RT Summary

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

File ID:	I:\LCMS01\DATA\20200723\20200723_017	**Lab Code:**	EQ2000310-07
Instrument ID:	E-LCMS-01	**Analysis Lot:**	688323
Analytical Method:	6850	**Signal ID:**	1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	403,151	2.86
	Upper Limit ==>	604,727	4.86
	Lower Limit ==>	201,576	0.86
Associated Analyses			
Continuing Calibration Verification	EQ2000310-07	202,415	2.91

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: HS20070621

Service Request: E2000640
Date Analyzed: 7/24/20 13:59

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

File ID: I:\LCMS01\DATA\20200724\20200724_020
Instrument ID: E-LCMS-01
Analytical Method: 6850

Lab Code: EQ2000311-01
Analysis Lot: 688371
Signal ID: 1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	161,047	2.90
	Upper Limit ==>	241,571	4.90
	Lower Limit ==>	80,524	0.90
Associated Analyses			
Continuing Calibration Verification	EQ2000311-01	149,874	2.90
Batch QCMS	EQ2000302-04	80,779	2.90
LH18/24-SP140_071420	E2000640-001	126,203	2.90

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000640
Project:	HS20070621	**Date Analyzed:**	7/24/20 15:11

Internal Standard Area and RT Summary

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

File ID:	I:\LCMS01\DATA\20200724\20200724_029	**Lab Code:**	EQ2000311-02
Instrument ID:	E-LCMS-01	**Analysis Lot:**	688371
Analytical Method:	6850	**Signal ID:**	1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	161,047	2.90
	Upper Limit ==>	241,571	4.90
	Lower Limit ==>	80,524	0.90
Associated Analyses			
Continuing Calibration Verification	EQ2000311-02	142,468	2.90
Batch QC	E2000627-004	214,190	2.85

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000640
Project:	HS20070621	**Date Analyzed:**	7/24/20 15:37

Internal Standard Area and RT Summary

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

File ID:	I:\LCMS01\DATA\20200724\20200724_032	**Lab Code:**	EQ2000311-03
Instrument ID:	E-LCMS-01	**Analysis Lot:**	688371
Analytical Method:	6850	**Signal ID:**	1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	161,047	2.90
	Upper Limit ==>	241,571	4.90
	Lower Limit ==>	80,524	0.90
Associated Analyses			
Continuing Calibration Verification	EQ2000311-03	143,487	2.90
Batch QCDMS	EQ2000302-05	121,804	2.85

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000640
Project:	HS20070621	**Date Analyzed:**	7/24/20 15:53

Internal Standard Area and RT Summary

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

File ID:	I:\LCMS01\DATA\20200724\20200724_034	**Lab Code:**	EQ2000311-04
Instrument ID:	E-LCMS-01	**Analysis Lot:**	688371
Analytical Method:	6850	**Signal ID:**	1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	161,047	2.90
	Upper Limit ==>	241,571	4.90
	Lower Limit ==>	80,524	0.90
Associated Analyses			
Continuing Calibration Verification	EQ2000311-04	142,073	2.90

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000640
Project:	HS20070621	**Date Analyzed:**	7/24/20 16:33

Internal Standard Area and RT Summary

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

File ID:	I:\LCMS01\DATA\20200724\20200724_039	**Lab Code:**	EQ2000311-05
Instrument ID:	E-LCMS-01	**Analysis Lot:**	688371
Analytical Method:	6850	**Signal ID:**	1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	161,047	2.90
	Upper Limit ==>	241,571	4.90
	Lower Limit ==>	80,524	0.90
Associated Analyses			
Continuing Calibration Verification	EQ2000311-05	142,477	2.90

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000640
Project:	HS20070621	**Date Analyzed:**	7/24/20 17:59

Internal Standard Area and RT Summary

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

File ID:	I:\LCMS01\DATA\20200724\20200724_050	**Lab Code:**	EQ2000311-06
Instrument ID:	E-LCMS-01	**Analysis Lot:**	688371
Analytical Method:	6850	**Signal ID:**	1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	161,047	2.90
	Upper Limit ==>	241,571	4.90
	Lower Limit ==>	80,524	0.90
Associated Analyses			
Continuing Calibration Verification	EQ2000311-06	128,840	2.90

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	E2000640
Project:	HS20070621	**Date Analyzed:**	7/24/20 19:18

Internal Standard Area and RT Summary

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

File ID:	I:\LCMS01\DATA\20200724\20200724_060	**Lab Code:**	EQ2000311-07
Instrument ID:	E-LCMS-01	**Analysis Lot:**	688371
Analytical Method:	6850	**Signal ID:**	1

		Sodium Perchlorate-18O4	
		Area	**RT**
	ICAL Average ==>	161,047	2.90
	Upper Limit ==>	241,571	4.90
	Lower Limit ==>	80,524	0.90
Associated Analyses			
Continuing Calibration Verification	EQ2000311-07	129,501	2.90

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

ALS Group Houston

PERCHLORATE7

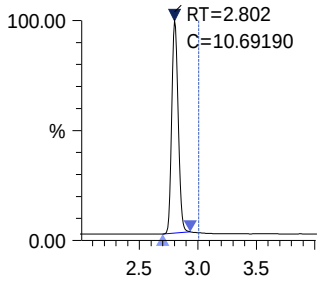
Date acquired: 7/20/2020 1:39:32 PM
Acquired by: System Administrator
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Vial: 4 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE7	7/20/2020 1:39:32 PM	488934	10.69190	20200720_022	2.802	25.0000	1.0000	4
Sodium Perchlorate-18O4_IS	PERCHLORATE7	7/20/2020 1:39:32 PM	380500	1.00000	20200720_022	2.800	25.0000	1.0000	4

Perchlorate

Conc 10.69190
Area 488934

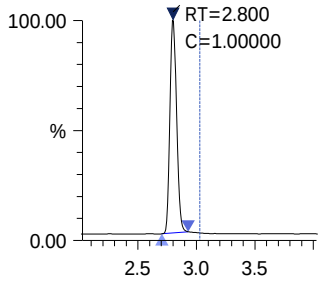
Q 99.00>83.00 (-) 1.26e5



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 380500

ISTD 107.00>89.00 (-) 9.71e4



ALS Group Houston

EQ2000302-01

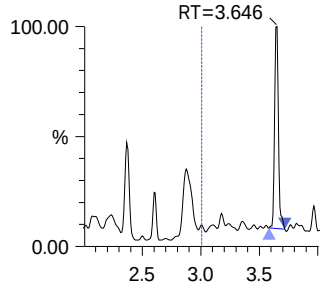
Date acquired: 7/20/2020 1:47:28 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_023.lcd
Vial: 1 | Inj. Volume: 25.0000uL | Tray: 3

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	EQ2000302-01	7/20/2020 1:47:28 PM	----	----	20200720_023	----	25.0000	1.0000	1
Sodium Perchlorate-18O4_IS	EQ2000302-01	7/20/2020 1:47:28 PM	475788	1.00000	20200720_023	2.866	25.0000	1.0000	1

Perchlorate

Conc ----
Area ----

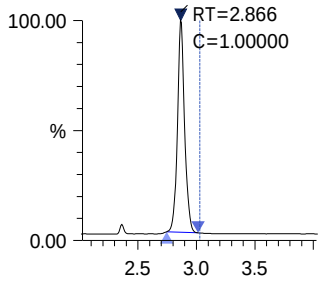
Q 99.00>83.00 (-) 6.94e2



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 475788

ISTD 107.00>89.00 (-) 1.12e5



ALS Group Houston

EQ2000302-02

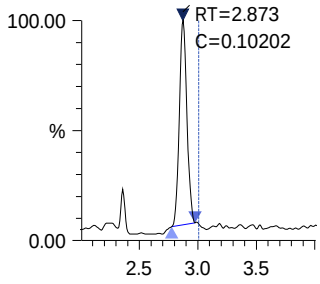
Date acquired: 7/20/2020 1:55:23 PM
Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_024.lcd
Vial: 2 | Inj. Volume: 25.0000uL | Tray: 3

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	EQ2000302-02	7/20/2020 1:55:23 PM	5951	0.10202	20200720_024	2.873	25.0000	1.0000	2
Sodium Perchlorate-18O4_IS	EQ2000302-02	7/20/2020 1:55:23 PM	485348	1.00000	20200720_024	2.868	25.0000	1.0000	2

Perchlorate

Conc 0.10202
Area 5951

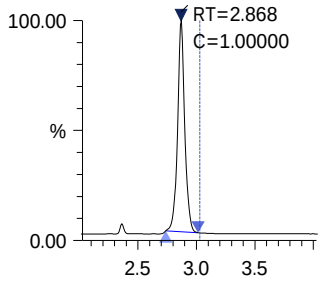
Q 99.00>83.00 (-) 1.38e3



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 485348

ISTD 107.00>89.00 (-) 1.15e5



ALS Group Houston

EQ2000302-03

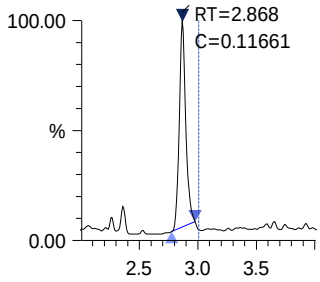
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Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_025.lcd
Vial: 3 | Inj. Volume: 25.0000uL | Tray: 3

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	EQ2000302-03	7/20/2020 2:03:16 PM	6802	0.11661	20200720_025	2.868	25.0000	1.0000	3
Sodium Perchlorate-18O4_IS	EQ2000302-03	7/20/2020 2:03:16 PM	485451	1.00000	20200720_025	2.866	25.0000	1.0000	3

Perchlorate

Conc 0.11661
Area 6802

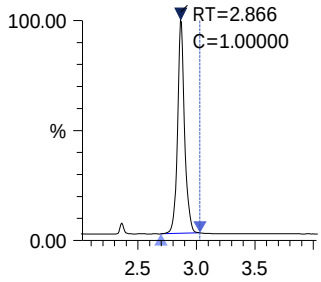
Q 99.00>83.00 (-) 1.83e3



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 485451

ISTD 107.00>89.00 (-) 1.17e5



ALS Group Houston

PERCHLORATE7

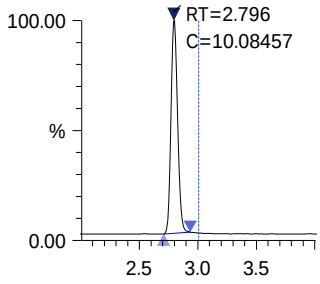
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Acquired by: System Administrator
Data File: I:\LCMS01\DATA\20200720\20200720_033.lcd
Vial: 4 | Inj. Volume: 25.0000uL | Tray: 1

Name	Sample ID	Acquired Date	Area	Conc.	Data Filename	Found RT	Inj Vol	ISTD Amount	Vial
Perchlorate	PERCHLORATE7	7/20/2020 3:22:41 PM	453118	10.08457	20200720_033	2.796	25.0000	1.0000	4
Sodium Perchlorate-18O4_IS	PERCHLORATE7	7/20/2020 3:22:41 PM	373864	1.00000	20200720_033	2.794	25.0000	1.0000	4

Perchlorate

Conc 10.08457
Area 453118

Q 99.00>83.00 (-) 1.14e5



Sodium Perchlorate-18O4_IS

Conc 1.00000
Area 373864

ISTD 107.00>89.00 (-) 9.49e4

